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ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 2000

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HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

HOUSE OF REPRESENTATIVES

ONE HUNDRED SIXTH CONGRESS

FIRST SESSION

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT

RON PACKARD, California, *Chairman*

HAROLD ROGERS, Kentucky
JOE KNOLLENBERG, Michigan
MICHAEL P. FORBES, New York
RODNEY P. FRELINGHUYSEN, New Jersey
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NOTE: Under Committee Rules, Mr. Young, as Chairman of the Full Committee, and Mr. Obey, as Ranking Minority Member of the Full Committee, are authorized to sit as Members of all Subcommittees.

JAMES D. OGSBURY, JEANNE L. WILSON, and DONALD M. MCKINNON,
Staff Assistants

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ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 2000

THURSDAY, MARCH 4, 1999.

DEPARTMENT OF ENERGY

WITNESS

HON. BILL RICHARDSON, SECRETARY OF ENERGY

OPENING STATEMENT

Mr. PACKARD [presiding]. Ladies and gentlemen, I would like to begin on time. We do appreciate you all being here, and appreciate the members being here on time. I just have a habit of starting on time. I get a little upset sometimes sitting and waiting for my hearings to start.

So, maybe a little housekeeping as to how we will operate on this subcommittee. Inasmuch as this is the first hearing, it might be good to indicate how we plan to operate.

We will probably observe the 5-minute rule starting with Mr. Visclosky, and then go over as many cycles as necessary during the question period, so that all will be able to ask whatever they wish.

Opening statements. Unless members insist on an opening statement, I think that just maybe the chairman and ranking member will have short opening statements.

I do not wish for the hearings to be long and drawn out. We may not ask all the questions, either in this hearing or in future hearings. We may ask the witnesses and their staff to respond by submitting answers for the record, and we will get some of that today. We do intend to start our hearings on time, and hopefully not have them long and drawn out.

The next hearing, for the information of the members, will be next Tuesday. We are not exactly sure of the time because we may have some changes in the Full Committee markup on the supplemental that may interfere with our scheduled time, but right now it is scheduled for next Tuesday—next Thursday, not Tuesday, my apologies. Next Thursday. And you will have that if you have not already received it.

Now we are very, very pleased to welcome each of you here, and certainly the members of the subcommittee. I am very pleased to be able to serve with you on this subcommittee. This is my first term as chairman, and perhaps we might introduce some of those that are new on the subcommittee.

We have Bill Young who is now full committee chairman that will be serving as a member of the subcommittee, as he is on all subcommittees. Mike Forbes from New York. We are glad to have

Mike Forbes join us on the subcommittee. Mr. Clyburn is not here, but also a new member of the subcommittee, along with Tom Latham, who is here. Tom, we are delighted to have you with us. And I am delighted to join with some of you old veterans of the subcommittee.

I am particularly pleased to have as our first witness—and we won't introduce him quite yet—the Secretary of Energy, Mr. Richardson, who is one of our former colleagues and a friend of all of us, I believe.

We are pleased to have the opportunity to begin these hearings. We intend for this subcommittee to be one of the early bills out of the chute as far as the appropriations bills. We will complete our hearings during the month of March, and it is important that we have—in fact, we will conclude on March 25.

We will like to have all of the outside witnesses' testimony submitted to the committee by the 26th of March if we can. It would allow us then to proceed with the writing of the bill.

Again, Mr. Knollenberg, we are pleased to have you, and I am pleased to join with you on this subcommittee.

With that, I am going to ask if Mr. Visclosky would like to say a few words, and then we will proceed.

MR. VISCLOSKY'S OPENING REMARKS

Mr. VISCLOSKY. Mr. Chairman, I appreciate that very much. I welcome you to the subcommittee, and congratulate you on your chairmanship. And I also join in welcoming Mr. Forbes who has served with us on Treasury-Postal; and Mr. Latham, as well as Mr. Clyburn from South Carolina. I think all three gentlemen, as well as yourself, are a welcomed addition to this subcommittee.

I would also point out that the subcommittee has had a long tradition of bipartisan cooperation, members getting along with each other. That has certainly always been my experience. It was my experience with you when we served together on military construction; and through four different chairs and the last four Congresses that tradition has been maintained. I certainly look forward to working with you and members on both sides of the aisle here to make sure that we are as productive and responsible as possible as far as our responsibilities. I would simply also conclude by adding my welcome to Secretary Richardson. Happy for his success, and look forward to working with you, Mr. Secretary.

Thank you, Mr. Chairman.

Mr. PACKARD. Thank you very, very much. And we are very pleased to have the Secretary with us as our first witness in our hearing process. Like I mentioned, he served in the House for some years. Most of us have had very pleasant experiences working with you in the House.

I want to congratulate you on your new assignment, even though it is 6 months old now, as Secretary of Energy. We appreciate the work you are doing; looking forward to your testimony this morning.

I might mention that I presume members of the subcommittee have read your testimony. It is very thorough and very complete, and frankly very technical. You handled the issues very well. I have read it all, and I am sure they have.

I would not like to sit here for 2 hours and listen to it all again—[Laughter.]

But you may do as you wish, Mr. Secretary. But I would appreciate it if you would maybe summarize, but, again, it is up to you. We are delighted to have you with us though, and congratulations on the work you are doing at the agency.

STATEMENT OF SECRETARY RICHARDSON

Secretary RICHARDSON. Mr. Chairman, I want to get off to a good start with the subcommittee, so I will take the hint, and not only summarize, but summarize extremely briefly, because I know that this subcommittee has a lot of work to do. I also want to note that you, Mr. Visclosky, and myself are all new in our jobs, so I hope to have a very good working relationship with you and many members of the subcommittee who I have known over the years. And when I was at the United Nations I sort of felt I was Congressman Forbes' constituent. I don't know if he felt the same way, but he was my Congressman, and my friend for many years.

Mr. Chairman, we are proposing to this subcommittee $17.1 billion in your jurisdiction to strengthen our country. We have a number of missions: developing breakthroughs in science and technology; maintaining the safety and reliability of our nuclear weapon stockpile; ensuring energy security; and cleaning up the environment from the legacy of the Cold War.

I would also like to mention, Mr. Chairman, that I have here most of the assistant secretaries, for the relevant areas of the budget. So any questions that get very, very technical, I may be deferring to them.

Let me say also, Mr. Chairman, that I look forward to working with you on a number of issues. I know that Mr. Frelinghuysen—as a member of this subcommittee—and I had a chance to visit his facility, the Princeton Plasma Physics Lab just last week, and I was very impressed with the fusion work that they are doing there.

NATIONAL SECURITY

Mr. Chairman, in the interest of moving rapidly let me talk about national security which is one of our primary missions.

We maintain a safe and reliable nuclear weapon stockpile that does not require nuclear testing, and to do so requires that we ensure an adequate supply of tritium. This is a program that Dr. Vic Reis, who is on my right, runs here for our Department. It is very important, the stockpile stewardship program.

We also deal, Mr. Chairman, with the global nuclear peril through our nuclear non-proliferation programs, eliminating excess weapons grade materials, and adhering to international arms control treaties.

We have joined with Russia and a number of programs that are under the jurisdiction of this committee that are very important; nuclear cities, programs where we try to keep Russia and nuclear scientists from defecting and working with us rather than for the Iranians, Iraq's, and North Koreanans. These are some very important programs that we consider are key to our national security.

We also believe, Mr. Chairman, that these are programs that are being run well, and we look forward to working with you to make them run even better.

STOCKPILE STEWARDSHIP

As I mentioned, on stockpile stewardship the Secretary of Defense and I certified to the President for the third consecutive year that there was no need to conduct an underground nuclear test at this time. We think this program is working well.

Eleven thousand nuclear weapons have been safely dismantled since 1991. We have supercomputers that will reach 100 trillion operations per second by the Year 2004. These are advanced supercomputers that we use in the stockpile stewardship program to complete the shift from nuclear test-based methods to science-based methods to certify the safety and security of the stockpile.

Mr. Chairman, I think I have made a good decision for the taxpayer on tritium. I believe that we are ready to announce the figures of our negotiations with the Tennessee Valley Authority (TVA) to substantially save the taxpayer money; provide for our strategic stockpile, our tritium supply a flexibility for arms control negotiation.

But most importantly, I think I know, in a committee that wants us to reduce funding, we have done extremely well in protecting the taxpayer; and we have just concluded, as I said, our negotiations with TVA on the cost.

SOLAR AND RENEWABLES FUNDING

Mr. Chairman, moving on to other issues that do not relate to our nuclear weapons. Mr. Chairman, in the energy resources budget we are requesting $2.1 billion. Within the jurisdiction of the subcommittee, our request is $867 million.

We have a request of $399 million for solar and renewable programs, an increase of nearly 19 percent over Fiscal Year 1999. And we are doing some very important work in photovoltaics, solar, thermal, biomass, and alternative transportation fuels.

I am proud to say that the management process in the Office of Energy Efficiency and Renewable Energy has been tightened up. Dan Reicher, our very able Assistant Secretary, I know has been meeting with your staff, and we are continuing our efforts to deal with more competitive bidding and more solicitations. We have received more than 400 applications from a broad range of applicants.

This is one of our best programs, the renewables program, Mr. Chairman. We are doing a lot to have energy efficiency in federal buildings, a lot of very important research that takes place.

Today I am announcing that we are awarding the first two grants under the solicitation to Columbia University and the American Wind Energy Association. Both of these entities are shouldering at least 75 percent of the cost.

We are increasing our request for nuclear energy R&D by $13.5 million to $87.3 million.

NUCLEAR WASTE CLEAN UP

We also, Mr. Chairman, want to work with this subcommittee to develop a national plan to integrate our nuclear waste policy. We have a Rocky Flats policy, a Brookhaven, a New Mexico, and Oak Ridge policies.

We need a national policy. I have just met with the governors at the National Governors Association to try to develop a multi-year plan with funding and standards that once and for all recognizes that we have to dispose of this waste, and that it is in our interest to have an integrated plan rather than spotty, ad hoc initiatives that over the years have not worked.

WASTE MANAGEMENT PROGRAM

We, except for remaining ground water contamination, have completed clean-up of 22 large uranium mill tailing sites, as well as a number of other vicinity properties. We are also making progress at other sites, at Hanford.

I am very pleased that we reached an agreement with the governor and the attorney general on tanks. We have a reprogramming before the committee which we think is important on the Hanford Tanks issue.

We also are moving ahead on improving the management of our waste program. I have an Assistant Secretary that I have selected. If the other body ever confirms my nominee we will have made a lot of progress and moved towards more efficient management of this division, which does need better management.

On the low level, transuranic waste, we are having some problems regrettably with my State of New Mexico to open the facility known as the Waste Isolation Pilot Plant. Hopefully in the days ahead we will make progress because the State of Idaho and the Department of Energy have an agreement to have the waste come in by the end of April. This is tight. The Rocky Flats in Colorado—we have to make more progress there.

ENVIRONMENT, HEALTH AND SAFETY

Mr. Chairman, safety is a big issue for me. I issued a directive on safety today, which will be one of the most comprehensive in the history of the Department, if not "the" most comprehensive.

I want to hold contractors accountable for safety throughout our contracts. We will insist that the integrated safety management be put in place at each of our sites by September of 2000.

We have also taken many measures to conform with your subcommittee's project management initiatives. I know this is a management issue, and it is one that we take very, very seriously. I will establish a secretarial safety council to enforce these safety targets.

MANAGING OUR WORKFORCE

You will also be pleased to know that the Department is functioning leaner and smarter. We have reduced by 25 percent our workforce since 1995—25 percent—surpassing our goal by almost 2 years.

We have also reduced our contractor employment by 29 percent since its peak in 1992. I have an initiative called Workforce 21 to address some of the certain skill shortfalls that we have.

I am particularly concerned, Mr. Chairman, about losing employees at many of my colleague's sites, replacing that workforce with a technical workforce that can be drawn in and brought in. We are losing a lot of skilled engineers to the private sector, and we have to look at our replacement workforce, especially in the nuclear weapons complex, but it affects all the lab employees, certainly at Brookhaven, and certainly at Princeton also, which I visited last week.

Mr. Chairman, I think every Secretary of Energy says that they want to manage the Department better. The Department needs to be managed better; there is no question about it. We need to have clear lines of responsibility. We need to have more efficient reporting requirements. We need to make sure the labs and the headquarters communicate effectively. We have to be able to find ways to manage our waste and our clean-up better.

We need to make sure that we have a diverse workforce; that we need to have more women in science and engineering at our Department. We need to do many, I think, very important initiatives that deal with a top to bottom management review.

And I am doing that. And I would ask this subcommittee to give me the flexibility to do that. It is going to take a little time, but we have already made a lot of progress. I want to also look at the possibility by the end of the year, Mr. Chairman, of having a mega-contract for all our defense facilities; one contract that deals with all of our weapons labs.

Vic Reis is here. What we want to do is consolidate, save money for the taxpayer. We have a plethora of contractors, and we are looking at ways so that perhaps in a year, we can come back to this committee and deal with more efficient ways to manage our weapons complex, and that would be with one contractor.

Finally, Mr. Chairman, I think this committee has given us very good advice on many other management initiatives which we are adopting, which we want to work with you to do. Perhaps the most important one is to find ways that our Department is more accountable to the Congress.

Mr. Chairman, I have done this in 8 minutes, and you are right, it would have taken me 45.

[The prepared statement of Secretary Richardson follows:]

Statement of
The Honorable Bill Richardson
Secretary
U. S. Department of Energy
before the
House Committee on Appropriations
Subcommittee on Energy and Water Development

March 4, 1999

Mr. Chairman, and members of the Subcommittee, it's my pleasure to discuss with you the Department of Energy's budget request for FY 2000. We are proposing to this Subcommittee an investment of $17,082.2 million, which will strengthen America in the 21st Century.

First, I will outline the benefits the Department of Energy will offer our nation as we begin the 21st Century. Second, I will discuss the details of our FY 2000 budget request. And third, I will welcome your questions.

In his State of the Union message, the President set a bold agenda to meet the challenges of the 21st Century. The Department's capabilities place it at the forefront of America's technological advance into the new millennium. This budget will enable our people to use DOE's capabilities in science, security and energy to power the 21st Century with American ingenuity, competitiveness, and technological breakthroughs to dramatically improve our quality of life.

From my years in Congress, through my term as Ambassador to the United Nations, and into my tenure as Secretary of Energy -- which is now approaching six months -- I have been keenly aware of the importance which the Department of Energy holds for our society and our economy. When I announced the Department's budget request on February 1, I noted our corporate theme that, I believe, addresses the essence of what this agency can provide our nation: *Science, Security and Energy: Powering the 21st Century.*

Today, we employ technical and scientific knowledge and skills to fulfill our missions of:

- Developing breakthroughs in science and technology;
- Maintaining the safety and reliability of our nuclear weapons stockpile;
- Ensuring U.S. energy security; and
- Safely cleaning up the environment from the legacy of the Cold War.

In the 21st Century, we will continue our transition from a Cold War environment to one in which we are able to enjoy and wisely invest the dividends of peace. In fact, our weapons technicians already have safely dismantled more than 11,000 nuclear warheads since 1991. We plan to continue helping the former Soviet Union countries safeguard and reduce their nuclear weapons arsenal and dispose of the resulting fissile materials. Even in this environment of peace, however,

we have not relaxed our guard. We continue to hold America's defense as a top priority. But, as the world has changed, so have our defense needs. While our need for new nuclear weapons has subsided, our need has grown for new technologies, both to protect our nation against threats from new adversaries and for advanced capabilities to ensure that our stockpile of existing weapons remains dependable.

Last December, the Secretary of Defense and I certified to the President, for the third consecutive year, that there is no need to conduct underground nuclear tests at this time. To provide the advanced technologies required to continue certifying the safety and reliability of our nuclear arsenal, without further underground testing, we are developing enhanced supercomputers and other high-tech tools. Through the *Accelerated Strategic Computing Initiative (ASCI)*, our scientists now use the world's fastest supercomputers, capable of 3 trillion operations per second, and by 2004 we plan on developing one that works at 100 trillion operations per second. This speed will enable scientists using these supercomputers to do in one second the amount of work which a person using a hand-held calculator would need 100 million years to complete. This almost incomprehensible speed requires that our scientists develop new software "codes" and visual display systems to increase our capability to understand and use the vastly increased amounts of information these computers will present.

The supercomputing capabilities being developed for defense purposes also will be able to yield great benefits to society as a whole. In FY 2000, we propose to begin a new effort, the *Scientific Simulation Initiative (SSI)*, as part of the *President's Information Technology for the 21st Century Initiative*. The *SSI* will work with existing programs at the Department to extend supercomputer developments into the entire scientific community, revolutionizing American innovation in energy, environment, basic research, and technology. These supercomputers will bring dramatic advancements to the manner in which we conduct research in the 21st Century.

We are continuing our international participation in the *Large Hadron Collider*. The Department will design and fabricate subsystems of the accelerator and two large detectors. Total DOE contributions will be $450 million, with much of this going to U.S. laboratories, universities and industry. Additionally, several of our newly constructed scientific facilities will be coming on line this year and next. For example, the *Relativistic Heavy Ion Collider* will be completed on schedule, in FY 1999, and FY 2000 will be the first year of operation of the *Fermi Main Injector*, along with the *Stanford Linear Accelerator Center's B-Factory*, with its *BaBar detector*.

The world-class excellence of the science and technology programs DOE supports can be seen in the recognition our labs and scientists receive. To date, DOE-associated scientists have won 72 Nobel prizes. With 487 lifetime awards, the Department was also the largest 1998 winner of *R&D 100 Awards*, given annually by *R&D Magazine* for the 100 advancements in science and technology most likely to benefit society. DOE scientists won 34 of these awards last year. DOE technologies won two out of ten *DISCOVER Magazine* awards for 1998. And, *Science Magazine's* "Breakthrough of the Year for 1998" was shared by DOE's Supernova Cosmology Project, based at Berkeley Lab.

MANAGEMENT REFORMS

I am making management improvement a top priority during my stewardship of the Department. One area in particular I want to examine is the relationship of the field structure to the program offices and the rest of the organization. I have chartered a management review to undertake this task. It will be conducted by a small, internal task force which will report directly to the Deputy Secretary, in close consultation with the Under Secretary, and it will provide monthly reports to me. The task force includes selected career and non-career officials from the major programs to ensure that proposals are developed with the necessary and proper recognition of their concerns. I am looking forward to their findings.

As you know, there already is a great deal of useful information to aid this management review from studies conducted in recent years. For example, the Institute for Defense Analyses' "120-Day Study" is being implemented at the Department. An assessment of its progress will be one important component of the task force's review. The Galvin Report will be another important reference. I also feel that the Laboratory Operations Board can provide information useful to this group from its work over the last several years reviewing the laboratory and field structure. The Board currently is undertaking a study of the Department's management of its laboratories. Among other issues, it will address organizational structure and relationships between the field and headquarters. The external members of the Board are planning to provide me with their analysis and recommendations this month. The results of this review will be made available to the Congress before the end of the fiscal year.

I also would like to point out that the Department is addressing a number of related management issues:

- The Under Secretary is developing a clearly defined and well articulated Departmental R&D portfolio. This will ensure our R&D programs are properly structured and take advantage of interrelationships with all relevant program areas.

- We are restructuring procedures used for assigning M&O contractor employees to Washington. We have provided this Committee a report on these employees and are establishing rigorous procedures to assure their efficient and effective use.

- Independent project reviews and a study of DOE's management and facilities acquisition process are ongoing. Their recommendations, thus far, have been of enormous benefit. Reforming this process is a top priority. I intend to enact needed reforms in project management and will use these studies extensively in reforming that process.

- We are making increasingly effective use of our new Contract Reform and Privatization Office, which is designing and implementing contract reform and performance reviews in our management and construction contracts.

Overall, the Department is functioning in a smarter and leaner manner. Working with Congress, we've reduced our federal employee workforce by 25 percent in less than four years -- beating our ambitious goal by almost two years. We've also reduced our contractor employment by 29 percent since its peak in 1992. But this streamlining has left gaps in Departmental skill areas. To resolve this, in December I announced a targeted effort to bring specialized skills into the Department through *Workforce 21*. This initiative will put in place employment practices to ensure the Department has essential expertise to carry out its missions.

An indication of workforce problems facing the Department is documented in a study by an internal working group, which concluded: nearly half the current R&D Technical Managers will be able to retire within five years; serious skills gaps have developed due to significant downsizing; there exists virtually no pipeline to develop future managers; and the R&D manager corps lacks gender and ethnic diversity. In response to these and other concerns identified in the study, and in response to *Workforce 21*, the Under Secretary chartered a working group of the R&D Council to develop a corporate plan for strengthening DOE's R&D technical management. Their resulting Action Plan details specific actions to begin now to develop the Department's future R&D Technical Manager workforce.

These efforts will bolster our skills and comprehensive expertise, Department-wide. And we will expand diversity within our workforce, increasing the presence and position of women, minorities and the physically challenged. I ask for your support in this undertaking, Mr. Chairman.

THE DEPARTMENT'S FY 2000 BUDGET REQUEST

The Department of Energy's FY 2000 budget request before the Energy and Water Development Appropriations Subcommittee is $17,082.2 million, which represents an increase of just 0.2 percent over FY 1999 levels. However, what appears to be a "level" budget actually represents a 3.4 percent increase of $560.0 million in the operating budget when the one-time emergency appropriation of $525.0 million for purchase of Russian Highly Enriched Uranium and for plutonium disposition in Russia is removed from the FY 1999 appropriation. The Department's budget is organized into four primary lines of business:

- $2,844.5 million for Science and Technology
- $6,228.0 million for National Security
- $1,137.7 million for Energy Resources and Other
- $6,872.0 million for Environmental Quality

SCIENCE AND TECHNOLOGY BUDGET OVERVIEW

The Department of Energy, at its heart, is a science and technology agency. This expertise forms the foundation on which all Department work is based. The *Science* budget request of $2,844.5 million, an increase of $138.2 million, further supports our commitment to science. The major elements within the *Science* budget include:

- $697.0 million for High Energy Physics
- $342.9 million for Nuclear Physics
- $411.1 million for Biological and Environmental Research
- $888.0 million for Basic Energy Sciences

SCIENCE AND TECHNOLOGY HIGHLIGHTS

Let me highlight two areas of emphasis in our *Science* programs. First, we are requesting a $70 million investment as part of the *President's Information Technology for the 21st Century Initiative*, to develop and deploy new, far faster computers for advanced simulation in civilian applications. The Department's part, the *Scientific Simulation Initiative (SSI)*, will enable scientists and engineers to extend the contributions available from enhanced computer simulation capabilities to the design of a new generation of automobiles, development of improved pharmaceuticals, and improvements in weather and climate research, among many others, reaffirming America's leading roles in these fields. Of this $70.0 million investment, $52.0 million is requested within *Computational and Technology Research*; $10.0 million in *Biological and Environmental Research*; $7.0 million in *Basic Energy Sciences*; and $1.0 million in *Program Direction.*

And second, we will continue investing in the *Spallation Neutron Source*, for which we request an increase from $130.0 million in FY 1999 to $214.0 million in FY 2000. This state-of-the-art neutron scattering facility will contribute to developing stronger and lighter materials, more efficient motors, and increased understanding of the structure of matter.

Office of Science

The *Office of Science* budget request is $2,844.5 million, which has a number of programs within its domain. One of those is the *High Energy Physics* budget request of $697.1 million. Within this program, funding for the *Large Hadron Collider* increases $5.0 million, to $70.0 million in FY 2000. This program budget is largely driven by new facilities coming on line and additional availability for a number of existing scientific user facilities:

- $291.8 million for *Fermilab*, including initial operation of the new *Fermi Main Injector*;
- $150.2 million for the *Stanford Linear Accelerator Center (SLAC)*, including construction of the *SLAC Research Office Building*;
- $113.2 million, a 3.5 percent increase above inflation, to expand research at universities and other laboratories.

In *Nuclear Physics*, the FY 2000 request is $342.9 million, an increase of $4.5 million. Construction will be completed on schedule in FY 1999 for the *Relativistic Heavy Ion Collider (RHIC)* which is scheduled to operate for 33 weeks in FY 2000, with a proposed operating budget of $118.5 million. The *Alternating Gradient Synchrotron* is transferred from *High Energy Physics* to the *Nuclear Physics* program for use as the *RHIC* injector. The *Thomas Jefferson National Accelerator Facility*, with a proposed operating budget of $73.7 million, will continue

operating at 4,500 hours, delivering continuous beam to all three experimental halls. The $14.7 million request for the *Radioactive Ion Beam* facility at Oak Ridge will enable it to continue operating at a level of 2,400 hours. The *Bates Laboratory*, at MIT, was originally slated for closure in the Department's budget. However, we have decided it would be beneficial to maintain this facility as a working part of the DOE complex so that we might continue receiving its benefits and we shortly will submit a revised request for this funding.

For *Basic Energy Sciences*, our request is $888.1 million, a net increase of $88.6 million. In addition to funding for the *Spallation Neutron Source* and the *Scientific Simulation Initiative*, this area's subprograms include: $20.0 million for the *Climate Change Technology Initiative* to support scientific investigation of greenhouse gases; and $22.6 million to maintain and provide safety improvements for the *High Flux Beam Reactor*, at Brookhaven, which remains in a standby mode awaiting a final decision concerning restart; and $6.8 million to continue the *Experimental Program to Stimulate Competitive Research (EPSCOR)*.

For *Biological and Environmental Research*, our request is $411.2 million, a net decrease of $25.5 million from FY 1999, due to completion of several congressionally-directed projects in FY 1999. Excluding those one-time requirements, the budget grows slightly. Funding of $90.3 million for the *Human Genome* program reflects a new and accelerated DOE/NIH 5-year plan for determining a draft sequence of all 3 billion bases by 2001 and completed sequencing by 2003. For *Medical Applications*, $10.9 million is requested for *Boron Neutron Capture Therapy* Phase I trials, which will be completed for 100 patients at three sites; $24.7 million is requested for research on radiopharmaceuticals; and $5.2 million for new medical imaging concepts.

Within *Fusion Energy Sciences*, level funding of $222.6 million is requested. This includes $26.3 million for the first full year of operation of the *National Spherical Torus Experiment* and $10.0 million for the first year of a three-year, $48.0 million decontamination and decommissioning of the *Tokamak Fusion Test Reactor*, both at Princeton Plasma Physics; and $17.9 million for the *Alcator C-Mod*, at MIT, which will enable a 50 percent increase in operating time, permitting 18 weeks of operation in FY 2000, up from 12 weeks in FY 1999.

The *Computational and Technology Research* request is $198.9 million, an increase of $41.4 million. Included in this request are:

- $14.6 million for the *Next Generation Internet* initiative;
- $52.0 million for the *Scientific Simulation Initiative*'s development and deployment of software systems to introduce competition for super computing and networking facilities, and selection of new scientific projects for this application;
- $27.5 million for supercomputer access to DOE researchers through the *National Energy Research Scientific Supercomputing Center*;
- $14.8 million for the *Energy Sciences Network*; and
- $14.3 million for *Laboratory Technology Research*, to support the transfer of high-risk, long-term basic research to applied energy efficiency and utilization technologies.

Science Education

The Department and its national laboratories have built a proud 50-year record of pioneering educational involvement with helping to stimulate, nurture and teach this nation's science students. Our laboratories have developed many unique and highly effective educational methods of introducing young people to the world of science. One reason for this involvement has been the constant need to train the next generation of scientists, engineers and technicians for the highly-skilled job areas which our labs and Department require in order to maintain our technological leadership. A second reason is that our laboratories have amassed more than $30 billion worth of the world's finest state-of-the-art and one-of-a-kind scientific facilities which should be shared with the public. These facilities can become exciting classrooms in which to educate graduate research assistants, faculty and student interns on summer sabbaticals, and even high school students on science field trips. A third important reason for the Department's involvement in *Science Education* activities is to help ensure that this nation's minority students are given opportunities to develop careers in the many fields of science.

Each major program in *Science* is involved with *Science Education*, along with our national laboratories and other research facilities. In *High Energy* and *Nuclear Physics*, for example, over 1,000 graduate students from more than 100 universities work with 3,000 Department and laboratory researchers seeking insight into the nature of energy and matter. In fact, Department funding provides for 90 percent of all federal research in *High Energy* and *Nuclear Physics*. In addition to the attendant education which occurs from student involvement in these research activities, the *Office of Science* and the entire Department provide educational materials and opportunities directly to universities, schools and students. The budgets for *High Energy* and *Nuclear Physics* include a total of $3.9 million for new science activities providing opportunities for pre-college teachers and visits by faculty/student science teams to DOE laboratories. The *Basic Energy Biological Sciences, Environmental Research Sciences,* and *Computational* and *Technology Research* each have budgeted $1.9 million for these types of activities.

Additionally, in the $52.4 million *Program Direction* account, *Science Education* activities continue at $4.5 million.

NATIONAL SECURITY BUDGET OVERVIEW

For *National Security* programs, the request is $6,228.0 million dollars, an increase of $243.7 million from FY 1999. This budget provides the following amounts for these programs:

- $4,531.0 million for *Defense Programs*
- $ 747.3 million for *Nonproliferation and National Security*
- $ 36.0 million for *Intelligence*
- $ 18.6 million for *Counterintelligence*
- $ 200.0 million for *Fissile Materials Disposition*
- $ 30.0 million for *Worker and Community Transition*
- $ 665.0 million for *Naval Reactors*

NATIONAL SECURITY HIGHLIGHTS

A number of security concerns confront America, even in this time of peace. One potential post-Cold War nightmare is that weapons-usable nuclear materials from the former Soviet Union will fall into the hands of terrorists, criminals, or rogue nations. Proliferation of nuclear, biological, and chemical weapons is a major threat confronting us. In December, the President announced a government-wide *Expanded Threat Reduction Initiative* to strengthen our ability to combat this threat. We will continue our *Nuclear Cities Initiative*, designed to develop alternative commercial opportunities in the ten Russian nuclear cities to stem the "brain-drain" of scientists and technicians. We are working on materials protection, control, and accounting upgrades in nuclear sites throughout Russia and the Newly Independent States to protect their weapons-grade nuclear materials from theft. We also are helping improve working conditions at these sites, which are critical links in global safety but, in many cases, have guards who are not even being paid. The proliferation challenge in Russia and the Newly Independent States will not end once all nuclear materials have been secured. Thus, our budget also advances our cooperation with Russia in disposing of their military plutonium and it supports design of facilities needed to dispose of excess plutonium in our own country.

The rapid advance of technology has scattered the power of chemical, biological, cyber, and nuclear weapons throughout the world. For the first time in history, weapons potent enough to rock the security of nations do not require national efforts for their development, deployment or use. America's security is now reliant on our ability to create tomorrow's tools so we can defeat these technologically advanced and diffuse threats.

The Department is requesting funding to provide technology and expertise where there are pressing security needs and where we are the best prepared. Our Department has particular expertise in detection technologies for chemical, biological and nuclear weapons. In fact, we are creating the most effective, hand-held devices American law enforcement has seen for detecting radiation, and chemical and biological weapons. Our laboratories – the world's preeminent national defense technology centers -- are of increased interest to foreign intelligence. In response, we created a new *Office of Counterintelligence*, doubled its budget, and put counterintelligence fixes in place to ensure the security of our labs and our most sensitive information. DOE now houses more China-specific counterintelligence expertise than any other agency. Rapid continuation of our planned program will make it as good as the best in the government by the end of FY 2000.

Weapons Activities

The major budget area within *Weapons Activities* is contained in the budget decision units within *Defense Programs*. Their combined request for FY 2000 is $4,531.0 million, which is an increase of $131.0 million, or 3.0 percent above FY 1999. Areas within *Defense Programs* include:

Stockpile Stewardship: The request is $2,286.2 million in FY 2000, an increase of $160.3 million or 7.5 percent above FY 1999. Activities assess and maintain confidence in stockpile safety and

reliability without nuclear testing, through a technically challenging science-based program using experimental, computational and simulation capabilities. In FY 2000, major initiatives continue in high energy density research with lasers, radiography, and pulsed power. Subcritical experiments are conducted using chemical high explosives to generate high pressure environments in which to study and obtain new data on nuclear weapons materials, such as plutonium.

For the *Accelerated Strategic Computing Initiative (ASCI)*, a discrete element within *Stockpile Stewardship*, we request $542.4 million to provide leading-edge, high-end simulation capabilities needed to meet weapon assessment and certification requirements without nuclear testing. *ASCI* synergizes resources of the national laboratories, computer industry, and academia to push development of hardware and advanced applications, then introduces the new applications into the core programs.

For the *National Ignition Facility (NIF)*, scheduled for completion in 2003, we are requesting operation and maintenance funding of $5.9 million and construction funding of $248.1 million. *NIF* will provide a means to study primary boosting, assess secondary performance and validate new physics models and codes while pursuing its goal to demonstrate thermonuclear ignition in the laboratory. As one of the safeguards under which this nation would enter into the Comprehensive Test Ban Treaty, the President also requires us to maintain the *Nevada Test Site* in a state of readiness. The science-based stewardship activities it will be carrying out will help ensure it remains a vibrant facility. The Administration will push for Senate ratification of the Comprehensive Test Ban Treaty this year, to limit the spread of nuclear weapons and to help constrain development of more advanced nuclear weapons.

Stockpile Management: The program request is $1,998.3 million in FY 2000, a decrease of $73.2 million, or 3.5 percent below FY 1999. The *Stockpile Management Program* continues its historic responsibilities to provide near-term and long-range support for the enduring stockpile and to ensure an adequate supply of tritium needed for nuclear weapons. The *Core Stockpile Management Program* request is $1,552.0 million and will provide normal and corrective maintenance and system refurbishments, as well as dismantlements in accordance with the nuclear weapons stockpile plan. The *Enhanced Surveillance Initiative* request is $85.3 million to continue developing tools, techniques, and models to measure, qualify, calculate, and predict the effects of aging on weapons materials and components and understanding these effects as they impact weapons safety and reliability. The *Advanced Manufacturing, Design and Production Technologies Program* request is $85.0 million to focus on re-engineering and modernizing the weapons complex into an agile and fully integrated operation capable of responding to a wide range of production requirements. The *Radiological/Nuclear Accident Response Program* request is $77.6 million, including funds to support additional training for first responders to weapons of mass destruction incidents and additional start-up and equipment for rapid response.

For FY 2000, the budget request includes a total of $170.0 million for the *tritium* program: $106.0 million for operation and maintenance; and $64.0 million for construction. We plan to begin implementation of the *Commercial Light Water Reactor (CLWR)*, using Tennessee Valley

Authority reactors for irradiation services, which we selected as our primary option to use in providing a reliable source of tritium for the nuclear weapons stockpile. The *Accelerator Production of Tritium* program will be held as a backup option.

Technology Partnerships and Education: The $22.2 million *Technology Partnerships* funding request will continue to focus resources on partnerships supporting national security, including advanced manufacturing, with $5.0 million for the *Amarillo Plutonium Research Center* and up to $9.0 million for the *Advanced Computational Technology Initiative (ACTI)*, which partners laboratories and the oil industry to provide joint benefits, aiding the oil industry and enhancing the lab missions of the Department. The $29.8 million request for *Education* programs includes up to $8.0 million for the *Los Alamos School District*; a minimum of $6.0 million for the *Northern New Mexico Educational Foundation*; $5.5 million for the relocation of the *National Atomic Museum*; and $10.3 million for other defense-oriented educational activities at the laboratories.

Program Direction: The budget request is $246.5 million in FY 2000, which is a decrease of $3.1 million, or 1.2 percent. Initiatives to re-engineer the federal workforce will continue.

OTHER DEFENSE ACTIVITIES

Nonproliferation

For FY 2000, the budget proposes a multi-agency *Expanded Threat Reduction Initiative* for the Russian Weapons of Mass Destruction (WMD) complex. The Department of Energy is the preeminent United States agency providing operational, technological and analytical support to international efforts to prevent the proliferation of WMD. The FY 2000 request for the *Office of Nonproliferation and National Security* is $747.3 million, a $76.5 million increase over FY 1999, primarily for an increase in *Arms Control* in support of the *President's Expanded Threat Reduction Initiative* in fiscal year 2000. Within the $747.3 million request are the following: *Nonproliferation and Verification R&D* - $221.0 million; *Arms Control* - $296.0 million; *Nuclear Safeguards and Security* - $59.1 million; *Security Investigations* - $30.0 million, $20.0 million of which is offset by DP/EM contractors; *Emergency Management* - $21.0 million; *Highly Enriched Uranium Transparency Implementation* - $15.8 million; *International Nuclear Safety and Cooperation Program* - $34.0 million; and *Program Direction* - $90.4 million.

Intelligence

The $36.0 million request for the *Intelligence Program* supports the national security of the United States and directly impacts the policy-making process by providing actionable intelligence and technical support to intelligence operations. *Intelligence* serves four core policy analysis areas: nuclear proliferation and weapons; science and technology; energy security; and nuclear energy, safety and waste. The *Intelligence* budget remains unchanged from FY 1999.

Counterintelligence

In 1998, to address concerns at DOE facilities and emphasize the need to protect sensitive information, the Secretary reorganized the counterintelligence activities at the Department and

created a new *Office of Counterintelligence*. Its primary objective is to enhance the protection of sensitive technologies, information, and expertise against foreign intelligence and terrorist attempts to acquire nuclear weapons information or advanced technologies from the Department's national laboratories. The FY 2000 budget for this office is $18.6 million. The Department is planning to supplement this with an additional $12.6 million at the national laboratories, from programmatic funds for DOE defense activities, for a total of $31.2 million available for this program in FY 2000.

Environment, Safety and Health

Among items within *Defense Environment, Safety and Health's* request of $92.0 million, are: $41.0 million for *Health Studies* for the Marshall Islands medical surveillance program, joint U.S.-Russian studies of radiation health effects and epidemiological surveillance of DOE workers; $13.5 million for the Radiation Effects Research Foundation; and $12.8 million for Oversight.

Fissile Materials Control and Disposition

Given the political instability and worsening economic conditions in Russia, there is a very real threat that nuclear weapons materials could be stolen or diverted into the hands of terrorists or non-nuclear nations. These materials could then be used not only against other nations but also in the U.S. against Americans. To address these threats, I am pleased to report to you that we achieved important progress this past year regarding the disposal of surplus weapons plutonium.

In July 1998, the United States and Russia signed a "Scientific and Technical Cooperation Agreement" which provides for tests and demonstrations of technologies (up to and including pilot-scale tests and demonstrations) needed to dispose of surplus weapons plutonium. At the Moscow Summit in September 1998, President Clinton and President Yeltsin signed a "Joint Statement of Principles of Management and Disposition of Plutonium Designated as No Longer Required for Defense Purposes", which commits the two countries to seek to conclude a "Bilateral Plutonium Disposition Agreement" as soon as possible. The Bilateral Agreement would specify the technological approach and schedules to be followed by each country, the types of facilities to be constructed in Russia, and commitments in respect to the financing of these activities in Russia. These negotiations have begun and I expect we will be able to conclude this agreement by the end of the year. At that point, we will be able to develop a plan for the FY 1999 $200.0 million emergency appropriation which was earmarked to implement such an agreement in Russia. The FY 2000 budget request for these *Fissile Materials Disposition* activities is $200.0 million, an increase of $32.5 million over the FY 1999 comparable amount. The increase in FY 2000 is primarily for conducting the necessary technology development and demonstration, completing site-specific environmental analyses, designing three disposition facilities, and providing key negotiation and technical support for efforts to attain the Bilateral Agreement for the disposition of surplus Russian plutonium.

Worker and Community Transition

The *Worker and Community Transition Program* request is $30.0 million, which will allow the Department to facilitate site closure and promote reindustrialization of excess facilities that can

result in long-term savings. The program will assist in economic development and reuse of facilities such as the *Mound facility* in Ohio, the *gaseous diffusions plants* in Portsmouth, Ohio and Puducah, Kentucky, the *Hanford facility* in Washington State, and the *East Tennessee Technology Park* in Oak Ridge, Tennessee. It also funds incentives to encourage voluntary separation and assists workers in moving to new careers when workforce restructuring is required.

Naval Reactors

The Naval Reactors program is responsible for all aspects of reactors in the Navy's nuclear powered warships, this program has a 45-year record of safe, environmentally sound performance -- over 115 million miles steamed on nuclear power, a total of 5,000 reactor years of operation. Moreover, these reactors must operate reliably under extreme conditions at sea. An example is operating under the Arctic ice pack -- a situation allowing no margin for error or loss of power. The FY 2000 budget request for *Naval Reactors (NR)* in $665.0 million. Today, *NR* is responsible for 107 reactors, more than all commercial power reactors in the U.S., and almost as many as in the next two largest commercial nuclear power producing countries combined -- France and Japan. While ensuring the safety and reliability of their many operating plants, *NR* is developing new reactors to meet the Navy's needs. *NR* is currently well along in developing the Next Generation Reactor, which is on schedule and meeting all technical objectives, for the new VIRGINIA Class attack submarines. *NR* also is getting started developing a reactor for the Navy's new class of aircraft carriers, referred to as CVNX -- a major long-term undertaking. *NR* also is responsible for dealing with decommissioned reactors and is in the process of inactivating six shutdown prototype reactor plants. This effort is well along. At the end of this year, all six reactors will have been defueled, and one will be completely dismantled by the end of FY 2000.

ENERGY PROGRAMS BUDGET OVERVIEW

Energy Programs supports a variety of energy research and applied technology, including:

- $398.1 million for *Solar and Renewable Resources Technologies*
- $269.3 million for *Nuclear Energy*
- $ 50.7 million for *Environment, Safety and Health*
- $102.0 million for *Field Operations*

Its combined budget request for FY 2000 is $841.8 million, a 9.3 percent increase above FY 1999.

ENERGY PROGRAMS HIGHLIGHTS

I want the Committee to know we have listened to your concerns about management of the *EERE* programs, and their heavy reliance in the past on non-competitive awarding of funds. Our new management team has taken steps to enhance *EERE's* managerial efficiency and effectiveness. For example, a new group has just been established to improve corporate

management processes and procedures within *EERE*. It is composed of senior managers from the various *EERE* sectors and representatives from our national laboratories, the *Golden Field Office*, and other DOE management offices. We expect this group's recommendations will increase our ability to award even more funding competitively in FY 2000. I am pleased to report that through the use of broad-based solicitations, program management directives, and an increased emphasis on competition for laboratory subcontracts, EERE has reduced its use of non-competitive, sole-source contracts by 60 percent in just one year.

Renewable Energy

The *renewable energy* programs of the *Office of Energy Efficiency and Renewable Energy* improve performance and reduce costs of a broad range of technologies in *renewable electricity, fuels and related storage,* and *power delivery*. R&D in *alternative transportation fuels, photovoltaics, solar thermal, biomass, geothermal and hydroelectric power systems, hydrogen, energy storage, high temperature superconductivity,* and *utility restructuring analysis* respond to consumer needs, the environment and the economy.

In FY 2000, $398.1 million is requested for *Solar and Renewable Resources Technologies* with an additional $0.8 million available in prior year balances, for a program level of $398.9 million. This increase reflects Administration support of *Solar and Renewable Resource Technology Programs* to: reduce air pollution; improve U.S. energy security; address global climate change; and increase our nation's economic competitiveness. The budget request includes $93.3 million for *photovoltaics*. Most of the program's resources ($63.3 million) support fundamental and applied research which is essential for continued progress toward DOE's long-term goals of improved performance and lower costs of power generation. By FY 2000, photovoltaic systems will be delivering electricity for as low as $0.12 to $0.20 per kilowatt-hour, making this a competitively-priced alternative to diesel and other fossil fuels in many domestic remote locations and a wide-range of remote and on-grid sites around the globe. Improved materials manufacturing techniques and up to 16 percent energy conversion efficiencies have facilitated the resurgence of the U.S. PV industry as the world's leader.

Another program meeting with success is *Biomass/Biofuels* for which we are requesting $92.4 million. The 1.5 billion gallon annual U.S. production capacity for ethanol puts it on-track for widespread vehicle use at competitive prices in the blended-fuel market. Competing with today's inexpensive gasoline led our *Biofuels* program to co-fund development of facilities that use waste biomass from agriculture, forestry and dedicated crops. In an 80/20 industry/government cost-share, construction recently began in Jennings, Louisiana, on a demonstration plant to produce ethanol from the cellulose waste from sugarcane. This 20-million gallon facility is scheduled to produce ethanol by 2000 at an initial cost of $1.00 per gallon, on-track for our 2010 cost goal of $0.72 per gallon.

We are requesting $45.6 million for our *Wind* program. In 1980, electric power from Wind Energy Systems ranged from 30 to 40 cents/kilowatt hour. Through aggressive R&D efforts by *EERE* and its industry partners, we have reduced costs to between 4 to 6 cents/kWh. At this

price, wind systems are entering the competitive market in certain circumstances and we are working on Next Generation Turbine prototypes to reduce the cost of electricity from wind to as low as 2.5 cents/kWh by 2002.

Nuclear Energy

The *Office of Nuclear Energy, Science & Technology* maintains the federal government's expertise in nuclear technology. The Department strives to maintain nuclear energy as a reliable, economical, and environmentally-safe source of energy for the next century. The $269.3 million request for *Nuclear Energy Programs* will support several major program activities. *Nuclear Energy R&D* will receive $87.3 million, of which $37.0 million is for *Advanced Radioisotope Power Systems* and $11.3 million for *University Reactor Fuel Assistance and Support;* $25.0 million for the *Nuclear Energy Research Initiative (NERI),* our peer-reviewed R&D effort to address the long-term barriers to greater use of nuclear energy. Its key areas of research include proliferation-resistant reactors or fuel cycles; new reactor designs with higher efficiency, lower cost, and improved safety to compete in the global market; low power units for use in developing countries; and new techniques for dealing with nuclear waste.

The $5.0 million request for *Nuclear Energy Plant Optimization* will support initiatives to improve efficiency and capacity of existing plants. The Department has worked closely with the Electric Power Research Institute and Nuclear Regulatory Commission in this effort. Importantly, this work will be overseen by a special subcommittee of the Nuclear Energy Research Advisory Committee. We plan to cost-share this with private industry on a matching basis. Our *Nuclear Energy* budget request also includes $2.5 million for the *Advanced Nuclear Medicine Initiative*, as part of our *Isotope Program*. It will apply our unique expertise in isotopes to challenges facing American health care in the next century. Important advances such as new treatments for cancer, arthritis, and AIDS may arise from research with medical isotopes and DOE is best equipped to move this work forward. The $65.0 million request for *Termination Costs* focuses on *Experimental Breeder Reactor-II* shut down and deactivation. It will provide funding to maintain the *Argonne National Laboratory-West* site safety, security and safeguards infrastructure. In the Spring of 1999, the Department will decide whether to permanently deactivate the *Fast Flux Test Facility (FFTF)* or to conduct an Environmental Impact Statement in consideration for restarting it to support a range of national research reactor requirements. The $30.0 million request would fund minimum surveillance of *FFTF* to keep it in a safe and environmentally-compliant condition.

Environment, Safety and Health

The *Environment, Safety and Health (EH)* program is funded in three budget areas: *Energy Supply, Other Defense Activities,* and *Defense Environmental Restoration and Waste Management*. The $50.8 million *non-defense EH* request funded in *Energy Supply* consists of $16.4 million for *Technical Assistance;* $2.5 million for the *National Environmental Policy Act* program; $12.8 million for *Management and Administration;* and $19.0 million for *Program Direction*. The total *EH* FY 2000 request is $162.8 million, with *defense EH* at $112.0 million.

Power Marketing Administrations

The primary mission of the *Power Marketing Administrations* is to sell the power generated at federal hydroelectric dams. Sales preference is given to municipalities, rural electric cooperatives, and other public bodies. Power is sold at cost-based rates, with revenues from power sales used to repay the U.S. Treasury for operation and maintenance of power facilities and the capital investment with interest. Beginning in FY 2000, the Administration's proposed policy is that PMAs will no longer seek appropriations for power purchases used to "firm" the variable hydroelectric power, or for wheeling federal power across other utilities' transmission systems. Instead, customers of the *Southeastern, Southwestern,* and *Western Area Power Administrations* will pay their suppliers for power purchase and transmission arrangements. Power receipts have been reduced to reflect reduced spending by these three PMAs.

Since announcing our policy, we have learned that a number of PMA customers believe an abrupt adoption of this policy will create undue hardships for them. We stand ready to work with Congress and PMA customers to develop a workable transition plan. The Department also recognizes that financing methods used to "firm" federal hydropower and wheel it to end users must take into account individual situations found at each PMA power system. Therefore, the Department is open to new ideas that provide a permanent solution for financing this activity without relying on scarce appropriations. *Power Marketing Administration* funding, excluding *Bonneville*, decreases by $37.6 million in FY 2000. This includes a $51.8 million reduction for the *Western Area Power Administration*; an increase of $1.9 million for the *Southwestern Power Administration*; a decrease of $5.7 million for the *Southeastern Power Administration*, offset by an $18.1 million decrease in prior year balances to offset FY 1999 requirements, for a net decrease of $37.6 million.

The *Bonneville Power Administration* proposes to obligate $352.0 million of its borrowing authority in FY 2000, and will have net outlays of -$23.0 million. With more than $500 million of reserves, *Bonneville* is able to continue meeting its full obligations to U.S. taxpayers through annual payments to the U.S. Treasury and anticipates paying $618 million to the Treasury in FY 2000. Proposed appropriations language includes authorization for the *Northeast Oregon Hatchery Master Plan*, consistent with the established regional prioritization process for funding fish and wildlife projects.

ENVIRONMENTAL QUALITY BUDGET OVERVIEW

Our *Environmental Quality* budget for FY 2000 requests $6,452.0 million, an increase of $113.7 million. The FY 2000 request for the cleanup program is intended to maintain our commitment to achieve results and accelerate cleanup with an increase over the FY 1999 budget. It will provide funding to address the highest human health, safety, and environmental risks within the Department's complex. It also will enable continued progress toward answering the most critical questions in long-term nuclear waste disposal.

ENVIRONMENTAL QUALITY HIGHLIGHTS

The Department is aggressively addressing immediate and long-term environmental and health risks of the former nuclear weapons production complex and stabilizing *EM* spent nuclear fuel in preparation for disposal. We have completed half the cleanup of about 7,000 contaminated waste sites remaining from Cold War operations. In New York and South Carolina, we successfully removed high level radioactive waste from underground tanks and safely stabilized the waste in a glass form inside 815 sealed cylinders which are ready for disposal. We also have established baseline plans for accelerating cleanup, achieving risk reduction and saving billions of dollars.

In FY 1998, we finished cleanup of an entire class of nuclear waste sites -- uranium mill tailings sites. Except for remaining ground water contamination, we completed cleanup of 22 large sites as well as 5,300 "vicinity properties" including elementary schools and homes. This $1.5 billion project, authorized in 1978, included remediation of over 40 million cubic yards of contaminated soil and material. We also are making progress at our large sites where cleanup will continue well beyond 2006. In FY 1998, we completed deactivation of *N-Reactor*, the last of nine production reactors at the *Hanford Site*, along with that site's *B-Plant*. Deactivation reduced annual overhead costs to safely maintain these from about $39 million to $2 million.

Environmental Management

For *Environmental Management* we are requesting $5,700.0 million dollars for the base program and $228.0 million for *privatization* activities, for a total of $5,928.0 million This will enable each cleanup site under the Department's aegis to meet its safety and legal requirements, support our goals for accelerated cleanup and site closure, and maintain critical environmental projects and priorities. The base program request is nearly $100 million higher than in FY 1999 and the *privatization* request is essentially equal to the FY 1999 amount.

The *Environmental Management* budget request consists of five elements:

- $1,054.5 million for *Defense Facilities Closure Projects*
- $4,494.4 million for *Defense Environmental Restoration and Waste Management*
- $ 228.0 million for *Defense Environmental Management Privatization*
- $ 330.9 million for *Non-Defense Environmental Management*
- $ 240.2 million for *Uranium Enrichment Decontamination and Decommissioning Fund*

I already have started meeting with the governors of states where the Department has facilities to discuss their perspectives of our cleanup program and to listen to their long-term priorities.

Civilian Radioactive Waste Management

The Department achieved significant progress this past year, completing the Yucca Mountain *Viability Assessment*. In December, I submitted the *Viability Assessment* to President Clinton and the Congress. The *Assessment* recommended further study – and we are proposing the funding required to accomplish that.

For FY 2000, we are requesting $409 million, including $370.0 million in new budget authority, to support: continued data synthesis and analysis; model validation; and refinement of engineering and designs necessary for major upcoming decision documents: the Final Environmental Impact Statement in 2000; the Site Recommendation to the President in 2001, should the site prove suitable; and the License Application to the Nuclear Regulatory Commission in 2002.

Environment, Safety and Health

The FY 2000 budget request for *Defense Environmental Restoration and Waste Management* proposes $20 million for *Public Health Activities* within the *Office of Environment, Safety and Health (EH)*. These activities include health studies, health education and promotion, and other public and occupational health-related initiatives at DOE sites. These activities support the consolidated health agendas at each site, which are coordinated under the Department's Memorandum of Agreement with the Department of Health and Human Services. This program is carefully integrated with the *Health Studies* program funded within *Other Defense Activities* and also managed by *EH*.

DEPARTMENTAL ADMINISTRATION

The FY 2000 budget request for Headquarters administrative functions is $111.6 million for related salary and benefit expenses with funding for the *Office of the Secretary* budgeted at $4.9 million. The total on-board headcount of 1,298 employees, projected for FY 2000, reflects a 32 percent decrease from the original FY 1995 baseline of 1,920. Funding for contractual services and program support is $71.2 million and $18.6 million, respectively.

CONCLUSION

The Department of Energy's budget request for FY 2000 presents a realistic, yet, challenging program to address and meet the missions we have been given. Working with this Committee, I firmly believe we will be able to accomplish our tasks and that the nation will receive great dividends from our work.

Many of the challenges we face at the Department are internal. Management remains an area where focus is needed. But we are acting -- as our record indicates -- to effect improvement and to direct the assets of the Department toward solving the problems which await us in the next century. With your continued assistance and counsel, I have every confidence that the people and programs the Department has in place will serve our nation well. I welcome your questions.

QUESTIONS

Mr. PACKARD. But you were thorough on it. And again, thank you very much.

On questions we will take the members as they have arrived, in the order that they have arrived out of fairness. And Mr. Visclosky's made a suggestion which I think is a good one. And that is, if there are members that have other appointments or other hearings that they cannot remain, we still want to hear your questions.

And so, if you will just contact either Mr. Visclosky or myself, we would be more than pleased to move you up in the order, if it were possible, to allow you to ask your questions before you have to leave.

Again, I want to welcome Mr. Clyburn who has arrived now, and thank him for being here as a new member of this subcommittee.

ROLL CALL VOTE

Thank you very much. My staff reminds us that we need to have a roll call vote to close the March 18th hearing which is dealing with the atomic energy defense activities.

Mr. Visclosky, would you like to make a motion to that effect?

Mr. VISCLOSKY. Mr. Chairman, because the Subcommittee on Energy and Water Development will be dealing with national security and other sensitive matters at its hearing on atomic energy defense activities, I move that the hearing on March 18, 1999 be held in executive session.

Mr. PACKARD. Thank you. Any discussion on the motion?

It requires a roll call. The Clerk will call the roll.

The CLERK. Mr. Packard?

Mr. PACKARD. Yes.

The CLERK. Mr. Rogers? [No response.]

The CLERK. Mr. Knollenberg? [No response.]

The CLERK. Mr. Forbes.

Mr. FORBES. Yes.

The CLERK. Mr. Frelinghuysen?

Mr. FRELINGHUYSEN. Aye.

The CLERK. Mr. Callahan? [No response.]

The CLERK. Mr. Latham?

Mr. LATHAM. Aye.

The CLERK. Mr. Young? [No response.]

The CLERK. Mr. Visclosky?

Mr. VISCLOSKY. Aye.

The CLERK. Mr. Edwards? [No response.]

The CLERK. Mr. Pastor?

Mr. PASTOR. Aye.

The CLERK. Mr. Clyburn?

Mr. CLYBURN. Aye.

The CLERK. Mr. Obey? [No response.]

Mr. PACKARD. Thank you, 8 ayes. So it passes, and we appreciate that technical effort.

Now we would proceed to the questions. Again, we appreciate the testimony of the Secretary.

And I am going to open the questioning with a couple of general questions, and then we will proceed with Mr. Visclosky.

FY 2000 FUNDING PRIORITIES

You have been on the job, as we mentioned earlier, for 6 months, and you have certainly gotten your hands on the job. What do you see now after that period of time as your highest priority?

Secretary RICHARDSON. Mr. Chairman, right now what I see is the management issue. I can tell you right now that nuclear waste is an extremely high priority. Stockpile stewardship, national security is critical. The waste issues, how do we deal with clean up; those are immensely important. Science and technology.

But I think it all boils down to managing this Department better. This is a Department of $18 billion, if you add the Interior side to your jurisdiction. It is a Department of 100,000 people with labs and project offices every where.

What we want to do, Mr. Chairman, is continue what this committee suggested we do, and that is make our initiatives and our programs more effective and efficient. We have proceeded with the project management reviews that you asked us to do. I am expanding that to defense programs and environmental management programs similar to our review teams in the science area.

We are moving forth on ways to ensure that R&D is more effective and efficient, and we have set up a team to deal with that issue.

I mentioned earlier our labs; how can we have our labs not be duplicative? They are crown jewels and they are doing excellent work, but maybe there are ways that we can manage them better.

Workforce 21. As I mentioned, Mr. Chairman, we have technical work and some very important priorities to ensure that we have a future workforce in these very technical, scientific national security areas that can replace the very good existing workforce.

Contract reform. We have followed generally the Committee's view that we should re-compete as much as we can, and we are going to continue doing that. We think that this is a way that we can be more efficient and find ways to save money for the taxpayer.

But Mr. Chairman, the management review that I have instituted at the Department is comprehensive. And when I testify again you will see that this is not a paper review; this is going to propose some broad changes in the way we manage our department.

We have not been as good as we should be in the safety area, in the clean-up area. We have not been as good as we should in complying with States and the Congress on a lot of clean-up and other schedules.

We are a very important and good department with a lot of good people, but I think the key and most important priority is to have this department managed better. We have reduced, Mr. Chairman, 25 percent over 4 years. That does not mean we are going to continue doing that and be efficient.

I think we have reached a point where we now have to look at critical skills, and recognize that if we are going to fulfill the objectives of taking care of our nuclear weapons; of ensuring that Russia and their nuclear weapons and scientists do not go askew; that we

keep the stockpile stewardship program effective and efficient; the science and technology programs that we have.

We are making a major announcement today—work performed at the Advanced Photon Source at Argonne National Laboratory has confirmed that x-ray diffraction studies of hair from breast-cancer patients shows a markedly different pattern than hair from healthy subjects. Brookhaven, just in the last 6 months, has made great advances in the areas of narcotics detection.

Mr. Chairman, in the renewables area we are doing very important work. Not related to climate change, which is important, but the energy security, Mr. Reicher's program, is making the government more efficient, the energy efficiencies and the ways we use the taxpayer dollar.

My whole point is that managing the Department better will enable us to manage the direction that this committee has given us more effectively and efficiently.

FY 2000 FUNDING LEVELS

Mr. PACKARD. We will follow your management changes closely, I think, in the future, and we are looking forward to seeing those changes.

You have called for an increase, a modest increase—well, it may be considered a modest increase, $600 million increase over last year's budget or appropriated levels. And you are fully aware that the budget caps are being discussed here on the Hill. And if we have to take cuts because of living under the caps, or if we cannot come up with the monies that would be able to grant you the increases that you have asked for, what areas would you still wish to increase in terms of budgeting levels, and what areas would you be able or willing to cut?

Secretary RICHARDSON. Well, Mr. Chairman, I support all our funding. But let me just say, if you look at our budgeting—and Mr. Telson can explain it better—our budget is a 4.1 percent increase if you take into account some of the Russia programs that we got at the end of the year in the emergency appropriation.

So some have said—and Mike Telson, my budget man—where all he does is work on numbers—has said to me that our budget in essence is flat. And so I am not exactly asking for dramatic increases.

I think our budget is spaced out in a way that on stockpile stewardship we feel very fortunate that the $4.5 billion that we got will do the job to protect our weapons, and be able to come to you, as Secretary Cohen and I do every year, and say that we have met our national security goal of having these weapons without testing.

In the area of clean-up we got $5.7 billion, which is $100 million more than last year, which will enable us to meet the clean-up schedules at many of our sites.

In the science area we consider it a good budget, a slight increase.

Across the board, Mr. Chairman, I think our budget is fair. We are not a high growth department. We have reduced our work force. But I think if we are going to complete our mission I want to be able to come back to you in 6 months and answer your question, and say this is where we can reduce by improving our management.

Mr. PACKARD. I expected that answer; that you are not willing to cut anywhere, of course. And you are to be commended.

Mr. Visclosky, let's go to you.

Mr. VISCLOSKY. Mr. Chairman, thank you very much.

Mr. Secretary, again, wish you well in your endeavor, and realize you have already been called upon to make a number of hard decisions.

AGING WORKFORCE AND INFRASTRUCTURE AT PRODUCTION PLANTS

In your opening remarks you alluded to stockpile stewardship and you also mentioned stockpile management, and talked about some of the difficulties and problems we face as far as the workforce and facilities.

I do have a concern—and I guess I would be remiss in not mentioning them at the hearing, and I know you share my concern. But we have the four facilities, and my understanding is that the average length of service at the Kansas City plant, for example, is about 28.2 years, and that 25 percent of the staff could retire right now. I think that pretty well plays out at the other facilities, as well as problems with collapsing ceilings, puddles near electrical equipment, and what have you.

The administration generically has obviously set aside additional monies for defense functions. My concern is how are we collectively going to deal with what I think is a very serious problem in making sure that, one, the people problem prospectively, as far as the unique talents that your people possess are going to be secured in the longer term; and also, how are we going to address the real property maintenance issue?

Secretary RICHARDSON. Well, I think, Mr. Visclosky, I will answer your question, and then time permitting, Dr. Reis is also here, who is distinguished and has a long record in these issues.

We have to keep a balance between our stockpile management program and our stockpile stewardship program. You have pointed to a very critical problem, and that is people. And we are worried that the ever-increasing age of the workforce is a complex wide problem, especially in these defense plants, and we have to do something about it.

The reason this has happened is because of the downsizing of our workforce. If you all recall, 5 years ago we all considered legislation to abolish the Department. And we were conscious of that, and we reduced. But I think it has reached the point that a lot of these younger employees don't have seniority anymore.

We need to look at incentives, retirement bonuses. We need to recruit better. We need to get more minorities and women. We need to be more competitive with the workforce.

CHILES COMMISSION REPORT

A very distinguished admiral by the name of Admiral Chiles, has just completed a report on the workforce. He just finished briefing, I think, your staff. And I would urge you, if you get a chance, to read it because it deals with ensuring ways that—we find those that are nearing retirement with critical skills and give them retention bonuses; that we retain the services of retirees with certain

skills as part-time workers or advisors. Dr. Reis and I had heard a briefing on this yesterday.

We need to look at compensation packages, quite frankly, that also deal with ways to make employment in our labs, in our facilities, more attractive than the private sector. And I have to tell you, that is tough. But we have to have a way to ensure that there is a balance between stockpile management and stockpile stewardship. In other words, we have to have the people to do this job; we cannot just let people go and bring computers in. There has to be a balance, and I think that Dr. Reis has achieved that.

Could I ask Dr. Reis briefly to——

Mr. VISCLOSKY. Sure.

Secretary RICHARDSON. Vic.

Mr. REIS. I would elaborate just a bit on what the Secretary said. The Congress asked the Chiles Commission specifically to look at the personnel problem several years ago because that is the long-term—that is over time, as you project out in time, I think that is the most difficult part of the whole stockpile stewardship.

We are asked not to maintain the stockpile just this year, but we are asked to maintain it indefinitely in a safe and reliable case, and do that without testing. And that ultimately comes down to a judgment call of the people in the laboratories, and it comes down to the ability to maintain the critical skills in the plants as well.

So that is—you asked me what the number one problem is over time. At this stage of the game it is the personnel—it is the personnel level.

I think many of the suggestions of the Chiles Commission—we are in the process of implementing, and will be implementing more. In doing that, we have to train those people. We have to shift the skills of the people who are retiring to the new people coming on board.

And I think the key finding, if you will, of the Chiles Commission—in fact, their number one finding related to the long-term stability of the program. People don't want to come in if they don't think the program is going to last for that much longer. With the end of the Cold War people were very concerned with what was happening, so many of the younger people left at the same time we were doing the downsizing.

So the key item across the board is maintaining the stability of the program, because nobody is going to join if they don't think they are going to have a job 3, 4, 5 years down the road.

That was basically the number one concern. And as we have talked about this before in the past, the administration is now projecting a stable $4.5 billion budget for stockpile stewardship over the years. That was their number one concern about how to do that.

The details are very important as well; to initiate the training; to have the mentoring programs, and we are in the process of doing that. And maybe when we get together on the 18th we can go into that in more detail.

Mr. VISCLOSKY. Thank you, Mr. Chairman.

Mr. PACKARD. Thank you very much. Mr. Forbes from New York.

HIGH FLUX BEAM REACTOR AT BROOKHAVEN NATIONAL LABORATORY

Mr. FORBES. Thank you, Mr. Chairman.

Mr. Secretary, it is indeed a pleasure to see you again, and thank you so much for what I can only best describe as being a champion of Brookhaven National Laboratory.

As you know, it is a facility that is near and dear to my heart. I appreciate that the Secretary recognizes the really groundbreaking research that is going on there, and the fact that Brookhaven National Lab is really a major partner in making sure that America keeps its competitive edge.

You also know that I have been extremely critical of some of the past environmental practices, and I know you are no stranger to that. You come to this job with an excellent record in the House of being able to balance both environmental considerations against the need for America to make strong investments in its research and in its laboratories. So I am really pleased that you are at the helm of the Energy Department.

We have discussed a number of times, as you know, the High Flux Beam Reactor, and if you will indulge me, Mr. Secretary, clearly an issue of great importance to the people in the 1st District of New York, I am concerned obviously that this High Flux Beam Reactor would be approved for re-start. And I know that you are in the process now of contemplating, based on the various information that is being gathered. There is a comment period, which I thank you for extending the timeframe in which people could make comments to the Department of Energy on the environmental impact statement. I thank you for that indulgence.

And let me thank you too for postponing your decision twice, from my very—in this case—partisan view of keeping the reactor closed, I do appreciate the delay, and I am hopeful in the end that your decision will be one that perhaps falls in line with what some of us in the 1st District believe should be the case.

Have you a set timeframe at this point for when you will make a final decision on the re-start of the High Flux Beam Reactor?

Secretary RICHARDSON. Congressman Forbes, yes. I am going to make the decision in April, and my very able Director for Science, Martha Krebs, is in the process of preparing that recommendation now. And as you know, we extended the comment period at your request, and I did agree with you that more comment from your citizens and constituents was needed.

I want to make this decision based on science, based on the interest of the people in your community. I have some science people that think that this research is important. On the other hand, we have to look at the cost of this reactor; how much it would cost to restart it versus decommissioning.

There are a lot of factors, but I am not going to delay again. I think you would agree with me that the time has come to make the decision.

I am informed here the record of decision is a little later than April, but my recommendation from my staff will be given to me this spring. So we have a little bit of time.

Mr. FORBES. That is great. I appreciate that.

Secretary RICHARDSON. You know, Mr. Forbes, one of the things I found when I got in the job is a lot of decisions were postponed, and I came in September and had about five huge decisions involving a lot of States to do. I would prefer to make the decision sooner than later.

But here, I would hope that we could work together on it. This is a very important decision. And as somebody who also, as you know, spent time in your district, in New York, I sort of feel a kinship for that area too.

RELATIVISTIC HEAVY ION COLLIDER (RHIC)

Mr. FORBES. I know you do, and I appreciate that.

And let me thank you for your request, particularly in nuclear physics, to increase that budget by almost $5 million. I think that is particularly noteworthy when you take into consideration that we have that exciting new project that is to go on line very soon toward the end of this fiscal year, the Relativistic Heavy Ion Collider, which has been the pride of Long Island. And frankly, this member of Congress would love to take great credit for it, but I think it goes back three members of Congress that this project has been under construction, and frankly, a major priority, both with former Congressman Hockbruckner and former Congressman Carney.

This has been a project that has bipartisan support, and I am very, very appreciative that the Department did make the request for an increase, and that $118.5 million I would hope based on that request be dedicated to the RHIC project when it goes on line.

Having said that, I would also emphasize that I think the RHIC project really is—and not to detract from all the good research and all the other ability to do research at Brookhaven, but the RHIC is going to be clearly our centerpiece, and I think that its operation will continue to make sure that Brookhaven National Laboratory is in the forefront of research and development in this country. So I do thank you for that commitment.

Do you see any delay in the start-up of the RHIC project?

Secretary RICHARDSON. The answer is no. Let me just deal with the first part of your statement.

We did put in the $5.7 million in the clean-up funding. I think you are being very generous in sharing the credit with everybody. You had a lot to do with this; I think you put it in the bill. And we have honored that.

Mr. FORBES. Mr. Secretary, I also appreciate the fact that the administration, with your direction, asked for an increase in the environmental clean-up fund. It is almost $30 million, so I thank you for that.

Secretary RICHARDSON. Right. And we will be moving that—or the money is already moving.

In terms of the RHIC money, we will complete on time the RHIC funding in the fourth quarter—this is Fiscal Year 1999—and begin operating it. We are also providing an additional $17.9 million to Brookhaven to support research using this very unique facility.

So for the total of the Fiscal Year 2000 budget it is $106.1 million to fund these operations.

Mr. FORBES. Okay, I appreciate it. If I could just ask one final question. I know that the additional $5.7 million still hasn't been expended yet. Will that be forthcoming to Brookhaven?

Mr. RICHARDSON. I think—I have got my budget man here—$2.1 million has already been made available, and $3.6 million will be transferred in the next monthly financial plan.

Mr. FORBES. Thank you very much. Thank you, Mr. Chairman.

Mr. PACKARD. Thank you. The gentleman from Arizona, Mr. Pastor.

SCIENCE EDUCATION FUNDING

Mr. PASTOR. Thank you, Mr. Chairman. First of all, welcome to the subcommittee. I look forward to working with you under your leadership, and, Mr. Secretary, welcome to your position, and I also look forward to working with you.

I have two questions, Mr. Chairman. Mr. Secretary, I understand you are proposing a new science education budget of $10 million. I know it is very important, but other Secretaries were not as successful in getting this money, so, hopefully, you can persuade us that the request is important, and you can also inform us of how that money will be used.

Mr. RICHARDSON. Well, Congressman, I am delighted that you are on this subcommittee, and I am delighted that you are pressing for this initiative, because I think this is very important. We have proposed over the years—I think it was $15 million last year—for this program that basically is in line with what we talked about of replacing the work force that we have at the Department of Energy. This is a problem we have had with our Appropriations Committees. We hope this subcommittee gives us a chance to show that this is a good program.

What we have is a program that blends the assets of our National Laboratories with the National Science Foundation Education Programs. It is K through 12; it involves pre-college math and science teachers providing research opportunities at Department of Energy laboratories. They learn about science; they learn about the classroom science environment at the labs. It allows university faculty and student teams at the end of graduate level to participate in long-term research programs.

We are investing in science, and I hope, Congressman, that we will work together with every member of the subcommittee to make sure that this program is well managed, I can assure you of that. But give us a chance to show you that this is a good program. We have not had luck—but, I am going to work very closely with the Chairman and the ranking member and members of the subcommittee to persuade you that this is a good investment and a good program.

EDUCATION SUPPORT FOR NEW MEXICO

Mr. PASTOR. I can't help noticing that the New Mexico schools are doing well in Los Alamos, and I know that the factor is that they are in the State, but I would encourage you as I have former Secretaries that there are States adjoining many of the labs that could benefit, and I would encourage you that at least at Los Ala-

mos you might look at adjacent States that could participate in this, and it would be beneficial to its students, and so I—

Mr. RICHARDSON. You mean like Arizona?

Mr. PASTOR. I mean like Arizona. [Laughter.]

Mr. PACKARD. I am surprised that Mr. Pastor noticed that in testimony that all the education money goes to New Mexico; that is unique, isn't it?

SOLAR ROOFS PROGRAM

Mr. PASTOR. Well, I know that this Secretary is very sensitive to other States, and I know he will do his best to make sure that the adjoining States will participate.

I noticed in your budget, you are continuing to support solar and renewable resources. I think it is very important. I think it is important that we have a balance, and I congratulate you and thank you for supporting this effort. I have to tell you that I also want to commend your department, working with them. Most recently, I think, a couple days ago, they announced that they are trying or will try to get proposals from various Native American reservations in which we can use the photovoltaic cells—shingles in their communities. And you well know how isolated the Indian nations are and how widespread they are, and it is very commendable that you have this initiative. I will try to encourage as many Native American nations to participate, because it will help them; it is a win-win situation. It will help them in terms of generating power from solar energy, and I think will continue your effort to make sure that photovoltaic shingles are available, and you may want to comment on it.

Mr. RICHARDSON. Well, I thank you, because we have a very good program in solar energy. We have the Million Solar Roofs Program. We are doing a lot of innovative photovoltaic work, in fact, in the southwest, at our solar energy renewable lab, NREL in Colorado, in Golden, Colorado. In this connection, Mr. Pastor, I was discussing with other Cabinet members just yesterday ways that in the electricity restructuring bill we can bring some type of solar or power plant investment into Indian reservations.

But the point I would like to make to this subcommittee is that these renewable monies that we have in there are good for our energy security. They reduce our emissions; they address the problems of climate change. I think as you mentioned, the management of these programs is a lot better. It is being run very effectively and efficiently, and I would hope that this subcommittee also sees these as encouraging new technologies that will be export-intensive; that will bring us jobs, and, if I could, Mr. Pastor, Mr. Reicher who runs this program—do you want to add anything, Dan?

Mr. REICHER. Mr. Pastor, Mr. Chairman, we are very excited about the work with the tribes on renewables. These are often areas of the country without electricity or easy access to electricity. More generally, we are making real progress with renewables across the country, major new wind installations in Minnesota and Iowa, big new biomass facilities in Louisiana, California, work in Indiana, Illinois, Vermont. We have major commitments to solar energy, literally, from Maine to Illinois to New Mexico, Arizona, California, and Hawaii. Superconductivity, which this sub-

committee supports investments in has had some big breakthroughs in the Midwest. So, there is a great deal going on, and we think that the work is very important, and we appreciate the support.

POWER MARKETING ADMINISTRATION

Mr. PASTOR. Mr. Chairman—or Mr. Secretary, my last question deals with the Power Marketing Administration, and I read on page 15, that beginning in Fiscal Year 2000, the administration's proposed policy is that PMAs will no longer seek appropriations for power purchases used to firm the variable hydroelectric power or for wheeling Federal power across other utilities' transmission lines.

As you know, in the West, the PMAs have brought electricity to the most remote, isolated areas. This was a commitment that the Federal Government made to ensure that the rural areas would have power at a reasonable cost, and this policy which I think is rough, may cause problems to the customers that rely on the power—like WAPA in the West. As you know, WAPA has an extensive infrastructure in the West, and I would only hope that as you develop this policy that you take under consideration that there may be a need for a transition rather than just this rough change in policy, and I would like for you to share your thoughts on this change in policy.

Mr. RICHARDSON. Well, we will—we know that this so-called power wheeling has caused a little bit of concern, especially with some of the northwest members. We will work to address some of these concerns. We have to explain our proposal better, and my Chief Financial Officer, I would like him to visit with you and your staff. I think we can address some of the Members' and Senators' concerns, but, Mr. Pastor, we want electricity restructuring. We want everybody to be competitive, and some of the PMAs, they are part of the Department of Energy—I shouldn't say whine—they whine a little bit sometimes, and they whine to you. We are trying to make them a little more competitive, but maybe in this particular case, we haven't explained what we want to do well enough. We want them to be a little more competitive. We want them to run a little better. They are doing a good job, but before you address this legislatively, let us explain it in a more effective way.

Mr. PASTOR. Well, I appreciate the invitation to continue the dialogue because as much as they whine and as much as they are concerned, the reality is, I think that they also have to consider their ultimate customer. In many cases, the customer is a rural area, isolated, and may be concerned that a change in policy is going to cost them in terms of higher prices and the intent for developing this infrastructure was that we would get power to the most isolated areas. It was a Federal investment, and the customer, our constituents, would get power that they could afford, and so I think that is the concern. As you well know, coming from the West, the power marketing administrations play a very important role.

Mr. RICHARDSON. I understand, and let me assure you, you didn't see in our proposal any effort to privatize them or sell them off as in other years; we are not doing that. That doesn't mean that they and others shouldn't run, like all of us, a little more efficiently. But

I understand your point, and we are not trying to burden them; we will explain it better, but let us have this dialogue.

Mr. PASTOR. Thank you, Mr. Secretary. Thank you, Mr. Chairman.

Mr. PACKARD. Thank you, Mr. Pastor. The gentleman from Iowa, Mr. Latham.

Mr. LATHAM. Thank you very much, Mr. Chairman, and first of all, I would like to thank you for the opportunity to be on this committee; I am really looking forward to it, to work with you and all the members on the committee, and if you think you are new, Mr. Secretary, I am really new on this committee.

First of all, I guess I would just like to associate myself with the concerns that Mr. Pastor just talked about. I have a lot of communities, rural electricts, that derive power from the PMAs, and, obviously, it is a major cost issue in my part of the country, too. So if you are going to have a briefing or a conversation, we would sure like to be a part of that also.

Mr. RICHARDSON. Of course, okay.

WIND ENERGY TAX CREDIT

Mr. LATHAM. Thank you.

One thing, and it was alluded to earlier, is that there is a huge amount of wind generation activity going on in my part of the country and my district. I think one of the largest, if not the largest, wind generation farm in the country is going to be right in the center of my district, and I was just curious, is the Administration going to be supporting and pushing the extension of the wind energy tax credit and actively a part of that?

Mr. RICHARDSON. Well, let me say that we have a new commitment in Dan Reicher's office towards wind and I am very eager to see some of your facilities. This is very important to us. What is important about wind is it is meeting its technology goals. This is a renewable that is working. To give one example, electric power from wind turbines in 1988 cost between 30 cents and 40 cents per kilowatt hour, and through aggressive research and cooperation with industry in R&D, we have been able to reduce costs since then to between 4 cents and 6 cents per kilowatt hour, a reduction in costs of more than 80 percent. We have some research on the next generation turbines to reduce the cost even further to 2.5 cents per kilowatt hour by 2002. We think this is very important.

Dan, do you have any more that the Congressman would be interested in?

Mr. LATHAM. Yes, as far as the extension of the tax credit.

Mr. RICHARDSON. Yes, we support that; it is excellent.

BIORENEWABLES RESEARCH CONSORTIUM

Mr. LATHAM. You will be pushing it. Okay, good.

As you are probably aware, Iowa State University is home of the Department's Ames Laboratory, and there is a memorandum of understanding with DOE and the USDA as far as the biorenewables resource consortium. I would just ask you, I guess, to comment about what you think, and not everyone, obviously, supports biomass for this kind of research, but what do you think? Is it promising? What kind of future do we have?

Mr. RICHARDSON. I think it is promising, and, you are right, at Ames, which is one of the few labs I have not been to—I have been to 28——

Mr. LATHAM. You can come out; we will go to Ames, and we will go up with wind generators and have a great trip.

Mr. RICHARDSON. Sounds great, okay. I am serious, I would like to do that.

This is promising, the whole area of biofuels, the whole area of biomass power, the collaborative work we are doing with the Agriculture Department, the Forest Products Division of the Agriculture Department, because what we are able to do is produce different combinations of fuels, of different powers of chemicals from the different feedstocks. We think this is very promising, and this is going to be, I think, another way that we demonstrate that biomass is going to be an effective competitor to the imported fossil fuels. So, we are going to continue this program and we think it is promising.

BIODIESEL RULEMAKING

Mr. LATHAM. Great, I appreciate that. I know the chairman's interest in brevity, and I have another hearing too, but last year in the omnibus appropriations bill, we had biodiesel provisions in there, and it said the Secretary shall before January 1st of 1999, issue a rule establishing procedures for implementation. Has that rule been issued, and, if not——

Mr. RICHARDSON. In other words, no. [Laughter.]

Mr. LATHAM. So, we obviously have missed our January 1st, 1999 rulemaking.

Mr. RICHARDSON. On the diesel, it is being developed. [Laughter.] Let us do better there.

Mr. LATHAM. Okay. Thank you very much, Mr. Secretary. Thank you, Mr. Chairman.

Mr. PACKARD. Thank you, Mr. Latham. We are delighted to welcome a new member, Mr. Clyburn from South Carolina, and the time is yours.

Mr. CLYBURN. Thank you very much, Mr. Chairman. Mr. Chairman, I want to express my appreciation to Secretary Richardson for his testimony here today and pledge to you, Mr. Chairman, and to the Secretary, my cooperation as we are trying to develop an appropriations bill that will meet the needs of the various programs we discussed here today while ensuring that taxpayers receive a good return on their dollars.

First of all, let me add my association with the concerns expressed by Mr. Pastor and Mr. Latham as it relates to the PMAs. As you know, in rural South Carolina, I have those concerns as well. Mr. Secretary, as you well know, the Department of Energy has a significant presence in South Carolina. I took note of the fact that you spent your very first day on the job down at the Savannah River site, and I hope we can count on your interest not waning in that. But I wanted to express my strong support for SRS' high level waste Alternate Source Processing Program. I know the Department has budgetary constraints and must balance competing interests, and it may be useful for you and I to meet privately to

discuss this, but I want you to be aware of my interest in this program.

YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY

I think I only have one real question outside of my interest in the PMAs, and that is the characterization of the Yucca Mountain program, as you know. In my opinion, the Federal Government has not met its responsibilities, and the result is that South Carolina electricity customers are paying a disproportionate share of the Federal debt. I think that is a bit unfair, and I would like for you to give me briefly your vision of what is going to happen with that program.

Mr. RICHARDSON. Thank you, Congressman. First, on Savannah River, it is one of our strongest facilities, and I appreciated the way that you spoke up for it when we decided on the pit disassembly. I know your views; I think we responded to them. Savannah River has three key facilities for the Department of Energy. It is a community that is supportive of our Department, and we are supportive of the relationship. It is going to continue; it is going to flourish.

On your question, Congressman, and I know Savannah River has done its share for the country in foreign fuel and domestic fuel and waste, I appreciate what you said. I have put forth before the Congress—I have floated a proposal for consideration on nuclear waste that basically says that the Department of Energy would take title to the waste at the 72 different sites on an interim basis until we have made a definitive decision on Yucca Mountain as the permanent repository. Now, that decision is to be made in the year 2001.

I don't want to get into a legislative train wreck with the Congress, which in the past has voted very overwhelmingly to say that there should be interim storage at Yucca Mountain. We think the science and transportation factors dictate that we be very careful that we find ways to work together. This proposal that I have made, we are not necessarily endorsing it or putting it in legislative language; it is a way to start a dialogue with the Congress so that States like yours and delegations in the Congress can be assured that we have a policy.

Now, under my plan that I floated, the utilities would have to drop all their lawsuits to the Department of Energy to the Federal Government. We are liable now because we have not met these deadlines. And from the utility fund, we would want—it is about $7 billion to construct this permanent repository—it would pay for us taking title. Now, this doesn't mean that you are dramatically changing what exists today. It basically means that we would contract out to make sure that this waste is properly stored and maintained as it is now.

I don't know what kind of response we are going to get. I am testifying before the Energy and Commerce Committee on this. Some utilities like it, Wisconsin likes it; others don't. This is a new proposal on the table. What I want to avoid with this Congress and this committee is a showdown on this issue. I think we can work together to try to address this very serious concern.

Mr. CLYBURN. Well, thank you, Mr. Secretary, and thank you, Mr. Chairman.

Mr. PACKARD. Thank you, Mr. Clyburn. Mr. Knollenberg from Michigan.

Mr. KNOLLENBERG. Mr. Chairman, thank you very much, and, incidentally, let me congratulate you, which I haven't had the opportunity to do; this is our first meeting. I want to also congratulate Mr. Visclosky as ranking member. We do look forward to working with both sides of the aisle, and we do a pretty good job I think, as you said.

Mr. Secretary, I want to congratulate you on your position; it has been a while since you have held it, but it is the first time that we have had a chance to really talk, and I appreciate your coming forward today.

CLOSURE FUND

I wanted to talk about the Closure Fund. I know you expressed your optimism, at least your support of that. This Closure Fund, as you know, does something about closing down some of those sites, Rocky Flats being one, that brings us, hopefully, some successes; something I think we dearly need. I remember back in 1995, when I first became a member of this subcommittee, they were projecting that the date that they might reach closure would be somewhere around 2065. We found that totally unacceptable, absolutely unacceptable, and so we engineered some ideas about bringing about something that would put many of these sites online for closure sooner. And, so we adopted sites, such as Rocky Flats, Fernald, Mound, and others to close them down. The idea being that by closing them down, by bringing about a success, we will have more money for the Savannah Rivers of the world, the Hanfords and the others, because they have problems too. We don't mean to look away from them, but I do think that we need a victory.

One of the things I have noticed is the budget does not allow for the monies that are needed to bring closure about by 2006. Instead, it is 2010, and I guess my first question to you is what is the amount of money that would be needed to bring it to closure by 2006, and why haven't you asked for more money to bring that about?

Mr. RICHARDSON. Well, first, Congressman, we appreciate the work that you have done on this. I know this is a big interest of yours. I am here to tell you that I am committed to closing Rocky Flats by the year 2006.

Mr. KNOLLENBERG. I am glad you said that.

Mr. RICHARDSON. And the amount that we have requested, we believe, can do that. Now, the contractors are running around saying they need more money, and I hope you don't listen to them, because with the budget we have, I believe we can make that target.

Closure of Rocky Flats, Congressman, is also contingent on solving other problems I have with the opening of the facility in New Mexico, and waste coming from Idaho. So, I would hope that you will help. You have taken a big interest in this program, not just the funding, but also with the targets, that when we look at this prospective meeting and summit of governors and of other elected officials to set up targets for all the other facilities just the way you did for us on Rocky, that we do it for the Mounds and Fernald

which I will be visiting soon and do it in a systematic way. But I can assure you the amount we are asking for Rocky Flats this year—we are requesting $100 million more in our cleanup funds than we did last year. It is enough, so——

Mr. KNOLLENBERG. It is enough?

Mr. RICHARDSON. It is enough, so these tales that they need more money because that way they can complete the cleanup or proceed with a contract, don't listen to them. We can do the job, and I can assure you we will.

MANAGEMENT CONCERNS

Mr. KNOLLENBERG. Well, I appreciate your going on the record making that statement. We will have the continuation, I am sure, of this debate.

Let me go to another question that I think has to do with—and some of this is not on your watch, not on your time, but it is a concern that many of us have—it has to do with management. You spoke of the need for better management, and I don't disagree with that. I think the DOE, very honestly, can be assessed as being in some difficulty when it comes to having people in positions at the top. If you look at—let me just ask you, how many positions in DOE require Senate confirmation?

Mr. RICHARDSON. Too many, but—[Laughter.]

My point in answering that—you know I am having difficulty getting my nominees confirmed.

Mr. KNOLLENBERG. Let me just say this, I understand that you are. I can probably answer that question for you. I believe there are five. You can disagree out there, and if you think so——

Mr. RICHARDSON. No, you are right, there are five, and there may be a sixth.

Mr. KNOLLENBERG. And there may be a sixth when you consider the position of the Assistant Secretary of EM. I don't disagree with you that you are having some difficulty, and some of this is not on your shoulders or shouldn't be if it is not on your watch. But there has been a little bit of a revolving door at the top, and the problem is there appears to be no revolving door at all at some of those other positions, because what we have are acting individuals, and, frankly, acting people I don't think get you there.

You spoke of this need for better management, and I quite agree with you, but you also, I think, need managers. You need some people in position to actually manage, and I don't see that with acting managers. My concern is that there must be—and you may have some thoughts about this—there must be some very difficult thinking going on about finding a qualified person for this office. I would just like to ask you why or why is it so difficult? If it is so difficult to find that one person, then, perhaps, we need to—and I am just asking—break it up in some fashion. But there appears to be a deficiency of leaders in positions where there should be strength.

Mr. RICHARDSON. Well, you have pointed to a very important problem, and I will say, Congressman, we have for the job that you care about—I know about the Assistant Secretary for Environmental Management—we have somebody up before the Senate; her nomination has been up there for a while; a woman who has run

NASA, the Space Center in Houston. She is good; hopefully, she will be confirmed soon. But we have had her up here.

This right here, Rose Gottemoeller who runs all my Russia programs, has been up for about three months now, and I know that the Senate was preoccupied with other problems, but this affects me when my nominees—and they are very capable—aren't confirmed. The Deputy Secretary who comes from the Office of Management and Budget who is like the Department's manager is still pending. I think these are going to be resolved soon, but I can't stress to you the importance that we have and we attach to attracting good managers.

This woman, Carolyn Huntoon, her main strength is management. She manages well; she managed the space operation, and we think that those skills are paramount in this job of environmental management which I know that you have paid a lot of attention to.

Mr. KNOLLENBERG. At the Office of EM, for example, we have had an acting secretary since, I say, October of 1997. I admit that Mr. Alm didn't leave until January 1, but the announcement was made in October, and we still don't have anybody with their hands on the wheel who has the capacity to lead as something other than acting. I am reminding you, I know of what you know, but I want it on the record that we have some concern about that.

Mr. RICHARDSON. Yes.

Mr. KNOLLENBERG. We truly do, so I—I have consumed, I think, more than my share of time here—but I did want to get those things out, and I will wait for the next round for a couple of other questions. Thank you, Mr. Secretary.

Mr. PACKARD. Thank you, Mr. Knollenberg. Mr. Edwards, from Texas.

Mr. EDWARDS. Thank you, Mr. Chairman. Let me first say that having worked with you on the Military Construction Subcommittee where you served as chairman, I look forward to working with you here. Your leadership there was strong, decisive, bipartisan, and fair, and I know those same skills will come to this subcommittee and make a great contribution to important issues under your jurisdiction here. I look forward to working with you.

Mr. Secretary, sorry I missed your opening statements, I was——

Mr. RICHARDSON. You didn't miss much. [Laughter.]

Mr. EDWARDS. I was at a Thursday morning meeting in which you and I used to sit together. But I am thrilled about your appointment as Secretary and look forward to working with you as well. If what I touch on in my one or two questions has been addressed, please let me know, and I will refer back to the record.

I think about what we do in this Congress—most of what we do a year or two or three after we are gone will be quickly forgotten. But if I look at one legacy I hope would come out of this committee and all our work together, it would be that somehow and someway we had made life safer for our children and grandchildren vis a vis potential threats from nuclear, chemical, and biological attacks against the 50 States of the United States.

CONTROL OF SOVIET NUCLEAR MATERIALS AND CHEMICAL AND BIOLOGICAL WEAPONS

I would like to ask two questions, basically: one, what is your overall summary of how we are doing in the former Soviet states in helping them get control of their nuclear materials, and, secondly, what do you think the role is of the Department of Energy in relation to the Department of Defense in chemical and biological weapons? Is there some expertise DOE can bring to the table? If I were playing devil's advocate, and I said why not just put all of the efforts to deal with chemical and biological weapons and threats against the United States under the auspices of a much larger Department of Defense, what would be your response to that?

Mr. RICHARDSON. Well, Congressman, what we bring at the Department of Energy is technology from our National Laboratories. For instance, the construction of and the research and development of hand-held detectors, ways that border guards can detect a nuclear accident or a nuclear spill; little portable machines that we are developing at our National Laboratories, specifically, Lawrence Livermore, Sandia, and Los Alamos.

When the President, a month ago, had his chem-bio initiative, it was the National Laboratories of the DOE that did the most sophisticated technology that is being used by our local cops and firemen, the first responders, that are not used by some sophisticated scientists but that can be used against the potential of chem-bio attack in this country.

We work very closely with the Department of Defense. They have the main funding for responding to an attack. Our funding is relatively modest. I think in fiscal year 1999 it is $19 million, and we are asking for $32 million based on the renewed threat.

But in terms of our programs with Russia, we think that they are being managed well. A recent GAO report, while citing some management concerns, came out and said that our program to manage with the Russians the safety of their nuclear weapons, their materials, the potential theft of weapons, the security of sites, nuclear cities initiative, keeping Russian scientists from selling out to other countries was working well, and, Rose Gottemoeller, who is here, runs our program. We are right now working at 40 sites in Russia, Russian sites, and we have contained approximately 650 metric tons of plutonium or highly enriched uranium. We have security systems right now at 25 out of the existing 53 sites, and we are upgrading 100 buildings at the remaining 28 sites.

One of the problems—since you know this issue and you know Russia—is Russian guards have no blankets, because they are not getting paid. There are no locks on the gates, so you are also doing very elemental things. The guards don't have shoes because of the economic conditions; and they are not getting paid. So, we have to have a program, and we need the support of the Congress to make this program work.

Mr. EDWARDS. Well, I appreciate the work the Department's already done, and sometimes you get less credit for preventing a disaster than responding to it or less credit for preventing a war than

winning a war, but, clearly, prevention is better than reaction later.

I will follow up with some of your leadership on the question of $32 million, I think, was that the request for chem-bio research?

Mr. RICHARDSON. Yes.

Mr. EDWARDS. Because maybe there are other areas of the Government that are getting large amounts of research, but if one begins with the presumption that our first responsibility in this Congress is to defend, literally, the lives of our American citizens, the fact that we would be putting out a $1.5 trillion budget with $32 million into research to defend over 200 million citizens from the reality of a chemical or biological attack seems amazingly small. And I would like to get a better sense of maybe where all the different research is going on.

Mr. RICHARDSON. We will provide that for you.

[The information follows:]

FEDERAL RESEARCH AND DEVELOPMENT TO ADDRESS THE THREAT OF CHEMICAL AND BIOLOGICAL WEAPONS

The Department of Energy Chemical and Biological Nonproliferation program is one of several complementary Federal research programs focused on the chemical and biological threat. The Department of Defense R&D programs (including the Chemical and Biological Defense Program and several DARPA programs) are primarily aimed at military, as opposed to civilian applications, although some areas of research certainly have dual use. The Department of Health and Human Services is developing new vaccines and medical therapeutics. The interagency Technical Support Working Group supports a broad range of near-term counter-terrorism technology development efforts, some of which specifically deal with the chemical and biological threat. Research is also supported by the Department of Justice through National Institute of Justice and FBI programs.

In addition to these research programs, other important programs underway at several agencies emphasize operational, training and acquisition dimensions of preparing for chemical and biological attacks. However, the threat of domestic use of chemical and biological weapons, whether by terrorists or national states, must be viewed as a long-term problem. We must bolster our preparation and response systems to ensure our citizens are not vulnerable. Research investments today and in the coming years will be required in order to develop, demonstrate and deploy technologies and systems that can offer increased civilian protection and effective response capabilities. The Department of Energy is committed to developing such technologies and systems, and to working with other federal, State and local planners and responders that ultimately must use them.

CHEMICAL AND BIOLOGICAL WEAPONS

Mr. EDWARDS. And if we had additional money, what would we do? I think we need to redefine the whole concept of national security. If I were a terrorist—I am for a limited Missile Defense System—but if I were a terrorist, I am not going to send an ICBM into the United States knowing your Nation can then wipe me off the face of the Earth, because you will know exactly from which place that missile was launched. I am going to get a cup of anthrax and put it in the water supply of a small town in Texas or a mid-size city in Iowa and terrify every family in America. We need not just small incremental changes in this area, we need to be sure we are putting the resources there that we need to. So, I look forward to following up with your people in trying to determine what the proper role is. I don't want to duplicate what DOD is doing or somebody else, but if you have expertise that others can't duplicate, we ought to take advantage of that and, I believe, as just one voice. We

ought to make that a real priority within our Federal Government. Thank you, Mr. Chairman.

Mr. PACKARD. Thank you, Mr. Edwards. Mr. Frelinghuysen, from New Jersey.

FUSION ENERGY FUNDING

Mr. FRELINGHUYSEN. Thank you, Mr. Chairman. It is a pleasure to work with you. Mr. Secretary, thanks very much for coming up to New Jersey last Friday and for invoking the fact that you visited the Princeton Plasma Physics Lab. It was good to have your irrepressible self up there on behalf of the Department. That lab, as you are aware, you saw first-hand, is doing some remarkable research, and this leads to my first question about fusion research.

The Fusion Energy Sciences Program, as you are aware, Mr. Secretary, did suffer severe budget cuts over the last few years back, going from $300 million to approximately $230 million today. For the last few years, the budget has leveled out. Do you anticipate requesting increases for this program in coming years, and what would be your general funding projections?

Mr. RICHARDSON. Well, as I told the Princeton people in your presence, I think that fusion research is critically important. I had gotten little doses of the good work when I represented Los Alamos in the Congress, and I think the work at Princeton is outstanding. These fusion reductions, as I mentioned to you, weren't on my watch. Martha Krebs, my Science Director, is here. We want to secure proper funding this year. Quite frankly, because of the importance of fusion, I would like to see us do more in the outyears and the years ahead, and I want to work with you to do that.

I also want to say to you that I appreciate your role in recognizing this great lab. I know it is not right in your district, but you have become sort of the patriarch to make sure that lab is properly funded, along with Congressman Holt, and we appreciate that.

TOKAMAK DECOMMISSIONING

Mr. FRELINGHUYSEN. I am not sure I want to be classified as a patriarch, but I am a strong supporter. In the overall scheme of things, what disturbs me, if you look at the overall budget, nuclear energy for our country represents just under 20 percent of the Nation's electricity, yet we are investing far more in terms of issues like solar and renewable, and sometimes this appears to be skewed. I think fusion does represent, I think, a viable part of our future, and I am not alone in advocating for it.

As you know, Mr. Secretary, this budget contains funding for the start of the decommissioning of the Tokamak machine at Princeton, some $10 million. I was surprised to see this funding contained in the program account for this task, and I am wondering why it is in there? Normally, when you have a decommissioning of machines and devices, it is in the EM account. Could you provide me with some sort of rationale as to why it is in the program account? Some might argue—and I would since I am interested in fusion—that other elements of the Fusion Program would have to be reduced to make room for the decommissioning activity.

Mr. RICHARDSON. Congressman, first of all, we put money in the budget for the decommissioning, and we thank you for your leader-

ship on that. I had a chance to see this Tokamak facility, and it is operating—the decommissioning is going to operate effectively and efficiently. It has been a general practice of the Department that when a program reuses—plans to reuse a facility that what generally happens is that the program is responsible for decommissioning that facility, and——

Mr. FRELINGHUYSEN. Actually, it was my understanding to the contrary, that normally decommissioning of machines and devices are carried out in the EM account, but what does history show?

Mr. RICHARDSON. History shows that we have some examples that support what I just mentioned: the National Spherical Torus Experiment at one of our labs; the main injector at Fermi National Accelerator; the B-factory at Stanford Linear Accelerator. Basically, we have established facilities. What we do is we refurbish or recycle many of our established assets for use in these new projects. In other words, we try to get the most out of the existing deployments.

I would like to provide additional information for the record.

[The information follows:]

FACILITY DECOMMISSIONING

History shows that programs, other than EM, have refurbished and recycled many of their established facilities or assets for use in new projects. Recent examples include the Fermilab Main Injector and the B-Factory at SLAC which made use of existing site credits and, of course, the National Spherical Torus Experiment which is using part of the TFTR building and support systems. Basically this is done, by the programs, to maximize use of existing resources and infrastructure and minimize costs of new projects. For the fusion program, the TFTR building and support systems are a valuable resource which could be used for a future fusion device if the TFTR vacuum vessel and other contaminated systems could be removed.

GAO REPORT ON EMPLOYMENT FOR RUSSIAN SCIENTISTS

Mr. FRELINGHUYSEN. Well, I understand where we can cannibalize and reuse things; that makes sense, but I do think we ought to try to spend as much money on new initiatives and less money for decommissioning of these types of accounts. I will continue to work with you to make sure that we put the money less into decommissioning—although, obviously, those are necessary expenses—and more into continuing research opportunities.

I would like to shift, if I could, I just have a couple more minutes here. Recently, the General Accounting Office issued a report criticizing your program aimed at developing non-military jobs for Russian weapons scientists in Russia. This was reported at some length in the New York Times, initially, before the GAO report came out, so that the Russians do not leave to work for other nations unfriendly to the U.S. It is noted in that report that only 37 percent of the $63 million spent through June 1998 on the program reached the Russian scientists. About 51 percent went to DOE for National Laboratories whose personnel administered and oversaw the individual projects. Is this what the Department envisioned for the program?

Mr. RICHARDSON. Let me say that this GAO report also said that this is a useful program and that we need to manage it better, but that they endorsed our objective of protecting nuclear scientists from defecting and also dealing with the whole issue of proliferation prevention. They did point out some management shortfalls that we are addressing.

Mr. FRELINGHUYSEN. But the description concluded, and it was somewhat disturbing, that the DOE Lab officials did not know how many scientists are receiving funds or whether key scientists and institutes are being targeted. I don't know whether that is accurate or not. Obviously, given that sort of conclusion, that calls out for some major changes, and I assume those are in the offing.

Mr. RICHARDSON. Yes, well, we don't totally agree with that. They did point out some shortfalls; you mentioned one. We are trying to move the lab representation to about 50 percent rather than the 37 to 60 skew, but let me point out to you that I think that is sort of an unfair rap, because you want our lab scientists, the people that made our nuclear weapons and maintained them under the experts, to be involved in this program. They happen to be in Los Alamos and Sandia and our weapons labs, and you have to transport them to Russia; you can't move them. So, it is a little bit of a disingenuous attack, but we are addressing that. We want to spend more money in Russia with these scientists. We can assure you that on another criticism we are trying to make sure that there is commercialization. I think there is a total of $38 million that has been invested.

My main point is that this is a very important objective. We need to manage it better, I agree, but the tenor of the press report was that this was a problem program, that money was being wasted, and I can assure you if you read the fine print of the report, they say that this program is important; that it achieves its objectives, and that it needs to have some management improvements.

Mr. FRELINGHUYSEN. Well, lastly, are the Russians taxing?

Mr. RICHARDSON. Right now——

Mr. FRELINGHUYSEN. I think that is bizarre, but——

Mr. RICHARDSON. Yes, we are negotiating with the Russians when Primakov, the Prime Minister, comes here to meet with the Vice President next month. Hopefully, we will have a negotiation that will eliminate that tax. That has been a problem. There is a tax component; we don't think it should be in there, and we are trying to deal with it.

Mr. PACKARD. Would the gentleman yield on that just for a moment so we don't have to come back to this issue, because I certainly wanted to discuss that, too? You have gotten the GAO report and its concerns. Hopefully, you will act on them.

There is a lot of corruption in Russia. We know that. We would hope that this money does not filter to the wrong people. And hopefully, your oversight of the project will be sufficient to make certain that it gets to the right people.

And secondly, I certainly want to emphasize what Mr. Frelinghuysen has already done, and that is that more money needs to go to the project and not to the oversight labs here in the United States.

Mr. FRELINGHUYSEN. I appreciate that. Thank you, Mr. Chairman.

Mr. PACKARD. Let me bring up one point before I go to Mr. Visclosky, and then I want to come back to my—a couple of questions that I would have.

RICHLAND REPROGRAMMING

We have the reprogramming request that we received a few days ago on the Richland reprogramming—it is $53 million, which is a fairly sizeable reprogramming at least sizeable in what I am used to reprogramming as the chairman of other subcommittees. And it just arrived. You've had it for six months. Your people have had it for six months, and now it is laid on us to do the analysis work and to get it done in a few days or else we are going to be dismissing or laying off 700 contract employees at Hanford. That is not a good position that this committee likes to be put in. We would hope that you would tell your people not to send a reprogramming with a deadline like that. Mr. Visclosky and I do not want to be responsible for laying off 700 contract people at Hanford. And yet, we do need a little time to analyze the reprogramming. You've had it six months, and then given us a week or two. That is not the way we would like to be treated. We hope that you will improve that.

Mr. RICHARDSON. Mr. Chairman, you are right. We need to do better there. I have also had the same problem that Mr. Knollenberg referred to. I have some vacancies at Hanford because I want a strong team there. And it has taken me a while to move the team around and bring in some strong people. That was a factor in the delay. The head of the Richland office, the Office of River Protection, a general counsel position, the deputy—we have—we are going to be in the next 30 days moving some very strong people there.

But you are right. You are right. There was a delay that is not acceptable. We have sent a message down that this needs to move faster. There is, though, Mr. Chairman, an urgency to move on this. And it is part of the privatization project. It is part of the privatization, which you all have wanted us to do.

Mr. PACKARD. The merits of the request, Mr. Secretary, are not in question at all, and I think it will be processed as quickly as we can. It is just that we felt that we were treated a little bit with a hook that we didn't appreciate. And thank you very much. Mr. Visclosky?

Mr. VISCLOSKY. I am fine, Mr. Chairman.

YUCCA MOUNTAIN NUCLEAR WASTE REPOSITORY

Mr. PACKARD. Thank you. Then let me go on to some other questions. I was going to talk about the weapons programs in Russia and the closed cities and so forth, but you—we have talked about that sufficiently.

The Yucca Mountain Nuclear Waste Repository has been an ongoing difficult problem for this committee and, of course, for your Department. And we recognize that. The administration has continued to oppose legislation to modify the Nuclear Waste Policy Act and provide interim storage, and that has certainly put the Federal Government into a little bit of a difficult position. As I read further material, I find that lawsuits and costs and so forth could go from a couple of billion to $8 billion dollars or more in trying to deal with this, and that is monies that I don't know where we could ever come up with.

But at any rate, why does the Department still continue to refuse to make proposals, legislative or otherwise, in addressing this responsibility? And what is being done to literally solve the problem?

Mr. RICHARDSON. Mr. Chairman, we will continue to oppose interim storage at Yucca Mountain. It wasn't part of the legislation. We want good science to make decisions, not political factors. We want to make sure that the viability of Yucca, the suitability, which is not to be decided until the year 2001. As you know, I recently, at the end of last year, submitted to the Congress a report that says we should continue research on Yucca. There are no showstoppers. There are some water problems with that mountain. We would have to continue studying it.

We have opposed interim storage because of the transportation factors. You have to move the waste to Yucca. We think science should make those decisions.

But, Mr. Chairman, I have proposed something new. I did it before the Senate as a starting point to discuss, to have a dialogue, rather than engage in a veto fight that I believe took place a year ago. What I have proposed is, let us discuss ways in which we can bring environmentalists, the utilities, and the States together in a plan along this line. And this is not in concrete.

The Department of Energy takes title to the waste at the 72 sites that exist in the country. In exchange for that, we take responsibility. The utilities drop their lawsuits against us. As you mentioned, they have sued us, and we have had a couple of verdicts against us. That concerns me. That would perhaps come out of our budget. But that concerns all taxpayers.

There is a fund of $7 billion in the utility fund that would be used to pay for this program. We think that we can achieve this. But maybe there is somebody else who has a proposal. I almost didn't get confirmed by the Senate, when I was told that we had no authority to float or negotiate. Well, I have that authority. I floated that with the Senate, and I am appearing before the Commerce Committee—Energy and Commerce now—in the next couple of weeks. And we have thrown that out. We know it is a problem, Mr. Chairman. And this committee has been positive in funding the activities at Yucca. We are spending about $500 million at Yucca to make sure it works; that we do the proper scientific work; that there is a proper foundation. And it is a serious problem.

Mr. PACKARD. As you well know, Mr. Secretary, leaving the spent fuel where it is at is probably more dangerous and more problematic for us than finding an interim solution. That is my—and I am sure this committee's—biggest concern is that we just don't have a policy that the companies and the agencies can deal with. Is your proposal going to lead us to a solution on an interim basis?

Mr. RICHARDSON. Well, I hope so. It has received mixed reviews—stony silences. It is kind of out there. I just did it last week. We are also trying to get some cost data. This is not perfect. I just don't want us to have a showdown where we are forced, in our judgement, to do something that scientifically is not sound. And that is to move ahead with interim storage. We would have to transport all the waste to Yucca. I think we can do it safely, but all I am saying is right now there is waste at these 72 sites. The utilities are managing them. They are doing a good job. What we

would do is take title to them until we have permanent storage. So you are not I think dramatically changing the——

Mr. PACKARD. Have we agreed to pay for the cost to the utilities for storage?

Mr. RICHARDSON. Well, there is a fund. Yes, there is a fund that the utilities contributed to for the creation of the Yucca Mountain site, $7 billion. So there is a fund to pay for this. I just don't want taxpayers to get stuck with new funding for this.

Mr. PACKARD. Thank you. We will go to Mr. Edwards then. Mr. Edwards, okay. Mr. Forbes?

CLEANUP OF NUCLEAR WASTE

Mr. FORBES. Thank you, Mr. Chairman. Mr. Secretary, I know that you share a great priority with getting cleanup done, and I would like to visit with that a little bit more if I could for a moment.

And I do appreciate the $100 million increase that you have requested, I guess making that a total of $5.7 billion for cleanup at your various nuclear sites across the country. There is I think probably an institutional frustration, and I mean that both from the Department of Energy perhaps and certainly from Congress' point of view that our constituents would like to see us get these sites cleaned up yesterday. And I know because of financial constraints, we have to plod along and hope that we can maximize our cleanup with the monies given.

There was one proposal apparently that has either been presented to the Office of Environmental Management over at DOE that looked at maybe the private contractors coming in. Perhaps at the surplus defense nuclear facilities, where we are now storing some of the hazardous waste, that if we deactivated some of those sites and had a private contractor come in that some of those savings could perhaps be invested in having that contractor clean up the site, even go to the private marketplace and get dollars to expedite cleanup, and then on a fixed-base cost the Department would pay for that.

Has that idea got any currency with you in the Department, or are there other ideas that might be floated around. I know that all of our Departments and agencies had to be very creative in approaching a lot of these problems. Could you comment a little bit about that?

Mr. RICHARDSON. You know, I don't have the specifics on that proposal, but I am ready to consider ways to make sure this cleanup works, and it hasn't. I think you were overly generous. You said perhaps funding reasons were responsible for us not doing the cleanup. We have not managed these sites the right way. We have not stayed—I think Mr. Knollenberg will tell you, we have not met our deadlines—Hanford being a big one. We have had some problems with Brookhaven, too.

So I am ready to look at all options that accelerate the cleanup, and at this upcoming session with governors and others where we look at all our objectives in the cleanup area, at all our sites. And set up some standards and funding goals and principles that we are ready to look at. We don't have a national policy. You pointed

out the problem. We have separate policies, and I think use of the private sector more efficiently is important.

Now, I will tell you that some of the commercial sites, we have States not wanting us to use them, because they are not licensed in some cases by States. So we have to take that into account. We have to make sure that these sites are fully certified and that they are safe. This is a—my staff is telling me to tell you that you have a very good new idea. [Laughter.]

BROOKHAVEN NATIONAL LABORATORY EMPLOYEE CONCERNS

Mr. FORBES. I thank your staff. Thank you. Well, I take it that the Department is receptive, and I appreciate that, Mr. Secretary. I have one other quick question.

I know that some of the employees from Brookhaven National Laboratory have discussed, I believe with you directly, that some of the nuclear facility workers felt negatively impacted if, in fact, there is a reorganization, a RIF, or even a downsizing, based on a decision out of the Chicago office that prevented them from partaking in retraining and getting priority in reappointments to other nuclear facilities and the like. Could you comment about their concern?

Mr. RICHARDSON. We will come up and talk to you about that.

I don't see it as that big a problem. I think when I was at Brookhaven I said to you that I felt the budget would be stable there. There would be no layoffs. And I think I can stick with that. The issue of the training vis a vis the Chicago office, I am going to look into. But that is part of—that is part of why I want to reorganize this Department.

Now, I think there are good reasons perhaps why New York reports to Chicago. But maybe there is a better way. And, you know, there are these webs of reporting that have been at the Department for years, and I don't know if you remember—you were probably too young. Admiral Watkins, who was a previous Secretary of Energy, used to say that what we had was all these fiefdoms everywhere. Nobody knew what they were doing. Well, I don't think they are fiefdoms, but sometimes I have difficulty getting a handle on who reports to whom and how we can manage ourselves better. But we will come up and talk to you about that.

Mr. FORBES. I appreciate that, and I do concur with the concern about the fiefdoms. I think it is part of the reason why Brookhaven National Laboratory went through the difficult time it did, because of these cross reporting—lines of reporting, et cetera. But I thank you for taking a look at that. Thank you, Mr. Chairman.

Mr. PACKARD. Thank you. Mr. Knollenberg.

SOLAR AND RENEWABLE FUNDING VERSUS NUCLEAR ENERGY FUNDING

Mr. KNOLLENBERG. Mr. Chairman, thank you again, and Mr. Secretary we will come back with a couple of more questions.

I want to focus a little bit on Kyoto and the climate change issue. And notwithstanding, of course, the position of the House and the Senate, the administration has gone ahead and signed the Kyoto Protocol, a treaty I believe is flawed. I don't think it is going to do anything to reduce CO_2 emissions, and that I believe is the goal of

something I want to talk about which is the CCTI, the President's initiative.

I just want to take a moment, and look at the science that is being conducted by the Department of Energy relative to CO_2. In your prepared remarks, and you might have made this comment when you were making your abbreviated delivery, you mentioned the investment, you looked at this as being an investment. And I would like to look at the return on the investment with respect to the CCTI. It is true, is it not, that the CCTI is an effort to reduce CO_2, greenhouse gases?

Mr. RICHARDSON. Yes.

Mr. KNOLLENBERG. Yes. My concern is why is the focus then on the solar and the renewables when you look at the kind of viability of those areas with respect to what we currently have on the table? For example, coal is about 50 percent. I know there have to be ways to clean coal. Nuclear is about 20 percent. It doesn't produce any CO_2, greenhouse gases. Hydro is, I think, about 10 percent and then natural gas is in that range of double digits perhaps, and that maybe I've got those backwards, but nuclear I know is 20 percent.

It seems to me that if the aim is to reduce CO_2, that we should be focusing on the areas that really do produce a minimum or zero CO_2. I think you would agree with that.

So my drive here is to, my emphasis is to put some thought on the nuclear side. And we can talk about the thrust and the achievements in the areas of wind and solar, but the fact is that they produce way less than one percent, a fraction, a tiny fraction of one percent of today's electric power. So it would seem to me that the focus should be on those things that do work, those things that are in the marketplace that are market tested. And I would wish for one that tomorrow, we could wake up and overnight solar would be a source of power that would be commercially viable and effective and that would reduce the problems we have with if CO_2 is, in fact, that problem to the world that some suspect that it is. That could be debated, of course, but I am—I just would like to have your thoughts about where can or why can't we put more focus on those areas that do work instead of those that are still as yet untried? They are tried, but they are not proven, I should say.

Mr. RICHARDSON. Well, Congressman, let me answer it this way. First, we are not trying to implement the Kyoto Agreement through the back door by funding some of these renewable initiatives. Let me just be clear about that.

Second, if you look at our budget, we have some increases, and we recognize the importance of nuclear energy. And we also recognize, and our spokesman at the Buenos Aires conference on climate change that recently took place late last year mentioned nuclear power, the nuclear component in our discussion.

Mr. KNOLLENBERG. And, Mr. Secretary, not to interrupt, but so did Ambassador John Rich, when we spoke with him in Europe during the month of January. So those—they are advocates, I don't mean to suggest there's not.

Mr. RICHARDSON. But if you look at funding, we are doing well. We are doing well in the Nuclear Energy Research Initiative, and the Nuclear Energy Plant Optimization Program. I hope we can do

better. Last year, we requested $10 million for this, and it was cut out by the Congress. This is research that we think is important.

Coal research. I think—and Dan—well, this is fossil fuels—we are doing more natural gas and coal research. We think—let me tell you why we think renewables and energy efficiency reduction of carbon, some of the requests are important. They are not back door attempts to bring climate change approval through the Congress. When you invest in renewables, we think it improves our energy security. It does reduce emissions. It maintains our lead as a country in science and technology. It gives us abundant supplies of affordable energy. It creates jobs, maintains a strong national economy, so I would hope when you look at what we have proposed in renewables, and there is an increase in energy efficiency programs—there is a slight increase, that you see them as something that is important to our national energy policy and not as climate change initiatives.

I am not disagreeing with any points that you made. Coal, when I was in New Mexico, clean coal research and coal gasification. We want to have a pollution-free power plant, coal power plant.

ALTERNATIVE FUEL VEHICLES WITHIN THE DEPARTMENT

Mr. KNOLLENBERG. Let me just interrupt here, because I agree with part of what you say. But you know in the increases, the solar and renewable increases, they are substantial, it is 73 percent. Solar thermal is 37; wind is 56 percent; and yet nuclear is way down to a pinch, hardly—it is not an increase at all. And I agree that we have done some things there.

Here's the concern I really have, and I think I could formalize this into a question. We know that DOE supports these, and you support them. But does DOE use these themselves? Do you, for example, could you supply for the record—if you can't, can somebody on your staff indicate how many automobiles that DOE has that are, in your fleet, that are electric or hybrid?

Mr. RICHARDSON. Well, I—one of my two is gas.

Mr. KNOLLENBERG. Yours? I mean the Department.

Mr. RICHARDSON. Oh, but seriously.

Mr. KNOLLENBERG. I am talking about DOE.

Mr. RICHARDSON. No, my DOE car, my second car.

Mr. KNOLLENBERG. Good.

Mr. RICHARDSON. I only have—I shouldn't tell you have many cars I have. I have two. [Laughter.]

Mr. KNOLLENBERG. Well, how much does the Department, how many vehicles does the Department have? If the Department is so strongly in favor of using solar and renewables, how many vehicles do you have?

Mr. REICHER. We are—Mr. Knollenberg, we are actually ahead of the requirements under the Energy Policy Act that was established in 1992.

Mr. KNOLLENBERG. Well, the State of Michigan has 300 vehicles, for example, that they use that are natural gas. How many does the DOE have?

Mr. REICHER. We have hundreds of alternative fuel vehicles—natural gas, ethanol, electric. Hybrids are just coming out this year.

Mr. KNOLLENBERG. Could I have a complete list of all of those, and specifically the kind of vehicle that it is and what it consumes?

[The information follows:]

NUMBER AND TYPE OF ALTERNATIVE FUEL VEHICLES AT THE DEPARTMENT OF ENERGY

At the end of fiscal year 1998, the Department of Energy had 650 alternative fuel vehicles in its fleet. Most of the vehicles are natural gas, but we also have ethanol, propane, and electric vehicles as shown in the table below. The vehicles are primarily pickup trucks and vans, but include some compact and mid-size sedans. We expect to add 1,000 alternative fuel vehicles to the Department's fleet during fiscal year 1999 and our planning and acquisition efforts are well underway. Barring any unforeseen ordering or delivery complications, we expect at the end of fiscal year 1999, to have 1,650 alternative fuel vehicles as shown below.

U.S. DEPARTMENT OF ENERGY ALTERNATIVE FUEL VEHICLES

	Estimated in fleet or awaiting delivery at end of fiscal year 1998					Estimated fy 1999
	Compact sedan	Mid/full-size sedan	Pick-up truck	Van	Total all models 1998	Total all models 1999
Natural Gas	55	1	246	252	554	1,108
Ethanol		46		45	91	453
Propane			3		3	24
Electric			2		2	65
Totals	55	47	251	297	650	1,650

NUMBER AND TYPE OF ALTERNATIVE FUEL VEHICLES AT THE DEPARTMENT OF ENERGY

Mr. REICHER. Yes. Absolutely. And it is the biggest mix is natural gas, and then ethanol.

NATIONAL RENEWABLE ENERGY LABORATORY'S POWER SOURCES

Mr. KNOLLENBERG. The other question I would have and I will conclude with that, Mr. Chairman, is that we have mentioned the National Renewable Energy Laboratory in Golden, Colorado, and I've been there. If there is any place on earth that should rely solely on solar and renewables, I would think it would be that laboratory. Do they?

Mr. REICHER. Mr. Knollenberg, yes, the lab uses a fair amount of both solar derived and wind derived electricity to run the power plant, and it is, in fact, now buying green power off the grid produced by public service——

Mr. KNOLLENBERG. What kind of green power?

Mr. REICHER. Wind produced.

Mr. KNOLLENBERG. Totally?

Mr. REICHER. No, it is a percentage—I can get you those numbers. But the lab has an increasing amount of its power that is, in fact, renewables-based.

Mr. KNOLLENBERG. Wouldn't you think that if that lab were totally on solar power, or renewable power of some kind that that would be a—that would be a success story that you could replicate and sell—but you're saying to me that it is not the case?

Mr. REICHER. No, it is, in fact, the case literally.

Mr. KNOLLENBERG. Totally?

Mr. REICHER. Not totally, it is an increasing amount. And I can get you those percentages——

Mr. KNOLLENBERG. An increasing amount I understand, but that is not the answer I am looking for. Would you be so kind as to send me or supply me with the specifics of just how much, what percentage of power is derived—how it is derived and from what sources for that laboratory? I think it is not to damage the potential that you are striving for at all, but where are we? Let us get an assessment of where we are, and let us see if we can't move forward. But in a way, I think it is meaningful. I do come back again to the nuclear side that there should be—and I know, Mr. Richardson, Secretary Richardson, you have advanced your support in the nuclear side. I think, however, it is being considered like a step child in terms of these percentages, because the percentages don't lie. They have increased substantially, and if you would do that for me, I would be most appreciative.

Mr. REICHER. Absolutely, and I will give you those numbers and also show you how it is progressing in other parts of the Department and other agencies as well. It is on the rise. If I could, on CCTI, I just wanted to make the point that the largest percentage of the funding in CCTI is actually for the more efficient use of fossil and nuclear-derived electricity—more efficient use in buildings, more efficient use in industry, more efficient use in cars. The next largest is, in fact, for clean power generation. Big increases in support for hydro. Big increases in support for technologies like wind, which are making real penetration into the market. Natural gas is very heavily supported in this budget for both.

[The information follows:]

USE OF RENEWABLE POWER AT THE NATIONAL RENEWABLE ENERGY LABORATORY

In 1998, the National Renewable Energy Laboratory's(NREL) electrical energy usage was 17.1 million kilowatt hours. Of that, the laboratory generated 1.4 million kilowatt hours from its own renewable energy projects and purchased 4,000 kilowatt hours of wind power from Public Service Company. Details and energy savings from energy efficient technologies in buildings is detailed below.

Purchased green energy

In Colorado electrical power generated from wind is available from the local utility, Public Service Company of Colorado, through their Wind Source program. NREL purchases 4,000 kilowatt hours of wind power, which is adequate to provide the energy requirements of NREL's Visitors Center.

NREL-generated green energy

For several years NREL has used its own generation of clean electricity from our research programs to lower NREL's energy requirements and costs. The direct use of NREL-generated green electricity is summarized below (expressed as rated peak power).

• National Wind Technology Center wind turbines	900 kilowatts
• Solar Energy Research Facility commercial test photo-	12 kilowatts
• voltaic system	
• Outdoor Test Facility photovoltaic test systems	7 kilowatts
• Current Total	919 kilowatts rated peak power

In the future the laboratory may use the Field Test Laboratory's thermochemical user facility to generate up to 30 kilowatts from biomass.

In 1998, the total NREL-generated power from renewable energy was 1.4 million kilowatt hours.

Energy Efficiency Measures to Offset Consumption

NREL also has embraced the use of passive solar building design in its permanent site facilities, particularly at the Solar Energy Research Facility (SERF), the Thermal Test Facility (TTF) and the Visitors Center. For example annual energy costs for the SERF"s lighting, heating, cooling and auxiliary power equipment are 51% lower than similar buildings designed to meet federal standards. Even including the electrical energy for the SERF laboratory work, total annual energy costs are still 36% lower than federal standards. Integrated energy efficiency features at the TTF have reduced energy costs to 50% of federal standards for similar buildings.

These buildings have won several awards due to their design and energy efficiency including:

- 1999 ASHRAE Technology Award, First Place – TTF
- 1997 Jefferson County (Colo.) Design Excellence Award, Sustainable Development Category - TTF
- 1997 Efficient Building Award, New Construction Project Category, Energy Users News - TTF
- 1995 Federal Design Achievement Award, National Endowment for the Arts - SERF
- 1995 Award of Merit AIPE, FAME Award - SERF

Mr. KNOLLENBERG. As well they should be. Now, when you go back to hydro, that I understand. But I begin to come back to the same feeling I had a moment ago, that you are still talking about a fraction of one percent?

Mr. REICHER. On the natural gas——

Mr. KNOLLENBERG. That is coming—I am talking about coming from the solar and the renewables. And that is the focus—we are putting so much money into that arena, but what is the return on investment. And it has been a number of years that we have done that, so I think we have to start looking, do we really get our money's worth by continuing to fund a program that very honestly dwindles in terms of successes.

Mr. REICHER. Well, when you look at the cost curves, when you see how this, how the price of electricity has come down so dramatically——

Mr. KNOLLENBERG. Come down, and who is going to buy it without a subsidy?

Mr. REICHER. Well, it is, in fact, being bought in States across the country. As Mr. Latham said, the largest new wind installation in the world—indeed, the largest wind installation in the world is going in Iowa and major new installations in Minnesota, Colorado, and the Dakotas are making a move.

Mr. KNOLLENBERG. When they begin to push upward above that fraction of one percent in terms of being acceptable to the buying public, then you are going to begin to convince me. But until then, I think we have to really evaluate how we are spending this money. I have used my time here I think to its completeness. But I, Mr. Secretary, I do, again, welcome your visit here today, and I look forward to working with you. I truly do. Thank you. Good luck to you.

Mr. PACKARD. Did you have any questions, Mr. Frelinghuysen?

Mr. FRELINGHUYSEN. You could stay right there, if that is all right. Does the National Energy Policy Act mandate that we have all these different energy projects—photovoltaic, solar thermal, biomass fuel, or is it?

Mr. REICHER. No, it does not mandate those projects, you know, per se. It encourages the development. What it does——

Mr. FRELINGHUYSEN. But the sum total of all of those in this account, and I am not here to bash any of those, what does it produce in terms of the overall energy picture for the United States?

Mr. REICHER. Well, in terms of electricity, hydro, which, as I have said, we have asked for a major increase in hydro—it is on the order of about 10 percent. Natural gas.

Mr. FRELINGHUYSEN. No—well, the hydro account increased 279 percent. But what does hydro contribute to national energy?

Mr. REICHER. About 10 percent of U.S. electricity. And natural gas is coming on very strong. And, as I have said, we have major, major commitments to natural gas-fired production——

Mr. FRELINGHUYSEN. It is interesting that nuclear energy, and I am not here to promote nuclear, represents just under 20 percent, is that right, of the nation's electricity?

Mr. REICHER. Right, and we have made a——

Mr. FRELINGHUYSEN. And this subcommittee last year provided $19 million for nuclear energy research, and on the other hand we provided $54 million for photovoltaic research. I mean, to most of us, as lay people, that seems to be rather bizarre, a skewed figure.

Mr. REICHER. Well, Mr. Frelinghuysen, I think it is an energy source that is coming on strong with these prices coming down——

Mr. FRELINGHUYSEN. I understand the expression coming on strong. I understand that what you say about real penetration. But in the overall scheme of things, it is still fairly minuscule, isn't it?

Mr. REICHER. It is, indeed, small. As nuclear was 20 and 25 years ago, and there is a growth curve, and we are expecting a growth curve—we already are seeing in wind. We are seeing it in biomass. We are seeing it in natural gas. And we think we are going to see it in solar as well. You have got to start somewhere, and the key to starting is bringing the prices down to a point where they are, indeed, competitive. And they are today competitive in the United States in certain areas, in remote areas, where there isn't easy access to the grid, they are, indeed, very competitive all across the globe.

SOLAR ENERGY COMPETITION FOR GRANTS

Mr. FRELINGHUYSEN. Relative to the issue of competition for grants, I know that there were some problems in the past—sort of non-competitive awards. There have been some improvements in that area. Would you very briefly comment as to where we stand on that? I think that is a very positive development. You ought to take some credit for it.

Mr. REICHER. Well, I appreciate it. I won't bore you with the numbers, but the numbers have come up substantially in terms of the dollars that have been competed in both the energy and water account and in the interior account within our office. Not only the total dollar amount, but the number of people competing for these dollars has gone up dramatically, and the diversity of the types. You heard about Columbia University today. We had an application from them for money. We got it, and they turned out to be a very excellent applicant. And we are going to do some very significant work with them.

PERFORMANCE BASED CONTRACTS ENERGY AUDITS

Mr. FRELINGHUYSEN. Competition is important, but I do think the points that Congressman Knollenberg made, I would certainly echo some of them. Thank you very much. To the Secretary, Mr. Secretary, I read with interest your announcement that the Department has entered into a performance-based contracts with industry to reduce energy costs within government. This was in, I guess, yesterday's Washington Post. Could you tell the committee, which program at DOE is providing resources for this endeavor?

Mr. RICHARDSON. Mr. Reicher has all——

Mr. FRELINGHUYSEN. Back again?

Mr. RICHARDSON. Has all the money in our Department.

Mr. FRELINGHUYSEN. And at the same time—is this the same type of initiative I read about in the Wall Street Journal about your Department selecting firms for energy projects at military bases?

Mr. REICHER. Yes. This is an approach, it is very, very interesting, and I think it holds great, great promise. This is basically energy service companies going into Federal installations, doing energy audits, and using their own dollars, their private sector dollars, investing in retrofits to those facilities—heating, insulation, lighting—and then sharing in the savings to pay themselves back. And we basically put in place now, over $5 billion in contracting authority, the ability of the Federal Government to sign up to these private sector investments, to make the retrofits and share in the savings. And there is literally—we think on the order of a billion and a half dollars a year out of the Federal Government's $8 billion energy bill that can be saved. Again, not using taxpayer dollars, but using private sector dollars to invest in the retrofits and share in the savings. And we are really very, very bullish about this.

Mr. FRELINGHUYSEN. You are managing these programs?

Mr. REICHER. Correct.

Mr. FRELINGHUYSEN. The one that was announced the day before yesterday on Tuesday as well as the one for the military bases?

Mr. REICHER. Correct.

Mr. FRELINGHUYSEN. One might ask, why shouldn't each of the government agencies itself be required to contract with industry? Or they just don't have the—or are you such a good manager that you have decided, somebody decided that the DOE ought to be doing it?

Mr. REICHER. What we have done——

Mr. FRELINGHUYSEN. I am not against it. I just wondered what the rationale was?

Mr. REICHER. It is a matter of, I think, of efficiency. What we have done is put in the basic contracts. We have made it very simple. If you run a post office in Iowa, and you want to make changes to reduce your energy use, we made it——

Mr. FRELINGHUYSEN. You could start with one in Morristown. I just moved my office out of there. The average temperature.

Mr. REICHER. I should have picked New Jersey. [Laughter.]

Mr. FRELINGHUYSEN. The average temperature in my post office is 75 degrees year round. They have to have the air conditioning on in the winter because it was so hot.

Mr. REICHER. That is a great example.

Mr. FRELINGHUYSEN. And I have to say for the record that one of the reasons I moved out of there is it was so demoralizing that half the employees were asleep at the back table when I came in from doing whatever I did around the district because the post office was so hot.

Mr. REICHER. To very quickly answer, responding to that specifically, that building manager, in the old days, would have to go out——

Mr. FRELINGHUYSEN. There is no building manager for the U.S. Postal Service. [Laughter.]

Mr. REICHER. Congressman, you, in the old days, would have to call an energy service company. Engage in a two-or three-year process of entering into a contract. Maybe you would succeed. Maybe you wouldn't. We have now got that down to a point where we have standing contracts under which any Federal agency can go in a matter of three to six months, enter into a simple arrangement

with one of these pre-selected companies. The beauty of this is we pre-select it on a competitive basis. These companies in six regions of the United States, and we have cut it to a three-to six-month process for sitting down, getting the audit done, getting the investment, and improving the energy use.

Mr. FRELINGHUYSEN. Well, I think what you are doing is commendable, and my time is almost up. What are the costs to your Department to manage this program, or are they somewhat reduced by your partnerships and relationships with the private sector?

Mr. REICHER. Very much reduced. It used to be that the Congress was appropriating dollars, large dollars, to make energy retrofits to Federal buildings. That is getting close to zero now, and what we have replaced it with are these private sector dollars. The cost to us is in managing these large contracts, and the overall budget for the office. It is called the Office of Federal Energy Management Programs and is between $20 million and $30 million a year, bringing in over the next several years literally billions in investment, so it is a wonderful return on investment.

Mr. FRELINGHUYSEN. Okay, we don't hear that often around here, so thank you very much. Thank you, Mr. Chairman.

COX COMMITTEE REPORT

Mr. PACKARD. Thank you, Mr. Frelinghuysen. I think we are about to wrap up, so we won't be long, Mr. Secretary. The Select Committee on National Security and Military and Commercial Concerns with the Republic of China, the People's Republic of China, headed up by Chris Cox, has not released their report yet, but press reports have indicated that there are some real concerns about security at our national labs, particularly those that are producing nuclear weapons, do you have any comments on that at this point?

Mr. RICHARDSON. Mr. Chairman, when I came into the Department, I recognized that this was one of our biggest problems, and we have moved aggressively to try to correct that problem. The Cox report, which is still classified, indicates that basically in the 1980s there was some compromising of our national secrets, primarily to China. And what we are doing now is assessing the damage of these disclosures.

Now, we have taken some very aggressive steps in the Department of Energy to correct this problem. Number one, I have brought in an FBI counter-intelligence expert to run this program. We now have counter-intelligence people at each of the labs that we didn't have before, reporting directly to the lab director. We have basically done background checks on all visitors from sensitive countries. We have tightened our visitor procedures across the board. Now the lab director bears responsibility on who comes into the lab. There are accompanied people that go in with some of these individuals from sensitive countries. We have doubled the counter-intelligence budget, doubled the request, and we hope this committee is generous when it comes to this, although I think this is in the National Security component.

I have also instituted some very tough procedures involving polygraphs with members of my lab teams. For those that are involved in some very sensitive activities, relating to these programs.

So I believe we have responded, some say excessively, I think the problem is under control, but we suspect that over the years the Department was not as strong in security as it should have been.

Mr. PACKARD. When the report is released and available in full, both this committee and I am sure you and your Department will address those concerns very specifically.

Mr. RICHARDSON. Yes.

MANAGEMENT REFORM AND IMPROVEMENTS

Mr. PACKARD. We appreciate that. You have indicated that one of your top priorities is management reform and improvements, and in your testimony you indicated that you have got different boards and reports, the Galvin report and others, that are being used as informational tools; and that you will release this to the Congress before the end of the fiscal year. I would really appreciate if we get it as soon as you can make it available to us so that we can see what you are doing.

I have no further questions. It has been a very good hearing. You have been an excellent witness. You are very good, and I want to tell you that we have appreciated you being here. I want to thank the staff for helping us prepare for this our first hearing. It has gone I think very well. I appreciate the support and the participation of the members. And thank you very, very much.

The hearing is adjourned.

[The questions and answers for the record follow:]

RICHLAND REPROGRAMMING

Mr. Packard. Mr. Secretary, the Committee recently received a request to reprogram environmental cleanup funds at the Richland site. I don't want to address the merits of the reprogramming, but the timing. The Department knew, or should have known, about the need for this reprogramming since last summer. However, it took well over six months for the Department to notify Congress, and now the Committee is being told it must approve the request quickly or there will be large layoffs in the contractor workforce. Can you tell the Committee what caused this delay?

Dr. Telson. Mr. Chairman, you are correct that, by last summer, the Department was aware of emergent safety and environmental compliance issues at the Richland site which were not contemplated when the FY 1999 Budget was submitted to the Congress. We also knew, once the contract for the Hanford tank waste vitrification facility was awarded to British Nuclear Fuels, Limited in August 1998, that the schedule for construction projects needed to support this contract would slip. While our estimates of the amounts needed and available for reprogramming were not firm at this point, we realize we should have scheduled briefings for the subcommittee to explain the problem and discuss a path forward. Essentially, the delay was caused by our efforts to carefully review and challenge each of the requirements and the sources of funding. This reprogramming is exceptionally large in dollar value, and the components are technically complex. Nevertheless, we sincerely regret the difficulties created for your committee, by the short time period remaining for your review of our proposals. We will work to avoid such situations in the future.

PROGRAMS TO AID RUSSIAN WEAPONS SCIENTISTS

Mr. Packard. A recent GAO report was very critical of the Department's management of the program to help unemployed Russian weapons scientists. The Initiatives for Proliferation Prevention (IPP) program has been operating since 1994, and we have appropriated over $100 million for it. However, GAO notes that of the funds spent from fiscal year 1994 through June 1998, only 37 percent went to scientific institutes in the Newly Independent States. About 63 percent of the program's funds were spent in the United States, mostly by the Department of Energy's National Laboratories in implementing and providing oversight of the program. It is highly unlikely that this Committee would have supported the program from the very beginning had we known that such a small amount would actually get into the hands of the Russian weapons scientists we thought we were helping. Mr. Secretary, how can you explain this misuse of funds, and how do you intend to fix it?

Secretary Richardson. This is not a misuse of funds. Indeed, GAO had as its first conclusion (page 60) that "DOE's effort to supplement the salaries of former weapons scientists so that they do not sell their services to terrorists, criminal organizations, or countries of proliferation concern is laudable and, we believe, in our national security interests." Previously, the IPP calculated that it had engaged 4500 full-time equivalent former weapons specialists in the Newly Independent States (NIS). In March 1999, an effort was begun to more precisely identify the numbers of persons engaged by the Program. This involves the review of each deliverable file, under each contract placed over the life of the Program, to identify the number of persons invoiced under each deliverable. This is a significant effort, which is not yet complete. However, based upon results to date, IPP has raised its number of engaged weapons specialists to 5900 over the life of the program. Furthermore, 3610 weapons specialists are currently actively involved in IPP work in the NIS. Moreover, U.S. industry has contributed over $38 million in resources to 84 of these projects (under cooperative R&D agreements), indicating that our efforts are generating considerable interest in activities with commercial potential.

IPP expenditures in the United States have been high because of the need for supervision by the DOE National Laboratories -- an involvement that is one of the core strengths of the IPP program and one that is mandated in the legislation founding the initiative. It is the close involvement of DOE National Laboratory scientists and engineers in the IPP projects that assures that the work done and the deliverables received, under firm, fixed-price contracts, are receiving stringent oversight. The principal investigators monitor each contract, collaborate with the NIS scientists and engineers, working jointly on a given project, participate in selecting an industry partner in the U.S., arrange the Cooperative Research and Development Agreements (CRADA) with the industrial partner, and then monitor the CRADA. Often, joint publications and joint inventions result from these collaborative efforts. This crucial involvement of DOE Laboratory personnel provides confidence that NIS scientists and engineers are not sending in old reports and data from their files as new deliverables. The hands-on involvement of DOE personnel also helps ensure that IPP funds are being spent on IPP projects and are not diverted to other purposes at the recipient institutes. IPP Principal Investigators from the laboratories spent the equivalent of nearly 10 man-years in the NIS in FY 1998 alone, ensuring that IPP projects were being done properly, with full attention to contract requirements. (It should be noted that

although these days were worked in the NIS, the travel funds were counted as being spent in the United States, an accounting artifact that does not provide a full picture of resources devoted to work in the NIS.)

Another factor affecting the proportion of IPP funds expended in the United States is that IPP provides important support for other U.S. government programs. For example, since International Science and Technology Center (ISTC) funds cannot be spent in the United States, IPP funds are used for work at U.S. laboratories in support of ISTC work in Russia. Over the life of the Program, six IPP projects worth approximately $950,000 were funded in direct support to ISTC projects. In addition, IPP has been funding nearly $500,000 in ISTC salaries on an annual basis. Further indirect support to ISTC projects is being provided from National Laboratory overheads and other related sources.

Despite these factors, however, the IPP program is implementing changes to increase the commercial emphasis of IPP projects and to raise the overall proportion of project funds sent to the NIS to well above 50 percent. Our goal is 60 percent. This will be accomplished by requiring that each laboratory place more of its IPP project dollars on U.S. industry cost-shared projects, to which U.S. industry is contributing resources, as opposed to technology demonstration and feasibility projects not involving U.S. industry. For these U.S.-industry cost-share projects, an increased share of funding will go to the NIS. In addition, on-going technology demonstration projects that are not meeting project milestones or have only a slight chance of commercialization will be canceled and the funds made available for more commercially promising projects. As an aggregate, these measures will result in an increasing commercial emphasis, more U.S. industry cost-share and participation, and a greater percentage of overall IPP funds going to the NIS.

Mr. Packard. Your budget request proposes to build on the IPP program and significantly increase funding for the Nuclear Cities Initiative to employ workers in the former "closed cities" in Russia. Funding for these two programs would increase from $30 million to $60 million in fiscal year 2000. Why should the Committee increase funds for these programs if more than half of the money remains with the Department's own laboratories?

Secretary Richardson. There have been solid reasons for the proportion of funds spent by the IPP program in the United States, but with the evolution of the program, we will be moving aggressively to reduce this fraction and increase expenditures in the NIS in the future. The Nuclear Cities Initiative (NCI) has yet to begin the expenditure of significant program funds. Because this program has different objectives and is structured differently from the IPP program, we believe that from the outset the proportion of NCI funds going to Russia will be substantially greater than that seen in the IPP.

As noted above, the Initiatives for Proliferation Prevention (IPP) program has engaged 5900 former Newly Independent States (NIS) weapons scientists and engineers at 170 institutes in over 400 projects. Much like the Materials Protection, Control and Accounting (MPC&A) Program, the "scientist-to-scientist" approach employed by the IPP Program has been critical to gaining acceptance in to the former Soviet weapons laboratories and establishing working

relationships with the scientists. In fact, it is the close involvement of the DOE National Laboratory scientists and engineers that assures the scientific validity and value of the work done and the deliverables received under firm, fixed-price contracts between the national laboratories and the NIS institutes.

It is also important to understand the large salary disparity between DOE National Laboratory scientists and their NIS counterparts. The average DOE Laboratory scientist typically makes as much as 25 times more than the average NIS scientist. Therefore, a dollar-to-dollar comparison is misleading. Since the DOE Laboratory scientists are critical in the oversight on a one-on-one basis, there will be costs accrued in the United States.

However, the DOE understands the concerns raised by the GAO and is committed to getting as much funding to the NIS scientists and institutes as possible. A stronger emphasis has been placed on commercialization by requiring the laboratories to focus more on developing Thrust Two projects, which involve a cost-sharing with U.S. industry, and moving current Thrust One demonstration projects to the Thrust Two phase. The project proposals that have been received this fiscal year indicate that the laboratories are already responding to these requirements. This will result in a greater proportion of funds going to the NIS, as commercialization of technology in the NIS required increased support to the institutes. For example, commercialization prototypes will be built in the NIS rather than the U.S.

As for the Nuclear Cities Initiative, the National Laboratories will continue to play an important role, based on their existing good relations with the weapons facilities, but it will be a different role, focused on helping to create viable job opportunities in the Nuclear Cities. This will mean that a considerably greater proportion of program funds will be spent in the NIS.

A major portion of NCI funds will go to funding job creation, either by providing seed money or other means. While the exact mechanisms for this are still being worked out, DOE is exploring such avenues as the use of U.S. Government-supported enterprise funds or the European Bank for Reconstruction and Development as channels for investments and small loans. In order to create a viable business environment in the cities, DOE will spend money on infrastructure and business education. DOE plans to turn to established non-governmental organizations as contractors in these efforts. In giving the cities a variety of support necessary to ease the economic transfer to non-weapons activities, DOE will leverage other existing U.S. Government assistance programs.

ALTERNATIVES TO CENTRALIZED INTERIM STORAGE

Mr. Packard. Mr. Secretary, you recently announced your intent to examine alternatives to centralized interim storage such as having the Department take title to spent fuel onsite and assume management responsibility until such time as it can be placed in a permanent repository. What interest have the utilities shown in this proposal?

Secretary Richardson. Several utilities have commented, both positively and negatively, on this proposal. The utilities expressing positive comments are seeking further details on how such an arrangement would proceed.

ACCEPTANCE OF SPENT FUEL

Mr. Packard. Mr. Secretary, the Administration continues to oppose legislation to modify the Nuclear Waste Policy Act to provide for the interim storage of nuclear waste. Furthermore, the responsibility of DOE to begin accepting spent fuel from commercial utilities has been affirmed by a court of competent jurisdiction. Why does the Department refuse to make any proposals, legislative, or otherwise, to address this responsibility?

Secretary Richardson. On February 25, 1999, before the Senate Energy and Natural Resources Committee, I discussed the possibility of the Department taking title to spent fuel onsite and assuming management responsibility until such time as it can be placed in a permanent repository. I want to continue to examine this idea further and take a serious look at how such a proposal would be structured and paid for without imposing undue burdens on either utility ratepayers or the taxpayers. I also want to analyze further proposals that would ensure that the revenues raised by the nuclear waste fee remain available to complete the job of safe management and disposal of nuclear waste.

As I have stated before, the Administration is committed to resolving the complex and important issue of nuclear waste disposal in a manner consistent with sound science and protection of the public health and safety, and the environment. We continue our longstanding commitment to permanent, geologic disposal as the basic goal of DOE's high-level radioactive waste management policy.

EPA AND NRC STANDARDS

Mr. Packard. Last year the President's Committee on Advisors on Science and Technology (PCAST) Report on Federal R&D noted that "[t]he regulatory barriers to development of the site remain both uncertain and high. The EPA has not yet published for comment the standards that must be met at Yucca Mountain, and consequently, the NRC has not yet published the regulations that DOE must satisfy to get a license for the repository." What steps have been taken since last year to address this concern?

Secretary Richardson. I understand that both the EPA and NRC have taken steps since last year to develop regulatory standards for a repository at Yucca Mountain. EPA recently reported that it will shortly release a draft proposed radiation protection standard for interagency review. On February 22, 1999, the NRC published a proposed regulation, Disposal of High-Level Wastes in a Proposed Geological Repository at Yucca Mountain, Nevada (10 CFR Part 63).

VIABILITY ASSESSMENT

Mr. Packard. For years the Department of Energy has cited the issuance of a Viability Assessment as an important milestone in the Yucca Mountain site characterization process. On multiple occasions, the Administration deferred potential support for the interim storage of nuclear waste at Yucca Mountain until publication of the Viability Assessment. Yet the Viability Assessment has been issued, it identified no "show stoppers" at the Yucca Mountain site, and the Administration continues its knee-jerk opposition to interim storage. Of what practical consequence was the Viability Assessment? It appears to have been nothing more than another bureaucratic exercise in procedural complication and an excuse to waste more money.

Secretary Richardson. The Viability Assessment is the compilation of over fifteen years of cutting-edge scientific and engineering work at the Yucca Mountain site. The Viability Assessment provided Congress, the President and the public with information on the progress of the Yucca Mountain Site Characterization Project. It also identified the critical issues that still need to be addressed before a decision can be made on whether to recommend the Yucca Mountain site for a permanent repository. DOE is focusing its ongoing efforts on three major areas: 1) increasing understanding of the key natural processes that are important to long-term performance of a repository; 2) improving the design of key engineered components of a repository; and 3) increasing confidence in performance assessment models. These three sets of activities will be the focus of DOE work before the site recommendation decision. The Viability Assessment confirmed that, so far, we are on the right path toward deciding whether Yucca Mountain can serve as the permanent repository. We are on target to decide in 2001 whether Yucca Mountain is suitable, and to submit a license application to the Nuclear Regulatory Commission in 2002, if it is determined suitable.

The Administration's position on the interim storage legislation has not changed. There is nothing in the Viability Assessment that would change the Administration's position that the President would veto any bill similar to the bills passed in the 105th Congress. The Administration believes that the Federal Government's longstanding commitment to permanent geologic disposal should remain the basic goal of high-level radioactive waste management policy. The Administration believes that interim storage placed in Nevada, as proposed in HR 45, would undermine our progress toward permanent geologic disposal of our Nation's nuclear waste and weaken the credibility of regulatory and institutional activities required to maintain the public's confidence in any siting decision.

CONSTRUCTION PROJECT MANAGEMENT

Mr. Packard. In fiscal year 1998 this Committee provided funding for an independent assessment of projects and project management systems at the Department. Last year we were told that the assessments for 32 projects would be completed by September 1998. However, we have received significantly fewer than that to date. What is the status of this effort, and why is it taking so long to get the independent project assessments completed and transmitted to Congress?

Secretary Richardson. In following the Committee's instructions prior to initiation of the independent assessment process, the Department contracted with the National Research Council for a preliminary study to determine if independent assessments of its construction projects were warranted. The NRC's report, issued in February 1998, concluded that independent assessments were warranted and it outlined a process by which the assessments should be conducted.

The Department then developed a schedule for having the recommended projects reviewed and met with Subcommittee Staff in April 1998, to present this schedule and cost projections for completion of these project reviews. The schedule called for all reviews to be completed and presented to Congress within a time-frame ending by March 31, 1999. Two subsequent meetings have been held with Subcommittee Staff to update them on project status.

I regret that the Department has not been able to meet all time components of this schedule. In some instances, awarding of contracts to independent reviewers was delayed due to difficulties in identifying contractors who had no conflicts of interest. While nine project reviews have been delivered to Congress thus far, only two of those have included Departmental responses to reviewers' recommendations. Frankly, I have not been satisfied with the responses which have been prepared thus far, and have directed appropriate Departmental personnel to do a more thorough job responding and developing corrective action plans to accomplish the needed improvements in the Department's construction management capabilities. I expect that responses to the remaining seven reports will be delivered to the Congress in the next few days.

To date, 23 reports have been completed and work on the Neutrinos at the Main Injector (NuMI) project at Fermi is continuing. We expect reports for the remaining two reviews, Rocky Flats and the Fernald Closure Sites, to be completed no later than October 1999. The size and complexity of these two sites have required far more time than our original estimates provided.

Although the Department is behind the originally planned schedule for delivery of these reviews to Congress, I feel it is important that we provide the Congress with effective, accurate and responsive corrective action plans showing how the Department will achieve the improvements the assessments recommend, and that all of us desire.

COX COMMITTEE REPORT

Mr. Packard. Mr. Secretary, I realize that the report of the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China (the Cox Report) has not yet been made available to the public. However, several press reports have raised concerns that the Department's nuclear weapons laboratories were involved in disclosing sensitive information. Is there anything you would like to say about this issue?

Secretary Richardson. The Department is proactively responding to those recommendations in the Cox Report which involve Departmental equities. More information will be provided to the Committee in a classified forum. We intend to continue to make the necessary changes at the weapons laboratories in order to vigilantly protect taxpayer financed classified and sensitive unclassified research and development taking place at these facilities.

DOE MANAGEMENT STRUCTURE

Mr. Packard. Mr. Secretary, as you noted in your statement, many internal and external reviews of the Department's complicated field and headquarters management structure is inefficient, and that the Department should undertake a major effort to rationalize and simplify its management structure. This was the recommendation of the Galvin Report, the Institute for Defense Analysis "120 Day" study, the Laboratory Operations Board, and a DOE Oversight report that looked at the problems which led to the tritium leak issue at Brookhaven National Laboratory. What types of changes are you exploring or expecting? How soon will the results of your review be ready?

Secretary Richardson. I have asked a small team to: review all past studies, including the ones mentioned in your question; discuss with senior managers at headquarters and in the field the alternatives for management and organizational reform, along with the pros and cons of each; and provide me with a set of recommendations. I expect to receive and act on these recommendations within the next few weeks.

While recognizing that the current management structure has certain weaknesses, my mind remains open, and I would not wish to prejudge the outcome of the review I have asked for. Any changes we make, however, will be designed to increase the accountability, as well as the efficiency, of the DOE management structure. I would be happy to provide a briefing to the Committee once I have reviewed and acted upon the recommendations from this review.

DOE MANAGEMENT STRUCTURE

Mr. Packard. Mr. Secretary, are you planning to look at the current laboratory structure in the Department? As you may recall, the Galvin panel recommended that one of the nuclear weapons laboratories be eliminated. There have been concerns raised about duplication of program activities and mission creep at the laboratories. In light of the extensive costs involved in just maintaining the infrastructure and bureaucracy at almost thirty multi-purpose and single-purpose DOE laboratories, have you given any thought to some type of laboratory closure commission?

Secretary Richardson. The recommendation to eliminate one of the nuclear weapons laboratories, along with other recommendations, was not accepted. On September 25, 1995, the President announced that the continued vitality of all three Department of Energy nuclear weapons laboratories was essential. The decision was based on the need for two design laboratories to ensure the viability of the stockpile stewardship. The department has created a comprehensive R&D portfolio management system, involving the R&D Council and the Laboratory Operations Board, and utilizing portfolio analysis and laboratory R&D profile analysis. This system is being used to better chart the future of R&D and the role of the laboratories in meeting DOE's missions and goals in the coming years.

Mr. Packard. Mr. Secretary, the Laboratory Operations Board stated last year that it was time to reassess the fundamental nature of - the assumption behind - the management and operating (M&O) contractor relationship. The board noted that other agencies operate high quality laboratories without the same level of bureaucracy present in the DOE system, and recommended NASA's Jet Propulsion Laboratory and DOE's Lincoln laboratory as two models that should be examined. What steps have you taken to examine other approaches to laboratory governance?

Secretary Richardson. The external members of the Laboratory Operations Board included this question as one of their priorities for future work in their Third Report to the Secretary of Energy Advisory Board, September, 1997. The external members have not chosen to undertake a specific study in this area but issues related to the Department's contracting practices are part of the external members' ongoing work. The larger issue of laboratory governance is included in a comprehensive management review now being undertaken across DOE.

EXTERNAL REGULATION OF DOE FACILITIES

Mr. Packard. Mr. Secretary, on February 19, 1999, you notified the Committee that the Department would no longer be moving toward external regulation of its nuclear facilities. Since the results of the pilot project to simulate NRC and OSHA regulation at the Lawrence Berkeley National Laboratory have not yet been finalized, on what did you base your decision?

Secretary Richardson. The purpose of the February 19, 1999 letter was to inform the Congress that, based on the information we have seen from the pilot project program to date, it would be premature to submit legislation to exempt certain facilities from external regulation at this time. We also indicated that conduct of additional pilots would not help clarify issues or resolve problems that have been identified. We indicated that, before making a final decision, we would complete our work with NRC, OSHA, States, and local governments to analyze the results of the pilots and would report back to the Congress with the results. This determination was based on the work we have already completed with the NRC for the Lawrence Berkeley National Laboratory pilot, as well as the pilots for the Radiochemical Engineering Development Center at Oak Ridge and the Receiving Basin for Offsite Fuels at Savannah River during the last 18 months. We expect to publish final reports for all of the pilots reflecting the views of all of the agencies involved within the next sixty days.

Mr. Packard. Your letter indicates that the pilots have highlighted a number of significant, unresolved issues including: whether DOE or its contractor should hold a license; difficulties in assessing facility design under NRC standards in some older facilities; the extent to which older facilities can be upgraded to meet NRC standards; applicable requirements for safeguards and security, deactivation and decommissioning; and cost. Many of these issues were addressed in the successful transition of the gaseous diffusion plants to NRC regulation. One of the reasons the gaseous diffusion plant transition was so expensive was that the Department does not require its facilities to meet its own regulatory standards, thus upgrades were necessary to satisfy NRC regulations. How do you respond to the criticism that DOE should not continue to regulate its own facilities since it does not adequately enforce its own regulations and currently operates facilities which would not meet NRC and OSHA worker and public health standards?

Secretary Richardson. Both OSHA and NRC have noted that DOE=s standards, technical competence, and operations are sound from a safety standpoint. But, as the Chairman and others have pointed out, we need to do better in how we ensure compliance with our requirements and, where deficiencies exist, ensure that managers are held accountable and corrective actions are taken on a timely basis. As a first step in that direction, I recently issued a directive to the Department to take actions including: publishing revised DOE acquisition regulations in a final rule that, among other things, will hold a contractor's entire fee at risk in the event of poor safety performance; strengthening our independent oversight and enforcement programs; establishing a complex-wide tracking system to ensure that actions needed to correct deficiencies in safety and emergency management are identified and corrected on an expedited basis; and establishing a Secretarial Safety Council that will guide complex-wide implementation of our Integrated Safety Management program.

Mr. Packard. Your letter states that your analysis to date indicates that many of the potential benefits of external regulation appear to be outweighed by the associated costs and difficulties raised in the pilot projects. Please provide the Committee with the analysis which supports this conclusion.

Secretary Richardson. A complete and detailed analysis of the cost impacts resulting from external regulation, along with a discussion of the issues identified in the pilot projects, will be included in the reports for the three pilots. Most of the difficulties we have identified are related to the need to have multiple regulators at different facilities at one site. Based on what we have seen so far, it is clear that how the regulator chooses to classify deficiencies and require abatement can make a tremendous difference in the costs of compliance.

Mr. Packard. Your letter indicates that the Department plans to strengthen internal oversight. What specific actions do you plan to take to ensure that internal oversight provides comprehensive coverage of DOE facilities?

Secretary Richardson. Recently I announced a major new initiative to improve safety accountability and performance at the Department of Energy. We need to strengthen our capabilities to protect the safety and health of people who work at and live near our facilities. While DOE's standards, technical competency, and operations are sound from a safety standpoint, the Department needs to improve how we ensure compliance with our requirements and, where deficiencies exist, ensure that managers are accountable and that corrective actions are taken on a timely basis.

In order to achieve the goal of greater safety accountability, I will be taking a number of actions over the next year, starting with Integrated Safety Management (ISM). A significant foundation has been laid over the past few years with the development of ISM as the Department's corporate policy for environment, safety and health. The ISM program now needs to go beyond its concepts and principles and establish the basic elements of meaningful oversight, enforcement, and accountability. We will have ISM systems completely in place and verified at all DOE sites by September 2000. The Office of Environment, Safety and Health will provide me with independent oversight of how line management is meeting its ISM commitments. Oversight findings, ratings, and trends will now be important in determining contractor and personnel performance reviews.

Mr. Packard. The Committee is familiar with activities and reports of the Department's Office of Oversight. However, as noted by this Committee and the Defense Nuclear Facilities Safety Board, the Department's program offices, field offices, and sites have not consistently taken timely action to ensure that oversight findings are addressed. What action do you plan to take to ensure that line management is responsible and accountable for timely and effective corrective actions?

Secretary Richardson. The Office of Environment, Safety and Health conducts independent evaluations of safety and emergency preparedness and outlines its findings. The Department, however, lacks an effective system for demonstrating that identified deficiencies have been corrected. We will take a number of steps to improve our overall performance in this area. The Office of Environment, Safety and Health will immediately develop protocols that define the process for planning, scheduling, and conducting oversight evaluations. Action plans to correct identified deficiencies will be mandatory, and we will develop a system within 60 days to track, follow through, and close corrective actions across the complex.

The system will identify the Federal senior managers and Principal Secretarial Officers responsible for correcting and closing pending safety deficiencies. The Office of Environment, Safety and Health will be giving me regular independent assessments of how well the Department is meeting these goals.

Mr. Packard. What actions do you intend to take to ensure effective interface between DOE's internal oversight program and the enforcement under DOE Price Anderson Amendment Act?

Secretary Richardson. These programs have distinct roles and missions in ensuring accountability for safety in DOE. The EH Enforcement staff, responsible for undertaking regulatory enforcement actions against DOE contractors when violations of nuclear safety requirements occur, conducts its activities in concert with DOE field management that oversees contractor activities on a daily basis. The Office of Oversight provides independent oversight of all DOE operations, including the Field Offices, in the full range of matters relating to environment, safety, health, and safeguards and security. The Oversight office needs to remain independent of DOE line management in headquarters and in the field.

At the same time, the Office of Oversight and its site representatives are an important source of information for the Enforcement staff and the two offices need to work effectively together. To enhance coordination, EH will develop formal processes for Enforcement staff review of independent oversight findings and reports. In addition, the Office of Environment, Safety and Health will develop formal procedures for referring issues to the Enforcement staff when possible violations are identified.

Mr. Packard. What processes will be used to settle disputes in the event that the Department's program offices, field offices, or sites do not agree with internal oversight findings?

Secretary Richardson. If sites do not agree with internal oversight findings, the Department's Chief Operating Officer (currently the Under Secretary) will resolve any disputes that cannot be resolved by lower levels of management. The Office of Oversight will perform follow-up to ensure that deficient conditions are resolved in a satisfactory manner.

WORKER HEALTH AND SAFETY

Mr. Packard. The Committee is aware that the Environmental Protection Agency (EPA) has raised concerns about the regulation of the health and safety of private sector employees who are working at various sites in formerly contaminated buildings and space leased by the Department for economic development purposes. What specific concerns have been raised by EPA?

Secretary Richardson. EPA believes that many of the leases being contemplated or recently executed at DOE facilities, such as Oak Ridge, may be inconsistent with the Hall Amendment and with the recent interim policy EPA and DOE jointly signed to implement the Hall Amendment. EPA also reiterated concerns identified by an OSHA onsite pilot review of leased operations in the East Tennessee Technology Park in Oak Ridge.

Mr. Packard. How is the Department addressing these issues?

Secretary Richardson. To assure a consistent approach to the application of safety and health polices for private tenants, an internal DOE headquarters task group is reviewing existing practices and will be providing guidance to DOE field organizations. Also, we are talking with EPA to better understand and address their concerns. On March 2, 1999, we hosted EPA on a tour of Oak Ridge facilities that had been remediated utilizing leases authorized under the Atomic Energy Act, and we will be having future meetings with EPA as we work together to ensure a safe and healthy working environment for the workers.

TRITIUM PRODUCTION

Mr. Packard. What is the status of the Department's negotiations with the Tennessee Valley Authority to use the Watts Bar and Sequoyah reactors to make tritium? What issues remain to be resolved?

Dr. Reis. DOE and TVA have signed a letter agreement that resolves all cost issues. No other major issues remain to be resolved. It is expected that a formal interagency agreement will be signed by the first of May.

NONCOMPETITIVE AWARDS

Mr. Packard. For the past two years, the Subcommittee has included a provision in the Energy and Water Development Appropriations bill requiring the Department to award contracts using competitive procedures. This provision applies to the management and operating (M&O) contracts, but it is an important principle for smaller contracts as well. By program, please provide for the record the number and percentage of contracts, grants, and other procurements which were awarded non-competitively in fiscal years 1997, 1998, and 1999.

Mr. Farrell. The following table provides the information requested for other than M&O contracts. New awards that were noncompetitive and that were subject to the Competition in Contracting Act of 1984 (CICA) are included in the column labeled *Acquisitions*. The column labeled *Grants* identifies all new discretionary grants that were awarded noncompetitively, including Congressionally directed (Appropriations Acts/Reports) projects. (The information follows:)

It should be noted that, of the 10 noncompetitive contract decisions made during fiscal years 1998 and 1999, 6 are designated as Federally Funded Research and Development Centers (FFRDCs). While CICA recognizes FFRDCs and provides a specific statutory exception to the use of competitive procedures for such contracts, the Department has decided to compete its FFRDCs at the National Renewable Energy Laboratory, the Brookhaven National Laboratory, and the Idaho National Engineering and Environmental Laboratory. To the best of our knowledge, no other Federal agency has competed any of its FFRDCs.

NUMBER OF NONCOMPETITVE NEW AWARDS

INITIATING OFFICE	FY1997		FY1998		FY-1999*	
	Acquisitions	Grants	Acquisitions	Grants	Acquisitions	Grants
Albuquerque Operations Office	2	7	3	7		2
Assistant Secretary for Defense Programs	0	0	2	0	1	
Assistant Secretary for Energy Efficiency & Renewable Energy	0	66	2	29		
Assistant Secretary for Environment Safety & Health	2	0	3	0		
Assistant Secretary for Fossil Energy	7	1	2	0		
Bartlesville Project Office	0	9	0	6		1
Chicago Operations Office	1	6	0	7		
Office of Energy Research	0	7	1	7	1	1
Energy Information Administration	0	0	3	1	1	
Assistant Secretary for Environmental Management	1	3	1	0	2	
Federal Energy Technology Center	4	12	5	11	1	21
Golden Field Office	1	17	0	16		
Idaho Operations Office	4	10	1	13		4
Nevada Operations Office	2	11	2	5		
Office of Nonproliferation & National Security	3	2	1	1		
Oakridge Operations Office	0	3	0	4		
Oakland Operations Office	7	4	2	2	2	1
Office of Management and Administration	10	0	3	0	2	

Office of Economic Impact and Diversity	0	1	0	2		
Office of Field Management	0	0	1	0		
Office of Worker & Community Transition	2	0	0	0		
Office of Nuclear Energy	1	1	0	0		
Ohio Field Office	0	2	0	0	1	
Pittsburgh Naval Reactors Office	0	0	1	0		
Richland Operations Office	2	11	1	2	1	
Rocky Flats Office	0	1	1	2		
Savannah River Operations Office	2	40	0	0		
Southwestern Power Administration	1	0	2	0		
Strategic Petroleum Reserve	2	2	1	0		
Western Power Marketing Administration	9	1	6	0	1	
Total Noncompetitive New Awards	63	217	44	115	13	30
Total New Awards	631	934	658	878	187	131
Noncompetitive New Awards as a % of Total New Awards	10%	23%	7%	13%	7%	23%

* Represents data collected through March 1, 1999

SECTION 301(b), PUBLIC LAW 105-245

Mr. Packard. The provision requiring competition of M&O contracts also provided the authority for you to waive the requirement after a 60 day notice to Congress. The waiver authority was provided to allow the opportunity to maintain contractors who are doing a good job without disruption of a contract competition. What waivers were provided in fiscal years 1998, 1999, and anticipated for 2000?

Mr. Farrell. In 1994, the Department changed its policy regarding competition of M&O contracts. As a consequence, the incidence of competition has been greater during the subsequent 4 year period than any time in the Department's history. In fiscal year 1998, Congress imposed a statutory requirement that M&O contracts be awarded using competitive procedures unless use of such procedures is waived by the Secretary and notice of the waiver is provided to Congress 60 days prior to award. The Department's policy under the statutory requirement remains unchanged. It should also be noted that neither the Department's policy nor the statutory requirement contain a provision for maintaining contractors who are doing a good job as the purpose for the waiver. This was actually a feature of the Department's earlier policy which promoted repetitive extensions of M&O contracts over competition.

In fiscal year 1998, notice was provided to the Committee for those waivers granted by a former Secretary of Energy prior to enactment of this provision, but where award had not yet been effected prior to the date of enactment. They included extensions for the Stanford Linear Accelerator Center, the Pacific Northwest National Laboratory, the Oak Ridge National Laboratory and the Oak Ridge Y-12/K-25 Site. In addition, notice was provided for full term extensions to the Sandia National Laboratory, the Argonne National Laboratory, the Ames National Laboratory, and the Thomas Jefferson National Accelerator Facility. Notice was also provided to the Committee of the competitively awarded follow-on contract for the Brookhaven National Laboratory after termination of the incumbent contract. Because the competition was limited to nonprofit organizations, a "waiver" notice was sent to the Committee although DOE had been advised that such notice was not necessary.

Notice was also provided for short-term extensions to the contracts for the West Valley Demonstration Project, the Knolls Atomic Power Laboratory, the Oak Ridge Institute for Science and Education, the Savannah River Site Paramilitary Services, the Nevada Test Site Security Services, and the National Renewable Energy Laboratory. Regarding the latter 4 contracts, such extensions were provided to permit the conduct of competitions for successor contractors.

For fiscal year 1999, the Secretary has authorized short-term noncompetitive extensions to the contracts for the Kansas City Plant, the Oak Ridge Y-12 Plant, and the Pantex Plant. The purpose of these short-term extensions is to permit further evaluation of the potential benefits of consolidating these contracts under a single contract. It is anticipated that one or more competitions will be conducted after the results of the study are assessed and a final decision regarding the consolidation is made. The notices required by the Act for the extensions to the Kansas City and the Oak Ridge Y-12 Plant will be provided to the Committee in the near future. A notice is not required for the extension to the Pantex Plant contract because it will be

accomplished through the exercise of an existing competitively placed option.

A number of additional decisions on management and operating competitions may be made in Fiscal Years 1999 and 2000. In the event that any such decision results in a "waiver" of competition, the Secretary will provide the Committee with the required notification.

LISTING OF MAJOR CONTRACTS

Mr. Packard. For the record, please list all management and operating (M&O) and management and integration (M&I) contractors by site, including for each, the date that the contract was last awarded through either a competitive or noncompetitive procedure, and the date the contract will expire. Include the current length of each contract including any extension periods which are permitted under the current contract. Please identify any contracts which have expired and are being extended on a short term basis pending further negotiation.

Mr Farrell. The following table provides the requested information. (The information follows:) For fiscal year 1999, the Secretary has authorized short-term noncompetitive extensions to the contracts for the Kansas City Plant, the Oak Ridge Y-12 Plant, and the Pantex Plant. The purpose of these short-term extensions is to permit further evaluation of the potential benefits of consolidating these contracts under a single contract. It is anticipated that one or more competitions will be conducted after the results of the study are assessed and a final decision regarding the consolidation is made. The notices required by the Act for the extensions to the Kansas City and the Oak Ridge Y-12 Plant will be provided to the Committee in the near future. A notice is not required for the extension to the Pantex Plant contract because it will be accomplished through the exercise of an existing competitively placed option.

The Department is current conducting competitions for the management and operation of the Idaho National Engineering and Environmental Laboratory and the Oak Ridge National Laoratory.

QUESTION 24: CURRENT SITE MANAGEMENT CONTRACTS

MANAGEMENT AND OPERATING CONTRACTS

RESEARCH FACILITIES	CONTRACTOR	CATEGORY	STATUS	COMPETED	AWARD	END
Pacific Northwest National Laboratory	Battelle Memorial Institute	Research	FFRDC	No	12/30/1964	9/30/2002
Ames Laboratory	Iowa State University	Research	FFRDC	No	5/24/1943	12/31/1999
Oak Ridge National Laboratory	Lockheed Martin Energy Research	Research	FFRDC	No	12/6/1995	3/31/2000
Princeton Plasma Physics Lab	Princeton University	Research	FFRDC	No	1/1/1976	10/14/2001
Thomas Jefferson Accelerator	Southeastern University Research Assn.	Research	FFRDC	No	8/3/1984	9/30/1999
Stanford Linear Accelerator Laboratory	Stanford University	Research	FFRDC	No	1/1/1976	12/31/2003
Fermi National Laboratory	Universities Research Association	Research	FFRDC	No	1/1/1976	12/31/2001
Los Alamos National Laboratory	University of California	Research	FFRDC	No	1/1/1943	9/30/2002
Lawrence Berkeley National Lab	University of California	Research	FFRDC	No	1/1/1940	9/30/2002
Lawrence Livermore National Laboratory	University of California	Research	FFRDC	No	1/1/1976	9/30/2002
Argonne National Laboratory	University of Chicago	Research	FFRDC	No	1/1/1940	9/30/1999
Brookhaven National Laboratory	BSA	Research	FFRDC	Yes	1/4/1998	1/4/2003
National Renewable Energy Laboratory	Midwest Research Institute	Research	FFRDC	Yes	9/30/1998	10/31/2003
Sandia National Laboratories	Sandia Corp (Lockheed Martin)	Research	FFRDC	Yes	10/1/1993	9/30/2003
Idaho National Engineering Lab	Lockheed Idaho Technology Co	Research	FFRDC	Yes	8/3/1994	9/30/1999

PLANT AND MISC FACILITIES	CONTRACTOR	CATEGORY	STATUS	COMPETED	AWARD	END
Knolls Atomic Power Laboratory	KAPL, Inc (Lockheed Martin)	Research	formerly FFRDC	No	8/4/1993	9/30/2000
West Valley Project	Westinghouse (West Valley Nuclear Services)	Nuclear		No	7/31/1985	9/30/2001
Oak Ridge Y-12 Site	Lockheed Martin Energy Systems	Defense		No	1/1/1976	3/31/2000
Waste Isolation Pilot Facility	Westinghouse Electric Corp.	Defense	Orig competed	No	3/30/1984	9/30/2000
Kansas City Plant	Allied-Signal Inc.	Defense		No	10/24/1985	3/31/2000
Strategic Petroleum Reserves	DYNMcDermit	Oil Reserve		Yes	3/26/1993	3/31/2003
Bettis Atomic Power Laboratory	Bechtel National	Research	formerly FFRDC	Yes	9/30/1998	9/30/2003
National Civilian Radioactive Waste Progra	TRW Environmental Systems	Nuclear		Yes	2/12/1991	2/12/2001
Test Site Support and Operation	Bechtel Nevada, Inc	Defense		Yes	10/27/1995	10/31/2000
Specific Manufacturing Plant	Lockheed Idaho Technology Co	Environmental		Yes	8/3/1994	9/30/1999
Pantex Plant	Mason & Hanger-Silas Mason	Defense		Yes	9/30/1991	9/30/1999
Savannah River Site	Westinghouse Electric Corp.	Environmental		Yes	8/6/1996	9/30/2001

OTHER FACILITIES	CONTRACTOR	CATEGORY	STATUS	COMPETED	AWARD	END
Fernald	Fluor Daniel Envir.	Environmental		Yes	8/8/92	11/30/2000
Hanford Site	Bechtel Hanford	Environmental		Yes	6/30/93	6/30/2002
Hanford Site Envir Mgmt	Fluor Daniel Hanford, Inc	Environmental		Yes	8/6/1996	9/30/2001
Hanford Health Research	Hanford Environ Health Fdn	Environmental		Yes	6/15/1998	9/30/2001
Grand Junction Project Office	MACTEC	Environmental		Yes	6/14/1996	6/30/2000
Grand Junction Project Office	Wastren, Inc	Environmental		Yes	6/14/1996	6/30/2000
Rocky Flats Envir. Technology Site	Kaiser-Hill LLC	Environmental		Yes	4/4/1995	6/30/1999
Mound Plant	Babcock & Wilcox	Environmental		Yes	8/1/1997	2/3/2003
Envir & Enrich Progs Oak Ridge Sites & P	Bechtel Jacobs Company	Environmental		Yes	12/18/1997	9/30/2003
Oak Ridge Inst. of Science & Ed	Oak Ridge Associated Universities	Services	formerly FFRDC	No	9/1/1983	9/30/1999
Bettis Atomic Power Laboratory	Westinghouse	Research	formerly FFRDC	No	9/30/1998	9/30/2003

SUPERCOMPUTING INITIATIVES

Mr. Packard. Mr. Secretary, the Department has requested significant funding in computing capabilities both in the defense programs with the Accelerated Strategic Computing Initiative (ASCI) and in the non-defense programs with the new Scientific Simulation Initiative (SSI). These total over $600 million. The Department's proposal appears to create a parallel program including the purchase of additional expensive supercomputers for non-defense programs, rather than making maximum use of the supercomputers already being purchased by ASCI for the nuclear weapons program. Isn't it possible to more fully integrate the activities of the defense and non-defense programs?

Secretary Richardson. The Department has taken steps to ensure the integration of SSI and ASCI. The Office of Science, which will be responsible for the SSI computer science and enabling technologies research, and the management of the ASCI program in the Office of Defense Programs have established a joint task force to ensure appropriate integration of research in computer science, applied mathematics, and other enabling technologies. The initial focus of this group is to develop a joint program plan for data management and visualization with the roadmaps and research agenda developed last year in the joint DOE-NSF workshop on Data and Visualization Corridors.

We have evaluated the possibility of using ASCI computing hardware for SSI programs and have concluded that this is not possible. Current ASCI computing resources are being fully utilized to meet stockpile stewardship needs, which also includes computing time used by universities under the Academic Strategic Alliance Program. Because the Stockpile Stewardship Program and the ASCI systems are driven by national security considerations, availability to meet SSI milestones and computational requirements cannot be assured. In addition, the ASCI machines are generally operated in a classified mode and switching to an unclassified environment to execute SSI models and simulations, such as climate change, is time consuming and costly.

We have also carefully considered the option of using an ASCI computer after ASCI has released it and moved to the next stage in its technology roadmap. We have concluded that this is not possible for a number of reasons. The most important of these is that the experience of ASCI in using these computers led the vendors to make significant improvements in the underlying technology for the later ASCI systems. These improvements will make the later ASCI systems significantly easier for ASCI scientists to use effectively. If we restrict the SSI program scientists to the older, released ASCI systems, they lose the advantage of lessons learned in the ASCI program. In addition, if SSI must wait for released ASCI machines, then the SSI schedule becomes critically dependent on the vendors' ability to deliver upgraded ASCI systems. Finally, it is important to note that this option has significant costs because ASCI's contractual arrangements with the vendors assumed that these computers would be "traded in" as a part of the ASCI upgrade and many expensive peripheral devices, such as high-speed disk drives, would need to be replaced due to security concerns. In fact, in the case of ASCI Blue Pacific, the cost of replacing the disk drives alone would be approximately $5 million.

PERSONNEL MANAGEMENT

Mr. Packard. Section 3161 of the National Defense Authorization Act for Fiscal Year 1995 provided DOE authority to establish and set the rates of pay for not more than 200 scientific, engineering, and technical personnel whose duties will relate to safety at defense nuclear facilities of the Department. How many positions have been filled using Defense Act excepted service authority in each year since fiscal year 1995?

Mr. Farrell. The Defense Act excepted service authority has been used to fill 45 key engineering, scientific, and other technical positions responsible for the safe accomplishment of the Department's mission in defense nuclear facilities programs. In Fiscal Year 1995, 13 positions were filled, 10 positions in Fiscal Year 1996, 17 positions in Fiscal Year 1997, and 5 positions in Fiscal Year 1998. No positions have been filled to date during this fiscal year. Of the 45 positions filled, 40 are currently encumbered and 5 have left the Department.

Mr. Packard. For the record, for each headquarters program organization, provide a table for fiscal years 1997, 1998, and 1999 showing the number of federal employees, the number of M&O contractor or laboratory employees detailed to HQ, the number of support service contractors, and other consultants, and any other categories of employees who work for the Headquarters program organizations in the Washington region. Please provide totals for each of the categories.

Mr. Farrell. The following table provides the number of Federal employees (# of FTEs) and M&O contractor employees (# of people) assigned to the Washington, D.C. area by Program Office for Fiscal Years 1997 and 1998, and projections for1999. Support Service obligations for FY 97 and 98 as well as Support Service Budget Ceilings for FY 99 are also provided. The number of Support Service employees is not maintained by the Department, given the fluctuating nature of the work involved. The Department's Annual Report to Congress on the Use of Support Service Contractors and M&O Contractor Employees (January 1999) provides a listing of all support service contracts and contractors in Appendix D. A copy of the report is included with this response. (The information follows:)

Department of Energy
HQ Program Offices Federal Employees, M&O Contractor Employees & Support Services Budgets

Organization	Federal Employees (End of Yr.)			M&O Contractor Employees (# of people)			Support Services Budgets (Dollars in Thousands)		
	FY98	FY99 (Projected)	FY00	FY97	FY98	FY99 (Projected)	FY97 Obligation	FY98 Obligation	FY99 Ceiling
Office of the Secretary	32	40	40	0	1	1	0	0	0
Chief Financial Officer	204	210	210	0	2	1	5,111	4,086	4,087
Defense Programs	281	267	261	41	31	34	23,589	22,743	27,000
Energy Efficiency & Ren. Energy (NREL)	360	362	349	78	18 38	18 38	17,934	10,923	17,500
Office of Science	267	271	266	15	9	10	6,532	5,967	9,000
Environmental Management	429	427	412	88	21	10	42,217	34,669	23,300
Environmental, Safety & Health	339	326	312	73	32	3	21,465	21,740	43,000
Fissile Materials	28	28	28	5	0	0	7,081	5,285	481
Fossil Energy	174	174	169	11	2	2	55,876	66,908	72,000
Management and Administration	600	597	586	10	0	0	15,846	15,743	25,400
Nonpro. & Nat. Security (NE-NN) Counterintelligence Intelligence	284 8 38	309 15 38	301 15 36	67 - -	64 25 1	86 26 2	32,033	30,029	30,544
Nuclear Energy	72	96	93	59	6	6	7,367	5,149	6,295
Office of Policy	111	112	120	14	5	6	1,497	1,250	1,372
Worker Transition	25	22	21	2	2	2	3,358	1,345	1,555
Other	1,003	989	962	211	119	111	53,819	50,928	101,374
TOTALS	**4,255**	**4,283**	**4,181**	**674**	**376**	**356**	**293,725**	**276,765**	**362,908**

DEPARTMENT OF ENERGY

USE OF MANAGEMENT & OPERATING CONTRACTOR EMPLOYEES SUPPORTING DOE IN WASHINGTON D.C.

USE OF SUPPORT SERVICES CONTRACTORS

JANUARY, 1999

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ACRONYMS

ANL	Argonne National Laboratory
BNL	Brookhaven National Laboratory
CN	Office of Counterintelligence
CFO	Chief Financial Officer
DOE	Department of Energy
DP	Office of Defense Programs
EE	Office of Energy Efficiency and Renewable Energy
EH	Office of Environment, Safety and Health
EM	Office of Environmental Management
EPACT	Energy Policy Act of 1993
FE	Office of Fossil Energy
HCA	Head of Contracting Authority
HQ	Headquarters
IAEA	International Atomic Energy Agency
IN	Office of Intelligence
INEEL	Idaho National Engineering and Environmental Laboratory
KCP	Kansas City Plant
LANL	Los Alamos National Laboratory
LBNL	Ernest Orlando Lawrence Berkeley National Laboratory
LMER	Lockheed Martin Energy Research
LMES	Lockheed Martin Energy Systems
LMITCO	Lockheed Martin Idaho Technology Company
LLNL	Lawrence Livermore National Laboratory
MA	Office of Management and Administration
M&O	Management and Operating
MD	Office of Fissile Materials Disposition
MRI	Midwest Research Institute
NE	Office of Nuclear Energy, Science and Technology
NEST	Nuclear Emergency Search Team
NN	Nonproliferation and National Security
NREL	National Renewable Energy Laboratory
NSSP	National Security Support Program
OH	Overhead
ORAU	Oak Ridge Association of Universities
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
OSTP	Office of Science and Technology Policy
PNNL	Pacific Northwest National Laboratory
PO	Policy and International Affairs Office
SAI	Strategic Alignment Initiative
SC	Science Research Program
SNL	Sandia National Laboratory
STP	Special Technology Program
WT	Office of Worker and Community Transition

DEPARTMENT OF ENERGY'S USE OF MANAGEMENT AND OPERATING CONTRACTOR EMPLOYEES SUPPORTING DOE IN WASHINGTON D.C. AND USE OF SUPPORT SERVICES CONTRACTORS

EXECUTIVE SUMMARY

The Department of Energy and its predecessor agencies have relied on the private sector to assist in accomplishing their missions. Realizing that all of the necessary technical and management expertise is not available in its Federal workforce, DOE contracts with industrial firms, nonprofit research organizations, and academic institutions for assistance in performing the highly complex programs for which it is responsible. These organizations manage and operate major industrial plants, conduct basic and applied research in a myriad of scientific endeavors, and provide technical and management support to the Department in executing multi-billion dollar programs affecting the national defense, the availability of future energy resources, and environmental cleanup.

Use of contractors has served the Department well, facilitating the accomplishment of varied, complex, and highly technical activities. The Department, however, has been in a period of restructuring and downsizing. Accordingly, while reducing the level of its Federal staffing, the Department has continued to reduce the management and operating contractor workforce as well as its use of support service contracts.

In August 1995, the Department of Energy initiated Strategic Alignment Initiative 37- Reducing Support Service Contracting. That initiative set a Department-wide goal of reducing support service contracting by $90 million per year in Fiscal Years 1996 through 2000. Additionally, to ensure that reductions in support service contracts were not offset by assignment of Management and Operating (M&O) contractor employees to inappropriate support services functions, the Department initiated a program in late 1995 to strengthen its management of the use of such employees by Headquarters Program and Staff Offices.

Congress continues to express concern about excessive use of support service contractors and other non-Federal employees throughout the Department. The FY 99 Energy and Water Development Appropriations Conference Report 105-749 directed the Department to reduce the use of contractor employees at Headquarters in FY 99 by 10% below the FY 98 level of usage. The Report also directed the Department to provide a report by January 31, 1999, on the use of all support service contractors and on M&O contractor employees detailed to Headquarters. This report responds to that Congressional Directive.

The Department's efforts over the past three years have resulted in improved management of its M&O contractor employees in the Washington area and elimination of inappropriate assignments. Total assignments during this time frame have been reduced from over 670 to 379. In fact, the January 1998 level has been cut by 59. The Congressional Directive for a ten percent reduction of employees during FY 99 compared to usage in FY 98 will be met based on current projections for each office.

Over the next several months, the Department intends to establish a more efficient system for defining and managing those assignments which require the technical expertise from laboratory employees. Currently, a draft DOE Order is under review which revises requirements in using M&O contractor employees in the Washington area. By April, plans for utilizing M&O contractor employees will be submitted from Headquarters Program and Staff Offices and from Field Offices for FY 00 staffing requirements with proposed ceilings for assignments during the next fiscal year.

Over the past three years, the Department has also achieved a continual decrease in the monies obligated for support service contractors throughout the Department. The FY 94 obligation baseline was $700 million. Over the past three years, obligations have declined to $518 million in FY 96, to $453 million in FY 97, and to $404 million in FY 98. The decrease in obligations during FY 98 was an eleven percent reduction from FY 97.

USE OF MANAGEMENT AND OPERATING CONTRACTOR EMPLOYEES SUPPORTING DOE IN WASHINGTON D.C.

BACKGROUND:

Management interest in the use of M&O contractor employees at DOE Headquarters grew as a result of Strategic Alignment Initiative 37 - Reducing Support Service Contracting. Its primary objective was to significantly reduce expenditures for DOE support service contracts. The Department on September 22, 1995, prohibited Heads of Departmental Elements from using M&O contractor personnel to compensate for support service contract reductions. M&O contractor personnel include those funded by Interior and by Energy & Water Development appropriations. Additionally, the Department established policy to prohibit use of such employees for administrative or management purposes outside the scope of their contract.

Subsequently, the Office of Human Resources and Administration requested information on the number and usage of M&O employees at Headquarters to establish a baseline of usage and determine the appropriateness of their use. Salary, benefits, overhead and added factor costs, were also included in the inventory.

Preliminary data from Headquarters organizations were used by the former Deputy Secretary on August 14, 1996, to direct Departmental elements to review the work performed by each contractor employee. A determination was to be made whether that work conformed to the policy direction and whether the assignment was cost effective. The former Deputy Secretary further directed an update of the inventory after the review.

In July 1996, the Office of Inspector General issued a report, *Audit of the Department of Energy Program Offices' Use of Management and Operating Contractor Employees.* This report identified weaknesses in the Department's monitoring of employees in Headquarters and recommended that the Department: define activities that may be performed by laboratory employees; develop a system to monitor placement of laboratory employees within Department program offices; and evaluate the budgetary impacts of continuing support by laboratory employees.

On March 21, 1997, the Department formalized its policy on the usage of M&O contractor employees in Policy Notice 350.3. The Policy Notice defined and prohibited inappropriate assignments, required a determination that assignments were cost effective, and restricted usage of contractor employees that violated personnel policies or created conflicts of interest. Subsequently, the former Deputy Secretary directed that no further assignments to Headquarters could be effected without the approval of the Assistant Secretary for Human Resources and Administration.

On March 25, 1997, the Assistant Secretary for Human Resources and Administration expanded the scope of the employee inventory to include those DOE reimbursable M&O employees assigned to M&O Washington area offices, but not associated with a specific Headquarters program. The Assistant Secretary further directed Field Managers to review those assignments and direct contractors to terminate assignments found inappropriate or unnecessary. Field Managers were also directed to institute controls for future assignments.

On August 28, 1997, Headquarters program offices and field office managers were requested to update the matrix of M&O contractor employees. This request provided a specific format to follow and requested annotations on differences between data collected by the Office of Inspector General and the Assistant Secretary's Office.

The inventory includes those M&O contractor employees assigned to the Washington D. C. area and fully reimbursed by the Department. It does not include M&O employees working for other Federal agencies under the Department's Work for Others program, nor those assigned under statutorily authorized Intergovernmental Personnel Agreements or those assigned to the Nuclear Emergency Search Team (NEST) Program or the TRW Yucca Mountain Contract. The NEST Program is required to operate from the Andrews Air Force Base. The M&O contract location for Yucca Mountain is in Washington D.C.

As of January 1998, a comprehensive inventory of M&O contractor employees on assignment in the Washington area was completed. Each Headquarters program and staff office, in conjunction with the Department's field offices, identified those M&O contractor employees who supported their respective offices.

The inventory identified many contractor employees as being in Washington but not in support of a program office. They had been assigned by a contractor to the Washington area without any specific request from either a Headquarters program office or a field office. The Office of Inspector General also identified many such employees. The former Deputy Secretary, on January 16, 1998, asked field office managers to reconcile the Department's inventory with the listing of contractor employees provided by the Inspector General who were assigned to Washington, D. C.

The inventory and DOE guidance and policies, summarized by Table I, were submitted on January 30, 1998 to the Energy and Water Development Appropriations Subcommittee. Subsequently, DOE Notice 350.4, dated February 26, 1998, extended DOE N 350.3. A report analyzing the January 30 submission was submitted to the Subcommittee on March 3, 1998.

The March report, which addressed the discrepancies with the Inspector General's inventory, concluded that the Department's efforts had resulted in improved management of its M&O contractor employees in the Washington area. The inventories verified that an employee reduction of 235 people had occurred over six months. Table II compares the inventory completed at the end of FY 97 to one completed in January 1998. Of the 235 person reduction, 101 had been transferred to support service contracts without exceeding the individual program's ceilings, 23 people had been incorrectly classified and 111 positions had been terminated, reassigned to non-DOE projects, or reassigned to work at the host laboratory.

TABLE 1

PREVIOUS DOE NOTICES AND GUIDANCE ON USE OF M&O CONTRACTORS AND LAB EMPLOYEES FOR SERVICES IN THE DC AREA

NOTICE/GUIDANCE DATE	REQUIREMENTS
September, 22, 1995 Secretary O'Leary	M&O Contractor employees shall not provide expertise not associated with their stated mission and shall not provide administrative or management support services.
August, 14, 1996 Deputy Secretary	Heads of Departmental elements shall establish a program within their offices to properly manage use of M&O employees, to meet directive of 9/22/95, provide an accounting of employees, and include consideration to limiting duration of assignment due to cost.
DOE NOTICE 350.3 March 21, 1997	(1) Assignments must provide technical expertise associated with the mission of the lab and shall not provide services compensating support service contracting reductions, administrative or management support services or federal employees functions. (2) DOE authorization authority shall implement a management process for control of assignments including an inventory, evaluate each program request, provide a copy of Notice to M&O employee, and inform Field Manager of assignment. (3) Cognizant Assistant Secretary must approve assignments, in writing, which exceed 365 days. Payments for any additional tax burden caused by extended assignment shall not be allowed in accordance with DEAR 970.3102-16(c)(4).
March 21, 1997 Deputy Secretary	Statement reiterates to Secretarial Offices importance of Notice 350.3 and credible cost reduction initiatives, notifies of meeting to determine status of M&O employees including subcontractors, and advises Field Managers that no further assignments will be made to HQ offices without written approval from Assistant Secretary of Human Resources and Administration.
March 27, 1997 Assistant Secretary for Human Resources and Administration	Field Managers must establish internal mechanisms to ensure that no M&O employee or subcontractor is assigned to a HQ program without written authorization from the Assistant Secretary of Human Resources and Administration. Survey was required of employees assigned to HQ and contractor offices. Field managers will direct contractors to terminate any assignment which is not necessary or appropriate, and future assignments are to be adequately controlled.
May 30, 1997 Stephen Mournighan	Revises authorization form. Clarifies requirements for completing forms: -Authorization is required for all M&O contractor or subcontractor employees located in DC and paid for by Department funds; -The Field Manager must sign the Authorization Request if the employee being assigned is not affiliated with a HQ program office; -Authorization must be requested for any employee whose assignment exceeds 30 days and must be obtained prior to assignment or renewal; -The cognizant Assistant Secretary must approve in writing, assignments to HQ which exceed 365 days. If an employee is not affiliated with a HQ program, the Cognizant Field Manager is responsible for approving the exception to the 365 limit. - Employees, who support two or more programs somewhat equally, must have the Assistant Secretary, or Director for each of those programs with assignments sign the authorization request.
DOE NOTICE 350.4 February 26, 1998.	The Notice extends DOE N 350.3 dated 3-5-97 until 12-31-98

TABLE II
M&O CONTRACTOR STAFF ASSIGNMENTS IN THE WASHINGTON AREA

EMPLOYEE CLASSIFICATION	11/97 INVENTORY	1/98 INVENTORY
Headquarters Program Assignments • Located in DOE Offices • Located in Contractor Offices	463	282 (97) (185)
M&O Contractor Assignments	123	156
Assignments not verified in November Inventory which were subsequently classified	87	
Totals	**673**	**438**

There were 156 contractor employees identified as being funded by the Department and located in the Washington area, but not identified by the program offices as directly supporting them. The Department committed to further evaluate these positions and to develop the proper management process to follow in: assigning tasks to contractor staff, determining the work location for these tasks, and determining the role of Headquarters programs within the staff assignment process.

Subsequent to the March Report, the Department initiated an effort to further evaluate and to develop a more efficient approach for assigning and managing the use of M&O contractor employees in the Washington area. The following actions were taken:

- Comprehensive inventories were completed in July and November;
- Interviews were conducted with each M&O Washington Office Manager for those offices which have costs reimbursed by the Department. All interviews were conducted at the office location except for one contractor;
- Working Groups representing all Headquarters Program and Staff, and Field Offices, were formed to address issues and approaches;
- Pilot Projects were developed with the Offices of Nonproliferation and National Security (NN), Intelligence (IN), Counterintelligence (CN) and Transportation Technologies within Energy Efficiency & Renewable Resources (EE) defining critical skills requirements from the laboratories;
- Pilot Projects were undertaken with the Oakland and Richland Field Offices to develop support staffing plan formats for the contractor offices; and
- A DOE Order consolidating and modifying requirements is currently proceeding through the DOE system for approval.

STATUS OF ASSIGNMENTS:
The July 1998 inventory of the M&O contractor employees located in Washington indicated that the number of assignments had remained constant since the January inventory. (Table III) Assignments supporting the 156 employees, previously not identified as program assignments, were defined. Many of these assignments provide office support to the contractor offices. Others are assigned to tasks authorized by Program Offices, and are being performed by contractor personnel in Washington because the contractor determined it was the most effective use of resources. The employees supporting the National Security Support Program (NSSP) contract and National Renewable Energy Laboratory (NREL) projects were also part of the 156 positions. NSSP manages the training and readiness program for emergency response and supports the NEST Program. NREL has an office in Washington which provides technical support in fulfilling program requirements for the Energy Efficiency and Renewable Energy Program (EE).

Assignments inventoried in July 1998 are characterized as follows:

- The number of M&O contractor employees located in Washington D. C., reimbursed by the Department, is 434. This includes all subcontractors retained through the M&O Contractor, but does not include IPAs, Work-for-Others and special categories of assignments such as the NEST Program at Andrews Air Force Base.

- The number of administrative support, which may be directly or indirectly funded by a Headquarters Program or Staff Office(s), and other overhead positions, e.g., management, computer support, program or external liaison, sales support, or support to other agencies, in the contractor offices is 81. These represent about 18% of the contractor employee assignments in Washington.

- Approximately 120 of the contractor employees (~28%) are located in DOE Facilities. Most have assignments with the Defense Program (DP), the Science Program (SC), and other National Security Programs (NN, IN, CN).

- About 15% of the assignments are to subcontractors (76). These employees work out of the subcontractors' Washington Offices. Most support the Environmental Management (EM), Environment, Health, and Safety (EH) and Nuclear Energy (NE) Programs.

- Fourteen M&O contractors currently provide technical support to Program or Staff Offices. Eleven have Washington Offices and about 36 percent of the employees are located in ten of the contractor's offices.. This percentage does not include the administrative or overhead positions in these offices. A few employees are located at other agencies or are providing assistance to Congressional Committees / Senators at their request.

- Argonne and Pacific Northwest National Laboratory Contractors have staffs whose costs are supported by several programs, and in the case of PNNL are partially supported by the lab's discretionary funds. ANL provides regulatory support and PNNL is undertaking initiatives supporting climate change studies. Assignments for these activities are segmented into separate categories from Program Offices' inventories.

The increases in the number of assignments between January, 1998 and July 1998 for DP and EE Programs were not related to additional new assignments for these Offices. The assignments were made by the M&O contractors supporting task authorizations initiated by these Programs (part of the 156 employees identified as non-program assignments). During this time frame, NN was subdivided into three offices-NN, IN, CN. Additional assignments for these National Security Programs were made to support a number of new initiatives.

The November 1998 inventory (Table III) shows a decrease from July 1998 of over ten percent of employees assigned to work tasks in Washington. The inventory, which is included in Appendix A, includes a listing of all current employees, descriptions of their assignments and costs. The reduction over the four-month time frame is related to the decrease in the use of subcontractors through the laboratories. Programs reducing use of subcontractors include EH, EM, and NE. The current number of subcontractors assigned is 47 compared to 76 in July. This trend of subcontractor support reduction will continue through FY 99 as current work tasks are completed and new tasks are transferred to support services contracts.

The number of administrative and overhead positions in the M&O contractor's offices also had a reduction from 81 to 69 employees. The percentage of office support positions to total number of assignments remains about 18 percent. The November inventory (Appendix A) defines the current job responsibilities for these positions.

Table III also includes the projected number of contractor employees at the end of FY 99. These projections are preliminary and subject to change as Program and Staff Offices complete their critical skills assessments and define their needs for the remainder of the Fiscal Year.

During this past year, the Department initiated a pilot project assessing the technical skill requirements for National Security Programs. (Appendix B) The Offices involved included Nonproliferation and National Security (NN); Intelligence (IN), and Counterintelligence (CN). Because of related national security concerns, the Department has restructured its organization, expanded a number of its programs, and retained laboratory employee expertise to technically support these efforts. It is anticipated an additional 25-30 people will be assigned temporarily to support these programs as they evolve. The technical skills assessment provided the basis for determining the number of M&O contractor employee assignments which are required.

A second initiative focused on developing a simpler format for defining critical skills requirements and job functions with the Office of Transportation Technologies in the Energy Efficiency and Renewable Energy Office. This format incorporates all existing assignments and provides additional information on Federal FTE positions and budgets. (Appendix C)

Currently, the Department is finalizing the format and approach for defining the technical skill requirements from the laboratories which will be required for each program. These requirements are proposed to be reviewed on an annual basis by the Department. **Even with modest growth in some Program areas, the Department estimates that the number of contractor employees during FY 99 will be reduced by more than 10 percent below the FY 98 level.** (FY 98 level defined as the average number of employees from January and July inventories.)

TABLE III
M&O CONTRACTOR EMPLOYEE ASSIGNMENTS

PROGRAM OFFICE	TOTAL STAFF 1/98	TOTAL STAFF 7/98	TOTAL STAFF 11/98	PROJECTED STAFF 9/99
OFF - SEC	0	0	1	1
CR	2	3	2	1
DP	20	34	31	34
EE	36	NREL 18 EE 45	NREL 18 EE 38	NREL-18 EE-38
EH	41	38	32	3+
EM	26	25	21	10+
SC	10	10	9	10+
FE	11	3	2	2+
MD	3	2	3	3
PO	11	6	5	6+
WT	2	2	2	2
NE NE-NN	53	30 10	6 9	6 9
NN IN-CN	67	61 21/0	55 25/1	79 26/2
LAB OH	ND	81*	69	Target-60
Special Cat. ANL-Reg.	156	8	9	9
PNNL-Clim		16	20	20
Congress		3	2	3
NSSP		18**	19**	19**
TOTALS	**438**	**434**	**379**	**361**

*Includes Program direct charged administrative support staff

**NSSP to be excluded from Inventory; similar to NEST Program

Note: Special categories include M&O staff who undertake work tasks for a number of programs, e.g. Argonne regulatory analysis, or staff whose project is charged to a number of programs/OH, e.g. PNNL climate change staff. The programs currently utilizing ANL and PNNL staffs in these categories will continue to have access. + indicates those programs who assign tasks to these staffs.

CONTRACTOR WASHINGTON OFFICES

Currently there are 11 M&O contractor offices in the Washington area funded partially or totally by the Department. Costs for the operation of these offices are charged to cost centers at the cognizant laboratory. These offices are also utilized by visiting staff from the laboratories. BNL currently has no staff assignments being undertaken by staff in the contractor office, but provide space for visiting staff from the laboratory. Table IV defines the location and current annual rents. The annual rent includes the entire leased space costs which may support assignments other than DOE. Most office space leased is approved GSA space.

TABLE IV
CONTRACTOR WASHINGTON OFFICES

OPS OFFICE	LAB	CONTRACTOR	LOCATION	RENT
Albuquerque	SNL	Lockheed Martin	L'Enfant Plaza	$140K
Albuquerque	LANL	Uni. of California	12th & D	$109K
Chicago	ANL	Uni. of Chicago	L'Enfant Plaza	$464K
Idaho	INEEL	LMITCO	L'Enfant Plaza North Bethesda Germantown	$145K $113K $11K
Oak Ridge	ORISE	ORAU	19th & K	$85K
Oak Ridge	ORNL	Lockheed Martin LMER/LMES	7th & C Germantown	$128K $52K
Oakland	LBNL	Uni. of California	12th & D	$308K
Oakland	LLNL	Uni. of California	L'Enfant Plaza Germantown	$185K $100K
Richland	PNNL	Battelle	9th & D	$1.2M*
Golden	NREL	MRI	12th & D	$253K

**Contractor Lease. Space subleased to BNL.

COST CONSIDERATIONS:

The inventory of all contractor employees, which is included in Appendix A, includes the assignment costs to the Program for each individual. The cost information includes the salary, employee benefits, overhead and added factor costs such as relocation or per diem charges. Several M&O employees are hired locally from Washington, e.g. administrative support, which precludes any per diem or relocation expenses. The Washington contractor office costs are proportionally charged to the cost center(s) from where employees are assigned. Thus, Washington office overhead and lab overhead costs are included.

MANAGEMENT SYSTEMS:

The Department initiated steps over three years ago to manage the use of M&O contractor employees assigned to Headquarters as part of its downsizing the DOE organization, which involved reducing the number of Federal Employees and Support Service Contractors without increasing M&O Contractor Employees. What has evolved is a system of approving individual assignments by the Office of Management and Administration taken out of the context of program needs, and without addressing the existing long term assignments to Programs or assignments other than direct technical support to Headquarters staff. Approval of individual assignments has become time consuming and resource intensive. In addition, some types of assignments have not been covered by current policy.

Many Headquarters assignments of laboratory employees, however, are extremely important in achieving the Department's missions. There has been an erosion of technical skills due to downsizing of the operations, as well as requirements for varying technical skills because of changing program missions. Program areas will continue to have needs for the skills of laboratory personnel.

Work groups, which included representatives from all Headquarters Program and Staff and Field Offices, were formed to address policy and management structure for the assignment of M&O employees to Washington. Department Policy on use of Facility Contractor employees has been clarified and is currently proposed as illustrated by Table V.

TABLE V
CRITERIA FOR EMPLOYEE ASSIGNMENTS

Requirements for Assignments	Restrictions on Assignments
Assignment either: ✘Provides technical expertise and experience critical to Program mission not otherwise available from other labor pools for less costs; ✘Undertakes work tasks which require location in Washington because of required interface with Headquarters Staff or with other agencies; or ✘Provides administrative support in contractor office. Number and type of assignments are based on good business practices. Assignment must: ✘Provide technical expertise associated with the mission of the Lab; ✘Be within approved ceilings of either Program, Staff or Contractor Staffing Plans.	Assignment does not: ✘Provide services compensating for support service contracting reductions, management support, or assume federal services functions; ✘Provide administrative support within Federal facilities or for Federal employees; ✘Create adverse impact with the contractor meeting contract commitments due to the absence of the assignee; ✘Undertake business development or provide legislative liaison; ✘Extend beyond the completion of the project. Subcontracts will not be awarded for the purpose of providing direct support to Program offices. Assignments to subcontractor employees through a contractor must receive sufficient benefit to justify the contractor management cost

*Criteria apply to all assignments > 30 days

Currently a draft DOE Order is under review which delineates revised requirements for use and management of contractor employees from DOE Facilities. Table VI delineates current management requirements to those proposed in the draft Order. Procedures and an information system to assist in the management of this program are being developed. The proposed Order delineates management responsibility and accountability as follows:

- The Program Assistant Secretary or Staff Office Director is responsible for defining the technical requirements for employees from the lab and for proposing a ceiling for the number of assignments each year and keeping assignments within that ceiling;

- Each Head of Contracting Authority (HCA) is responsible for developing an annual staffing plan in conjunction with the Facility Contractor and proposing a ceiling for the number of office administrative and overhead staff positions each year. The HCA is also responsible for processing assignments for Facility Contractor employees within the approved ceilings; and

- The CFO is responsible for reviewing the budget and resources components of the annual staffing plans and will establish ceilings with the concurrence from the Office of Management and Administration.

NEXT STEPS:

The Department has undertaken efforts over the past three years which have resulted in improved management of its M&O contractor employees in the Washington area. The total number of assignments have been reduced from over 670 to 377. The Congressional Directive for a ten percent reduction of employees during FY 99 compared to usage in FY 98 will be met.

Over the next several months, the Department will continue to improve its system for managing these employees. The proposed Order will be processed through the Department. By April, plans will be submitted from Program, Staff, and Field Offices for FY 2000 technical support requirements with proposed ceilings for assignments during the fiscal year. Ceilings will be established prior to the next fiscal year.

TABLE VI
M&O CONTRACTOR EMPLOYEE MANAGEMENT SYSTEM

Management Element	Current Requirements and Processes	Proposed Actions
Policy -DOE-N350.3 & N350.4 -Guidance Memo 5/30/97	-Authorization required for all M&O staff (including Subs) > 30 days assignment. -Program directed assignments authorized by DOE authorization authority. -Lab directed assignments authorized by DOE Field Manager. -All assignments/renewals approved by Director of Management and Adm. -Assignments are to provide technical expertise associated with the Laboratory.	-Prepare revised policy/review with DOE team. Establish number of M&O positions in conjunction with critical skill needs, program budgets, Federal FTEs and management consideration. -Establish number of administrative / overhead functions for M&O contractor office staff. -Define process for managing off-site lab positions.
Congressional Directives Appropriation Bills	-**'96** Eliminate use of support services retained from M&O contractors. -**'99** Reduce contractor employees at HQ in FY 99 by 10% of FY 98 levels.	Prepare congressional status report for submission by January 31
Management Approval Processes	Assignments occur as follows: **I.** -Program identifies individual. -Request prepared in required format for M&O assignments and authorized by Assistant Secretary or Staff Office Director. -Request approved by the Director of Management and Administration. **II.** -Program submits work authorizations to Field Office with work scope and budget to be undertaken by contractor. Assignment by contractor may include staff located in Washington. **III.** -Program submits work scope to field office requesting subcontractor assistance. Task assigned by M&O. **IV.** -Contractor/Field office locates staff in Washington due to costs or other considerations.	-Maximum number of positions assigned to each Headquarters Program or Staff Office based on skills assessment plan. -Contractor Office administrative and overhead support requirements established in staffing plan -Ceilings established for each Hq. Program and Staff Office and each Contractor Office by CFO with concurrence of Management and Administration Director. -Program notifies lab/field of position/task required. Head of Contracting Authority (HCA) manages process for assignments.
Data Base Management	Authorization authorities are to maintain inventory and make available upon request.	Evaluate on-line data base maintained as assignments are authorized by HCA

USE OF SUPPORT SERVICES CONTRACTORS

BACKGROUND:

As part of its overall restructuring and downsizing efforts, the Department undertook a strategic analysis of its support service needs. In August 1995, the Department approved Strategic Alignment Initiative (SAI) 37 - Reducing Support Service Contracting. That initiative called for reductions in certain support service contract obligations of $90 million each year for FY 96 through 2000, from a FY 1994 baseline of approximately $700 million. To implement this initiative, the Department established an overall obligation ceiling for support services of $610 million per year through FY 2000, with an obligational ceiling allocated to each Headquarters and Field Departmental element which could not be exceeded without management approval. In FY 96, these individual ceilings added up to a Department-wide ceiling of $600 million; in FY 97 $606 million, and in FY 98 $514 million. To ensure compliance, the Department tracked obligations on a quarterly basis through its Procurement and Assistance Data System (PADS) and advised individual organizations if they approached their assigned ceiling.

The types of support services subject to SAI - 37 are as follows:

- *Technical Support Services:* These include: determining feasibility of design considerations; development of specification, system definition, system review and reliability analyses; trade-off analyses; economic and environmental analyses, used in the Department's preparation of environmental impact statements; test and evaluation, survey or reviews to improve the effectiveness, efficiency and economy of technical operations.

- *Management Support Services:* These include analyses of workload and work flow; directives management studies; automated data processing; manpower systems analyses; assistance in the preparation of program plans; training and education; analysis of Departmental management processes; and other reports or analyses directed toward improving the effectiveness, efficience and economy of management and general administrative services.

In establishing SAI-37, maintenance and operations services were excluded from those support services subject to the obligation reduction goals. Examples of maintenance and operations services include: general housekeeping and custodial services; physical security and fire fighting; transportation, logistics, and maintenance and operation of facilities. These contract services were excluded in order to ensure that the proper security, and health and safety, of the Department's facilities were not compromised.

CURRENT STATUS:

In FY 96, the Department's obligations for support service contracts were $518 million, $182 million less than the FY 94 obligation baseline. (See Table X) The cost avoidance objective was exceeded by 100 percent. In FY 97, the Department's support service obligations totaled $453 million, which was $247 million less than the FY 94 baseline. The cost avoidance objective was exceeded by 160 percent. **In FY 98, obligations for support services continued to decline to $404 million or a $296 million less than the baseline. This is a eleven percent reduction of support service obligations from FY 97.**

TABLE VII
SUPPORT SERVICE CONTRACTS OBLIGATIONS
(Millions of Dollars)

FISCAL YEAR	BASELINE*	OBLIGATIONS	COST AVOIDANCE
1996	700	518	182
1997	700	453	247
1998	700	404	296

*Fiscal Year 1994 Contract Obligations

NEXT STEPS:

The Department will continue to implement its SAI - 37 initiative through FY 2000. The existing methodology and management controls for ensuring that the Department successfully accomplishes its cost reductions appear to be working well and will be continued.

For FY 99, the Department's ceiling is $524 million, and each component organization has been allocated its individual limit which is defined in Table VIII. Also included in this table are the 1998 limits and obligations by organizational unit. Appendix D to this report includes information on the current support service contracts and contractors.

TABLE VIII
SUPPORT SERVICE ORGANIZATIONAL CEILINGS REPORT
(Dollars in Thousands)

Headquarters Organizations with Ceilings

Organization	FY'98 Ceilings	FY'98 Actuals	FY'99 Ceilings
Field Management FM Congressional Review Fund	3,434	2,998	2,834 35,000
Chief Financial Officer CR Support to Programs	3,771	4,086	2,723 1,364
Civilian Radioactive Waste Management	38,551	26,724	35,890
Defense Programs	27,000	22,743	27,000
Energy Efficiency	15,500	10,923	17,500
Science Research*	9,000	5,967	9,000
Environmental Management	35,000	34,669	23,300
Environmental, Safety and Health	33,800	21,740	43,000
Fossil Energy**	74,980	66,908	72,000
General Counsel	360	385	650
Management and Administration	26,000	15,743	25,400
Inspector General	3,000	2,434	4,000
Nonproliferation	34,544	30,029	30,544
Nuclear Energy	6,809	5,149	6,295
Policy for International Affairs	1,372	1,250	1,372
Worker Transition	1,794	1,345	1,555
EIA	27,000	18,387	27,000
Fissile Materials	481	5,285	481
Subtotal	**342,396**	**276,765**	**366,908**

* Includes Office of Scientific and Technical Information (OSTI)
** Includes Strategic Petroleum Reserve (SPR) and Federal Energy Technology Center (FETC)

TABLE VIII (Continued)
SUPPORT SERVICE ORGANIZATIONAL CEILINGS REPORT
(Dollars in Thousands)

Organizations with No Ceilings or Zero Dollars Projected

Organization	FY'98 Ceilings	FY'98 Actuals	FY'99 Ceilings
Federal Energy Regulatory	0	123	0
Economic Impact	0	0	0
Working Capital Fund	0	7,933	0
Power Marketing	0	0	0
Congressional	0	51	0
Subtotal	**0**	**8,107**	**0**
Total for HQ Programs	**342,396**	**284,872**	**366,908**

Field Office Organizations with Ceilings

Albuquerque	38,000	32,480	34,200
Chicago	5,000	10,058	4,750
Idaho	14,000	8,525	14,000
Nevada	10,500	19,160	9,500
Oakland	5,857	2,089	4,507
Oak Ridge	15,092	1,900	15,092
Ohio	4,516	2,861	3,550
Richland	26,000	11,143	24,000
Rocky Flats	7,000	5,065	7,000
Golden*	5,951	5,065	5,950
Savannah River	20,000	8,043	15,000
Subtotal	**151,916**	**106,402**	**137,549**

*Includes Regional Support Offices (RSOs)

TABLE VIII (Continued)
SUPPORT SERVICE ORGANIZATIONAL CEILINGS REPORT
(Dollars in Thousands)

Power Administrations with Ceilings

Organization	FY'98 Ceiling	FY'98 Actuals	FY'99 Ceiling
Southeastern	178	(29)*	150
Southwestern	1,970	817	1,970
Western	17,518	12,245	17,648
Subtotal	**19,666**	**13,033**	**19,768**
TOTAL for Field Offices and Power Administrations	**171,582**	**119,435**	**157,317**
DOE GRAND TOTALS	**513,978**	**404,307**	**524,225**

* Funds from previous fiscal years were de-obligated

APPENDIX A

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Name	Duties	Percent Support	Start/End (mm/yy-mm/yy)	Cost $000/mo.	M&O / Sub-Contractor
Congressional Assignments					
Lyons, P	Advisor to Senator Domenici on science technology	100	2/97-2/99	16	LANL
Perret, R.	Provides assistance to Senator Henry Reid	100	5/96-5/99	27	LLNL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Name	Duties	Percent Support	Prog.	Start/End (mm/yy-mm/yy)	Pgm. Cost $000/mo.	M&O / Sub-Contractor
Office of Counterintelligence (CN)						
Evalenko, D.	Designs and implements modifications to CN's Analytical Research Data System	100	CN	8/97-3/99	15	LANL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Name	Duties	Percent Support	Prog.	Start/End (mm/yy-mm/yy)	Pgm. Cost $000/mo.	M&O / Sub Contractor
Office of the Controller (CR)						
Palmieri, T.	Provides tech. expertise in analyzing tech. program accounts	100	CR	9/98-5/99	18	SNL
Robinson, L.	Provides tech. expertise in implementing Financial Data Warehouse	100	CR	1/98-1/99	12	LANL

M&O Contractor Employees On Assignment in the Washington, DC, Area

(November 1998)

Name	Duties	Percent Support	Prog.	Start/End (m/y-m/y)	Pgm. Cost $000/mo.	M&O / Sub-Contractor
Defense Programs (DP)						
Abbott, D.	Assist in technical review of radiation safety documents	50	DP	5/94-5/99	16	LLNL
Bearce, T.	Nuclear weapons information life cycle management	100	DP	6/98-7/99	25	LANL
Bieg, K.	Provides expertise in nuclear engr., pulsed power, and code development	100	DP	7/96-9/99	16	SNL
Bishop, M.	Specialized tech. advice to the Nuclear Incident Response Team Leader	100	DP	2/97-2/99	16	SNL
Bradley, R.	Expertise on the design, manufacture, and operation of use control systems	100	DP	2/98-2/99	16	SNL
Dean, P.	Tech. expertise -assist DP prog. mgrs. in reviews of ASCI implementation plans	100	DP	11/97-11/98	13	SNL
Denier, D.	Support in training activities on implementation for 93-3 (covert support)	100	DP	9/97-TBD	13	INEEL
Evancoe, P.	Program liaison: Bechtel mgt./DP-23 w/ work authorization statements	80	DP	5/97-12/00	16	Bechtel/NV
Fehringer, J.	Tech. expertise in dev./implementation of self-assessment prog. functions	100	DP	3/95-TBD	8	INEEL
Fisher, S.	Technical advisor weapons technologies (Stockpile)	100	DP	7/98-8/99	21	LANL
Freedman, J.	Provides resident technical advice to the ASDP & DAS for R & D	100	DP	1/97-1/99	16	SNL
Hassell, R.	Technical consultant, radiation protection	15	DP	2/98-TBD	15	ORISE
Hicks, B.	Technical expertise in operations & training related matters	100	DP	4/92-TBD	10	INEEL
Ingle, K.	Emergency preparedness training	10	DP	12/89-TBD	2	ANL
Koym, V.	Tech. expertise in nuc. weapons research, technology development, etc.	100	DP	10/97-9/98	16	LANL
Michelson, C.	Tech. advice for computing & scientific visualization for nuc. weapons assessment	100	DP	9/97-9/98	29	LANL
Musgrave, K.	Tech. expertise for USAF/XON prog. mgrs. in tech. reviews/AF nuclear weapons	100	DP	10/97-9/99	16	LANL
O'Neal, W.	Provides tech. assistance to the Radiological Response Support Team	100	DP	11/97-11/98	16	SNL
Peratt, A.	Expertise in theoretical plasma/weapon physics, code develop., etc.	100	DP	9/95-9/99	16	LANL
Peterson, R.	Enhanced surety risk assessment nuclear explosive safety issues	100	DP	4/98-4/99	16	SNL
Phillips, R.	Tech. editing manuals, guides, ORR reports/other assoc. tech.standards	100	DP	8/94-TBD	5	INEEL
Prassinos, P.	Nuclear safety analysis, studies for NRC licensing at the GDPs	100	DP	8/94-TBD	16	LLNL
Ray, N.	Tech. expertise in ops., engineering and sta. data analysis techniques	50	DP	3/94-TBD	10	INEEL
Robinson, T.	Technical advisor to US Nuclear Command Control	100	DP	2/97-2/98	16	LANL
Sanders, G.	Tech. expertise -USAF/XON prog. mgrs. in tech. reviews & AF nuc. weapons prog.	100	DP	10/97-9/99	16	SNL
Schroeder, D.	Assist NCCS with technical implications	100	DP	9/98-9/99	16	SNL
Sprague, W.	Expert Secure Net & Accelerated Strategic Computing Initiative	100	DP	4/98-4/99	16	KC Allied
Taylor, E.	Technical assistance on NEPA compliance	100	DP	5/94-5/99	17	LLNL
VanDevender, J.	Science Council: Provides resident technical advice to the ASDP	100	DP	7/98-11/98	16	SNL
Wayne, R.	Science Council: Provides resident technical advice to the ASDP	100	DP	9/98-12/98	16	SNL
Wilkinson, C.	Analytical and technical support for environmental issues	100	DP	2/95-2/99	9	LLNL

M&O Contractor Employees On Assignment in the Washington, DC, Area

(November 1998)

Name	Duties	Percent Support	Prog.	Start/End (m/y-m/y)	Pgm. Cost $000/mo.	M&O / Su Contract
Office of Energy Efficiency and Renewable Energy (EE)						
Ashton, W.	Competitive intelligence/tech. assessments; industrial energy use (multi-program)	28	EE	8/95-TBD	6	PNNL
Chandler, W.	Manage programs for Russian-American cooperation/industrial EE in China	77	EE	7/92-TBD	20	PNNL
Cleary, W.	Provide technical expertise in evaluating PNGV concept vehicle	100	EE	1/98-1/01	16	ANL
Coleman, P.	Analyzes and compiles data on efficiency, etc. for FEMP	100	EE	6/96-TBD	6	LBNL
Conover, D.	Provide technical info for building codes and standards/assess their impact	94	EE	9/91-TBD	22	PNNL
duPont, W.	Tech. support on the NFRC & ASTM test methods -windows energy efficiency	100	EE	10/96-TBD	6	LBNL
Eike, D.	Human-computer interface and database design (also, FE-3%)	77	EE	5/92-TBD	18	PNNL
Eisenberg, J.	Analyzes impact/potential of WAPs and State Energy Programs	100	EE	4/93-TBD	10	ORNL/LMI
Evans, M.	Manages energy efficiency and climate projects in Russia and Eastern Europe	70	EE	1/94-TBD	10	PNNL
Flemons, T.	Researches/develops logistical/communications systems on automobiles	100	EE	1/91-TBD	12	ANL
Fox, J.	Assists in maintaining OIT website, database system design	34	EE	10/96-TBD	6	PNNL
Garland, P.	FEMP Inter-laboratory Council	100	EE	9/95-TBD	13	ORNL/LMI
Grostick, E.	Provides engineering/analytical assistance to the PNGV	100	EE	6/98-6/99	15	ORNL/LMI
Gustafson, B.	Tech. support for verifying energy savings for FEMP	100	EE	5/95-TBD	6	LBNL
Harris, J.	Analyzes/develops energy efficiency in Federal purchasing	100	EE	5/93-TBD	6	LBNL
Holloman, J.	Performs program management/research on lighting/develops test procedures	100	EE	5/95-TBD	17	PNNL
Hunt, W.	Evaluates feasibility of alternatively funded energy efficiency projects	100	EE	5/93-TBD	15	PNNL
Jordan, G.	Evaluates laboratory, technology & energy performance impacts	100	EE	11/92-TBD	15	SNL
Kinzey, B.	PNNL manager for BETA program; technical analysis of dessicants, etc.	100	EE	6/87-TBD	14	PNNL
Kumar, S.	Supports monitoring and program verification protocols program for FEMP	100	EE	6/96-9/99	6	LBNL
Legro, S.	Conducts research on Eastern European energy efficiency projects	100	EE	6/96-TBD	7	PNNL
Logan, J.	Leads US team: info exch. & business outreach/China coop./climate chg.	60	EE	1/97-TBD	12	PNNL
McDonald, S.	Research on building, design, siting, construction, maintenance, disposal	96	EE	4/95-TBD	13	PNNL
McKane, A.	Promotes industrial partnerships for Motor Challenge	100	EE	4/94-TBD	6	LBNL
Munro, M.	Coordinates technical studies for Buildings Technology Program	100	EE	10/95-TBD	10	ORNL/LMI
Nicholls, A.	Performs research on building energy trends and carbon emissions	62	EE	10/87-TBD	13	PNNL
Papar, R.	Tech. aid on Motor Challenge Prog.& Internat'n'l projects w/forest prod./building	100	EE	5/96-TBD	8	LBNL
Placet, M.	Researches tech. commercialization/develops indust. databases (also, OH-52%)	20	EE	1/91-TBD	5	PNNL
Plotkin, S.	Performs technical and economic analysis of transportation technologies	100	EE	6/97-TBD	13	ANL
Purcell, C.	Researches lighting systems; analyzes savings from lighting retrofit projects	30	EE	1/91-TBD	5	PNNL
Shugars, J.	Prepares EE materials	40	EE	7/94-9/99	5	LBNL
Singh, M.	Evalutes transportation energy and environmental technologies issues	90	EE	7/78-TBD	16	ANL
Stodolsky, F.	Heavy vehicles efficiency and fuel analysis	70	EE	9/80-TBD	12	ANL

Tomlison, H.	Energy Star Program					100	EE	3/97-1/00			PNNL/D&R
Tracey, R.	Home Energy Rating Program					100	EE	3/97-1/99			PNNL/D&R
Tutterow, V.	Supports Motor Challenge Program, particularly with forest products					100	EE	4/96-TBD	12		LBNL
Walker, G.	Coordinate auto and energy companies with EE's PNGV					100	EE	7/98-1/2000	12		LMER/ORNL
Weiner, S.	Researches chemical industry technology needs					48	EE	7/93-TBD	12		PNNL

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Name	Duties	Percent Support	Prog.	Start/End (m/y-m/y)	Pgm. Cost $000/mo.	M&O/Sub-Contractor
Office of Environment, Safety and Health (EH)						
Berringer, J.	Technical and staff support to Office of Oversight	25	EH	9/96-3/00	3	PNNL
Blake, M.	Site baseline analyses & integrated ES&H Planning	34	EH	10/96-9/99	2	ORNL/MSI
Bunch, D.	ES&H plan, strat., risk, prgm. & vuln. analysis	53	EH	10/96-9/99	14	ORNL/MSI
Carswell, P.	ES&H budget analysis and program assessments	91	EH	10/96-9/99	11	ORNL/MSI
Chipman, G.	Nuclear safety assessment and strategies, program planning	22	EH	10/96-9/99	6	ORNL/MSI
Cruppies, L.	Beryllium exposure assessment: FEOSH	50	EH	10/96-9/99	4	ORNL/LINK
Davis	Program decisions impact on contractor performance	9	EH	10/96-9/99	1	ORNLMSI
DiCampli, J.	Specialist in risk prioritization methodologies	85	EH	10/96-9/99	7	ORNL/MSI
Fallon, W.	Analyst/Scientist, safety performance analysis (also, OH-12%; EH-64%; EM-22%)	100	EH	7/97-9/99	13	PNNL
Giangiuli, J.	Business risk management	68	EH	7/97-9/99	11	ORNLSMI
Goldin, H.	Chief Engr, expert Nuke Safety analyst & Plant Operations	85	EH	10/96-9/99	12	ORNL/LINK
Harrison, D.	Sr. Engr, Expert Risk Analyst, Plant Ops, ES&H mgmt planning	95	EH	10/96-9/99	12	ORNL/LINK
Heide, C.	Tech Associate, S&H Database development and analysis	90	EH	10/96-9/99	6	ORNL/LINK
Holler, B.	Administrative Support	26	EH	10/96-9/99	1	ORNL/MSI
Kiang, P.	Waste mgmt., D&D self-assessment guide	50	EH	10/96-9/99	4	ORNL/LINK
Leuschner, C.	Program and Project Analyst	81	EH	10/96-9/99	10	ORNL/MSI
Lewis, S.	BS&H research assistance (also, EM-40%)	60	EH	3/98-9/99	3	ORISE
Martore, J.	Risk Management and Performance Measures	73	EH	1/97-9/99	13	ORNL/SMI
Purcell, C.	Scientist, environmental expertise in Clean Air Act Regs. (also, EM-40%)	60	EH	10/91-9/99	11	PNNL
Rand, L.	Technical editing, graphics design	60	EH	10/96-9/99	3	ORNL/LINK
Rucosky, K.	Internet support	35	EH	10/96-9/99	3	ORNL/MSI
Saveland	Impact of program decisions on prior ES&H commitments	38	EH	10/96-9/99	3	ORNL/MSI
Scheffer, K.	Nuke Mat/Mgmt & Impact of program decision on ES&H	9	EH	10/96-9/99	1	ORNL/MSI
Shorett, J.	Scientist, environmental expertise regulatory analysis (also, OH-50%)	50	EH	5/91-9/99	7	PNNL
Snyder, B.	Chief Scientist, Expert nuke safety, reg development and analysis	10	EH	10/96-9/99	3	ORNL/LINK
Starostecki, R.	Mgmt Consultant, Worker Safety & Health, BNL Support	2	EH	3/97-9/99	1	ORNL/MSI
Tabatabai, A.	Proj. Mgr, expert ES&H tech support/integrated mgmt systems	95	EH	10/96-9/99	18	ORNL/LINK
Tabatabai, O.	Research Engr, S&H expertise, risk assessment, reactor safety	75	EH	10/96-9/99	7	ORNL/LINK
Taylor-Boyd, L.	Administrative Support	17	EH	10/96-9/99	1	ORNL/MSI
Westendorf, B.	Chief Scientist, Chemical Safety Expert, Safety Management	6	EH	10/96-9/99	1	ORNL/LINK
Whitesides, R.	Technical support to specialist	14	EH	10/96-9/99	1	ORNL/MSI
Woody, J.	Principal Investigator, Safety & Health, D&D, lead Technical	85	EH	10/96-9/99	12	ORNL/LINK

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Office of Environmental Management (EM)						
Ball, L.	Provides Technology Information Exchange for EM	100	EM	10/95-TBD	13	INEEL
Bradbury, J.	Site Specific Advisory Board evaluation (PNNL-70%) (Public Involvement)	25	EM	10/98-12/99	7	PNNL
Christian, G.	Program manager for DNFSB 97.1	100	EM	3/97-TBD	17	INEEL
Creque, T.	Program manager for plutonium focus area	100	EM	1/97-TBD	16	INEEL
Cutshall, N.	Tech. council for tech. application WM/ER (O/H-50%)	50	EM	8/95/TBD	12	ORNL/LMI
Griffin, T.	Develops information databases	100	EM	3/97-12/98		PNNLD&
Harrington, M.	Info. Sys. devel/integration; tech analysis	100	EM	10/98-12/99	17	SNL
Hill, J.	Researches the volumes of material in Hanford tanks	35	EM	12/93-TBD	10	PNNL
Hill, R.	Program manager for complex-wide Activities Integration Program	100	EM	11/97-TBD	17	INEEL
Huggins, K.	Life cycle costs - 98 BEMR	100	EM	1.98-12/98		PNNL/PP
Kefauver, D.	Provides technical support to SECOM	100	EM	10/95-TBD	9	INEEL
Kiski, B.	Provides system engineering expertise for EM integration	100	EM	10/95-TBD	15	INEEL
Kytola, K.	Surface barrier applications summary	100	EM	9/98-12/98	11	PNNL
Livingston, D.	Information management analysis for technology deployment activities	100	EM	10/96-12/98	8	SNL/RM(
Longus, L.	Anal. external rulemaking and reviews. Tech. issues related to exemptions	85	EM	05/96-12/99	14	LLNL
Nail, J.	Technical support to DNFSB 97.1 recommendation	100	EM	6/97-TBD	18	INEEL
Niewenhous, M.	Cost analyst	100	EM	10/96-12/98	7	PNNL/PP
Primeau, S.	Safety analysis reviews and certification; engineering analysis	100	EM	10/97-12/98	17	ANL/Eag
Reed, K.	Environmental assessment support (also, EH-20%)	60	EM	9/98-12-98	7	ORISE
Stack, H.	Management information task manager	100	EM	10/97-12/98	8	SNL/RM(
Towell, R.	Reviews Safety Analysis and certification of Type B packages	100	EM	10/97-12/98	17	ANL/Eag

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Fossil Energy (FE)						
Schmalzer, D.	ANL Fossil Energy Program Manager in ANL Washington Office	25	FE	1/86-TBD	3	ANL
Veil, J.	Conducts engineering analysis of water regulatory development/implementation	78	FE	9/90-TBD	10	ANL

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Name	Duties	Percent Support	Prog.	Start/End (mm/yy-mm/yy)	Pgm. Cost $000/mo.	M&O / Sub-Contractor
Office of Intelligence (IN)						
Annechini, F.	Assigned to CIA/CMOC; expert on radiation detection/health physics equip.	100	IN	3/98-998	10	Allied Sig./KCI
Arcuni, A.	Nuclear analysis of foreign material, fuel cycles & material protection	100	IN	9/95-TBD	15	PNNL
Baran, J.	Tech. analysis on Chinese nuclear weapons design, production and testing	100	IN	2/98-1/00	21	LANL
Borland, R.	Nuclear Information Management Systems development	100	IN	2/94-TBD	23	PNNL/SAIC
Cefus, G.	Intelligence analysis of foreign materials, programs and capabilities	100	IN	10/98-10/99	17	WSRC
Davis, R.	Tech. assess. of scientific developments supporting Joint Chiefs of Staff Ops.	100	IN	3/98-3/99	7	SNL
Doherty, V.	Technical support for information collection and database development	100	IN	10/96-TBD	8	ANL
Easton, W.	Analysis and special security requirements for DOE HQ and laboratories	100	IN	9/94-TBD	15	PNNL/SAIC
Edsall, J.	Tech. ops. anal. training to ensure intell./counterintell. compliance w/ req'm'ts	100	IN	9/91-TBD	20	PNNL
Farmer, M.	Nuclear analysis of foreign nuclear materials and fuel cycles	30	IN	9/92-TBD	19	PNNL
Fletcher, C.	Technical analysis of energy issues and nuclear proliferation	100	IN	9/95-TBD	14	PNNL
Gibbs, D.	Evaluation of DOE in physical and GENSER security	100	IN	10/93-TBD	11	PNNL/SAIC
Gift, E.	Nuclear anal. of uranium enrichment (currently in Oak Ridge)	50	IN	1/95-TBD	18	PNNL/SAIC
Harris, S.	Information analysis and production requiring special security access	100	IN	8/96-TBD	2	PNNL/SAIC
Higgins, P.	Technical analysis of nuclear reactors, materials and fues cycles	100	IN	7/96-TBD	18	PNNL
Jaggers,D.	Technical analysis of nuclear smuggling issues	100	IN	3/97-TBD	2	PNNL/SAIC
Johnson, C.	Technical analysis of nuclear fuel cycle	100	IN	8/98-TBD		PNNL
Kreykes, J.	Supports interagency response to suspect nuclear terrorism threats	100	IN	3/97-TBD	12	ORNL/LMES
Lewallen, T.	Tech. assessm't. of scientific developm'ts. for Special Technologies Program	100	IN	10/87-9/99	19	Bechtel/NV
Long, M.	Analysis of nonproliferation needs and technologies	100	IN	9/93-TBD	11	ORNL/LMES
Martinez, R.	Tech sup.-Russian nuclear weapons packaging/production/testing/logistics	100	IN	5/98-4/00	20	SNL
Mathews, J.	Tech. analysis of nuclear proliferation programs of emerging nuclear states	100	IN	1/96-TBD	20	PNNL
Shaw, B.	Tech. analysis on environmental securities matters (100% support for FY 99)	80	IN	10/92-TBD	20	PNNL
Swartz, R.	Analysis and information on Asain nuclear materials/programs	100	IN	3/95-TBD	14	PNNL
Whitford, D.	Technical analysis on nuclear fuel cycle and reactor matters	100	IN	10/98-12/98	20	PNNL

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Name	Duties	Percent Support	Prog.	Start/End (m/y-m/y)	Pgm. Cost $000/mo.	M&O / Sub-Contractor
Office of Fissile Materials Disposition (MD)						
Passman, S.	Joint US/Russian Steering Committee/logistical support for Russian activities	100	MD	6/98-9/99	23	SNL
Williams, W.	Technical support for HEU, U-233 and plutonium disposition	100	MD	10/98-9/99	24	WSRC
MacArthur, D.	Technical advisor on Russian Plutonium	100	MD	9/98-9/99	16	SNL

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Office of Nuclear Energy (NE)						
Goldberg, M.	Project Manager, Depleted UF6 Programmatic EIS	98	NE	3/85-12/99	15.5	ANL
Gorenflo, L.	Demographic impact analysis; waste/materials management activities	17	NE	12/94-12/99	1	ANL
Mohar, M.	Project Manager, Advanced Technology Applications in various programs	75	NE	3/94-12/99	11	Bechtel/NV
Mussler, R.	Technical support for DUF6 Program	40	NE	11/96-10/98	9	ANL/Checkpoi
Vallejos, E.	Technical knowledge of nuclear fuel issues/uranium sales	100	NE	4/97-4/00	15	LLNL
Young, K.	Project Manager, DUF6 Program	100	NE	3/95-12/99	14	LLNL

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Name	Duties	Percent Support	Prog.	Start/End (mm/yy-mm/yy)	Pgm. Cost $000/mo.	M&O / Sub-Contractor
Office of Nonproliferation and National Security (NN)						
Booth, S.	Critical infrastructure team member.	100	NN	8/98-9/99	28	LANL
Boyleston, C.	Expert advice/anal.- info.security/critical infrastructure protection, etc.	100	NN	10/98-9/99	10	PNNL
Cappis, J.	Tech. sup.- international safeguards prog. - IAEA environ. anal. techniques	100	NN	6/98-7/99	21	LANL
Caskey, D.	Tech sup. for security upgrades at Russian defense-related sites in Russia	100	NN	11/97-10/99	18	SNL
Coffey, M.	Tech sup. to Russia/NIS Nuclear Security Taskforce under MPC&A Program	100	NN	7/98-7/00	19	BNL
Coleman, J.	Technical advisor on nuclear fuel processing	100	NN	9/97-9/99	23	SR
Crane, F.	Tech support for high priority fissile materials in Kazakhstan	100	NN	7/95-TBD	16	PNNL
Creasey, H.	Tech. support for security alarms/CCTV/Access Cont. Sys./GTN	100	NN	8/98-8/99	10	INEEL
Creer, W.	Tech support for nuclear security upgrades at Russian nuclear facilities	100	NN	10/96-9/98	14	PNNL
Curtis, D.	Tech support for nuc. weapon security upgrades at Russian nuclear weapon sites	100	NN	3/98-3/99	26	LANL
Dagle, J.	CI team member focusing on electric power	100	NN	8/98-11/98	28	PNNL
Dahlstrom, T.	Supports conduct of domestic seminars on nuc. awareness/emerg. management	20	NN	1/97-12/98	5	Bechtel/NV
Dickerson, S.	Tech sup. on equip./prices for upgrades associated w/Russian nuclear facilities	100	NN	7/97-7/99	10	SNL
Donaldson, T.	Technical advisor on non-intrusive and cooperative monitoring technologies	100	NN	10/97-9/99	21	ORNL-LMER
Doran, K.	Manages Bechtel/NV team for EOC equipment system	100	NN	3/89-12/00	14	Bechtel/NV
Doughtery, D.	Technical support to Russian HEU; transparency technical exchange programs	100	NN	1/92-TBD	22	BNL
Englert, P.	Technical support to the Emergency Operations Center (EOC) network	100	NN	3/96-12/00	14	Bechtel/NV
Gakh, A.	Tech. advisor on nonproliferation appropriateness with new IPP projects in NIS	100	NN	2/98-12/99	16	ORNL/LMES
Harder, D.	CI team member as Cybertechnology and Cyber-Assurance expert	100	NN	8/98-9/00	16	LLNL
Harris, C.	Technical/engineering support for the emergency communications network	100	NN	3/97-12/99	14	Bechtel/NV
Hauber, J.	Supports Initiatives for Proliferation Prevention (IPP) & Nuclear Cities Initiative	100	NN	8/98-8/99	25	LLNL
Hayes, S.	Tech. advisor for nuclear materials safeguarding projects in South America	100	NN	8/98-8/99	18	ORNL-LMES
Helmick, B.	Tech. sup.- maintaining compatibility of databases for EMS (Emerg. Mgmt. Sys.)	100	NN	9/94-12/00	14	Bechtel/NV
Hirschi, E.	Technical expert on Former Soviet Union nuclear security controls/support	100	NN	1/98-12/98	14	PNNL
Heinberg, K.	MPC & A analysis	100	NN	3/96-TBD	8	PNNL
Kantelo, M.	Technical advisor on nuclear materials processing (located at D.I.A.)	100	NN	10/97-9/98	17	WSRC
Kostorowski, D.	Technical support to the Russia/NIS Nuclear Materials Security Task Force	100	NN	7/98-5/99	18	PNNL
Krupa, M.	Graduate student. (Became a Federal Employee effective 1/14/99)	100	NN	8/97-5/99	5	LANL
Lawson, M.	Technical support for Proliferation Prevention Initiative	100	NN	10/96-9/98	10	PNNL-SAIC
Liles, M.	Training coordinator for FSU Task Force/Technical support for MPC&A	100	NN	4/96-4/99	8	ORNL/LMES
Mathews, C.	Tech. sup. to Russia/NIS Nuc. Materials Security Task Force.(MPC&A Prog.)	100	NN	10/98-9/99	19	PNNL
Mladineo, S.	Tech sup.- Russian/Newly Indep'd'nt States Nuc. Mat. Sec. Task Force (MPC&A)	100	NN	7/95-TBD	16	PNNL
Murphy, J.	Tech support for the development of plutonium stabilization processes	100	NN	6/97-6/99	20	ORNL/LMES
Nelson, N.	Tech support to MPC&A Program to resolve taxation issues	100	NN	7/98-7/00	6?	LANL

O'Shell, P.	Tech sup.- Russian/Newly Indep'd'nt States Nuc. Mat. Sec. Task Force (MPC&A)	100	NN	11/98-10/99	16	ORNL/LME
Phillips, J.	Tech spec./liaison to ensure disposition of BN-350 spent fuel in Kazakhstan	100	NN	5/98-4/99	17	PNNL
Prindle, N.	Tech. expertise in nuc. fuel cycles/nonprolif. sup. US-China Arms Control Exch.	100	NN	7/98-7/99	17	SNL
Robare, K.	Maintenance support for Proforce Radio/other components of the security sys.	50	NN	6/95-TBD	7	INEEL
Roboski, R.	Tech. liaison- export control activities in Russia/Newly Independent States (NIS)	100	NN	6/97-12/98	17	SR
Rudolph, R.	Technical liaison on exports of materials, commodities, and technologies	100	NN	6/97-8/99	18	ANL
Sekine, J.	Technical support for declassification productivity issue	100	NN	6/96-TBD	15	SNL
Shepherd, G.	Technical support for implementing upgrades in Ukraine	100	NN	5/98-5/99	17	LANL
Stoutland, P.	Technical expert on chemical biowarfare detection	100	NN	10/98-10/98	26	LANL
Ten Eyck, W.	Specialist for inspections, technical transfer and international security	60	NN	7/92-TBD	9	PNNL
Thorne, C.	Expert advisor/negotiation strategist; Chair., Nuclear Suppliers Group/Dual Use	100	NN	5/98-5/99	13	LANL
Torres, J	CI team member focusing on R&D roadmap	100	NN	8/98-11/98	16	SNL
Toth, W.	Tech. sup. to MPC&A Program-nuclear security upgrades and transportation	100	NN	7/98-8/00	15	ORNL-LME
Trujillo, A.	Nuclear material physical security expert on MPC&A	100	NN	5/98-5/99	18	SNL
Wallace, J.	Supports FBI during initial stages of nuclear threat assess.-emerg. ops (Quantico)	100	NN	6/94-12/00	19	Bechtel/NV
Watt, M.	Technical support for nonproliferation nuclear supplier bilateral agreements	100	NN	2/98-2/99	11	PNNL
Whitworth, A.	Tech advisor supporting IAEA safeguards implementation	100	NN	10/95-TBD	17	PNNL
Wolcott, J.	Technical advisor for the Comprehensive Test Ban Treaty	100	NN	10/97-10/98	23	LANL
Wolfram, J.	Technical support to the Proliferation Prevention Initiative	100	NN	2/98-12/99	16	INEEL
Yoshida, D.	Technical support for security alarms/CCTV/Access Control Systems/GTN	100	NN	7/95-TBD	13	INEEL
Zimmerman,	Expertise video teleconferencing	100	NN	8/98-12/00	13	Bechtel/NV
Office of Nonproliferation and National Security - Office of Nuclear Energy (NN-NE)						
Congdon, M.	Technical analysis for the International Nuclear Reactor Safety Program	100	IS	11/95-TBD	21	PNNL
Feather, M.	PPO Task Monitor at Novoraulsk, Rus-HEU; Expert advisor	73	IS	11/96-Perm	10	LLNL-SAIC
Glaser, J.	Project Engineer for Transparency HEU Program	100	IS	3/96-TBD	15	LLNL
Handleman, S.	Archiving data chronologies, tracking HEU systems	100	IS	6/94-TBD	7	LLNL-SAIC
Missimore, J.	Summer student - data analysis support - Russian shipments	25	IS	6/96-TBD	3	LLNL
Ostrander, P.	Technical support to the International Safety Program	100	IS	1/95-TBD	16	PNNL
Phillips, A.	Technical support to NE-1 on International Safety Program	100	IS	7/97-7/99	20	PNNL
Reger, M.	MTA program management HEU Program	8	IS	6/92-TBD		LLNL-SAIC
Thomas, D.	Analytical, technical support for the Transparency Program	100	IS	7/95-TBD	15	LLNL

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Office of Policy and Internal Affairs (PO)						
Conner, B.	Project mgmt. For DOE's Strategic Mgmt. System	100	PO	10/96-TBD	11	ORISE
Delmastro, D.	Support for strategic planning, laws, and policy development	100	PO	11/96-TBD	7	ORISE
Mandelbaum, C.	Compiles, reviews, and plans budgets for organizational units (also OH-60%)	40	PO	5/97-TBD	7	ORISE
Myers, R.	Technical support for Strategic Management System	100	PO	12/96-TBD	3	ORISE
Ryder, R.	Plans/develops systems for Secretarial decision-making	50	PO	12/96-TBD	8	ORISE

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Office of the Secretary (S)						
Stein, K.	Tech. assistant for sys. engineering support for R. Alvarez, Sr. Policy Advisor	100	S	4/94-TBD	16	INEEL

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Office of Science (SC)						
Bader, D.	Tech. advice on computer hardware, adv. math and climate modeling program	100	SC	6/90-TBD	21	PNNL
Barnes, K.	Provide tech. advice/expertise in development of Strategic Simulation Initiative	100	SC	6/98-9/99	12	ORNL/LMEI
Britt, H.	Provide technical advice/evaluation in the field of heavy ion research	49	SC	5/97-4/00	12	LLNL
Cieslak, W.	Provide sci./tech. advice/eval. on matls. science, phys. metallurgy, corrosion	100	SC	9/98-8/99	20	SNL
Edgerton, S.	Performs research and coordination on air pollution and sustainability issues	100	SC	6/97-TBD	17	PNNL
McCracken, M.	Provides support to the National Assessment Coordination Office	100	SC	8/97-TBD	25	LLNL
Melamed, D.	Provide advice/expertise in fields of chemistry, materials science & biology	100	SC	3/98-12/98	11	BNL
Oliver, E.	Tech. advice/expertise in development of Strategic Simulation Initiative	100	SC	4/98-10/99	8	ORNL/LMEI
Rohlfing, E.	Scientific/tech advice/eval. on atomic, molecular/optical physics program	100	SC	7/97-7/99	18	SNL

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Worker and Community Transition (WT)						
Balcombe, M.	Conducts displaced worker syrvey anal. on workforce planning/restructuring	90	WT	07/96-09/99	10	ORISE
Jones, G.	Technical analysis and annual report on workforce restructuring	50	WT	07/96-09/99	10	ORISE

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Employees Assigned to Administrative / Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Argonne National Laboratory (ANL) - University of Chicago					
Allen, M.	Administrative support: secretarial	30	12/96-TBD	2	ANL
Jacoby, F.	Administrative support: network	16	9/96-TBD	2	ANL
Thomas, K.	Administrative support: secretarial	33	1/93-TBD	2	ANL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Employees Assigned as Professional Staff - Multi-Program Funded

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Argonne National Laboratory (ANL) - University of Chicago					
Barisas, S.	Regulatory & risk assessment analysis (supported FE, NN)	32	9/87-TBD	4	ANL
Elcock, D.	Analysis of waste disposal regulations & alternatives (supported FE, EH, PO)	39	10/91-TBD	5	ANL
Gasper, J.	Waste, water, air, radiation related regulatory analysis (supported FE, EH, PO, NE)	55	2/87-TBD	7	ANL
Hocking, E.	Analysis of land use issues (supported EH, PO)	53	12/89-TBD	8	ANL
Kimmell, T.	Training and guidance development for env. restoration (supported EH)	6	11/93-TBD	1	ANL
Martino, L.	Training and guidance development for env. restoration (supported EH)	19	8/87-TBD	2	ANL
Puder, M.	Analysis of waste-related regulations & legislation (supported EH, NE)	43	5/94-TBD	5	ANL
Ranek, N.	Hazardous and mixed waste regulatory analysis (supported EH, NE, NN)	73	10/92-TBD	9	ANL
Snyder, T.	Air regulatory analysis, transportation policy analysis (supported EH, EE)	51	1/92-TBD	6	ANL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Employees Assigned to Administrative / Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Idaho National Energy Engineering Laboratory (INEEL) / Lockheed Martin Idaho Technologies Company (LMITCO)					
Forsythe, J.	Supports the LMITCO Washington Operations Office / interfaces with NE	100	10/95-TBD	14	INEEL
Fourr, B.	Supports ER & WM field efforts at HQ; assists HQ program with issue resolution	100	11/94-TBD	14	INEEL
Hathaway, L.	Supports the LMITCO Washington Operations Office -focuses on resource issues	100	3/97-TBD	9	INEEL
Marble, R.	Supports the LMITCO Washington Ops. Office -budget analysis;works w/ S. Craig	100	8/95-TBD	15	INEEL
Moller, W.	Manager of LMITCO Washington Operations Office	100	2/94-TBD	20	INEEL
Pilo, M.	Supports ER & WM field efforts at HQ; assists HQ program with issue resolution	100	12/94-TBD	17	INEEL
Rogan, B.	Supports the LMITCO Washington Operations Office	100	7/95-TBD	8	INEEL
Silverman, D.	Attorney for Morgan, Lewis, & Bockus to identify license requirements	100	10/97-12/98	12	INEEL/MLB
Tate, K.	Provides office support to LMITCO employees supporting the NRC	100	10/95-TBD	5	INEEL
Tatum, K	Supports the LMITCO Washington Operations Office	100	1/98-TBD	4	INEEL
Winlind, T.	w/Finnagin/Henderson/Farsbow/Garrett/Dunner for bankrupcy protection	100	8/98-8/99	10	INEEL/FHFG&I

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, D. AREA

(November 1998)

Employees Assigned to Administrative / Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub Contractor
Los Alamos National Laboratory (LANL) - University of California					
Albert, D.	J. Herbert Hollomon Fellow in the National Academy of Engineering (NAE)	100	8/97 - 1/99	10	LANL
Anderson, P.	Office Administrator, Government Relations Office	100	TBD	7	LANL
Askew, J.	Undergraduate student, Government Relations Office	50	4/98 - 4/99		LANL
Garrity, P.	Policy Analyst, Government Relations Office	100	TBD	14	LANL
Marques, R.	Graduate Student, Government Relations Office	100	8/98 - 8/99	1	LANL
Nelson, N.	Graduate Student supporting NN-30	100	1/98 - 3/98	5	LANL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, D. AREA

(November 1998)

Employees Assigned to Administrative / Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Lawrence Berkley National Laboratory (LBNL) / University of California					
Howard-Jewler, M.	Office manager and administrative support for project activities	100	5/93-TBD	4	LBNL
Ibanez, M.	Administrative support for project activities	100	10/97-TBD	3	LBNL
Lane, M.	Administrative support for project activities	100	2/98-TBD	3	LBNL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Employees Assigned to Administrative/Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Lawrence Livermore National Laboratory (LLNL) / University of California					
Belding, J.	Computer network support (FESSP office) (subcontractor CompRep)	100	6/97-5/99	6	LLNL
Custer, J.	Administrative specialist (FESSP office)	100	12/94-12/99	6	LLNL
Glick, S.	Admin. specialist III; provides admin. support and secretarial duties (FESSP office)	100	4/98-4/99	6	LLNL
James, V.	Office Manager for LLNL's Washington office (at L'Enfant Plaza)	100	4/97-TBD	6	LLNL
Rosen, R.	Develops NRC-type standards (function to ID's Spent Fuels Program w/EM funds)	100	7/95-TBD	14	LLNL
Schomer, C.	Analizes and tracks legislation	100	10/93-TBD	6	LLNL
Shephard, R.	Executive Director of Science and Engineering Alliance	100	12/94-12/99	12	LLNL
Weston, R.	Administrator, Transparency implementation Project (FESSP office)	100	4/98-5/99	7	LLNL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, D. AREA

(November 1998)

Employees Assigned to Administrative / Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
National Renewable Energy Laboratory (NREL) / Midwest Research Institute (MRI)					
Addison, W.	Administrative assistance	100	11/97-TBD		NREL
Hamilton, K.	External laboratory liaison with Congress and other Washington-based institutions	100	7/93-TBD		NREL
Kelly, N.	Administrative assistance primarily on FEMP, BTS, and OTT projects	100	3/95-TBD		NREL
Luszcz, C.	Facility and office operations management	100	5/92-TBD		NREL
Myers, C.	Administative assistance for NREL technical staff	100	10/97-TBD		NREL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Employees Assigned as Professional Staff - Multi Program Funded

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
National Renewable Energy Laboratory (NREL) / Midwest Research Institute (MRI)					
Arnold, M.	FEMP technical assistance and outreach	100	6/98-5/99		NREL
Babiuch, W.	Project Leader for EE/OBPCS analysis	100	7/92-TBD		NREL
Baldwin, S.	Works 75% for OSTP (under an IPA) and 25% on NREL analysis program	25	3/95-TBD		NREL
Birky, A	Analysis for several EE/OTT projects	100	6/98-6/99		NREL
Boes, E.	Program Analysis Office Director	100	12/91-TBD		NREL
Fang, J.	Analysis for the utility and transportation sectors	100	6/93-TBD		NREL
Galen, P.	International policy and regulatory analsis for utiltiy sector	100	8/92-TBD		NREL
Goldstein, L.	Project leader for EE/OT analysis	100	10/92-TBD		NREL
Green, C.	Environmental and climate change analysis	100	8/98-TBD		NREL
Hammel, C.	Analysis for OTT projects, including batteries, biofuels analysis and compliance	100	4/97-TBD		NREL
Howard, D.	FEMP Support Network (FSN) and Energy Savings Performance Contracting	100	8/97-TBD		NREL
Mortensen, J.	Policy analysis for program metrics analysis	100	1/98-TBD		NREL
Plympton, P.	OBT tenchnical program implementation activities (e.g., Smart Schools intitative)	100	5/95-TBD		NREL
Porter, K.	Energy analysis for the utility sector and wind energy analysis	100	10/90-TBD		NREL
Schaper, V.	Energy analysis for the transportation sector	100	9/92-TBD		NREL
Tanner, S.	EE/FEMP Water Conservation program	100	10/97-TBD		NREL
Thomas, K.	Leads implementation of EE/FEMP's SAVEnergy Audit and Showcase Programs	100	6/91-TBD		NREL
Tricket, D.	Policy and utility analysis	100	297-2/99		NREL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Employees Assigned to Administrative / Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Oak Ridge National Laboratory - Lockheed Martin Energy Research (LMER)- Lockheed Martin Energy System (LMES)					
Cooper, Jr., R.	Advisor to the Army in the review of projected Army technology	100	5/97-5/99	17	LMER
Cutshall, N.	Tech. counsel in environmental restoration needs. Manager, ORNL GTN Office	100	8/95-TBD	12	LMER
Glovier, H.	Develops program with DOD Navy program	100	6/98-3/99	9	LMER
Gresalfi, M.	Tech. sup. to Center of Excellence for Metals Recycle	100	11/93-TBD	10	LMER
Reuther, Jr., T.	Identifies and facilitates new program opportunities	100	2/90-TBD	11	LMER
Thomas, Jr., P.	Provides liaison between ORNL and DOE;Office Manager	100	2/90-TBD	16	LMER/LMES
Young, J.	Provides advice and counsel to the Director of ORNL's Washington office	100	11/94-TBD	4	LMER

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Employees Assigned to Administrative / Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Oak Ridge National Laboratory (ORNL) - Oak Ridge Institute for Science and Engineering (ORISE) - Oak Ridge Associated University (ORAU)					
Leshley, E.	Administrative and logistical support to ORAU/ORISE programs	100	8/91-TBD	5	ORISE

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Employees Assigned to Administrative / Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Oak Ridge National Laboratory - NSSP Program Contract					
Alvarez, S.	NSSP	100	10/96-TBD	5	ORNL
Bennett (Sanders), L.	NSSP	100	8/97-TBD	5	ORNL
Bone-Johnson, T	NSSP	100	12/97-TBD	5	ORNL
Boyd,D	NSSP	100	10/96-TBD	13	ORNL
Bullington, E	NSSP	100	5/97-TBD	10	ORNL
Colley, J	NSSP	100	9/97-TBD	11	ORNL
Correa,J	NSSP [Note: All positions provide technical support	100	4/97-10/98	11	ORNL
Days,D	NSSP	100	4/97-TBD	11	ORNL
DeVito	NSSP for the National Security Support Program (NSSP)]	100	10/96-TBD	7	ORNL
Harrison, M	NSSP	100	5/97-TBD	10	ORNL
Heiser, W	NSSP	100	11/96-TBD	14	ORNL
Huppman,J	NSSP	100	11/96-TBD	12	ORNL
Innis, M	NSSP	100	8/98-TBD	11	ORNL
Jones,T.	NSSP	100	1/97-TBD	6	ORNL
Mahnel, B	NSSP	100	7/97-TBD	11	ORNL
McDonnell, J	NSSP	100	7/95-TBD	16	ORNL
McNally,W	NSSP	100	3/97-TBD	14	ORNL
Palm, L	NSSP	100	3/97-TBD	11	ORNL
Williams,R	NSSP	100	10/96-TBD	12	ORNL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, D. AREA

(November 1998)

Employees Assigned as Professional Staff - Multi-Program Funded

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Pacific Northwest National Laboratory (PNNL) / Battelle Memorial Institute (BMI)					
Ashton, W.	Intelligence/technical assessments	46	8/95-TBD	9	PNNL
Brown, R.	Research on impacts of global climate change	100	4/93-TBD	6	PNNL
Clarke, J.	Conducts research on the climate change and for the Mexican Petroleum Institute	100	3/90-TBD	14	PNNL
Dooley, J.	Researchs economic modeling of climate change techniques	100	5/93-TBD	7	PNNL
Edmonds, J.	Leads research projects in economics/policy aspects of global climate change	100	6/86-TBD	11	PNNL
Gilbert, R.	Environmental statistical designs, analyses, and assessments	100	10/96-TBD	10	PNNL
Gratton, P.	Technical expertise on DOE programs (NN)	50	7/94-TBD	14	PNNL
Green, L.	Project administration and proposal development for Global Climate Change Group	100	1/96-TBD	5	PNNL
Izaurralde, R.	Researches ecosystem impacts for the global climate change	100	7/97-TBD	9	PNNL
Kim, S.	Technical market analysis of fusion energy in energy/economic modeling	100	7/89-TBD	3	PNNL
MacCracken, C.	Model-supported research on economic/policy aspects of global climate change	100	1/93-TBD	6	PNNL
Malone, E.	Technical expertise and management for Global Climate Change Group	100	4/92-TBD	8	PNNL
Moss, R.	Tech. support to U.S. Global Change Research Program Assessment Working Group	100	8/93-TBD	9	PNNL
Pitcher, H.	Conducts research on the climate change scenarios, greenhouse gases,etc.	100	4/91-TBD	10	PNNL
Rayner,S.	Research on social/cultural aspects of global change (other projects include	100	2/91-TBD	11	PNNL
Rosenberg, N.	Research into impacts of climate change, agricultural and forest system productivity	100	8/92-TBD	11	PNNL
Runci, P.	Research on international and US energy R&D programs, policy, and trends	100	4/94-TBD	6	PNNL
Sands, R.	Economic model-assisted analysis of global climate change issues	100	8/86-TBD	9	PNNL
Stork, K.	Technical research supporting global climate change international programs	100	2/94-TBD	6	PNNL
Wickline, M.	Project management support for EE programs	100	9/98-TBD	4	PNNL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Employees Assigned to Administrative / Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Pacific Northwest National Laboratory (PNNL) / Battelle Memorial Institute (BMI)					
Abuzere, R.	Strategic analysis of external impact on organization	100	12/93-TBD	5	PNNL
Benedick, R.	Develop business strategy across PNNL	100	9/98-TBD	12	PNNL
Brown, W.	Manages operation for BWO	100	9/98-TBD	9	PNNL
Cooper, C.	Develop business strategy across PNNL	100	3/92-TBD	12	PNNL
Desmond, C.	Analyze and disseminate legislative and budgetary information	100	12/97-TBD	5	PNNL
Glass, M.	Secretary for sponsored research prog. (ER-7%, EM-2%, NN-12%, lab.-44%)	100	8/97-TBD	3	PNNL
Hampton, S.	Secretarial support to sponsored Research Prog. for Global Climate Change Group	100	3/95-TBD	3	PNNL
Hill, P.	Secretarial duties for sponsored research programs	100	7/98-TBD	3	PNNL
Kehl, K.	Provides telecommunications and building operations support	100	11/89-TBD	5	PNNL
Kelly, K.	Provide secretarial support to business strategy management (overhead)	100	7/98-TBD	3	PNNL
Killgo, P.	Secretarial support for sponsored research programs (non-DOE-10%)	90	2/95-TBD	3	PNNL
Kirk, J.	Computer/technical support to BWO and DC area (other DOE projects-75%)	25	8/96-TBD	4	PNNL
LaRue-Garzillo, V.	Receptionist for Battelle Washington Office	100	12/89-TBD	3	PNNL
McGath, D.	Support to Vice President (part-time)	100	8/87-TBD	3	PNNL
McKnight, C.	Administrative Support (other projects: OH-32%, DOD-7%)	93	1/96-TBD	3	PNNL
McNeese, M.	Secretarial duties for sponsored research programs (non-DOE-40%)	60	7/98-TBD	3	PNNL
Nicholls, L.	Prepare sales proposals, and oversee subcontracting for BWO	100	3/97-12/98	6	PNNL
Turish, J.	Computer/technical support to BWO and DC area staff (other DOE projects-50%)	50	10/94-TBD	5	PNNL

M&O CONTRACTOR EMPLOYEES ON ASSIGNMENT IN THE WASHINGTON, DC, AREA

(November 1998)

Employees Assigned to Administrative / Overhead Contractor Office Functions

Name	Duties	Percent Support	Start/End mm/yy-mm/yy	Cost $000/mo.	M&O / Sub-Contractor
Sandia National Laboratory (SNL) / Lockheed Martin					
Alpert, D.	ASME Fellow	100	TBD	10	SNL
Berman, M.	Executive Director of National Innovation Initative	100	9/98-9/00	14	SNL
Cieslak, M.	AAAS Congressional Fellow	100	9/98-8/99	18	SNL
Davis, M.	Secretary, Sandia Washington Office	100	1/97-1/99	4	SNL
Gibson, K.	Technical advisor for classified programs and technology issues (CIA)	100	10/96-9/99	15	SNL
Griggs, M.	Office Manager, Sandia Washington Office	100	TBD	4	SNL
Thompson, O.	ASME Fellow	100	1/98-12/98	18	SNL

APPENDIX B

NONPROLIFERATION PROGRAM PILOT PROJECT
CRITICAL TECHNICAL SKILLS REQUIRED FROM M&O CONTRACTORS

JULY, 1998

Note: During the July to November time frame, the Office of Human Resources and Administration (HR) was changed to the Office of Management and Administration which is managed by a Director in lieu of an Assistant Secretary.

NONPROLIFERATION PROGRAM PILOT PROJECT
CRITICAL TECHNICAL SKILLS REQUIRED FROM M&O CONTRACTORS

OBJECTIVES:
The Department has established policy limiting the use of M&O contractor employees in Headquarters and has institutionalized control mechanisms to ensure that any new and renewal assignments are in accordance with policy limitations. Currently the Assistant Secretary for Human Resources and Administration must approve these assignments of M&O contractor employees. This project was initiated to assess the critical skills required by the Department which are only available from the National Laboratories through the M&O Contractors. The Office of Nonproliferation and National Security (NN) was selected for the pilot project. The purpose of the project is to define positions with critical skill requirements and, to define a streamlined administrative process for placement of personnel in these positions.

PROJECT APPROACH:
Since pilot project initiation, NN has subdivided into three Offices: The Office of Nonproliferation and National Security (NN), the Office of Intelligence (IN), and the Office of Counterintelligence (CN). All three Offices are currently included in the project International Safety within the Office of Nuclear Energy is being transferred to NN. This Operation is not included in the project.

The following steps have been undertaken for this pilot project:

- Definition of the mission and key programs for each office;
- Analysis of skills and technical expertise required to undertake defined programs;
- Assessment of skills and responsibilities of personnel currently on assignment from the laboratories;
- Identification of additional positions which are required by programs with skills that can only be provided by the M&O contractors;
- Assessment of current and proposed assignments regarding conformance to laboratory missions,
- Proposed allocation of M&O staff positions for FY'98 and '99 by program with critical skills categories.

The next step is to present the proposed number of M&O contractor employees within the Nonproliferation and Intelligence Programs to Acting Secretary Moler and Acting Assistant Secretary Tamura. With approval, NN, IN, and CN will assume responsibility for managing these positions within their allocation and defined skill categories. Approvals for assignments will not be required from the Assistant Secretary for Human Resources and Administration. Any changes to defined skill categories or staff levels within existing skill categories that would drive the resource allocation above a threshold will require supplemental approval. The Offices will continue to be responsible for meeting the Department's Policy on assignments of M&O Contractor staff, excluding the requirement for HR-1 approval. In addition, the database of employees will be maintained in the format defined by Procurement and the Field Offices requirements will be met for assignment of staff to Headquarters.

PROGRAM MISSIONS

The Nonproliferation and Intelligence Programs have missions which require highly technical skills. Their missions and performance expectations are summarized by the Table on the following page. A number of recent Presidential Directives and Initiatives, including the Critical Infrastructure Directive, the Nuclear Cities Initiative, the Counterintelligence Directive, The Second Line of Defense Initiative, the Trilateral USAT, and an expansion of the Materials Protection, Control and Accounting Program (MPC&A) place an additional demand for technical expertise and experience. Many of the critical skills are only available from the National Laboratories through the M&O Contractors.

CURRENT STAFFING AND MANAGEMENT STRUCTURE

As of July 15, the NN and IN Offices have a total of 81 M&O Contractor employees (79.3 FTEs) supporting their programs in the Washington DC area. Requests for additional assignments are being received. Seventy-six of the current employees are located in DOE office space. Three are located either at the FBI, Pentagon, or the Defense Intelligence Agency. The fourth person's work station is Nevada; 25% of his time is in Washington. One person, semi-retired, works out of his home directly for the lab, and one works at the PNNL contractor's office. Over 35 percent of the current staff have been supporting the program offices in DC prior to 1997.

CURRENT M&O STAFFING LEVELS

OFFICE	TOTAL NUMBER DC AREA	NUMBER LOCATED AT DOE	NUMBER ASSIGNED PRIOR TO '97	APPROX. NUMBER PER DIEM	APPROX. ANNUAL COST
NN	60	55	19	4	$11.7M
IN	21	21	13	0	$3.6M
CN	0	0	0	0	0
TOTALS	**81**	**76**	**32**	**4**	**$15.3M**

In addition, the International Safety Office, which is being transferred from Nuclear Energy to the Nonproliferation and National Security Office, currently has sixteen M&O employees assigned to work assignments for their office. All of the M&O staff are located at the contractor's offices. LLNL has staff assigned to the transparency program which monitors the purchase and transfer of LEU derived from HEU removed from dismantled Russian weapons. PNNL has staff assigned to the International Nuclear Reactor Safety Program. With the assimilation of the International Safety Office into NN, an evaluation will be completed regarding the use, as well as future need, for M&O staff.

The Office of Counterintelligence, recently formed, has relied upon support services contractors to support their work functions previously managed within NN With its expanded responsibility, CN will require additional technical support. This Office is proceeding with awarding a support service contract in order to acquire additional technical expertise. It is anticipated that two positions will be required in the Director's office.

PROGRAM MISSIONS AND PERFORMANCE EXPECTATIONS
FY' 98-99

PROGRAM OFFICE	MISSION	PERFORMANCE MEASURES REQUIRING ADDITIONAL TECHNICAL RESOURCES
INTELLIGENCE	-Provide timely, accurate , foreign intelligence analysis -Provide quick turnaround, specialized technology applications and operational support to the intelligence community -Provide threat assessment support	-Provide 3000 intelligence briefings for program and policy officials -Publish 1200 current intelligence products and studies -Provide nuclear weapons-elated training for 260 intelligence personnel -Provide 12 counterintelligence awareness training sessions -Conduct 70 counterintelligence travel briefings debriefings -Complete and transition 3-5 Special Technologies projects
COUNTER-INTELLIGENCE	-Ensure an effective counterintelligence program throughout the DOE complex enhancing the protection of sensitive technologies, information, and expertise against foreign intelligence and terrorist attempts to acquire nuclear weapons information or technologies from the labs	-Provide specialized analytical support in key mission areas-debriefings, investigations, and threat assessments--using unique counterintelligence skills -Construct a Sensitive Compartmented Information Facility (SCIF) -Initiate a cyber program necessary to bring the Department in line with its CI community partners who are advancing a watch and warning capability to secure national interests in Cyber Space. -Establish a complex-wide intrusion detection capability & response
NONPROLIFERATION AND NATIONAL SECURITY	-Prevent the spread of WMD materials, technology and expertise -Detect proliferation of WMD -Reverse proliferation of capabilities -Respond to WMD emergencies	-Provide direction for meeting requirements for Critical Infrastructure Protection Program assisted with the CI Task force including: -Plan for protection of DOE systems by Nov '98 -Lead for private sector energy national protection plan (Oil & Gas and Electrical sectors) Schedule for plan by Nov'98
I ARMS CONTROL & NONPROLIFERATION	-Focal point within the Department for activities which support the President's arms control and nonproliferation policies and objectives	-For Russia, the NIS and the Baltics, continue MPC&A upgrades at the 50-plus facilities which use or store weapons-usable nuclear materials and maintain schedule to complete all upgraded materials protection, control and accounting systems by the end of calendar year 2002 -Complete the ratification and implementation of the Comprehensive Test Ban Treaty (CTBT), including supporting U.S.responsibilities for on-site inspections at DOE facilities -Replace unilateral nuclear export controls with multilateral controls -Under Initiatives for Proliferation Prevention, engage 3500 weapons scientists in peaceful projects at their institutes -Maintain integrity of long term storage and maintenance of the spent fuel canisters prior to removal from North Korea -Place an additional 13 metric tons of U.S excess nuclear weapons material under IAEA inspection, develop IAEA verification program for Russian excess material under IAEA verification program
II EMERGENCY MANAGEMENT	-Provide comprehensive, integrated emergency planning and response programs throughout the Department -Operate the Headquarters Emergency Operations Center, Communications Center, and emergency network -Operate reliable capabilities to detect and assess developing emergencies -Operate the HAZMAT Spill Center	-Conduct emergency management system & threat awareness assessments, training programs and drills and exercises -Provide situation assessments within one hour after identification of a potential emergency -Support the increased role of the Department in the formulation of policies for combating terrorism and nuclear materials trafficking -Program shift has included the expansion of the Emergency Operations Center
III. SECURITY AFFAIRS	-Formulate plans to assure effective protection of DOE facilities, and the control and accountability of nuclear materials and sensitive information -Carry out protection responsibilities in support of U.S nonproliferation policy	-Accelerate development of computer security enhancements for information assurance -Begin alarm system replacement and installation of vehicle barrier systems at headquarters to comply with Department of Justice Report on Vulnerability Assessment of Federal Facilities
IV RESEARCH AND DEVELOPMENT	Develop, design, and produce operational sensor systems needed for proliferation detection, treaty monitoring, nuclear warhead dismantlement initiatives, and support to intelligence activities.	-Transfer to the FBI, technology which will provide a capability for rapid, in-field analysis of hazardous biological materials -Deliver a prototype of an ultrasensitive near-real-time analyzer for nuclear explosion produced Xenon isotopic gases -Complete an airborne demo of a quantitative chemical plume characterization capability, that uses lasers for weapons production monitoring -Deliver the first 5 flight units of an extended-energy-range X-ray sensor for monitoring nuclear explosions in space -Develop technologies and systems for detection of nuclear weapons proliferation and treaty verification

The key technical areas which are currently supported by M&O staff are illustrated by the following table:

M&O PERSONNEL CURRENT FUNCTIONS

PROGRAM/ CURRENT STAFF	KEY FUNCTIONS
OFFICE OF NON-PROLIFERATION -Director's Office 6	Previous assignments were as members to the Science Council. (5-7) Positions are being eliminated. The Critical Infrastructure Protection Team is being formed.
-Research & Development 6	Recommendations on and reviews of technologies to strengthen R&D Program
-Arms Control and Nonproliferation - 34	Technical support to the MPC&A Program, the Proliferation Prevention Initiative, IAEA, Export Program Controls, and Test Ban Treaty and Agreements
-Security Affairs - 7	Technical support and maintenance of security systems developed at INEEL and installed at HQ facilities
-Emergency Management 7	Technical support for emergency communications systems and EOC network. Key development is by Bechtel NV
OFFICE OF INTELLIGENCE 21	Intelligence analysis of foreign nuclear material, programs, capabilities, technical assistance on deployment of detection technologies, development of nuclear IMS security.

LAB MISSIONS

Approximately a fourth of the Department's budget is dedicated to the national security mission. The three nuclear weapons laboratories-Los Alamos Laboratory, Lawrence Livermore National Laboratory, and Sandia National Laboratory-perform the majority of the DOE's national security-related R&D. Other Labs have specialized participating roles. The roles and number of current assignments for NN and IN are illustrated by the following table:

ROLES OF DOE"S MULTI PROGRAM LABORATORIES
Current M&O Staff Assignments to Washington

MISSION	LABS WITH PRINCIPAL ROLES Number of DC Assignments	LABS WITH SPECIALIZED ROLES Number of DC Assignments
NATIONAL SECURITY	**SNL--9** Responsible for non-nuclear components as well as systems integration of all stockpiled devices. Unique capabilities in advanced manufacturing technology, microelectronics, and photonics. Supports nonproliferation intelligence programs	**PNNL--26** Nonproliferation and arms control verification technology **ORNL/LMES/ORISE--9** Policy analysis; Design and delivery of security education and training; Emergency preparedness
	LANL--9 Responsible for nuclear components of stockpiled weapons which it designed. Unique capabilities in neutron scattering for enhance surveillance. Supports nonproliferation and intelligence programs	**BNL--2** Nonproliferation and IAEA technical support **ANL--4** Reduced enrichment fuel for research and test reactors to reduce the risk of nuclear proliferation; X-ray science
	LLNL--4 Responsible for nuclear components of stockpiled weapons which it designed. Unique laser capabilities for laboratory simulation of nuclear explosive behavior. Supports nonproliferation and intelligence programs.	**INEEL--5** Nonproliferation and counterproliferation sensor development applications **PARTICIPATING ROLES** **STP-NV--8** Special Technology Program (STP) supporting nonproliferation capabilities and various classified programs **SR--4** Technology Center supports technologies for national defense **KCP--1** Logistics activities in support of technology transfer manufacturing

M&O CONTRACTOR STAFFING NEEDS

The Program Offices of NN, IN and CN have defined their needs for technical support from the laboratories for FY'98 and '99. The projected need for M&O contractor personnel in Washington is 114, which is an increase of 47 people since the March 1998 report to Congress. CN has identified an additional 23 technical positions which are to be filled by Support Services staff. Requirements by office are defined by the following table:

PROPOSED M&O STAFFING

PROGRAM OFFICE	CURRENT NUMBER	PROPOSED NUMBER	KEY FUNCTIONS OF ADDITIONAL M&O PERSONNEL
NN (Total) Director's Office	**60** 6	**86** 7	Technical assistance in developing plan for protecting critical infrastructure-DOE and Electrical and Oil and Gas Industries. Assistance to other Federal agencies.
Research & Development	6	8	Technical expertise on chemical/biological detection technologies and on other deterence technologies
Arms Control & Nonproliferation	34	55	Technical support securing nuclear mat'ls in Russia. Revising nuclear export controls. Securing spent fuel in North Korea & Kazakhstan. Supporting IPP to prevent brain drain in FSU. Implementing treaty verification programs/supporting IAEA.
Security Affairs	7	6	-
Emergency Mgmt.	7	10	Support terrorist program and EOC expansions
IN (Total) Special Technology	**21** 4	**26** 4	-
Nuclear Non-proliferation	12	16	Technical assistance to assess foreign weapon program activities, fuel cycle development, fissile mat'l security
Energy Assessment	0	0	-
Intelligence Sup.	5	6	Analytical assistance for information analysis
CN (Total)	**0**	**2**	
CN Director Office	0	2	Counterintelligence Inspectors
Cyber Program	0	(14)	Technical assistance to develop CI Cyber capability
Investigations	0	(3)	CI Investigations of potential intelligence threats
Personnel Security	0	(4)	Technical support to screen high risk populations
Analysis Program	0	(2)	Counterintelligence analytical assistance to assess information sources for foreign intelligence threat
TOTAL M&Os	**81**	**114**	Note. ( ) represents positions for support service contract

CRITICAL SKILLS CATEGORIES

The science and engineering talent of the DOE laboratories provide the nuclear weapons expertise which is required to support the Nation's arms control, nonproliferation, and intelligence program requirements. The extreme sensitivity of nuclear weapons work has limited where work has been performed and thus, limits the available labor pools for the required skills to support the evolution of the national security programs.

This project has attempted to define the skills and technical expertise required to undertake defined programs which will require the technical assistance from the M&O lab contractors. Specific requirements by program office are included in the appendix to this report. The skills and technical expertise were categorized into six major categories as illustrated by the following table. These skill categories are based on the key functions delineated on proceeding tables for current and proposed M&O staffing. Most positions require skills from a combination of the categories. Many positions also require SIC clearance.

CRITICAL SKILLS CATEGORIES REQUIRING M&O STAFF SUPPORT

CATEGORY	EXAMPLE TECHNICAL SPECIALITIES
I. Technologies: Application for, installation of, interpretation from technologies related to treaty monitoring, proliferation detection, deterence,& counterintelligence investigations.	-Field sensors and algorithms to characterize nuclear explosions. -Detection technologies including hyper spectral, electro-optical, chemical effluent, space based multi-spectral and thermal imagery -Chemical/biological detection-genomic sequencing, micro fabrication -CI intrusion detection technologies* -Personnel security tools, CI Scope Polygraph*
II. Information Management and Security Systems: Installation and maintenance of, applications for, protection of information and security systems related to National Security.	-Specific knowledge of proprietary systems, e.g., Litton Poly-Scientific Supervision II System, Motorola CentraCom Gold System -Integrated systems development, computer modeling, advanced data processing, strategic simulation systems, systems security -Global Enfrosphere, Cyber specialists* -DOE emergency communications networks
III. International Intelligence	-Foreign operations and technologies -Foreign nuclear materials programs
IV. Weapons and Nuclear Materials Processes	-Nuclear reactors, materials production and transport, fuel cycles, fuel processing, plutonium stabilization -Weapons testing, production and dismantlement
V. Program Knowledge: Operational knowledge of programs related to National Security Programs	-Electrical, Oil and Gas industries production, supply and distribution -Export licensing/custom operations -International nuclear safeguards and securities programs -International treaties and agreements on arms control -Technology commercialization -Counterintelligence Inspection
VI. Counterintelligence Analytical Applications	-Substantive expertise in CI examinations and investigations* -Psychological behavior assessments*.

*A technical support contract will be issued supporting these skill areas for the CN Program

APPENDIX C

OFFICE OF TRANSPORTATION TECHNOLOGIES

HEADQUARTERS M&O EMPLOYEE STAFFING REQUIREMENTS

Fiscal Year 1999

OFFICES	Fed FTEs	M&Os		M&O EMPLOYEE (Key Functions)
		FY 98	FY 99	
Office of the Deputy Assistant Secretary (EE-30) Collects and analyzes technology and market data, using computer models to project technology potential and market share, and calculating program benefits. Focus: • Estimated impacts, benefits, and costs of advanced transportation vehicle and fuel technologies. • Publishing and distributing the *Transportation Energy Data Book*. • Comparative total energy cycle analysis for advanced transportation technologies.	9	2	2	Provide the economic and analytical skills necessary to perform the following functions: ✓Provide semi-independent, non-programmatic assessments of the ability of Office of Transportation Technologies (OTT) programs to reduce and reverse the rate of growth of oil imports. ✓Provide semi-independent assessments of the energy and emissions impacts of introducing individual technology types being research by OTT. ✓Provide liaison on modeling activities, that evaluate programs and strategies for long-term introduction of advanced- and alternative-fueled vehicle technologies, with the Energy Information Administration, the Office of Policy Planning and Analysis, and the U.S. Environmental Protection Agency. ✓Develop a PC-based simulation model that estimates the total fuel cycle impacts of electric vehicles being introduced in metropolitan areas.
Office of Advanced Automotive Technologies (EE-32) Under the auspices of the President's PNGV Initiative and Fuels Initiative, directs research, development, & validation of technologies that will enable automobiles to have several times the fuel economy of current comparable conventional vehicles, fuel flexibility, and emissions that comply with projected statutory limits. Focus: • Advanced batteries for electric vehicles • Advanced subsystems and critical components for hybrid vehicles • Components and propulsion technology for fuel cell vehicles • Improved energy conversion efficiency of traditional combustion engines • Use of petroleum based and alternative transportation fuels in automobiles • Propulsion system and lightweight automotive materials	26	4	5	Provide chemical, mechanical, electrical, and materials engineering skills, and systems integration expertise, required for the following functions: ✓Lead the government/industry Task Force implementing the OSTP Fuels Initiative, including: (1) development of performance characteristics for fuels to be used in advanced injection engines and fuel cells, and (2) establishment of a research pathway for fuels development that will not harm the environment. ✓Provide assistance in implementing research activities related to the government/industry Partnership for a New Generation of Vehicles (PNGV). ✓Evaluate the effectiveness of diesel exhaust aftertreatment techniques in terms of increased nitrogen oxides conversion efficiency and reduced particulate emissions. ✓Perform independent analysis of diesel engine test data from program-sponsored testing performed at national and independent laboratories of advanced diesel engines and vehicles to determine effect of low-sulfur diesel fuels on emissions. ✓Provide integration systems support for logistics and communications on automotive research related to the PNGV initiative. ✓Provide technical support in electrochemistry research related to energy storage improvements

OFFICES	Fed FTEs	M&Os		M&O EMPLOYEE (Key Functions)
		FY 98	FY 99	
Office of Heavy Vehicle Technologies (EE-33) Directs research and development of technologies to enable the heavy vehicle transport industry to exploit energy efficiency and alternative fuel capabilities of the diesel engine and other potential propulsion systems. Focus: • High efficiency diesel engines for heavy duty trucks • Adaptation of high efficiency diesel engine technology for sport utility vehicles and light trucks • Use of petroleum based and alternative transportation fuels in trucks • Propulsion system and lightweight vehicles materials for trucks	10	1	5	Provide chemical, mechanical, and materials engineering skills, and technology transfer expertise, required for the following functions: ✓Perform life-cycle assessments of heavy vehicles and their alternatives and develop supporting models that characterize fuel use, emissions, and economic impacts of heavy vehicles and alternative fuels. ✓Analyze the needs of potential heavy vehicle stakeholders for communications and outreach activities, including progress and expected benefits to stakeholder groups. ✓Perform technical analyses related to alternative fuel use in heavy vehicles with emphasis on use of natural gas.
Office of Technology Utilization (EE-34) Promotes the introduction and commercialization of alternative fuel vehicles (AFVs) and advanced technology vehicles with significantly improved fuel economy through the Clean Cities Program and EPACT implementation. Focus: • Public/private partnerships to expand use of AFVs and develop refueling infrastructure • Accurate, reliable information on all types of fuels and AFVs to promote consumer acceptance • Testing and evaluation of cars and trucks that use alternative fuels • Implementation of the requirements of EPACT	11	3	0	Provide the communications, public relations, and analytical skills necessary to perform the following functions ✓Develop outreach products to educate the public on alternative fuels and alternative fueled vehicles. ✓Design software for the alternative fuels outreach program. **[NOTE: In FY 1999, these functions were transferred to NREL in Golden, CO]**
TOTALS	56	10	12	

FY 1999 OTT Program Direction Funds: $6.2M
FY 1999 Program Funds $237.6M (including $2.3M for support services)
Laboratories funded: ANL, BNL, INEEL, LANL, LBNL, LLNL, NREL, ORNL, PNNL, SNL

M&O CONTRACTOR EMPLOYEES SUPPORTING OFFICE OF TRANSPORTATION TECHNOLOGIES

Fiscal Year 1998

NAME	JOB ASSIGNMENT	% TIME WORKING	ORG.	START/ END	COST ($K/MO)	M&O CONTRACT
Cleary W.*	Provides technical expertise in evaluating automotive energy conversion technology projects for PNGV research programs	100%	EE-32	1/98-1/99	15	ANL
Flemons T.*	Researches and develops logistical and communications systems on automotive research	100%	EE-32	1/91-10/99	15	ANL
Grostick E.*	Provides technical support for all advanced automotive technology R&D and PNGV operations	100%	EE-32	5/98-5/99	15	ORNL
Plotkin S.	Performs technical evaluations and modeling of transportation technologies	100%	EE-30	6/97-10/99	13	ANL
Singh M.	Performs technical analysis of transportation technologies and fuels	75%-EE 25%-PO	EE-30	7/78-10/99	16	ANL
Snyder, T	Develops outreach products to educate the public on alternative fuel vehicles	No longer assigned	EE-34		8	ANL
Stodolsky F.	Conducts and manages analytical systems studies on heavy vehicles	100%	EE-33	9/80-10/99	12	ANL
Sutter R	Designs software for the alternative fuels outreach program	No longer assigned	EE-34		4	ANL
Vercillom J	Designs software for the alternative fuels outreach program	No longer assigned	EE-34		4	ANL
Walker, G	Provides technical assistance in performance characteristics for fuels in advanced injection engines and fuel cells, and fuels-engine-aftertreatment systems	100%	EE-32	7/98-1/00	12	ORNL

*Located within DOE Facilities

APPENDIX D

(Copy retained in subcommittee files)

ENVIRONMENTAL CLEANUP

Mr. Packard. Mr. Secretary, many of my colleagues and I have been approached by small companies which claim to have innovative environmental cleanup technologies which could be used to significantly reduce cleanup costs at Department of Energy facilities. They complain that it is difficult to get anyone at the Department to listen and that Department of Energy contractors are not interested in trying new technologies unless they invent them. Can you comment on that concern?

Secretary Richardson. We recognize that small businesses do face certain challenges in seeking to assist the DOE cleanup activity, and it concerns us too. We know small businesses can make valuable contributions toward meeting DOE's formidable environmental cleanup challenge. We also understand their frustrations with this complicated issue, and the Environmental Management (EM) program is striving to make sure small businesses have venues to be heard and considered.

Mr. Packard. What procedures do you have in place to seek out small and innovative companies which have cleanup technologies, and how do you get the Department's contractors to use them?

Secretary Richardson. We are mindful of the challenges small businesses face and are putting into place contractual mechanisms that encourage the use of small businesses. For instance, the Oak Ridge EM Management and Integration Contract, which became effective April 1998 with Bechtel Jacobs Company as the prime contractor, contains the requirement for significant small business participation, including those with innovative cleanup technologies. Their approved plan calls for 50 percent of their subcontracts to be awarded to small businesses. Also, the RFIs for these contracts are market driven, solution-based, making it easier for small businesses with innovative technologies to compete. Thus far, with over $140 million in awards, they are ahead of this plan, and many of these small businesses are using innovative technologies. Major subcontracts have been in radiation control, waste information tracking systems, and environmental sampling, many of which are innovative.

Also, within EM's science and technology (S&T) program, which is responsible for providing new cleanup technologies, the Industry Program activity managed by the Federal Energy Technology Center (FETC) involves the private-sector entities in developing, demonstrating and deploying alternative cleanup technologies through government contracting mechanisms and competitive procurement. This program ensures that private sector companies–including small businesses–are able to compete within the DOE market to develop and deploy innovative, cost-effective solutions. S&T through FETC partners with private sector companies to assist them in developing their technologies through full-scale demonstrations at DOE sites. The Industry Program activity has managed development and demonstration efforts of 114 technologies, 56 of which are small business technologies. Of these small business technologies, 26 have been demonstrated at a DOE site.

And in FY 1998, with Congressional approval, EM's S&T program began a technology deployment initiative intended to serve as a catalyst to deploy new demonstrated technologies and innovative approaches that are already available for use, including those of small businesses. These projects, which are competitively selected, provide the valuable cost and performance data to gain user confidence and spur widespread deployment. This initiative provides an excellent opportunity for small businesses with viable technologies to fast-track deployment in partnership with sites. In fact, approximately two-thirds of the vendors associated with the FY 1998 technology deployment projects are small businesses, approximately half of which are small business technologies that have been sponsored in the past by EM's S&T program.

Mr. Packard. How many small company technologies have been tested at a DOE site?

Secretary Richardson. Our Environmental Management science and technology program, which sponsors the development of new or improved cleanup technologies, does not routinely track that level of detail on all the technology vendors and therefore cannot provide the exact number of technologies developed by small businesses.

However, we have this information for some programs within the EM Science and Technology program. These are:

- The EM Industry Programs activity, which involves the private sector through government contracting mechanisms and competitive procurement, has managed development and demonstration efforts of 114 technologies, 56 of which are small business technologies. Of these small company technologies, 26 have been demonstrated at a DOE site.

- EM's Deactivation and Decommissioning (D&D) Large Scale Demonstration Program (LSDP), where innovative technologies are tested in parallel with baseline technologies in actual D&D projects across the DOE complex, provides another venue for small business technology demonstrations. Since 1996, over 20 small business technologies have been demonstrated out of more than 50 technologies demonstrated during three major D&D projects at DOE sites.

Mr. Packard. How many were deemed successful?

Secretary Richardson. Again, since we do not routinely collect this type of vendor data, we cannot quote precise statistics on the performance of small business technologies. However, for the projects identified in the previous question, all of the 46 small business technologies demonstrated have successfully met their test objective. Based on the information we have, we believe the small business technologies appear to experience a comparable demonstration success rate as those of larger vendors.

Mr. Packard. How many have been adopted on a full-scale basis?

Secretary Richardson. Of the 26 small business technology demonstrations associated with the EM Industry Programs, 11 have been deployed at least once in actual cleanup activities. And of the 20 small business technology demonstrations associated with the D&D LSDP, more than half have been deployed in cleanup activities multiple times.

ELECTRICITY RESTRUCTURING

Mr. Packard. One by one, states are enacting electricity restructuring proposals. When can we expect to see a legislative proposal by the Department of Energy on this issue?

Secretary Richardson. In June, 1998, DOE submitted the Administration's proposed Comprehensive Electricity Competition Act to Congress. This legislation encourages states and unregulated municipal and cooperative utilities to implement retail electric competition programs. In addition, the bill proposes to remove the Federal impediments to competitive retail markets. DOE is currently working on revisions to the Administration proposal and expects to submit this updated legislation to Congress soon.

FINANCIAL INFORMATION

Mr. Packard. For each Department of Energy laboratory and facility which uses laboratory directed research and development (LDRD) funding, provide the amount of funding for LDRD in fiscal years 1997, 1998 and proposed for 1999.

Secretary Richardson. I will be pleased to provide details on the LDRD funding levels for the record. (The information follows:)

Laboratory Directed Research and Development (LDRD) [a]
B/A in millions

	Actual FY 1997	Actual FY 1998	Estimated FY 1999
Office of Science			
Ames Laboratory	0.2	0.1	0.3
Argonne National Laboratory	14.3	14.2	17.4
Brookhaven National Laboratory	3.5	2.6	4.6
Lawrence Berkeley National Laboratory	9.1	10.2	10.1
Oak Ridge National Laboratory	14.5	14.3	13.0
Pacific Northwest National Laboratory	12.8	11.9	11.0
Defense Programs			
Lawrence Livermore National Laboratory	51.0	55.7	55.5
Los Alamos National Laboratory	62.5	65.4	69.0
Sandia National Laboratory	71.1	76.6	80.0
Environmental Management			
Idaho National Environmental and Engineering Laboratory	11.7	10.0	12.0

[a] The requested information for the Office of Energy Efficiency and Renewable Energy at the National Renewable Energy Laboratory (NREL) is $3,230,000; $2,468,000; and $3,300,000 for FY 1997, 1998, and 1999, respectively. It should be noted that technically NREL uses Director's Discretionary Research and Development (DDRD) funding because they are not covered by the DOE Order on LDRD.

NEXT GENERATION INTERNET

Mr. Packard. Please provide a funding table for the Next Generation Internet that shows the funding levels for fiscal years 1998, 1999 and 2000. Also include a table showing funding by other Federal agencies for the same three years. Please provide the total cost and schedule for completion.

Dr. Telson. The Next Generation Internet is a three year program ending in FY 2000. Funding data for fiscal years 1998, 1999 and 2000 is shown in a table which I would like to insert for the record. The information follows:

Next Generation Internet
(In Millions of Dollars)

AGENCY	FY 1998 Approp.	FY 1999 Approp.	FY 2000 Request
National Science Foundation	$23	$25	$25
Department of Defense	$42	$50	$40
Department of Energy	$0	$15	$15
National Aeronautics and Space Administration	$10	$10	$10
National Institute of Standards and Technology	$5	$5	$5
National Institutes of Health	$5	$5	$8
TOTAL	$85	$110	$103

PARTNERSHIP FOR A NEW GENERATION OF VEHICLES

Mr. Packard. Please provide a table for each of the following crosscutting programs that shows the funding levels by organization and program for fiscal years 1998, 1999, and 2000. For those programs which are government-wide initiatives or also funded by other federal agencies, also include a table showing the total funding by agency for fiscal years 1998, 1999, and 2000. For each initiative, please provide the total cost and scheduled date for completion.

Dr. Telson. There are two tables I would like to insert for the record which detail funding for the Partnership for a New Generation of Vehicles (PNGV). The first shows the federal funding by agency while the second table shows PNGV funding by program for the Department of Energy. From FY 1995 through the FY 2000 budget request, $1.4 billion has been dedicated to government-wide PNGV efforts. Assuming the FY 2000 request continues through FY 2004, an additional $1.1 billion will be added for a program TEC of approximately $2.5 billion. The information follows:

Partnership for a New Generation of Vehicles
Government-wide Direct Support
(dollars in millions)

Federal Agency	FY 1998	FY 1999	FY 2000
Department of Energy	$120.5	$134.1	$149.1
Environmental Protection Agency	15.6	29.0	47.0
Department of Transportation	4.5	2.5	3.5
Department of Commerce	29.0	25.4	11.9
National Science Foundation	47.0	49.0	51.0
TOTAL	$216.6	$240.0	$262.5

Department of Energy
Partnership for a New Generation of Vehicles
(dollars in thousands)

	FY 1998	FY 1999	FY 2000
ENERGY CONSERVATION APPROPRIATION:			
Office of Transportation Technologies			
Vehicle Technology R&D	$88,206	$97,686	$117,580
Fuels Utilization R&D	$4,549	$6,915	$7,500
Transportation Materials Technologies	$20,855	$22,655	$17,000
Technology Deployment	$850	$840	$1000
Office of Industrial Technologies			
Aluminum Vision (Indirect support)	$1,000	$1,000	$1,000
Total, Energy Conservation	$115,460	$129,096	$144,080
SCIENCE APPROPRIATION:			
Basic Energy Sciences (Indirect Support)	$5,000	$5,000	$5,000
TOTAL, Department of Energy	$120,460	$134,096	$149,080

SCIENCE EDUCATION

Mr. Packard. Please provide a table for Science Education that shows the funding levels by organization and program for fiscal years 1998, 1999, and 2000.

Dr. Telson. The following tables indicate funding levels for the Science and Education Initiative, which I would like to insert in the record. The first table identifies Science Education funding sources. The second table reflects Science Education activities. The information follows:

DEPARTMENT OF ENERGY
Science Education
(dollars in thousands)

	FY 1998	FY 1999	FY 2000
Civilian Radioactive Waste Mgmt	452	470	489
Defense Programs	10,743	10,491	17,317
Economic Impact and Diversity	750	808	808
Energy Efficiency	827	1,101	1,196
Environment Safety & Health	2,110	1,402	920
Environmental Management	7,969	6,192	5,193
Science	34,102	36,007	42,357
Fossil Energy	5,182	5,121	5,265
Fissile Materials Disposition	8	9	9
Nuclear Energy	8,112	12,093	12,124
Nonproliferation & Nat'l Security	447	744	727
Subtotal	$70,702	$74,438	$86,405
DOE Overhead and Other	15,495	17,147	16,462
Non-DOE Sources	8,647	10,150	9,549
Total	$94,844	$101,735	$112,416

DEPARTMENT OF ENERGY
Science Education Activities
(dollars in thousands)

	FY 1998	FY 1999	FY 2000
Pre-College	15,124	13,318	16,453
Undergraduate	35,140	36,387	40,317
Graduate	38,683	42,331	40,308
Science Literacy	5,897	8,799	13,783
Undesignated	0	900	1,555
TOTAL	$94,844	$101,735	$112,416

ADVANCED COMPUTATIONAL TECHNOLOGY INITIATIVE

Mr. Packard. Please provide a table for each of the following crosscutting programs that shows the funding levels by organization and program for fiscal years 1998, 1999, and 2000. For those programs which are government-wide initiatives or also funded by other federal agencies, also include a table showing the total funding by agency for fiscal years 1998, 1999, and 2000. For each initiative, please provide the total cost and scheduled date for completion.

Dr. Telson. The following table shows funding levels for the Advanced Computational Technology Initiative (ACTI), which I would like to insert for the record. This program is scheduled for completion in FY 2000. The information follows:

DEPARTMENT OF ENERGY
Advanced Computational Technology Initiative
(dollars in thousands)

	FY 1998	FY 1999	FY 2000	Total Cost
Defense Programs - Technology Partnerships and Education	$10,731	$7,500	$9,000	$34,442
Office of Science	$3,862	$5,950	$5,250	$38,400
Fossil Energy	$0	$0	$0	$11,300
TOTAL	$14,593	$13,450	$14,250	$84,142

AMERICAN TEXTILES PARTNERSHIP

Mr. Packard. Please provide a table for each of the following crosscutting programs that shows the funding levels by organization and program for fiscal years 1998, 1999, and 2000. For those programs which are government-wide initiatives or also funded by other federal agencies, also include a table showing the total funding by agency for fiscal years 1998, 1999, and 2000. For each initiative, please provide the total cost and scheduled date for completion.

Dr. Telson. The following table shows funding levels for the American Textiles Partnership (AMTEX), which I would like to insert for the record. The information follows:

DEPARTMENT OF ENERGY
American Textiles Partnership
(dollars in thousands)

	FY 1998	FY 1999	FY 2000	Total Cost	Scheduled Date for Completion
Defense Programs -Technology Partnerships and Education	$9,931	$7,500	$0	$49,694	June 2000
Office of Science	$3,250	$3,500	$1,500	$36,900	FY 2000
TOTAL	$13,181	$11,000	$1,500		

GLOBAL CLIMATE CHANGE

Mr. Packard. Please provide a funding table for Global Climate Change that shows the funding levels for fiscal years 1998, 1999, and 2000. Also include a table showing funding by other Federal agencies for the same three years.

Dr. Telson. The U.S. Global Change Research Program funding for FY 1998, FY 1999, and FY 2000 is shown in a table which I would like to insert in the record. In the Department of Energy, the Office of Science provides the funding for these activities in the Biological and Enviromental Research account. The information follows:

U.S. GLOBAL CHANGE RESEARCH PROGRAM
(dollars in millions)

AGENCY	FY 1998	FY 1999	FY 2000
Department of Agriculture	$53	$55	$89
Department of Commerce	60	63	70
Department of Energy	106	114	125
Department of the Interior	26	27	27
Environmental Protection Agency	13	17	23
Department of Health and Human Services	35	40	40
National Aeronautics and Space Administration	1210	1177	1219
National Science Foundation	167	182	187
Smithsonian Institution	7	7	7
Total, All Federal Agencies	$1,677	$1,682	$1,787

SECTION 302, PUBLIC LAW 105-245

Mr. Packard. Mr. Secretary, Section 302 requires the Department to follow the requirements of the Federal Acquisition Regulation when awarding contracts unless you grant a waiver to allow for a deviation, and Congress is notified 60 days in advance. How have you implemented this requirement?

Mr. Farrell. The Department has issued formal policy direction to all Department of Energy contracting elements to implement the Secretarial and Congressional notification requirements of Section 302. The policy directive, which applies to both management and operating (M&O) contracts and to non-M&O contracts, specifically addresses these requirements by establishing strict standards for deviating from provisions and clauses prescribed in the Federal Acquisition Regulation (FAR). These standards are consistent with the requirements contained in the FAR governing deviations.

Specifically, the directive requires that all requests for deviations from the FAR be justified in writing and, following Headquarters review, be submitted to the Secretary for decision and, as appropriate, Congressional notification. It should be noted that, while the FAR recognizes M&O contracts, it does not prescribe provisions or clauses for use in such contracts. The prescription of provisions and clauses for management and operating contracts is left to agency implementation.

The Department has supplemented the FAR by prescribing provisions and clauses for use in its M&O contracts in Department of Energy Acquisition Regulation (DEAR) Part 970. Thus, as a stand-alone supplemental regulation, DEAR Part 970 does not constitute a deviation from the FAR. It should be further noted that the Department's authority to supplement the FAR in this manner was recognized by the conferees who directed that the Department be cognizant of and utilize those provisions of the FAR that permit exceptions to the FAR, and those provisions intended to address the special circumstances entailed by management and operating contracts.

SECTION 303, PUBLIC LAW 105-245

Mr. Packard. Mr. Secretary, section 303 prohibits the use of funds to provide enhanced severance payments and other benefits for federal employees. Has this prohibition been followed?

Mr. Farrell. The prohibition is being followed. Human Resources Directors were notified that enhanced severance payments and other benefits for federal employees could no longer be granted under section 3161 of the 1993 National Defense Authorization Act.

ENHANCED BENEFITS TO CONTRACTOR EMPLOYEES

Mr. Packard. Mr. Secretary, section 304 limits to $29.9 million the funds that can be used to pay enhanced severance payments and other benefits to contractor employees and provide community assistance grants. Has this limitation been followed?

Mr. DeGrasse. Yes, no program funds have been obligated in Fiscal Year 1999 for enhanced worker benefits at defense nuclear facilities covered by section 3161, consistent with the guidance provided to field offices. These benefits include incremental costs above severance or voluntary separation programs and education and relocation assistance. They also include outplacement assistance except in those cases where this benefit is part of established contractor policy prior to enactment of section 3161. Program funds have been used to provide displaced worker medical benefits, which have been incorporated into contractual requirements through a Departmental Order and Acquisition Letter issued by Secretary Watkins, prior to enactment of section 3161. Enhanced benefits may be provided as an allowable cost from program accounts at sites that are not defense nuclear facilities covered by section 3161. No funding has been provided for community transition assistance other than from this appropriation.

SECTION 305, PUBLIC LAW 105-245

Mr. Packard. Mr. Secretary, section 305 prohibits the Department from preparing or initiating Requests for Proposals (RFPs) for a program if that program has been proposed by the Department but not yet been funded by Congress. How have you implemented this provision?

Mr. Farrell. The Department has issued formal Department-wide policy direction implementing the notification requirements of Section 305 of the Energy and Water Appropriations Act, FY 1999. This policy directive was disseminated through the Department's formal distribution process to all contracting offices and affected program offices. Consistent with the law, this policy prohibits Departmental Program and Project Managers and Budget Officials from initiating and certifying procurement requests for goods and services that are in support of a program for which funding has been specifically denied. In addition, the policy directive prohibits contracting officers from preparing or issuing RFPs for which funds have not been properly certified by a designated authority. We have no evidence to date that would indicate that RFPs have been issued contrary to the restrictions of Section 305.

SECTION 501, PUBLIC LAW 105-245

Mr. Packard. Mr. Secretary, section 501 prohibits the use of funds appropriated to each agency to be used in any way, directly or indirectly, to influence congressional action of any legislation or appropriation matters pending before Congress. How have you implemented this provision?

Secretary Richardson. The Department has issued formal policy direction to all Department of Energy contracting activities to implement the requirements of Section 501. The policy directive prescribes the incorporation of a new clause into existing and future contract and financial assistance awards using fiscal year 1999 funds. In addition, we recently updated a brochure which identifies the various statutory and regulatory lobbying prohibitions. The brochure is provided to all new contractors and financial assistance recipients at the time of award and is also available on the Department's procurement and financial assistance Internet web-sites. Last year, the Department issued a notice to all employees to increase awareness of these lobbying restrictions and other lobbying restrictions applicable to Federal employees. We are in the process of updating and reissuing that notice.

Author: DOECAST at ES1
Date: 1/9/1998 4:56 PM
Priority: Normal
Subject: Lobbying Restrictions
---------- Message Contents ----------

LOBBYING RESTRICTIONS

The Energy and Water Development Appropriations Act for Fiscal Year 1998 includes restrictions on lobbying that apply to Department employees and to Department contractors. The Act provides that none of the funds appropriated by the Act may be used in any way, directly or indirectly, to influence congressional action on any legislation or appropriations matters pending before Congress. The Act further provides that such funds may be used to communicate with Members of Congress as described in section 1913, title 18, United States Code ("Anti-Lobbying Act").

The Department of Justice has issued interpretive guidelines on permissible and prohibited activity under the Anti-Lobbying Act. The guidelines provide that Government employees may not engage in substantial "grass roots" lobbying campaigns. The term "grass roots" lobbying campaigns means campaigns of letters, telegrams and other private forms of communication, expressly asking members of the public to communicate with Members of Congress, in support of or opposition to legislation.

The Anti-Lobbying Act provides that employees of a Federal agency may communicate with a Member of Congress at his or her request, and may communicate to Congress, through the proper official channels, requests for legislation or appropriations. According to the Department of Justice guidelines, under the Anti-Lobbying Act, Government employees may: (1) lobby Congress or the public to support Administration positions on issues unrelated to legislation or appropriations, such as nominations or treaties; (2) communicate directly with Members of Congress and their staffs in support of Administration or Department positions; (3) communicate with the public through public speeches, appearances and published writings to support Administration positions; and (4) communicate privately with members of the public to inform them of Administration positions and to promote Administration positions, provided the communication is not part of a "grass roots" lobbying campaign that is expressly asking the public to contact Members of Congress in support of, or opposition to, legislation.

Any questions regarding this matter may be referred to Susan Beard or Ralph Goldenberg in the Office of the Assistant General Counsel for General Law at 202-586-8618.



Department of Energy
Acquisition and Assistance Regulations

AL No. 97-10R
FAL No. 97-04R
Date 11/20/98

ACQUISITION/FINANCIAL ASSISTANCE LETTER

AUTHORITY

This joint Acquisition/Financial Assistance Letter (AL/FAL) is issued pursuant to a delegation of authority from the Secretary.

****

Subject: FY 99 Energy and Water/Interior (Grants and Contracts)

I. **Purpose.** The purpose of this joint AL/FAL is to provide guidance regarding certain requirements applicable to acquisition and financial assistance instruments that are set forth in the Energy and Water Development Appropriations Act, 1999, Pub. L. 105-245 (Energy & Water Act), which was enacted on October 7, 1998, and the Department of Interior and Related Agencies Appropriations Act, Section 101 (e) of Division A of the Omnibus Consolidated and Emergency Supplemental Appropriations Act, 1999, Pub. L. 105-277 (Interior Act), which was enacted on October 21, 1998.

II. **Applicability.** In general, the guidance set forth in this AL/FAL is applicable to contracts and financial assistance instruments that are awarded by the Department using appropriations made available under the Energy & Water Act and the Interior Act. Moreover, certain of these requirements apply to subcontracts awarded under DOE prime contracts, as well as purchases made by recipients under DOE financial assistance instruments. Detailed guidance regarding the scope of the requirements set forth in these statutes, as well as implementing procedures, are provided in paragraph IV below.

III. **Background.** The guidance provided in this AL/FAL is essentially the same as the guidance provided in joint AL No. 97-10/FAL No. 97-04, except it contains some additional guidance regarding financial assistance awards to industry associations and does not contain the ROTC and Military Recruiting Access to Campus requirement or the prohibition on awards to contractors who have not filed their annual report regarding employment of certain veterans. Paragraphs IV, A and B apply to both DOE prime contracts and financial assistance awards. Paragraphs IV, C and F apply only to DOE financial assistance. Paragraph D applies to DOE prime contracts, and subcontracts thereunder. Paragraph IV, E applies only to DOE prime contracts. The guidance in this AL/FAL results from the following statutory requirements

Lobbying Restrictions (Energy & Water §501/Interior §303)

The Energy & Water Act prohibits the use of funds appropriated in the Act, either directly or indirectly, to influence congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in section 1913 of title 18, United States Code. The Interior Act prohibits the use of funds appropriated under the Act for any activity or the publication or distribution of literature that in any way tends to promote public support or opposition to any legislative proposal on which Congressional action is not complete.

Purchase of American-Made Equipment and Products--Sense of Congress (Energy & Water §502(a) & (b)/Interior §307(b)

These provisions provide that it is the sense of Congress that all equipment and products purchased with funds made available from the Energy & Water Act or the Interior Act should be American-made. The Energy & Water Act provision applies to both contracts and financial assistance instruments. The Interior Act provision applies only to financial assistance instruments.

Compliance with Buy American Act (Interior §307(a))

This provision provides that none of the funds made available under the Interior Act may be expended by an entity unless the entity agrees that in expending the funds the entity will comply with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a-l0c; popularly known as the "Buy American Act").

Prohibition of Contracts with Persons Falsely Labeling Products as Made In America (Energy & Water §502(c)/Interior §307(c)).

These provisions prohibit the award of contracts and subcontracts to persons who falsely label products as made in America. Persons determined to have intentionally affixed such a false label, or any inscription with the same meaning, will be considered for debarment pursuant to FAR 9.406-2(a)(4) and 9.406-2(b)(1)(iii).

Consulting Contracts As Public Records (Interior §301)

This provision prohibits the use of funds made available under the Interior Act for consulting contracts pursuant to 5 U.S.C. 3109 unless such contracts are a matter of public record and are available for public inspection.

Inappropriate Use of Appropriated Funds (Energy and Water Conference Report 105-245)

The report provides guidance on the appropriate use of funds for DOE financial assistance awards to industry associations. The conferees conclude that, as a general rule, appropriated funds should not be used to underwrite the operating expenses of industry associations and that the Department should compete its financial assistance awards for information dissemination and outreach activities conducted by trade associations and use merit review procedures.

IV. Guidance.

A. Lobbying Restrictions

1. Scope: This guidance applies to all solicitations and awards of DOE contracts and financial assistance instruments under which funds appropriated in either the Energy & Water Act or the Interior Act are obligated.

2. Procedures: The following clauses shall be incorporated into applicable solicitations and awards of DOE contracts and financial assistance instruments where the expenditure of funds is made available under the Energy & Water or Interior Acts.

LOBBYING RESTRICTION (ENERGY & WATER DEVELOPMENT APPROPRIATIONS ACT, 1999)

The contractor or awardee agrees that none of the funds obligated on this award shall be expended, directly or indirectly, to influence congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 U.S.C. 1913. This restriction is in addition to those prescribed elsewhere in statute and regulation.

(End of Clause)

LOBBYING RESTRICTION (DEPARTMENT OF INTERIOR & RELATED AGENCIES APPROPRIATIONS ACT, 1999)

The contractor or awardee agrees that none of the funds obligated on this award shall be made available for any activity or the publication or distribution of literature that in any way tends to promote public support or opposition to any legislative proposal on which Congressional action is not complete. This restriction is in addition to those prescribed elsewhere in statute and regulation.

(End of Clause)

B. Purchase of American-made Equipment and Products—Sense of Congress.

1. Scope: This guidance applies to all solicitations and awards of DOE contracts and financial assistance under which funds appropriated in the Energy & Water Act are obligated. This guidance also applies to solicitations and awards of financial assistance under which funds appropriated in the Interior Act are obligated *(This guidance is not applicable to contracts under which funds appropriated in the Interior Act are obligated)*.

2. Procedures: The following notice shall be incorporated into applicable solicitations and awards of DOE contracts and financial assistance instruments using funds appropriated under the Energy & Water Act. The notice shall also be included in solicitations and awards of financial assistance instruments using funds appropriated under the Interior Act.

NOTICE REGARDING THE PURCHASE OF AMERICAN-MADE EQUIPMENT AND PRODUCTS—SENSE OF CONGRESS

It is the sense of the Congress that, to the greatest extent practicable, all equipment and products purchased with funds made available under this award should be American-made.

C. Compliance with Buy American Act

1. Scope: This guidance applies to all solicitations and awards of DOE financial assistance under which funds appropriated in the Interior Act are obligated.

2. Procedures: The following clause shall be incorporated into applicable financial assistance solicitations and awards.

COMPLIANCE WITH BUY AMERICAN ACT

In accepting this award, the recipient agrees to comply with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a - 10c, popularly known as the "Buy American Act"). The recipient should review the provisions of the Act to ensure that expenditures made under this award are in accordance with it.

(End of Clause)

D. Prohibition of Contracts with Persons Falsely Labeling Products as Made in America

1. Scope: This guidance applies to all DOE contracts, and subcontracts thereunder, under which funds appropriated in either the Energy & Water Act or the Interior Act are obligated.

2. Procedures:

a. Pursuant to FAR 9.405(a), awards shall not be made to entities that are included on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

b. If DOE, or DOE contractor personnel become aware of a possible violation of the prohibition against falsely mislabeling products as made in America, and the entity is not on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs, the matter should be promptly reported through the DOE contracting officer to the Office of Management Systems, Office of Procurement and Assistance Management, for potential debarment of the entity pursuant to FAR 9.406-2(a)(4) and 9.406-2(b)(1)(iii).

E. Consulting Contracts As Public Records

1. Scope: This guidance applies to awards of DOE prime contracts for consulting services pursuant to 5 U.S.C. 3109 using funds appropriated in the Interior Act.

2. Procedures: Pursuant to the Freedom of Information Act (5 U.S.C. 552), as implemented in the Federal Acquisition Regulation at Part 24 and the Department of Energy's Freedom of Information Act Regulation at 10 CFR 1004, prime contracts are a matter of public record and are to be made available for public inspection upon request. Accordingly, these existing statutory and regulatory requirements would preclude violation of the prohibition set forth in Section 301 of the Interior Act.

F. Financial Assistance Awards to Industry Associations

1. Scope: This guidance applies to all awards of DOE financial assistance to industry associations under which funds appropriated in the Energy & Water Act are obligated.

2. Procedures:

a. Prior to making any award to an industry association, the DOE contracting officer shall ensure that the funds are provided for discrete tasks which accomplish a public purpose of support or stimulation and not for the principal purpose of paying the association's operating costs.

b. Overhead and general and administrative type-expenses incurred by industry associations as the result of conducting such discrete tasks may be reimbursed in accordance with the Government-wide rules for financial assistance.

c. The objective merit review policy stated at 10 CFR 600.13 applies to all discretionary financial assistance awards, including awards to industry associations.

d. Financial assistance activities for information dissemination and outreach activities conducted by industry associations shall be competed, to the greatest extent practicable. Any non-competitive award must satisfy the procedures established by the Department for non-competitive financial assistance.

V. **Effective Date**. This joint AL/FAL is effective upon its date of issuance shown on page 1.

VI. **Expiration Date**. September 30, 1999 or such later date as awards utilizing funds from the Energy & Water Development Appropriations Act, 1999, or the Department of the Interior and Related Agencies Appropriations Act, 1999 may be made and until the completion of any portion of such awards utilizing funds from those appropriations.

● *REGULATORY RESTRICTIONS ON ALLOWABILITY*

Cost principles for lobbying restrictions are found at:

- The Department of Energy Acquisition Regulation at Part 970 for DOE Management and Operating Contracts;
- The Federal Acquisition Regulation at Section 31.205 for contracts and financial assistance with commercial organizations;
- Office of Management and Budget (OMB) Circulars on Cost Principles, including:
  - OMB Circular A-21, Cost Principles for Educational Institutions;
  - OMB Circular A-87, Cost Principles for State, Local, and Indian Tribal Governments; and,
  - OMB Circular A-122, Cost Principles for Non-Profit Organizations.

Generally, the various directives contain similar provisions restricting the allowability of costs associated with lobbying. A summary of some of the unallowable lobbying provisions is provided below:

- Attempts to influence the outcome of any Federal, State, or local election, referendum, initiative, or similar procedures, through in kind or cash contributions, endorsements, publicity, or similar activities;
- Establishing, administering, contributing to, or paying the expenses of a political party, campaign, political action committee, or other organization established for the purpose of influencing the outcomes of elections;
- Any attempt to influence the introduction, or the enactment or modification of any pending, Federal, state, or local legislation through communication with any member or employee of the Congress or state legislature (including efforts to influence state or local officials to engage in similar lobbying activity), or with any government official or employee in connection with a decision to sign or veto enrolled legislation;
- Any attempt to influence the introduction, or the enactment or modification of any pending, Federal, state, or local legislation by preparing, distributing or using publicity or propaganda, or by urging members of the general public or any segment thereof to contribute to or participate in any mass demonstration, march, rally, fund raising drive, lobbying campaign or letter writing or telephone campaign;
- Legislative liaison activities, including attendance at legislative sessions or committee hearings, gathering information regarding legislation, and analyzing the effect of legislation, when such activities are carried on in support of or in knowing preparation for an effort to engage in unallowable activities; and
- Attempting to improperly influence, either directly, or indirectly, an employee or officer of the Executive branch of the Federal Government to give consideration to or act regarding a regulatory or contract matter.

Office of Procurement and Assistance Management
Office of Acquisitions and Financial Assistance Policy

Printed with soy ink on recycled paper



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Various Federal statutes and regulations prohibit "lobbying" by federal employees, as well as federal contractors, cooperative agreement participants, and grantees. Although the definition of "lobbying" may differ within statutes and regulations, the restrictions generally prohibit contacting or encouraging others to contact a state or federal legislator or executive branch official in an attempt to influence the enactment or modification of legislation or other specified activities. The following discussion provides general guidelines that should help identify the various statutory and regulatory lobbying restrictions. For more detailed guidance, you should consult your cognizant legal counsel.

FEDERAL EMPLOYEES

● *CRIMINAL LOBBYING STATUTE*

18 U.S.C. §1913 provides criminal sanctions and requires removal from office if Federal employees violate the statute's prohibition on lobbying with appropriated moneys. The restriction has been interpreted by the Justice Department to prohibit "grass roots lobbying" -- campaigns in which members of the public are encouraged to contact their Senators or Representatives. Slightly less restrictive rules apply to cabinet members and other Senate-confirmed officials acting within their areas of responsibility. The Justice Department guidance permits Federal employees to do the following:

- communicate with Members and their staffs in support of Administration or Departmental positions;
- communicate with the public through public speeches and published writings;
- communicate privately with individual members of the public, so long as those communications are not part of a grass roots lobbying campaign; and
- lobby Congress or the public on non-legislative or appropriation matters like nominations and treaties.

ALL EMPLOYEES (FEDERAL, CONTRACTOR, AND RECIPIENT) SPECIAL APPROPRIATIONS RIDERS

Annual appropriations legislation may contain provisions that are known as "riders" which may place restrictions on the use of appropriations. For example, a recent rider to the 1998 Energy and Water Development Act included a prohibition on the use of funds to influence congressional action on any legislation or appropriation matters pending before Congress except for communications to Congress as described in section 1913 of title 18 U.S.C. Another rider to the 1998 Interior Act prohibited the use of funds for publication or distribution of literature that in any way tends to promote public support or opposition to any legislative proposal on which Congressional action is not complete. Information concerning such riders may be obtained from your legal counsel or the Office of Procurement and Assistance Management, DOE Headquarters.

FEDERAL CONTRACTORS AND FINANCIAL ASSISTANCE RECIPIENTS

● *BYRD AMENDMENT*

A provision commonly referred to as the Byrd Amendment (31 U.S.C. §1352) prohibits the use of Federal contract, grant, loan or cooperative agreement funds to pay any person for influencing or attempting to influence the executive or legislative branch with respect to certain specified actions. The specified actions include the following:

- awarding of a Federal contract;
- making of a Federal grant;
- making of a Federal loan;
- entering into a cooperative agreement; or
- the extension, continuation, renewal, amendment or modification of any of these.

Any person who requests or receives a Federal contract, grant, loan or cooperative agreement is required to file a certification that no payments prohibited by the Byrd amendment have been made using appropriated funds, and a declaration providing information with respect to any payments made using other than appropriated funds. Violations of the Byrd amendment may result in the imposition of civil penalties of $10,000 or more.

● *SIMPSON-CRAIG AMENDMENT*

Effective January 1, 1996, the so-called Simpson-Craig amendment to the Lobbying Disclosure Act (2 U.S.C. §1611) makes any organization that is tax-exempt under section 501(c)(4) of the Internal Revenue Code ineligible for federal funds through an award, grant, or loan if the organization engages in lobbying activities as defined in that Act. This provision is unique in that it prohibits all lobbying by an organization, rather than simply prohibiting lobbying supported by Federal funds. Lobbying is defined here to include, among other things, any communication to legislative branch officials on behalf of a client with regard to formulation, modification, or adoption of Federal legislation.

● *DOE NATIONAL SECURITY CONTRACTS*

Special restrictions apply to contracts in excess of $100,000 obligating funds appropriated for national security programs of the Department of Energy. The restrictions at 42 U.S.C. §7256a make statutorily unallowable any costs incurred to influence (directly or indirectly) legislative action on any matter pending before Congress or a State legislature.

● *CONTRACTS IN EXCESS OF $500,000*

The Federal Acquisition Streamlining Act (FASA) created special restrictions applicable to certain contracts, in excess of $500,000. Costs incurred under these contracts to influence (directly or indirectly) legislative action on any matter pending before Congress, a State legislature, or a legislative body of a political subdivision of a State are statutorily unallowable, 41 U.S.C. §256(c).

PURCHASE POWER AND WHEELING

Mr. Rogers. Last week, the Administration testified before the House Energy and Power Subcommittee that they are "willing to work with Congress" to rectify the problems created by the Administration's proposal to zero out funding for purchase power and transmission services for the PMAs. I am very concerned with this proposal because the Southeastern Power Administration, which services thousands of constituents in my own district in Kentucky, owns no transmission lines. This would create disruptions to the system, and it seems the decision was made without considering the potential impacts on customers. What does the Administration intend to do to address this problem?

Secretary Richardson. The Administration is not proposing to eliminate the ability of the PMAs to engage in wheeling or purchase power activities. Rather, we are attempting in a narrow, focused manner to correct an anomaly in the appropriations process. Services will continue to be performed -- only the mechanisms for financing will be modified.

The Administration also recognizes that the financing methods used to firm Federal hydropower and wheel it to end users must take into account the individual situations found at each PMA power system. Therefore, the Department is open to new ideas that provide a permanent solution for financing this activity without relying on scarce appropriations.

Mr. Rogers. It is my understanding that the PMAs recover these costs from their customers in the same year the costs are incurred. From a budget standpoint, isn't it true that eliminating purchase power and wheeling by the PMAs does not ease budget pressures? If so, then why did you propose this idea?

Secretary Richardson. There is no net savings to the Federal Government as a whole. Currently, all annual operation and maintenance expenses, including Purchased Power and Wheeling (PP&W) costs, are recovered annually through the cost-based power rates charged to customers. However, the revenue, goes directly to the U.S. Treasury. The resulting asymmetry creates a budget burden on the Department and an undesirable distortion in the overall budget system. As such, the appropriation requirement for PP&W competes directly with other Departmental programs for scarce appropriations, even though offsetting revenues are collected. The FY 2000 budget contains a new proposal to alleviate this burden. The proposal encourages the development of external, non-governmental financial intermediaries to handle the flow of funds from PMA customers to their purchase power suppliers, eliminating this anomaly.

Mr. Rogers. Do you feel that appropriated funds for these services will be needed after all?

Secretary Richardson. We do not believe that appropriated funds are needed to participate in purchase power or wheeling services. The new policy proposes to change the financing, but not the function, of the PMAs' purchase power and wheeling program by seeking an alternative to appropriations. However, in the event new financing arrangements cannot be achieved given curent time constraints, we will work with Congress to identify alternative solutions.

Mr. Rogers. Mr. Secretary, I would assume your old constituents in New Mexico are concerned about this as well. I've been told that Southwestern Power may only be able to provide half the hours annually to it's customers if they are unable to purchase additional wholesale power. Wouldn't this result in higher electric bills for some of these customers?

Secretary Richardson. The Southwestern Power Administration has contracts in place to provide 1200 hours of firm energy per kilowatt of Federal power purchased by its customers. These contracts are based on average rainfall and the ability to purchase power through alternative methods, such as net billing, energy banks, bill crediting, and reimbursable authority, if needed. Absent the ability to use these alternative methods to acquire energy, Southwestern would only be able to guarantee approximately 600 hours of firm energy per kilowatt of Federal power. However, the Administration recently clarified its policy regarding alternative financing methods that allows their continuance. This change will give Southwestern the ability to provide 1200 hours of firm energy. As long as power receipts are used, no increase in costs should occur for our customers.

INCREASE IN RENEWABLES BUDGET

Mr. Knollenberg. DOE is requesting a total of $398.9 million for its renewable energy programs in FY2K, an increase of $63 million over the FY99 level, almost a 19 percent increase. How will this investment contribute to the capability of the U.S. to meet the Kyoto Protocol emission reduction targets by 2008 when the Protocol budget period would begin?

Mr. Richardson. A critical part of the Department of Energy's mission is "to foster a secure and reliable energy system that is environmentally and economically sustainable." To accomplish this mission, we plan and request appropriations for an integrated and balanced portfolio of research, development, and demonstration (RD&D) activities that address the Nation's present and future energy supply, delivery and end-use needs. Within this portfolio, there are groups of technologies that address the Nation's needs in various time frames. This follows a history of energy technology development efforts. For example, 70 years of Federal efforts resulted in hydropower presently supplying about 10 percent of the Nation's electric needs. Similarly, about 45 years of Federal efforts resulted in nuclear power presently providing approximately 18 percent of the Nation's electric needs. So far, there has been about 20 years of Federal effort on the development of renewable energy systems, which has resulted in significant improvements in performance and substantial cost reductions. Sustaining these RD&D efforts will result in renewable energy(non-hydroelectric) becoming an increasingly important component of our Nation's secure and reliable energy supply, with projections of over 25,000 megawatts produced in 2010 and 46,000 megawatts in 2020. Likewise, the Department's sustained investments in fusion energy RD&D may well result in this source of energy being an important component of the Nation's energy supply in a signficantly longer time frame.

The Kyoto Protocol is a treaty that has not been submitted to the Senate for ratification. Thus the Department is not implementing the Kyoto Protocol. At the 1992 Earth Summit in Rio de Janeiro, Brazil, the U.S. joined more than 150 countries in signing the United Nations Framework Convention on Climate Change (UNFCCC). The ultimate objective of the UNFCCC is the stabilization of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous interference with the climate. The U.S. Senate ratified the UNFCCC and our programs are designed in part to help meet the objectives and goals of the UNFCCC.

Climate change is only one of five main drivers behind the Department's work in renewable energy. Just as important as climate change are the key drivers of economic competitiveness, national security, environmental quality, and electricity restructuring. Therefore, we believe that a focus on a single point in time, such as 2008 in the unratified Kyoto Protocol, as the dominant metric for annual RD&D funding decisions will not result in the integrated and balanced portfolio of technology development efforts that are needed to meet the Nation's sustained energy needs.

While the focus of our energy RD&D efforts is on addressing all five main drivers, the utilization of these technologies does mitigate the effects of energy on the global climate. The projected use of the renewable energy technologies in the U.S. alone will displace 30 million metric tons of carbon equivalent (MMTCE) in 2010 and 64 MMTCE in 2020. A larger amount of MMTCE will result from the utilization of U.S. manufactured renewable energy systems in other countries.

ELECTRICITY GENERATION UNDER KYOTO PROTOCOL ON CLIMATE CHANGE

Mr. Knollenberg. Today, non-hydro solar and renewable energy provides less than 3 percent of the nation's electricity. What percentage does the DOE anticipate these non-hydro solar and renewable energy sources will provide in 2008, the first year of the Kyoto Protocol budget period?

Secretary Richardson. Under the definitions used in the Administration's 1998 proposal for a Comprehensive Electricity Competition Act, the *Annual Energy Outlook 1999* (*AEO99*) *reference case*, prepared by the Energy Information Administration (EIA) projects non-hydro renewable energy generation equal to 3.1 percent of the nation's electricity sales in 2008. However, the *AEO99* reference case assumes only current laws and regulations and thus does not assume that most states will move to retail competition, nor does it assume the passage of Federal restructuring legislation that would include a renewable portfolio standard (RPS). Renewable portfolio standards as included in the Administration Electric Restructuring proposal and several other legislative proposals in the last Congress would significantly raise the amount of non-hydro renewable generation. For your information, the June 1998 Administration proposal set a standard for non-hydro renewable generation equal to 5.5 percent of retail electric sales by 2010, subject to a cost cap on the price of renewable energy.

Mr. Knollenberg. What percentage of our nation's electricity does DOE anticipate will be provided by each of the other energy sources in 2008? Please give a separate percentage for each of the following energy types: coal, hydro, natural gas, nuclear, petroleum.

Secretary Richardson. The *AEO99 reference case*, projects the following generation shares in the year 2008: 50.0 percent coal, 7.9 percent hydro, 24.7 percent natural gas, 13.7 percent nuclear, and 0.9 percent petroleum. As indicated in the previous answer, the *AEO99* does not assume that most states will have competitive retail markets by that time. The *Comprehensive Electricity Competition Act: Supporting Analysis* (July 1998), which assumes passage of the Federal electricity restructuring legislation and is based on an earlier version of the *Annual Energy Outlook*, projects the following generation shares in the year 2008: 53.7 percent coal, 8.0 percent hydro, 17.9 percent natural gas, 14.1 percent nuclear, and 0.7 percent petroleum.

Mr. Knollenberg. If the U.S. had to remove a significant portion of coal from the mix of electricity generation sources in order to comply with the Kyoto Protocol, what alternative sources would the Administration rely upon to replace coal and to sustain U.S. economic growth?

Secretary Richardson. The Department is fully supportive of coal-fired electricity generation, which presently supplies well over half of the electricity consumed in this country. The Energy Information Administration's latest *Annual Energy Outlook* projects continued growth in coal-fired generation well into the next Century. The supporting analysis conducted by the Department in June 1998 for the Administration's Comprehensive Electricity Competition Act, which does not include any cap on greenhouse gas emissions, shows the same trend.

With respect to the Kyoto Protocol, two points should be noted. First, the Protocol includes, largely at the insistence of the United States, flexibility mechanisms such as international emissions trading and the Clean Development Mechanism. The Administration's analysis of the Protocol, developed by the President's Council of Economic Advisers, projects that use of these mechanisms would substantially reduce the amount of emissions reductions that must be achieved within U.S. borders while greatly reducing the costs of meeting the environmental goals. Numerous other analyses come to the same conclusion.

Second, the Department believes that it makes sense to spread any emissions reductions across a wide variety of sectors, through such measures as developing and deploying more fuel-efficient cars, increased competition in the electricity generation market, and increased energy efficiency in industry, and residential and commercial buildings. Reducing emissions in these ways will reduce pressures to switch away from coal in the electricity supply mix.

Mr. Knollenberg. Has DOE analyzed the potential cost of replacing coal with alternative generation sources? If yes, what were DOE findings?

Secretary Richardson. The Department has not undertaken a specific analysis of the potential cost of replacing coal with alternative generation sources. Any such analysis would have to consider, among other factors, the amount of coal-fired generation that would be replaced and the type of replacement generation, as well as impacts on the price of coal and other fuels.

Mr. Knollenberg. How much would it cost the average family of four today to purchase, operate and maintain a solar unit that could provide all of the residential electricity they needed?

Secretary Richardson. The answer depends on many assumptions that are not specified in the question. For example, the costs of solar power would vary according to the region of the country where the hypothetical family is located, whether the family maintains a backup connection to the electric power distribution system and whether the family is assumed to make cost-effective energy-efficiency investments that would reduce their overall electricity demand. However, except in very specific niche markets, the costs of on-site electric generation from solar energy using today's technology would be significantly higher than the cost of electricity purchased from conventional sources. Moreover, ongoing technology R&D is expected to continue to decrease the costs of these systems.

Mr. Knollenberg. How does that compare on a per annum basis with their current electricity bill?

Secretary Richardson. In 1993, the most recent year for which Residential Energy Consumption Survey (RECS) data is available, the average electricity expenditure for a four-person household was $1,036. Clearly, a decision to rely exclusively on on-site solar generated electricity using today's technologies to meet existing demand in its entirety would be an expensive proposition. At present household solar electricity systems are only economic in limited applications. DOE is working aggressively to decrease the costs of such systems

Mr. Knollenberg. How much money would they be losing through premature retirement of utility generation assets that they already paid for in their rates?.

Secretary Richardson. As electricity markets are increasingly driven by market forces rather than regulation at both the wholesale and retail levels, the balance between supply and demand, rather than the historical costs of past investments that enter into regulated electricity rates, will determine electricity prices. In general, past investment costs will have little or no role in setting electricity prices in competitive markets. The trend toward more competitive electricity markets is ongoing and independent of steps to limit greenhouse gas emissions.

RENEWABLE ENERGY COSTS TO BE COMPETITIVE

Mr. Knollenberg. When do you expect renewable costs to become competitive?

Mr. Richardson. The timing of competitive market entry for renewables depends upon both the specific technology and the specific application. Cost-competitive applications of renewable energy technologies are already entering the domestic marketplace -- primarily in niche applications and remote locations. For example, today's new portable road signs, electronic road survey systems, and emergency call boxes are generally powered by photovoltaics. Wind and PV power systems are also becoming the desirable alternative to diesel generators for remote power needs in areas ranging from isolated Alaskan villages to ranches and tribal lands in the Southwest to New England ski areas. The geothermal power generation system at The Geysers has provided competitively-priced baseload electricity for a number of years, and geothermal heat pumps are meeting the needs of homes, businesses, and schools around the country. By the middle of the next decade, research on solar hot water systems -- which are already competitive in many parts of the South and Southwestern U.S. -- will lead to less expensive, lighter and more durable systems with a thermal equivalent of $0.04 per kWh and an estimated increase in market penetration of 500 percent. With a few more years research, wind energy and biomass power systems will be poised to compete with fossil fuels in many regions of the country (in the 2005 - 2010 timeframe). Finally, while applications of photovoltaics are entering an ever-growing number of markets, market penetration should dramatically accelerate in the 2010 - 2020 timeframe when the estimated costs of power from PV systems are expected to drop from today's $0.18 to $0.25 per kWh to about $0.10 per kWh by 2010, trending even lower to $0.06 per kWh before 2020. Finally, we are working to reduce the environmental impacts of power production from hydropower so that we can maintain and enhance hydropower generation capacity (hydropower produces about 10 percent of our Nation's electricity today).

We have made tremendous strides in developing clean and reliable renewable energy technologies for the Nation since our programs began in the-mid-to late 1970s, and cost-effective market penetration is growing rapidly overseas. However, market penetration here in the U.S. -- where the cost of electricity is generally much lower – is growing more slowly. This is not necessarily a detriment, however. These overseas sales enable U.S. companies to build up and strengthen their industrial base. The data and on-the-ground experience gained from these installations also helps identify opportunities for technology improvements and future R&D.

Here in the United States, where the competitive revolution in the power generation sector has led to even further decreases in the price of power from new sources of generation, market penetration of renewable energy technologies is occurring more quickly in remote locations. We are working closely with our laboratories, industry partners, the electric power industry and others to ensure that the technologies we are working on today are focused on marketplace needs and will provide cost-competitive energy supply options.

Our programs are accomplishing this through a number of mechanisms, such as aggressive pursuit of the integration of renewables with fossil fuels and the development of modular systems. Hybrid renewable/fossil energy power systems will accelerate cost-effective market penetration of these

technologies, reduce environmental impacts of energy production, accelerate the deployment of distributed power systems that boost system reliability. Our renewable programs are also developing modular systems that can be scaled to need and installed in increments. These include both hybridized and "stand-alone" renewable technologies.

Still, renewable energy is already making market inroads in many states. For example, the world's largest wind installation is now being constructed in Iowa; there are major new commitments to solar energy in at least 15 states ranging from Massachusetts to Illinois to Arizona; advanced biomass power plants are being demonstrated in states such as New York, Ohio, Minnesota, Vermont and Indiana; and tens of thousands of new geothermal heat pumps in homes, businesses, schools and Federal installations in states as diverse as Indiana, New Jersey, Kentucky, South Dakota, Oklahoma, and Texas.

As you are aware, twenty years ago renewable energy was generally produced at a very high cost and in an inefficient manner. Since then, we have driven down costs and greatly improved technology performance, establishing a firm foundation for major technological and market success of renewables in the coming years. I would like to illustrate just how far we have come using the photovoltaics and wind energy programs as examples.

Wind: In 1980, the cost of electric power from wind turbines in 1980 ranged from $0.30 - $0.40 per kilowatt-hour (kWh). Through aggressive R&D by EERE and its industry partners on wind turbine aerodynamics, materials development and computer-aided design, we have been able to reduce the costs to between $0.04 and $0.06 per kWh. At this price, wind systems are entering the marketplace, expanding from the early California windfarms to States ranging from Vermont to Alaska, and from Minnesota to Texas. Wind energy systems are also poised to expand into other Great Plains and Northeastern locations, such as upstate Oklahoma, Wisconsin the Dakotas, Maine, and New York. We are also working on Next Generation Turbines to reduce the cost of electricity from wind even further -- to as low as 2 ½ cents per kWh by 2002. This cost will enable wind to compete in many regions of the U.S.

Photovoltaics: The first commercially-available photovoltaic (PV) systems in the early 1980s produced power at a cost of more than $1.00 per kWh. By FY 2000, PV systems will be delivering electricity for as low $0.12 - $0.20 per kWh -- depending upon the specific technology -- making clean, reliable PV systems competitive in many remote and on-grid sites here in the U.S. and around the globe. Improved materials manufacturing techniques and energy conversion improvements -- most supported by DOE and its laboratories -- have made these cost reductions possible and have facilitated the resurgence of the U.S. PV industry as the world's leader in this $1.2 billion global industry, which grew 95 percent between 1995 and 1998. With large manufacturing plants in Virginia, Maryland, California, Michigan, Delaware and Massachusetts, the solar industry is a growing part of the U.S. economy.

NUCLEAR ENERGY PLANT OPTIMIZATION (NEPO) PROGRAM

Mr. Knollenberg. What funding level was recommended for the NEPO program in the PCAST report?

Mr. Magwood. The PCAST report, "Federal Energy Research and Development for the Challenges of the Twenty-First Century" November 1997, recommended that the Department fund research on "operating reactors" at the level of $10 million per year, to be matched by industry.

The exact language of the PCAST report (page 5-13) is as follows:

> "The Panel recommends that DOE work with its laboratories and the utility industry to develop the specifics of an R&D program to address the problems that may prevent continued operation of current plants, and to fund such a program at $10 million per year, to be matched by industry."

The Department followed the recommendation of PCAST and developed, jointly with the Electric Power Research Institute (EPRI) and national laboratories, the "Joint DOE-EPRI Strategic Research and Development Plant to Optimize U.S. Nuclear Power Plants." This document forms the foundation for the FY 1999 budget request of $10 million for the "Nuclear Energy Plant Optimization" (NEPO) program. Congress did not approve FY 1999 funding for NEPO. The Administration, however, requested NEPO funding again in the FY 2000 budget request, though at a reduced funding request of $5 million.

KYOTO PROTOCOL

Mr. Knollenberg. Will efficiency, conservation, and improved technology be enough to meet the U.S. emission targets in the Kyoto Protocol and ensure an adequate electricity supply if EIA prognostications come true and nuclear power virtually disappears by 2020?

Secretary Richardson. Before addressing the implications of the "what if" scenario posed in the question, it is important to reiterate that the Department is strongly committed to a continued important role for nuclear energy in our electricity supply mix. The EIA AE099 reference case projects that power generation from nuclear will be about 8 percent of total generation in 2020. It assumes that no new policies will be implemented between now and 2020. Notably, our proposed budget for fiscal year 2000 includes funds for an initiative designed to facilitate life extension and re-licensing of existing nuclear plants. With life extension, nuclear energy can play an important role well beyond the 2020 date referenced in the question.

The Kyoto Protocol includes, largely at the insistence of the United States, flexibility mechanisms such as international emissions trading and the Clean Development Mechanism. The Clean Development Mechanism (CDM) is designed to encourage the use of energy efficient technologies and renewable technologies by developing countries. Under the CDM, developing countries can receive certified emission reductions (CER) for adoption of improved technologies compared to a pre-determined baseline technology. These CERs can be traded in the international market as permits. The Administration's analysis of the Protocol, developed by the President's Council of Economic Advisers, projects that use of these mechanisms can substantially reduce the amount of emission reduction that must be achieved within U.S. borders while greatly reducing the costs of meeting our environmental goals. Given the availability of these flexibility mechanisms, the actual amount of emissions reduction within U.S. borders needed to meet the Kyoto Protocol targets is likely to be only a fraction of the "gap" between projections of "business-as-usual" and the target level specified in the Protocol. Recognizing this, conservation, efficiency, and improved technologies can be expected to play a very important role in the 2020 timeframe identified in your question and the electricity industry will have the capability to ensure adequate supply of electricity in the US , although the specific roles of each of these elements, and of the Kyoto flexibility mechanisms, is inherently uncertain.

Meeting emission targets under the Kyoto Protocol without nuclear power would clearly increase the need to use flexibility mechanisms and/or carbon reduction opportunities in end-use sectors such as residential, commercial, industrial, and transportation. In the transportation sector, motorists may be driving vehicles with fuel efficiency far greater than 80 miles per gallon if research and development efforts are successful. Telecommuting may also reduce demand for transportation fuels. In the buildings sector, computer-controlled devices and more advanced heating and cooling technologies could also come into play. Adoption of new technologies in the market, however, will depend on the cost of these technologies, fuel prices, and consumer preferences regarding product attributes as well as their efficiency.

The research, development, and outreach efforts conducted by this Department are expected to improve the probability of successful development of new technologies and their eventual market penetration. The likelihood of success will be enhanced by a long-term commitment that includes consistent financial support.

FLEET AUTOMOBILES

Mr. Knollenberg. How many total automobiles does the DOE have in their fleet?

Mr. Farrell. The Department, including both Federal and contractor sites, has a total of 1,970 automobiles (sedans and station wagons) in its fleet.

ALTERNATIVE FUEL AUTOMOBILES

Mr. Knollenberg. How many alternative fuel automobiles does DOE have in their fleet and what types of fuel do these vehicles use to operate?

Mr. Farrell. The Department, including both Federal and contractor sites, has a total of 224 alternative fuel automobiles (sedans) in its fleet at the end of FY 1998. The types of alternative fuels used include natural gas, ethanol, propane, and electricity and are used approximately 65% of the time to operate the vehicles.

ADEQUACY OF Y2K FUNDING

Mr. Knollenberg. Although I am pleased to see support for the accelerated closure of Rocky Flats, I am concerned that there have been some additions to the scope of work that must be accommodated. With the goal of keeping acceleration on track, can you please comment on the adequacy of the Y2K funding in light of the changes to the scope of work.

Secretary Richardson. Rocky Flats has made dramatic improvement in its preparations for the Y2K change. This is part of the work that the Site must accomplish to keep safety, health, security and other computer-based systems continuing to work properly into the new century while proceeding with site closure activities. To accomplish this effort, Rocky Flats has had to accelerate into FY 1999 some of the Y2K work originally scheduled for FY 2000. Funding has been identified for the systems that would be affected the earliest, and the site has defined its funding needs for the remaining systems. Those funding needs are still under review by the Department. The Department does not expect that the acceleration of these Y2K compliance activities will impact the site's closure schedule.

HIGH FLUX BEAM REACTOR

Mr. Forbes. Mr. Secretary, thank you for appearing here today, and it's good to see you again. I thank you for being a champion of the excellent work being conducted at Brookhaven National Lab. During our time together in the House of Representatives in 1995 and 1996 I admired your outstanding leadership in protecting America's environment as a member of the House Committee on Resources.

As you know, this is a critical time for Brookhaven Lab, as we endeavor to resolve the problems of the past, while expanding the Lab's multi-disciplinary scientific mission and securing its position into the future as one of America's premier research institutions. I have long been critical of the Lab's past environmental transgressions, nonetheless I continue to advocate increased Federal research dollars for BNL so that the facility remains a major Long Island employer. In that spirit I have a few important questions:

The environmental, health and safety concerns of Long Islanders are my top priority, and this is the reason your decision on the fate of the High Flux Beam Nuclear Reactor (HFBR) at Brookhaven National Laboratory (BNL) is an issue of paramount importance to me. In fact, I thank you for agreeing to my request to extend from 45 to 90 days to comment period for the Environmental Impact Statement (EIS) on the HFBR and take this opportunity to implore you - one more time - to keep the HFBR from reopening.

On November 13, 1998, the Government Accounting Office issued a 45-page analysis of events surrounding a radioactive tritium leak from the High Flux Beam (HFBR) nuclear reactor at BNL and the resulting termination of Associated Universities as the contractor at BNL. The report found that poor oversight by DOE officials and inattention to environmental issues provided for working conditions that allowed radioactive tritium to leak undetected for possibly 12 years. On February 23, 1999 the Nuclear Regulatory Commission (NRC) released its evaluation of HFBR safety procedures and programs. The report found several instances of non-compliance with DOE and BNL's requirements including: failure to place low-level contaminated material in a radioactive material storage area; radiation postings not updated in a timely manner; two instances of incomplete corrective actions; several late or missed reviews or audits; and a failure to inform a manager of radiation survey reductions.

In July of 1997 EPA investigators released a report on BNL, citing it for "sloppy housekeeping" and lax safety procedures, including those at the HFBR. As a result of this investigation BNL was fined $80,000 in March 1998.

How can we tell whether it is possible for workers at BNL to operate the HFBR safely?

Secretary Richardson. The High Flux Beam Reactor has been undergoing intensive reviews to answer this question. The Department will use the results of several reviews before making a decision with respect to the operation of the High Flux Beam Reactor – reviews by a respected nuclear power operator, Duke Power; a full Environmental Impact Statement; and the review by the Nuclear Regulatory Commission. No facility in the Department will be operated if it cannot be operated safely.

Mr. Forbes. Since you took the helm at the Energy Department, the date for the Secretary's decision on the fate of the HFBR has twice been delayed, first to August 1999 and then to December 1999, nearly two years from the original decision deadline of January 1998 set by your predecessor Federico Pena.

Mr. Secretary, when will you make your decision on the fate of the High Flux Beam Nuclear Reactor at Brookhaven National Laboratory?

Secretary Richardson. During the Environmental Impact Statement (EIS) scoping process a year ago, the community requested that the Department expand analysis of the reactor's potential environmental impacts. To ensure that a comprehensive review is conducted, the Department has taken additional time for analysis and evaluation. The scheduled activities have been delayed to address issues of importance to the environmental health and safety of Long Island. The Draft EIS is now scheduled for public comment from April 1999 through mid-July 1999, and the Final EIS is expected to be published in November 1999. The change in schedule for the Draft EIS and Final EIS caused the delay in the Record of Decision which is to be issued no earlier than December 1999.

Currently, there is no preferred alternative in the EIS. If for any reason the Department decides on a preferred alternative at any time during the EIS process, the Department will inform the public immediately.

The High Flux Beam Reactor decision will also involve other factors including cost, timeliness, and the impact of the High Flux Beam Reactor on neutron science. Currently we are making significant investments in neutron science. These investments will be taken into account when we consider the future of the High Flux Beam Reactor.

BROOKHAVEN NATIONAL LABORATORY ENVIRONMENTAL CLEANUP

Mr. Forbes. I know you share my sense of urgency about the expeditious cleanup of BNL and appreciate its importance to both my constituents and to the future of the lab. In fact, I take this opportunity to thank you personally for ensuring that the Administration's Fiscal Year 2000 budget submission for Brookhaven National Lab's environmental cleanup budget was $29.5 million, $3.7 million higher than last year's request.

Last Congress, this Committee provided an additional $5.7 million to bring Brookhaven National Lab's environmental cleanup budget to a total of $30 million. I am aware, however, that the additional money has not yet been released to Brookhaven.

Please inform this committee when the money will be released to the lab, and what are the Department's specific plans are for this cleanup money?

Secretary Richardson. We are using the $5.7 million for several actions in FY 1999 to continue progress on Brookhaven cleanup. Approximately $0.8 million will be used for low-level waste disposal; $1.2 million will be used to continue disposal of legacy waste at the old hazardous waste management facility; $3.2 million will be used for planning and accelerated cleanup of the Brookhaven Graphite Research Reactor (BGRR); with the remainder, $0.5million, supporting several small cleanup activities. Approximately $3.7 million of the funding has been released to the Laboratory and is being used for these activities. The rest of the funds (approximately $2 million) were temporarily withheld while a memorandum of understanding (MOU) between the Offices of Environmental Management and Science was developed delineating the responsibilities of the two Offices. The MOU was recently completed, and the additional funding will be released to the Laboratory by the end of March 1999.

RELATIVISTIC HEAVY ION COLLIDER (RHIC) AT BNL

Mr. Forbes. Throughout my tenure in Congress I have worked diligently to secure and safeguard the funds necessary for the completion and operation of RHIC. In Fiscal Year 1999, RHIC received $16.6 million to complete construction. The Administration's Fiscal Year 2000 budget request contains $118 million for operation of RHIC and the use of the Alternating Gradient Synchrotron as RHIC's particle injector. Scientists worldwide will use this 2.5 mile particle accelerator to study subatomic particles and origins of the universe.

In your testimony you mentioned that the Relativistic Heavy Ion Collider (RHIC) at BNL will be coming on line in Fiscal FY 1999. While funding for construction and operation of RHIC have been consistent, what are DOE's future plans for full funding of the research budget - the budget for actually doing the experiments - at RHIC?

Secretary Richardson. The Department has given high priority to RHIC experiments in the formulation of the FY 2000 budget, consistent with recommendations from our scientific advisory committees. We recognize that a significant investment has been made by the nation and it is our intention to provide the resources needed to effectively exploit the scientific capabilities of this unique world class facility.

Mr. Forbes. You also mentioned the Bates Laboratory at MIT - originally slated for closure in the DOE budget, will now be funded. Will it be funded from the Nuclear Physics budget? If so, will this impact the RHIC budget?

Secretary Richardson. The Administration is currently in the process of considering an Amended Budget Request to provide sufficient funds to allow for continued operations of Bates. The details of the Amended Budget Request have not yet been finalized. It is not anticipated that the RHIC budget will be impacted.

DOE CANCER RESEARCH

Mr. Forbes. With the end of the Cold War, the defense mission of our national labs are waning. You may agree that many of the skills and technology built up during that era are useful - particularly when the labs can draw upon the expertise from institutions nearby - in attacking cancer. In fact, last year this committee provided $2 million for The Cancer Institute for Long Island, a joint project between Brookhaven National Lab and Stony Brook University, to create a comprehensive cancer institute, with a multi-disciplinary approach to basic and clinical research, and detection of cancer. The Cancer Institute of Long Island at Stonybrook will also develop new diagnostics and therapies.

What role do you see for DOE to be addressing significant medical issues, such as cancer?

Secretary Richardson. The dramatic advancements made in nuclear medicine, a medical speciality of radionuclide diagnosis and therapy, during the second half of this century are in large part because the Department of Energy (DOE) and its predecessors had the foresight to use its infrastructure and expertise to develop applications for treatment and diagnosis of devastating illnesses such as cancer, heart ailments, and brain function diseases and disorders.

The Office of Science's (SC) Biological and Environmental Research (BER) program is responsible for supporting, among many nuclear medicine projects including radiopharmaceutical and medical imaging instrumentation advances, the long standing program in positron emission tomography (PET) and radiotracers that are used in PET scanning procedures.

The PET scanning represents a major advance in the diagnosis and staging of important clinical cancers. PET radiotracer imaging reveals metastatic disease that other imaging techniques simply can not detect, helps diagnose cancer and guides physicians to the most beneficial therapies. DOE's BER program is supporting technology development for bringing together in synergy the powers of PET and magnetic resonance imaging (MRI) to allow solving complex diagnostic problems with improved confidence. For example, in case of a brain tumor in a patient, MRI can pin point the location and size of the tumor. PET can provide crucially important information - if the tumor is benign or malignant, if it is dead or alive after surgery, what should be the therapeutic treatment dose, and if the treatment is working.

The BER program is also supporting the use of the new molecular nuclear medicine techniques to bring the recent advancements in the molecular biology and human genome programs to bear upon radiotracer imaging for developing new biological imaging and radiobiological therapy technologies for early detection and highly selective treatment of cancer. The BER program is presently responsible for supporting the development of boron neutron capture therapy (BNCT), a new unique procedure for the treatment of inoperable brain tumors.

Furthermore, DOE's Office of Nuclear Energy, Science and Technology (NE) is responsible for developing, producing, and delivering hundreds of types of stable and radioactive isotopes for research, industrial applications, and use in nuclear medicine research and clinical practice, including cancer. NE operates and upgrades the production facilities at reactors, accelerators,

and hot cells across the complex to meet the critical needs of the DOE's radioisotope production and distribution program. DOE funded development of yttrium-90, a promising new isotope for treatment of a number of cancers. With development of an ultra-pure form of yttrium-90 in 1999, DOE entered into an agreement with a private sector entity to bring this promising isotope to the market. For fiscal year 2000, within NE, DOE proposes to launch a new program, the Advanced Nuclear Medicine Initiative to apply DOE's unique expertise and capabilities in isotopes to advance nuclear medicine technology. This initiative will sponsor scholarships and fellowships in nuclear medicine at universities and colleges and will fund peer-reviewed research, including the use of DOE's large inventory of alpha emitting isotopes to fight a spectrum of illnesses, including various types of cancer.

The Brookhaven National Laboratory (BNL) has been and continues to be an important partner with DOE in meeting its mission needs in the area of cancer diagnosis and treatment through our continued support for radioisotope production, radiopharmaceutical development, and evaluation of new medical technologies for potential clinical use in humans. The two most important nuclear medicine diagnosis technologies, a technetium-99m generator that is now used in approximately 35,000 clinical procedures each day, and fluorine-18-fluorodeoxy-glucose (FDG, a radiolabeled form of glucose) are the workhorse of PET for cancer diagnosis. Both were developed through BER program support at BNL. DOE continues to be committed to maintaining the BNL program as the world-premier-institution in nuclear medicine.

WORKER RE-TRAINING - PAPER, ALLIED-INDUSTRIAL AND ENERGY INTERNATIONAL UNION

Mr. Forbes. Section 3161 of the "National Defense Authorization Act for FY 1993" (P.L. 102-484) established within the Department of Energy the Office of Worker and Community Transition. The mission of the Office is to assist in the restructuring of the work force at a defense nuclear facility after a determination is made that a change in the work force (ie. Downsizing or RIFs) at the facility is necessary. It establishes several objectives to guide work force restructuring plans, including advance notice, retraining, options to minimize layoffs, education, relocation assistance and preference in hiring.

Section 3163 P.L. 102-484 defines a "Department of Energy Defense Nuclear Facility." The Section outlines specific sites for inclusion or exclusion under the definition but is ambiguous for Brookhaven. In 1993, when the Department of Energy developed a list of Defense Nuclear Facilities for purposes of section 3161, a determination was made to include all facilities not expressly excluded under section 3163 that received funding for Atomic Energy Defense Activities; this includes Brookhaven.

Brookhaven was removed from the list of Defense Nuclear Facilities in 1997 at the request of Cherri Langenfeld, Director of DOE's Chicago Operations Office. No notice was given to my office, or to my understanding the workers at Brookhaven.

I understand that representatives of the Paper, Allied-Industrial and Energy International Union, who represent nuclear facility workers at BNL, met with you last night to discuss their concerns at Brookhaven Lab. I have met with them as well and understand their concern over being denied benefits - such as retraining, education, relocation assistance and preference in hiring - afforded to other employees of facilities effected by defense cutbacks. Receipt of Defense Programs funding in past years for defense related research, is all that is required to qualify these sites for inclusion under this program.

Given that BNL qualifies for coverage under this important program, would you be willing to re-consider this past decision and report back to this committee on your findings?

Mr. DeGrasse. Yes. In fact, the Office of Worker and Community Transition is coordinating a reconsideration of the decision to remove the Brookhaven and Argonne National Laboratories from the list of defense nuclear facilities under section 3163. I will report back to this committee on our findings.

PRIVATIZATION OF NUCLEAR DEACTIVATION PROJECTS

Mr. Forbes. On February 10, 1999, Water Mill, Long Island resident and former DOE employee, Tip Brolin visited me and I understand that he has written you Secretary Richardson and met with your Environmental Management (EM) staff about an interesting proposal he has developed.

The Department of Energy spends hundreds of millions of dollars per year maintaining safety systems at surplus Defense nuclear facilities to ensure that the public and its workers are protected against the radioactive and hazardous materials in these facilities. If the bulk of this material were removed, i.e., the facilities were "deactivated", the cost of maintaining these facilities could safely be reduced by 90% or more, potentially saving large amounts over the long term. The proposal would enable the Department, through legislation, to contract with the private sector for facility deactivation as follows:

1. Department contracts on a competitive, fixed-price basis with private contractor
2. Contractor obtains funding for deactivation from the private sector
3. Department pays contractor from annual savings resulting from deactivation (takes about 3 years; no government funds obligated until payment due to contractor)
4. All payments come from savings in maintenance costs; no increase in annual budget.

Precedent exists for this approach. Through "shared energy savings" contracts the Department is presently authorized to contract for privately-financed energy-saving projects and pay the contractor from energy savings resulting from the projects. As you know, a proposal for the private financing of DOE cleanup sites was presented to DOE's Office of Environmental Management last December. Private financing has the potential to both save taxpayers dollars and expedite cleanup activities.

Where does this proposal stand and to what extent can DOE act on this proposal?

Mr. Secretary. Yes, we received this letter and responded to him last January. It is an interesting idea. As you know the Department of Energy spends hundreds of millions of dollars per year maintaining safety systems at surplus Defense nuclear facilities to ensure that the public and its workers are protected against the radioactive and hazardous materials in these facilities. If the bulk of this material were removed, i.e. the facilities were "deactivated," the cost of maintaining these facilities could safely be reduced by 90% or more, potentially saving large amounts over the long term. The proposal forwarded by Ms. Brolin would enable the Department, through legislation, to contract with the private sector for facility deactivation as follows:

1. The Department would contract on a competitive, fixed-price basis with private contractor
2. The contractor would obtain funding for deactivation from the private sector
3. Department pays contractor from annual savings resulting from deactivation (takes about 3 years; no government funds would be obligated until payment was due to the contractor)
4. All payments would come from savings in maintenance costs with no increase in the Department's annual budget.

Precedent exists for this approach. Through "shared energy savings" contracts the Department is presently authorized to contract for privately-financed energy-saving projects and pay the contractor from energy savings resulting from the projects. As you know, a proposal for the private financing of DOE cleanup sites was presented to DOE's Office of Environmental Management last December. Private financing has the potential to both save taxpayer dollars and expedite cleanup activities.

We responded to Mr. Brolin's letter last January stating that we find value in the "shared energy saving" contract concept based on its potential ability to reduce out-year costs and accelerate cleanup. We will be examining this proposal more closely. The Environmental Management program has actively pursued privatization proposals over the last several years and has had considerable administration and Congressional support for these concepts. Currently, we are supporting the continuation of existing privatization projects. We are not proposing any new projects in the FY 2000 budget until further progress is achieved with existing projects. In the interim, we will continue to explore this concept as well as others that have the potential for accelerating our cleanup work within existing financial constraints.

DECOMMISSIONING ACTIVITIES

Mr. Frelinghuysen. Could you provide for the record a list of other decommissioning activities done at DOE where the funding was carried in the program account? Include, please the activity and the costs associated with the activity.

Dr. Telson. Several years ago, when the Department created the Environmental Management program, that program was assigned responsibility for decontamination and decommissioning (D&D) for the existing backlog of facilities no longer needed. Many of these old buildings and sites were legacy facilities from programs long completed, and there were no natural links to existing programs. More recently, however, to make the Department's programs more sensitive to the full life cycle costs associated with their facilities and experiments, the Department is encouraging programs to fund D&D activities within program accounts. For example, in the FY 2000 Science program request for Fusion there is $10 million for decommissioning of the TFTR machine at Princeton Plasma Physics Laboratory. Following are other recent examples of DOE programs that are budgeting for the D&D costs of their facilities.

The Naval Reactors program is continuing inactivation efforts of 6 of 8 prototype reactor plants at three sites. In FY 2000, they are planning to eliminate surplus facilities, remediate and dismantle plant facilities and release applicable areas at their sites in Windsor, Connecticut for $7.0 million; at Kesselring, New York for $19.4 million, and in Idaho for $17.0 million. In each of the past three years, Congress has added to the President's budget request for inactivation efforts in the Naval Reactors program while cutting funds for projects in the Environmental Management program.

Defense Programs has several Management and Operating contractors conducting D& D activities as part of their site facilities management responsibilities. At Sandia National Laboratory, the Stockpile Stewardship Remediation Project supports decontamination, decommissioning, demolition and /or the reuse of existing facilities and buildings. The FY 1999 funding estimate is approximately $0.6 million. At the Y-12 Plant in Oak Ridge, the Building 9206 Deactivation project supports ongoing efforts to deactivate Building 9206 and transfer operations to Building 9212. The FY1999 funding estimate is approximately $3.2 million.

TOKAMAK FUSION TEST REACTOR

Mr. Frelinghuysen. Are you committed to the prompt decommissioning and decontamination of the TFTR device at Princeton?

Secretary Richardson. Yes, we have already begun preparations for this activity that, contingent on approval of the FY 2000 request, will start in October 1999. DOE, in consultation with the Princeton Plasma Physics Laboratory, developed a plan with two options for completing the TFTR Decontamination and Decommissioning (D&D) project. The first option would be to complete the D&D in 3 years at a cost of $59 million. The second option would be to complete it in 5 years at a cost of $72.2 million.

Given the lower costs and faster schedule, the Department has decided to pursue the 3-year option, assuming sufficient funds are available in the following 2 years, and is requesting $13.6 million (which includes $3.6 million annual maintenance and storage costs) in the FY 2000 budget to start the project.

FUSION ENERGY SCIENCES

Mr. Frelinghuysen. Secretary Richardson, the fusion community leadership, including both magnetic and inertial fusion, has developed a portfolio-based roadmap for their research which has been presented to the Department. Do you support this roadmap?

Secretary Richardson. We're pleased that the community leadership is working together. However, we have just launched a fusion task force under the Secretary of Energy Advisory Board to carry out a comprehensive review of the Department's fusion programs at the request of Congress. It would be premature to reach a judgment with regard to the community roadmap in advance of that review.

SCIENTIFIC SIMULATION INITIATIVE

Mr. Frelinghuysen. The fusion energy sciences program pioneered the concept of nationally networked supercomputers for scientific simulation. Do you anticipate this program will have a leading role in the DOE Scientific Simulation Initiative?

Secretary Richardson. The Fusion Energy Sciences program has a long history of enthusiastic support for advanced scientific simulation. The program clearly will require a greatly enhanced simulation capability to make optimum use of new, innovative national experiments and to collaborate effectively on major foreign facilities. At present, fusion is one of the basic science areas that are being considered for inclusion in the DOE Scientific Simulation Initiative (SSI). All of these areas could make good use of advanced scientific simulation capabilities; however, only two areas (combustion and global systems) will be selected for initial participation in the SSI on the basis of scientific peer review. Because of its long and successful history of using supercomputers, the fusion program is likely to be a strong competitor in this initial review.

Mr. Frelinghuysen. If so, how do you picture this role?

Secretary Richardson. The basic science programs that are selected will work closely with the global systems and combustion groups to make maximum use of the computer software and enabling technology developed as part of the SSI.

TOKAMAK FUSION TEST REACTOR

Mr. Frelinghuysen. Getting back to decommissioning of the TFTR for a minute, since the fusion program is level funded at $232 million which includes funds for the decommissioning activity of TFTR, some have argued that other elements of the fusion program have been reduced to make room for this decommissioning activity. Do you feel that other elements of the program have been compromised to make room for the decommissioning activities, a task that must be starting this year?

Secretary Richardson. The level of funding for fusion is being maintained constant at the FY 1999 level of $222.6 million. Because Congress directed us to reduce funding for the International Thermonuclear Experimental Reactor in FY 1999, we are able to use those funds in FY 2000 to support other high priority needs such as TFTR decontamination and decommissioning.

TRITIUM PRODUCTION

Mr. Frelinghuysen. Turning to the START II ratification, if the Russian Duma ratifies START II do we need to build a new production facility for tritium or can this proposal be put on hold?

Dr. Reis. No, even if START II is ratified, the U.S. will need a tritium production capability. A START I sized nuclear stockpile requires new tritium production by 2005. Last December, Secretary Richardson announced his decision that the Tennessee Valley Authority's Watts Bar and Sequoyah reactors represented the Department's preferred alternative for tritium production. This option has the flexibility to meet our present and future tritium needs. If our goal of reaching further arms reduction agreements is realized, the timing for new tritium production will be adjusted accordingly.

MERCURY EMISSIONS CONTROL TECHNOLOGY

Mr. Frelinghuysen. Finally, Mr. Secretary, I don't want to take a lot of time here today, and will submit some detailed questions for the record, but I just wanted to make a quick comment about one element of your agency's fossil energy budget. As you know, the EPA is facing a mid-year 2000 decision on whether, and how, to regulate emissions of mercury from coal-fired electric generating plants. Yet, as I look at your budget, you are still only supporting essentially table top R&D work in this area. It seems to me that we need to be looking at a couple of larger projects that will allow us to demonstrate the commercial application of some of the work you've already done, if we are going to give your sister agency some good data, I have a number of questions for the record on this topic and would appreciate you providing me with the Department's responses. What are the Department's research priorities in the area of air toxic emissions control? Specifically, what is the state of research into mercury emissions control technology?

Mr. Kripowicz. The number one priority is mercury, all chemical forms including elemental and oxidized. Arsenic and chromium, and other potentially toxic trace metals enriched in and on fine particles (fly ash less than 2.5 microns in diameter) also have a high priority.

The Department has developed accurate methods to measure specific forms of mercury in flue gases, investigated the transformation of mercury in coal combustors, and evaluated numerous sorbents for mercury control at the laboratory- and bench-scale. Pilot-scale testing of the most promising mercury control scenarios is being completed. The testing has focused on augmenting existing air pollution control devices to include mercury control. Results from the bench- and pilot scale tests provided more definitive mercury control cost data, which was incorporated into EPA's Mercury Report to Congress.

Mr. Frelinghuysen. Are there any promising technologies for controlling mercury emissions? In what stage of development are they?

Mr. Kripowicz. Yes. Injection of activated carbon in conjunction with conventional particulate control devices, electrostatic precipitators (ESP) or fabric filters, accompanied by flue gas cooling shows considerable technical promise, but is costly. There are several other promising technologies for controlling mercury in coal combustion flue gases. The mercury removal capabilities of several novel particulate control techniques that work in combination with existing particulate control equipment are being investigated. Also, the oxidized form of mercury is readily removed in wet flue gas desulfurization (WFGD) systems. Novel techniques to convert elemental mercury in the flue gas to the oxidized form are being developed. Significant mercury removals, up to 90%, are possible if most of the mercury is in the oxidized form and the power plant is equipped with WFGD. The mercury control technologies currently under development in the Department are at the pilot stage. Field testing experience would be needed before commercialization and widespread application to the utility industry.

Mr. Frelinghuysen. Are there currently any requests for proposals to demonstrate commercial application of mercury emissions control technology?

Mr. Kripowitz. No. The Department is planning to request proposals to obtain field experience of promising mercury control technologies in the fourth quarter of FY1999. Projects would be implemented in FY2000.

Mr. Frelinghuysen. It would seem to me that the Department should want to support plant-scale demonstration of mercury emissions control technology in order to provide EPA with the information it will need to make an informed decision. Would you agree?

Mr. Kripowitz. Yes. The Department has provided to EPA the most current and reliable mercury control cost data to date, obtained from pilot-scale projects. The mercury control technologies being developed by the Department emerged from a thorough research program built on fundamental information on the various chemical forms of mercury, interactions of mercury with other flue gas contaminants, and the operational constraints of existing pollution control equipment. Obtaining plant-scale data would provide much more definitive cost and operational data and would most likely enable EPA to make a more informed regulatory decision regarding mercury emissions from coal-fired power plants.

DUAL REVALIDATION

Mr. Visclosky. Mr. Secretary, part of stockpile stewardship is the revalidation of each of the weapons in the inventory. It is my understanding that it took three years to revalidate the W76, in part because of coordination difficulties between Los Alamos and Livermore personnel. Why did it take so long to revalidate the W76? At that rate, it appears that it could take almost 30 years to revalidate all the weapons in the stockpile. Because of this failure, the Department now intends to move to "weapon baselining," a much shallower approach. What would Congress need to do to ensure that dual revalidation is completed for all weapon designs, in a timely manner, instead of accepting the Department's belief that baselining is adequate or sufficient?

Dr. Reis. We do not view the revalidation of the W76 as a failure - rather, Dual Revalidation has provided a tremendous amount of first class work by all laboratories to firmly establish the credibility of the reliability and safety of the W76. By adjusting the program we plan to streamline the process while maintaining the quality of the assessment with the full involvement of all weapon laboratories.

The Nuclear Weapons Council approved the Dual Revalidation Program in January 1996 and selected the W76 to be the first revalidation candidate. The Dual Revalidation of the W76 is scheduled to conclude in December 1999. Revalidation of the W76 has been a pioneering effort in Stockpile Stewardship. This is the first time we have undertaken an intense, extended peer review process using modern tools and procedures. It took longer than expected to define the specific experiments, evaluations, analyses, and models to include in the program. Assembling twenty-five year old archived data into a fully integrated data package useful to another laboratory was far more complex and time consuming than envisioned.

Our Weapons Baselining Campaign is an accelerated formulation (all systems, four years) of a modern technical basis for all stockpile systems so that we can make the life extension decisions that will be required in the next decade. This approach is fully peer reviewed, enables us to balance the workload on the small supply of experienced people and will give us the opportunity to apply analytic tools still under development in the Accelerated Strategic Computing Initiative program.

KANSAS CITY INFRASTRUCTURE

Mr. Visclosky. Mr. Secretary, the Department's budget from now until FY 03 calls for a significant increase in Stewardship funding, yet there is no equivalent rise in Stockpile Management funding. DOE's neglect of the plants has reached a crisis stage. I want to ask a few questions about your views on the crisis and what you plan to do about it.

At Kansas City Plant, the first priority is personnel. 25 percent of their staff could retire now, 36 percent could retire in 2000. Many technical areas have single-person coverage. The plant can hire few new people, and in fact must reduce staff numbers. It needs to hire about 90 people in critical skills. Moreover, for the skilled trades staff doing direct weapons work, almost all were hired between 1977 and 1981 inclusive, with the greatest number hired in 1977 and 1978. The average length of service is 28.2 years. So in six years, a wave of mass retirements could begin. Unless something is done quickly to reverse the situation, it would seem, the plant will be unable to do the tasks required of it. In your view, is this acceptable? Is it an urgent situation or is it something that can be put off; and if so why? If it is not, what do you propose to do about it for FY 2000 and how do you plan to perpetuate nuclear weapons competence at the plant?

Dr. Reis. We are aware of this situation and are working with the M&O contractor. Hiring is just one of the many factors to be considered in maintaining competence throughout the nuclear weapons complex. Presently, the long term plan at Kansas City Plant is to reduce the footprint by approximately one million square feet, about one-third of the present floor space. This is consistent with the identified long term mission needs. As we reduce the footprint of the plant, employment levels will gradually be reduced through attrition, and skill mix problems will be addressed by selective new hiring.

In FY 2000, additional funds are allocated to Kansas City to assist in a smoother transition and to continue establishing the proper skill mix needed for identified future mission requirements. The essence is to earmark some funding for new hires who will replace critically skilled employees who are planning to retire in the near future. This should allow for the overlap needed to effectively retain these critical skills.

PANTEX INFRASTRUCTURE

Mr. Visclosky. At Pantex, the first priority is infrastructure. In one of the so-called "gravel gerties," a cell in which high explosive and plutonium components are mated, a false ceiling became so wet due to roof leaks that it fell into the room. In a bay, in which major weapon components are assembled or disassembled, puddles under electrical equipment forced termination of work for many days. There were three ruptures of fire mains, which carry water for firefighting; in one case, the water took out so much soil under a building that construction equipment had to be brought in to replace the soil. According to William Weinreich, General Manager of Pantex Plant, a classified mainframe computer is 12 years old, and is "inefficient and costly to maintain." He points out that industry typically spends 3 to 5 percent of replacement plant value each year on capital reinvestment; at Pantex, the infrastructure funding allocation is under one-half of one percent of replacement value. (3/1/99 HASC testimony, p.5) Mr. Secretary, would you want to be working with high explosives and plutonium on a wet floor with pieces of ceiling falling on you? Would you want to work on a wet floor with electrical equipment? Would you agree that these problems constitute a crisis that must be dealt with immediately, that is in the FY 2000 budget? If so, what do you propose to do?

Dr. Reis. Working in the conditions you have described is unacceptable. Let me assure you that the Department is committed to performing work in a safe manner and any conditions where workers are put at risk are unacceptable. With respect to the instances noted, the cell ceiling and roof have been temporarily repaired, with permanent repairs underway and temporary repairs have been made to prevent water leaks in the bay roof. The fire main rupture was repaired and soil under the ramp and outside the bay was excavated to ensure proper integrity and was subsequently replaced. Whenever occurrences such as these occur, emergency or temporary repairs are generally made within one or two days. More permanent repairs often require careful planning and separate funding, depending on the amount involved.

For the long term, the Department has recognized the need for investment in facility maintenance and replacement. This will be particularly important in carrying out the essential mission of Stockpile Life Extension. Over the past four years, funding has been provided for additional maintenance and general plant projects. Also, we are beginning a six-year construction effort, the Stockpile Management Restructuring Initiative, to downsize the physical size of the plant consistent with expected future workload requirements. In addition, a recapitalization program for the Pantex Plant has been proposed and is being reviewed. This recapitalization program addresses the broader issues of roofing and fire main integrity, as well as process and capital equipment reinvestment.

SAVANNAH RIVER INFRASTRUCTURE INVESTMENT

Mr. Visclosky. At Savannah River Site, the chief concern is about infrastructure. SRS annual investment in infrastructure has been less than one percent of replacement plant value for the last five years. SRS has a huge infrastructure on its 300 sq. mi., including 1,200 miles of roads, 125 miles of electrical transmission lines, 62 miles of main steam lines, and 63 miles of rail track. SRS indicated that inadequate infrastructure investment has resulted in deferred equipment replacements, shortages of spare parts that impair facility operations, inadequate system reliability, increased maintenance costs, unanticipated failures that require repairs and subtract funds from missions, a large backlog of deferred maintenance, and growing technology obsolescence. I'm told that railroad cross-ties are failing, roofs are deteriorating, and that there are other, similar examples. How much longer do you feel that it is reasonable to defer maintenance and investment at SRS?

Secretary Richardson. Beginning in the early 1990's, the Department undertook an initiative at the Savannah River Site to upgrade major infrastructure systems; such as fire protection, roads and bridges, radio communications, domestic water, sanitary wastewater, and telephones. These upgrades have been completed. The Department continues to implement line item projects to improve the infrastructure at the site. The Regulatory Monitoring and Bioassay Laboratory project will replace deteriorating laboratories with a new facility for compliance with environmental protection requirements. The CFC HVAC/Chiller Retrofit project is eliminating the use of chlorofluorocarbons used in coolers, as well as replacing aging control systems. The H-Tank Farm Storm Water System Upgrade will alleviate existing flooding problems and minimize rainwater infiltration to these waste tanks.

In addition to the ongoing projects discussed above, we are responding to immediate needs. An example of this is our recent plan to repair the Savannah River Technology Center main laboratory roof. While this work was initially planned for Fiscal Year 2000, it has become evident that the severity of the roof deterioration necessitates immediate action. We are providing $2 million from available funds to begin roof replacement in Fiscal Year 1999.

We share your concern about the need for reinvestment in infrastructure to ensure that the Savannah River Site is properly maintained. Specific infrastructure needs to support current site activities are being scrutinized as part of the ongoing surveillance and maintenance responsibilities of site management and action is being taken to ensure that any current infrastructure needs are met before associated facilities are operated.

Y-12 INFRASTRUCTURE

Mr. Visclosky. Y-12 has concerns about infrastructure and people. The newest major production building was built in 1969. A ceiling is near collapse in an area that does weapons work, on lithium. Another ceiling collapsed in a cafeteria while people were eating in it. Buildings are becoming dysfunctional and systems unusable. Management expresses concern that, due to inadequate investment, infrastructure is at the point where it may not be recoverable. Regarding people, half of Y-12's staff can retire in five years, and plant management asserts that they need to replace 100 people in the short term. At the same time, workload is increasing, up 10 to 15 percent from FY 1999 to FY 2000. Despite these needs, FY 2000 funding is down. Mr. Secretary, it seems to me that problems like these require immediate action. Do you agree? If not, why not? If so what plans does the Department have for solving Y-12's personnel and infrastructure concerns?

Dr. Reis. We agree. The Department of Energy must address personnel and infrastructure concerns in order to ensure the viability of the nuclear weapons complex.

In the past four years, approximately $109 million has been provided to the Y-12 Plant, specifically targeted for urgent needs, including infrastructure. This funding has been provided in addition to funding for routine maintenance and general plant projects. In addition, we are in the second year of a five-year construction project, Stockpile Management Restructuring Initiative, to make major physical changes to the plant.

In the case of the Y-12 Plant, we have established the Y-12 Site Integrated Modernization (YSIM) effort, chartered during the first quarter of FY 1999, to plan for a phased modernization of the Y-12 Plant, while ensuring the plant's capability to continuously and indefinitely support plant missions. The first phase of the YSIM effort, the Enriched Uranium Storage Facility Project has received mission need approval, and will be submitted as an FY 2001 new start.

Mr. Visclosky. Why did you reduce funding for Y-12 for this year?

Dr. Reis. The decrease is partially driven by the completion in FY 1999 of highly enriched uranium resumption activities, the delay of the start-up of the construction project to replace mechanical utility systems (99-D-123) resulting from the execution of Congressionally directed external assessments of construction projects, and the short-term rebalancing of workload and infrastructure investment. It is part of an overall DP budget request that reflects an appropriate longer term balance between the plants and weapons laboratories.

PRODUCTION PLANT MAINTENANCE

Mr. Visclosky. As a general point, it seems much less costly to maintain than to repair. I can change the oil in my car every few months for $20, or put it off and get a new engine for thousands of dollars. The same principle is at work here. Have you done studies of the cost of doing routine preventive maintenance at the plants, vs. repairs anticipated as a result of delaying maintenance?

Dr. Reis. The Department agrees that preventive maintenance is a cost-effective means of assuring operational dependability and maximum useful life of plant property and equipment. The policy is set forth in Department of Energy Order 4330.4B, Maintenance Management Program, which specifies that, "A proper balance of corrective and preventive maintenance should be employed to provide a high degree of confidence that . . . , equipment life is optimized, and that the maintenance program is cost-effective."

Rather than conducting its own studies in this area, the Department and its contractors avail themselves to studies conducted by the private sector. DOE contractors use the results of outside studies such as The Whitestone Building Maintenance and Repair Cost Reference, along with vendor recommendations and operational experience, to determine optimum maintenance requirements and to predict impacts of deferring maintenance.

BALANCE BETWEEN LABORATORY AND PLANT BUDGETS

Mr. Visclosky. I'm concerned about the balance between spending at labs and plants. It appears that the lab budgets are more or less adequate, and that the plant budgets are inadequate. The choices available are to continue the current course; rebalance priorities in favor of the plants, in which case lab budgets could be inadequate; or raise the defense budget top line and commit new funding to DOE. What are your views on each of these three choices? With DOD getting a substantial increase this year, why hasn't DOE's Office of Defense Programs been given enough of an increase to maintain the nuclear weapon plants?

Dr. Reis. I do not believe that the laboratory and plant budgets are necessarily out of balance, particularly when viewed from a longer term perspective. The budget must balance many legitimate but competing requirements within a finite resource envelope. I believe that the budget request submitted to Congress reflects the appropriate consideration and balancing of priorities.

CTBT AND PRODUCTION PLANT MAINTENANCE

Mr. Visclosky. Part of my concern is that if the United States wants to get rid of its nuclear weapons, it should do so only after direct consideration of the issue, not as a result of collapsing capability to maintain these weapons. Yet DOE is not doing its job in stockpile stewardship by failing to maintain the plants, and this, if not corrected promptly, could lead to denuclearization by default. There is also a Comprehensive Test Ban Treaty issue at work here. A necessary, though not sufficient, condition for Senate approval of the treaty is assuring U.S. capability to maintain its weapons for the long term. Do you agree with that assessment?

Dr. Reis. Nuclear weapons are still important. The President has stated that the maintenance of a safe and reliable nuclear stockpile is a supreme national interest. Under a Comprehensive Test Ban Treaty (CTBT), we will maintain the safety and reliability of our nuclear weapons, through the Stockpile Stewardship Program. This program requires the full cooperation and efforts of our laboratories and plants. We agree that we must have the capability to maintain our weapons for the long term. The Stockpile Stewardship Program is the key to maintaining that capability and the President has said he does not believe that we can get the CTBT ratified unless we can convince the Senate that the program works.

Mr. Visclosky. This capability cannot exist if the facilities that maintain weapons are themselves not adequately maintained. Do you agree with that?

Dr. Reis. Yes. We have, and continue to, refine and implement modern new technologies at the plants to prepare for the future workload. Equally important are the capabilities of our laboratories. Without an aggressive "early warning" program run by these laboratories, issues about potential plant maintenance problems will be of little concern.

Mr. Visclosky. I'm concerned that the current situation at the plants could give the Senate grounds for rejecting the treaty. Do you agree with that?

Dr. Reis. I would recommend that the Senate fully consider this issue and render its own judgment. I believe Senate ratification should be based upon our ability to certify and remanufacture, if necessary, the nuclear weapons stockpile, now and in the future.

LONG-TERM PLAN FOR PRODUCTION PLANTS

Mr. Visclosky. A final issue concerns the urgency of restoring the plants. Each year, the plant directors testify that they are seriously underfunded, yet DOE does not address these needs adequately. It now appears that they have reached a crisis point, that we have skimped on investment as long as we can, so that action is needed in FY 2000.

Does the DOE have a long-term plan that provides specific objectives and the requisite funding to meet infrastructure, recapitalization, and personnel needs at the plants? If so, when will the plants have recovered? If not, when will you present the Subcommittee with such a plan? Also, please provide the subcommittee with a list of the unfunded requirements at the plants.

Dr. Reis. I do not agree that the plants are underfunded. The weapons production plants are all operated by private contractors. The contractors have a fiduciary responsibility to their stockholders to maximize the return on their investment. Thus, the tendency to testify that their plants are underfunded is understandable. I believe the Department's budget request is sufficient for that task. The budget includes major infrastructure projects at each of the sites under the Stockpile Management Restructuring Initiative. In addition, the weapon production plants are preparing ten-year site plans, which will focus on long-term infrastructure modernization activities. The plans are due this summer, to support preparation of the FY 2001 budget.

MAINTAINING PRODUCTION PLANT WORKFORCES

Mr. Visclosky. DOE provides incentives for the plants if they do certain tasks well, such as beating deadlines on production of weapon components. These incentives focus attention on tasks that DOE determines to be important. Clearly, a critical task is maintaining the workforce at the plants. What incentives does DOE provide for the plants to do that?

Dr. Reis. The maintenance of a trained and qualified technical workforce has long been recognized as a key objective in the DOE's Stockpile Stewardship Program. A provision that the contractor will develop and deploy the infrastructure and technical workforce necessary to successfully accomplish the work in a safe, secure, environmentally sound and cost-effective manner is included within the Department's incentive-based contracts. Some of the incentive plans go on to require that the contractor ensure that all key technical competencies are maintained, while other contracts address the issue through skill mix performance measures.

TRITIUM

Mr. Visclosky. Did you do a cost comparison between Watts Bar and Bellefonte, and if so, what are the pluses and minuses of each option?

Dr. Reis. Extensive cost comparisons were conducted between the Bellefonte option and the option to use the Watts Bar and Sequoyah reactors. The Tennessee Valley Authority (TVA) submitted several proposals for the completion of the Bellefonte reactors. All of them required large up-front payments by DOE that would be well above the current Defense Programs budget request of $4.5 billion. The least challenging of these proposals from a budget perspective would have required DOE to pay to TVA $1,234 million (constant FY 1999 dollars) over a 6-year period. DOE would receive no share of plant revenues in return. DOE's total investment cost for the Bellefonte option would have been $1,764 million (constant FY 1999 dollars).

The Watts Bar/Sequoyah option required no investment costs over and above DOE's current project-specific costs of $566 million (constant FY 1999 dollars). This method of tritium production can be established within our current Defense Programs budget. A large portion of annual operating costs will vary with the amount of tritium required. This flexibility means that DOE will not have to pay for tritium it does not need.

The investment cost estimates for both the Bellefonte and Watts Bar/Sequoyah alternatives indicated above include $336 million (constant FY 1999 dollars) to design, construct, and start up a new Tritium Extraction Facility at the Savannah River Site. This facility is a necessary element of the commercial reactor tritium production system.

Mr. Visclosky. Why do you have more money in the budget for the backup than for the primary technology in tritium production?

Dr. Reis. In order to have a viable backup capability, DOE must complete the engineering development, and the preliminary design of the APT and archive all information that has been accumulated thus far. These efforts will be completed in FY 2002. The funding requested for APT is the minimum amount required to assure the viability of the APT as a backup facility.

Mr. Visclosky. Are there any serious technical uncertainties with irradiation services as a way of producing tritium? If not, what is the need for a backup?

Dr. Reis. There are no technical uncertainties with the irradiation services method of producing tritium. However, because having an assured supply of tritium is so important to national security, it is felt that DOE should have a backup.

Mr. Visclosky. What are you doing to resolve any legal challenges promptly? For example, have you considered announcing that you plan to put tritium-producing rods into Watts Bar immediately? That would bring any legal challenges to the fore, so that the irradiation services plan could continue, in which case funding for accelerator production of tritium could be dropped, or the irradiation services plan might be rejected, in which case DOE could move to accelerator

production of tritium quickly.

Dr. Reis. Tritium-producing rods cannot be placed in a reactor in production-scale quantities until the reactor has been licensed to do so by the Nuclear Regulatory Commission (NRC). Under the pending interagency agreement, TVA will request next year that the Nuclear Regulatory Commission amend the operating license of the Watts Bar and Sequoyah reactors. Because extensive preparatory technical analysis is required, these requests cannot be made any sooner. DOE is confident, based on NRC reviews of the tritium-producing rods to date, that licensing efforts will be successful. Further, the NRC has committed to expeditious reviews of license amendment requests.

Extensive reviews of statutes, regulations, and international agreements have revealed no prohibitions on the use of commercial reactors for tritium production. The Department does not believe there are any grounds for legal challenges.

Mr. Visclosky. How much more efficient would we be if we concentrated all of our closure funding on only one project? For example, could Mound give up $20 or $30 million in funding to Rocky Flats, and would there be any cost benefits to such an approach?

Secretary Richardson. The Department is committed to the goal of completing active cleanup and closing by 2006 all the sites currently in the Closure Fund. The Department's request for FY 2000 for this account provides sufficient funds for each of these sites to stay on schedule towards this goal. Although additional funds for certain projects in this account could provide greater confidence that the site will meet this goal, reducing the funds for other projects in this account would delay the projected completion date for other sites. This could result in higher life-cycle costs and could affect the Department's ability to meet its regulatory and stakeholder commitments. We believe that it is important to provide sufficient funding for all of our sites to meet our closure goals.

ENVIRONMENTAL MANAGEMENT

Mr. Visclosky. Once a site is clean by 2006, how do you intend to coordinate the expected reduction in workforce? What is your projection for the total workforce at Rocky Flats in 2007 versus this year?

Secretary Richardson. The size of the post closure workforce at Rocky Flats will depend upon land use and stewardship requirements, which have not yet been decided. This topic is currently under discussion with our regulators and stakeholders. As of September 30, 1998, there were 3,166 contractor employees at the site. Our projections are somewhat uncertain, but the combined number of federal and contractor employees will probably be less than 70 in the years immediately after closure, and will continue to diminish as long-term environmental restoration and stewardship activities stabilize.

Separations involving Rocky Flats contractor employees will be conducted under the terms and conditions of Rocky Flats Work Force Restructuring Plan Three, which was originally implemented on May 5, 1997. Efforts are being made to work with subcontractors who also have substantive functions at DOE sites other than Rocky Flats so that, as projects are completed, the workers can be shifted to other sites. It is expected that as major segments of the work are completed, a parallel reduction in budget and workforce will be implemented.

Additionally, there were 232 DOE Federal employees at the Rocky Flats site on March 13, 1999. This number will be reduced over the next several years through a combination of attrition, separation incentives, and the transfer of some business-related functions to other DOE sites. A small Federal staff is expected to remain after closure--targeted for 2006--to conduct post-closure activities.

ELECTROMETALLURGICAL TREATMENT

Mr. Visclosky. Is electrometallurgical treatment the most cost-effective way to deal with some of the DOE waste in Idaho? How do you intend to assure the environmental community that this is a benign effort?

Secretary Richardson. One type of spent nuclear fuel that may not be suitable for disposal in a geologic repository without treatment is sodium-bonded spent nuclear fuel. Sodium-bonded fuel contains metallic sodium, a highly reactive material. The Department is preparing an Environmental Impact Statement in which electrometallurgical treatment (EMT) and several other technologies are being evaluated as alternatives for the preparation of sodium-bonded spent nuclear fuel for disposal. The environmental impacts associated with implementation of electrometallurgical treatment of sodium-bonded spent nuclear fuel will be thoroughly investigated and reported in the Environmental Impact Statement. The draft of this document will be made available to the public, as well as other Federal agencies, American Indian tribes, state and local governments, and all other interested parties, for review and comment. Public meetings on the draft Environmental Impact Statement will be held in which all members of the public, including the environmental community, are encouraged to participate. Verbal and written questions will be addressed. With regard to your question of whether EMT or another alternative is the most cost-effective, we are undertaking an independent cost analysis, which will be completed prior to the Draft EIS. Preliminary evaluations indicate that electrometallurgical treatment is a cost-effective technology for preparing materials for disposal. Further analyses of the costs of all alternatives must be completed before the cost-effectiveness of electrometallurgical treatment can be determined with sufficient confidence.

With respect to public concern regarding this technology, we intend to undertake an open and fair process that provides meaningful opportunities for members of the public to obtain information and provide comments. We intend to consider carefully those comments in the decision making process, based on objective technical, cost, environmental, safety, and nonproliferation considerations. After completion of the final Environmental Impact Statement, the Department will publish a Record of Decision.

SCIENCE

Mr. Visclosky. What is the role of universities in DOE's piece of the Strategic Simulation Initiative (not NSF's)? Is there going to be specific funding set aside for university use?

Secretary Richardson. University researchers have always played a significant role in the programs of the Office of Science. It is absolutely clear that we cannot succeed in the goals of the Strategic Simulation Initiative (SSI) without strong university participation both as a provider of new ideas and techniques for solving complex problems and as a place to train and educate the generation of computational scientists that SSI requires. Therefore, we expect to have significant funding for universities under the SSI program.

DEFENSE EDUCATION PROGRAMS

Mr. Visclosky. Why do you need an $11 million increase in DP education funding?

Dr. Reis. The Department of Energy is committed to supporting education in science and math because maintaining our technical capabilities in the next generation is vital to our national security. The $11 million increase for Education activities includes two items previously funded within DP Program Direction: Los Alamos County School District, and the Northern New Mexico Educational Enrichment Foundation. The funding for these activities increased by $4 million, on a comparable basis. Support of schools has been of vital importance to attract and retain the superbly qualified scientists at Los Alamos.

The science and math education program, requested at $10.3 million in FY 2000, an increase of $1.3 million compared to the FY 1999 appropriation of $9.0 million, actively encourages students to pursue research careers of direct interest to the weapons program.

In addition, $5.5 million is requested to relocate the National Atomic Museum to the new Anderson Abruzzo International Balloon Park Museum site. The total cost to relocate the Museum, estimated to be between $9-10 million, will be cost-shared with the City of Albuquerque and various corporate entities. After its relocation, we expect that increased receipts from the higher number of visitors to the Museum will enable the Department to stop its yearly support of the Museum's operations.

PIT PRODUCTION

Mr. Visclosky. What are the milestones to getting to 20 pits a year in 2007? Why did you slip the capacity from 50 per year in 2005 to 20 in 2007? What capacity do you expect to be needed and why? What do you expect pit life to be? When do you expect to develop contingency plans?

Dr. Reis. The major milestones to establish a manufacturing capacity of 20 pits per year are:

1) FY 2000 - Demonstrate prototype pit production processes (two prototype pits currently completed).
2) FY 2001 - Qualify all manufacturing processes required to support war-reserve quality pit production and demonstrate limited pit manufacturing capability.
3) FY 2002 - Initiate procurement process (construction line item) to add additional equipment and facility improvements required for sustained pit manufacturing capability of 20 pits per year.
4) FY 2004 - Start replacement of laboratory equipment with production equipment required to support 20 pits per year.
5) FY 2007 - Complete equipment prove-in and demonstrate 20 pits per year capacity while meeting all war-reserve requirements.

The date for establishing a pit manufacturing capability of 50 pits per year was shifted to meet near term production requirements for the Department of Defense and to upgrade and replace laboratory equipment with production equipment required for 20 pits per year capacity without a cessation in pit production. Currently, 50 pits per year capacity can be achieved by 2010, if required, by replicating equipment and facilities used for the 20 pits per year capacity. However, a capacity of 20 pits per year will meet the DOE's current requirement to provide replacement pits destructively evaluated in the surveillance program.

The precise capacity for long-term (post 2015) pit production will be determined based on confidence in the prediction of expected pit lifetimes, the size of the nuclear stockpile, and the time expected to expand the 20 pits per year capacity. Additional information from DOE's Enhanced Surveillance Program is expected to provide additional insight into current (45-60 years) pit lifetimes by 2003. The size of the stockpile will be determined by national policy which cannot be predicted at this time.

A preliminary study for a contingency plan was completed in 1997. To develop a detailed contingency plan, more precise information is required. Such information is currently being acquired through the Pit Rebuild Program and W88 manufacturing program at the Los Alamos National Laboratory. By the end of FY 2000, these programs will provide sufficient information to develop a detailed contingency plan.

MATERIALS PROTECTION, CONTROL AND ACCOUNTING PROGRAM

Mr. Visclosky. When the DOE first planned the Material Protection, Control, and Accounting (MPC&A) Program, some discussion was given to the program being completed by 2001. Now, however, it seems that we are enduring an endless program without a clear final completion date. What is the new long-term plan and how long is it? Is this because the program is going more slowly, or have you identified new areas to fix?

Secretary Richardson. Back in 1996, the Materials Protection, Control and Accounting Program based its original mission planning and objectives on the estimates identified by the 1995 Joint Atomic Energy and Intelligence Committee (JAEIC) Report. The report identified 80-100 buildings in the Former Soviet Union with weapons grade nuclear material which required rapid upgrades. The program determined that upgrading these 80-100 buildings would require a sustained effort through 2002. However, since the 1995 JAEIC Report, the program has greatly expanded due to improved trust and confidence between U.S. and Russian experts, which has resulted in improved knowledge of and access to sites and buildings containing weapons usable nuclear materials. To date, the program has identified approximately 400 buildings requiring upgrades at 55 sites. We also have expanded the work with the Russian Federation Navy to include all sites with fresh nuclear fuel and naval spent fuel of proliferation concern. Our initial planning did not expect such excellent cooperation with or access to so much of the Russian Naval complex.

In addition, economic and political uncertainties in Russia during 1998 have made security of the nuclear material more difficult and have slowed some work. Also, the 1998 Russian economic crisis, the banking crisis, the devaluation of the ruble, and two changes of the Russian government have made doing business in Russia more challenging. For example, during this past winter, many of the completed, upgraded sites faced serious operating problems. Heat, winter uniforms for the guard force, and operational resources were unavailable on a consistent basis for many of these institutes. To address these difficulties the Materials Protection, Control, and Accounting program responded quickly by providing winter uniforms, space heaters, emergency generators, and system performance contracts to identified sites in need.

While the harsh Russian economic conditions have increased the risk of theft of nuclear materials, it also has created new opportunities to address proliferation risks. For example, the program is initiating a material consolidation program to simplify the nuclear security problem by moving material into fewer buildings at fewer sites. Prior to this crisis, this innovative approach would have been less likely to be supported by the Ministry of Atomic Energy (MINATOM). The recent violent acts at MINATOM and Russian Naval nuclear installations have promoted a more proactive approach by the Russian Federation to reduce the size of the problem. We are now actively working with the Russian Federation to develop a strategy to consolidate nuclear material into fewer buildings at fewer sites.

The program is still on track with the 2002 targeted date and expects to complete rapid upgrades at 100 of the most vulnerable buildings. In light of the expanded work, we are currently revising the scope of our plan. Our new estimate of 400 buildings requiring upgrades will likely be adjusted downward if we are able to undertake a vigorous consolidation effort with the Russians, which we fully expect at this time. Thus, as we develop our new work plan, we are necessarily factoring in some uncertainties. The President's Expanded Threat Reduction Initiative shows the program extending through FY 2004, but work may be required beyond that time. We will keep you informed as our new work plan develops.

ENERGY EFFICIENCY & RENEWABLE ENERGY

Mr. Visclosky. Of the funds added in the Omnibus Appropriations Act for EERE, how much is uncosted?

Mr. Richardson. We do not yet have information available on the uncosted balances from funds provided by the Omnibus Appropriations Act. The Omnibus Act included $60 million for the Solar and Renewable Energy Programs including $18 million which is an increment to the initial FY 1999 appropriations and $42 million which was to offset reductions applied to the initial FY 1999 appropriations. The Act was signed by the President on October 21, 1998. The Department was requested to present to Congress a program plan for the use of the additional funds and a proposal for the allocation of the reductions. Therefore, the funds from the Omnibus Act were not made available to the Solar and Renewable Energy Program for actual award until early February. The most current DOE accounting information is through the end of January, 1999 and does not yet reflect the status of the Omnibus funds. It is estimated that accounting information as of the end of February, 1999, will reflect that most of the funds are uncosted. However, EERE is working very hard to ensure that the funds are effectively used and that there will be minimal uncosted balances at the end of the fiscal year.

CVNX REACTOR DESIGN WORK

Mr. Visclosky. What is the current status of the CVNX reactor design work, and how far along will the reactor design work be when the first Defense appropriations funds are expended on the detailed design work of the entire ship?

Admiral Bowman. The reactor design effort is proceeding in parallel with the Navy's overall CVNX design work as part of a coordinated Integrated Product and Process Development effort, which is under the auspices of the Navy's CVNX Program Office. The Navy's evolutionary approach to CVNX, as discussed below, has already established specific design parameters (e.g., shaft horsepower, power and energy requirements, reactor and steam plant size constraints) for the CVNX-1 propulsion and electric plant. Work commenced in FY 99 and to date has validated that Naval Reactors can design a reactor to satisfy the Navy's identified needs and constraints. This includes additional power and energy for such Navy initiatives as the electromagnetic aircraft launch system (EMALS) and electrification of ship services. Consequently, the reactor design work is on-track to support overall ship design efforts and Navy long lead component procurement scheduled for FY 02 through FY 04. The Navy plans to request Congressional approval for Shipbuilding and Conversion (SCN) funds in those years for this purpose.

The Integrated Product and Process Development (IPPD) is a structured design process, led by the Navy's CVNX program Office, which is to ensure the constraints, design parameters, cost and capabilities of various ship systems are evaluated and integrated into the final ship design. Under this seamless design approach, there is no specific transition between overall ship functional and detailed design. System and component design efforts progress at varying rates as needed to support the overall ship construction schedule.

As background, the new CVNX Class will use an evolutionary, multi-ship plan for inserting new technologies to enhance warfighting, enable critical features for future flexibility, and dramatically reduce total ownership cost. In September 1998, the Defense Acquisition Board (DAB) concurred with Navy recommendations for a large-capacity (75 aircraft) nuclear powered aircraft carrier and the evolutionary strategy. CVN 77, as the first step toward CVNX, will receive a new integrated combat system, which will be forward fit to achieve cost reduction in the next class, CVNX. The design work to support this effort is currently ongoing under the oversight of the Navy's CVNX Program Office. CVNX 1 will receive a new nuclear propulsion plant, new electrical plant, and Electromagnetic Aircraft Launch System (EMALS). CVNX 2 is planned to receive hull improvements that include survivability improvements to meet new threats, a state-of-the-art flight deck, and improved internal ship arrangements and distributive systems.

The FY 99 and FY 00 Navy budgets include funding for design work required to integrate the CVN 77 combat system design changes and develop a new design propulsion plant, new electric plant, and EMALS for CVNX-1. Additionally, Navy funds are budgeted in FY00 and beyond to support overall CVNX ship design studies, including evaluation of potential survivability upgrades, internal reconfiguration, distributed system changes and flight deck improvements. Navy funded design efforts for the propulsion plant, electric plant and EMALS begin in FY 99 to provide for system and component development necessary to support CVNX-1, which is planned to begin construction in FY 06.

CHEM/BIO

Mr. Visclosky. Is any of the chem/bio defense work redundant or duplicative of current or planned work by the Department of Defense? Are the Labs doing any work on chem/bio defense outside of the review or approval of DoD? If so, why?

Secretary Richardson. Our work is not duplicative of that of the Department of Defense. In order to ensure that our work remains complementary, we meet frequently with senior officials in the Department of Defense, and with staff at the Department of Defense's laboratories. In addition, DoD and DOE programs in the chemical and biological areas are closely coordinated through the Counterproliferation Review Committee's (CPRC) Report to Congress, and the Nonproliferation and Arms Control Technical Working Group (NPAC TWG). These groups were specifically chartered to identify and eliminate undesirable redundancies or uncoordinated efforts, and to facilitate close coordination.

The DOE programs are not explicitly approved by the DoD. However, the DoD and DOE programs in the chemical and biological areas are closely coordinated through the processes described above. In addition, there are numerous informal coordination mechanisms through which information concerning specific projects may be passed. For example, the DOE program sponsors a summer meeting during which time all of the DOE chem-bio projects are presented. Last year this was attended by nearly 200 people, many from the DoD.

RELEASE OF PRIOR YEAR APPROPRIATION

Mr. Visclosky. How did you come with the $39 million from the interim waste account?

Secretary Richardson. The Program's initial request to OMB for FY 2000 was for $370 million to carry out necessary FY 2000 program activities as they were understood at that time. Subsequently, the Viability Assessment of a Repository at Yucca Mountain was completed and issued in December 1998. The Viability Assessment identified additional scientific and technical studies that would be required in FY 2000 to support a decision by the Secretary of Energy whether to recommend the Yucca Mountain site to the President in 2001, and if the site is found to be suitable, submittal of the License Application to the Nuclear Regulatory Commission in 2002. In view of the stage in the FY 2000 budget cycle at which the Viability Assessment was completed, the Administration believed it was necessary to request release of $39 million of the $85 million appropriated in FY 1996 in order to support the schedule and funding profile identified in the Viability Assessment.

WASTE ACCEPTANCE, STORAGE AND TRANSPORTATION

Mr. Visclosky. There is a 200 percent increase in OCRWM for waste acceptance, storage, and transportation. What activities are you assuming?

Secretary Richardson. Although an increase of 200 percent appears very large, in reality it represents an increase of only $3.9 million from a low base of $1.85 million in FY 1999. The increase in the FY 2000 budget is primarily due to a resumption of transportation-related activities that were drastically reduced in FY 1999 in order to focus on science at Yucca Mountain. In FY 1998, for the waste acceptance, storage, and transportation area, we received an appropriation of $5.9 million. The increase in FY 2000 to a funding level of $5.7 million reflects the need for the Office of Waste Acceptance, Storage and Transportation activities to support a 2010 initiation of waste emplacement at the repository, if the Yucca Mountain site is found suitable. Activities include issuance of a Request for Proposal for the private sector acquisition of waste acceptance and transportation services and to begin implementation of Section 180(c) of the Nuclear Waste Policy Act in the last quarter of FY 2001.

GAO REPORT ON NUCLEAR NONPROLIFERATION

Mr. Visclosky. Mr. Secretary, I know that concern has been expressed about a recently released GAO report on Nuclear Nonproliferation. Could you describe the changes that have occurred in the management of the Department's nuclear nonproliferation programs over the past couple of years and how those changes will address some of the concerns expressed by GAO?

Secretary Richardson. The Initiatives for Proliferation Prevention Program (IPP) has undergone significant changes since September 1997, when Mr. William Desmond took over as the Director. The GAO report touched upon these changes, but did not adequately address the improvements in the Program. For instance, to address criticism regarding the role and influence of the DOE National Laboratories in the IPP program, there has been an increase in federal oversight from DOE Headquarters, and a consolidation of financial management to DOE headquarters from the Albuquerque Operations Office. These steps have resulted in stronger accountability in the program.

Proposal review procedures have also been enhanced to make the review process more comprehensive and consistent for both project approval and continuation once approved. A stronger emphasis has been placed on commercialization, with increased allocation of project funds to U.S. industry cost-shared projects. The results show a dramatic shift from FY 1994, when 63 percent of project funds were allocated for technical feasibility projects and 37 percent for industry cost-shared projects. By contrast, in 1998, 39 percent of funds were allocated for technical feasibility projects and 61 percent for industry cost-shared projects.

Over the past eighteen months, moreover, we have also intensified our review of individual IPP projects to ensure that they will not contribute to Russian military capabilities.

We will continue these initiatives as we also implement the GAO's recommendations in a variety of additional areas.

Mr. Visclosky. One specific issue addressed in the report was that "only" 37 percent of the funds actually went to scientific institutes in the former Soviet Union, with the remaining funds going to support the U.S. labs in implementing the program. Isn't it true that the salaries of the average U.S. scientist involved in this program are much higher than their Russian counterparts?

Secretary Richardson. Yes, it is true. The DOE National Laboratory scientist typically makes as much as 25 times the salary of the Newly Independent States (NIS) scientist. This is only part of the story, however. Proper oversight of these programs is very important to us, and U.S. laboratory scientists spent the equivalent of nearly ten man-years in the NIS in FY 1998, ensuring that IPP projects were being done with full attention to the contracting requirements. The U.S. laboratory scientists and engineers actively participate in locating and recruiting industry partners for the Thrust 2 projects, arrange the CRADAs and monitor their progress. Although these visits were to the NIS, the travel funds were counted as being spent in the United States. Another factor is the degree to which the IPP supports other U.S. government programs.

For example, since International Science and Technology Center (ISTC) funding cannot be spent in the United States, IPP funds are used for work at U.S. laboratories, in support of ISTC work in Russia. Over the life of the program, six IPP projects worth approximately $950,000 have provided direct support to ISTC projects. In addition, IPP has been funding nearly $500,000 in ISTC salaries on an annual basis. Further indirect support to ISTC projects is being provided from National Laboratory overheads and other related sources.

The IPP program is working to significantly increase the proportion of project funding going to the NIS institutes in the coming years, which will increase even further the numbers of scientists being supported in NIS countries. Our goal is 60 percent of total project funding, and 50 percent of program funding, going to the NIS.

Mr. Visclosky. Doesn't the travel in this program primarily consist of U.S. lab personnel traveling to Russia and other countries? Aren't those travel costs counted under the amount of money spent in the United States?

Secretary Richardson. The travel in this program consists of both DOE National Laboratory scientists and engineers going to the Newly Independent States (NIS), as well as former NIS weapons scientists and engineers traveling to the United States to visit their National Laboratory colleagues for project reviews and other project-related work. This travel and is an important factor in the stringent oversight and transparency associated with the program.

In the GAO report, U.S. travel costs were compiled under the heading of "U.S. share" and NIS travel costs are counted under the "NIS share," although the U.S. travel actually occurs in the NIS and vice versa. Typically, travel by NIS scientists, in terms of individual trips per project, is at about half the level of U.S. scientists.

Mr. Visclosky. When U.S. scientists do travel to these countries, aren't there security and intelligence-related reasons for having multiple personnel involved in the visits, thus further increasing the costs assumed to have been spent "in the United States"?

Secretary Richardson. A number of DOE National Laboratories have policies that travel to the Newly Independent States (NIS) countries cannot be undertaken by individual travelers. These policies have been instituted because of safety and security concerns caused by the economic conditions in Russia. Having U.S. scientists travel with others also reduces the risk that they might be approached or, possibly, compromised by foreign intelligence services. Another reason for two or more travelers on some IPP trips is the requirement to conduct stringent oversight of projects, which sometimes requires experts from multiple disciplines.

Two or more travelers on the same trip obviously increases travel costs, as a week's trip by one traveler from the U.S. to the NIS typically costs $5,000-6,000. Such trips typically involve DOE National Laboratory scientists or engineers going to the NIS -- so that most funds are actually spent there -- but this funding is accounted for as spent "in the United States."

SOLAR AND RENEWABLE ENERGY/COMPETITIVE GRANTS

Mr. Visclosky. Mr. Secretary, this Subcommittee has been critical of the number of sole-source projects in the solar and renewable energy programs. I understand that you have taken steps to address these concerns. Could you describe how you have changed your business practices in this area, and describe impact of these changes on this program?

Mr. Richardson. The Department has been very aggressive in taking actions to to increase competition in our solar and renewable energy programs and to reduce sole source projects. Let me summarize our progress:

* The Office of Energy Efficiency and Renewable Energy is projected to substantially increase our proportion of competitive awards between FY 1998 and FY 1999 through a variety of actions, including increased use of broad-based solicitations, program management directives, and an increased emphasis on competition for laboratory subcontracts. For example, the FY 1999 spend plan of the Office of Power Technologies will result in a level of competitive awards of 93 percent (including Congressionally- directed activities).

* On December 3, 1998, the Office of Energy Efficiency and Renewable Energy released a competitive solicitation for its information dissemination and outreach activities, including work previously performed by industry associations on a noncompetitive basis. More than 400 applications have been received by the Department under this solicitation, and many new entrants have competed, including leading universities. These applications all have been subjected to objective merit review, and awards are being processed by Headquarters Procurement Services. The first competitive awards under this solicitation were announced on March 4 to Columbia University and the American Wind Energy Association.

* On March 2, 1999, Assistant Secretary Reicher issued guidance to all organizational elements on competition for EE-sponsored financial assistance agreements for information dissemination and outreach. The purpose of this guidance is "to affirm the commitment of the Office of Energy Efficiency and Renewable Energy to competition and objective merit review in discretionary financial assistance...and to set forth additional procedural requirements...to comply with the Conference Report on the Energy and Water Development Appropriations for Fiscal Year 1999."

In addition, the Office of Energy Efficiency and Renewable Energy is undertaking two comprehensive actions, which I believe will advance our management reforms even further.

* First, we are working with the National Academy of Public Administration to undertake an independent review of our financial management and procurement practices. This review will address concerns expressed in the past by Members of this Subcommittee, including the extent of uncosted balances and the adequacy of competition in our acquisition and financial assistance processes.

* Second, Assistant Secretary Reicher has established an EE Management Improvement Team. Its mission is to improve corporate management processes and procedures within EE. This Team will: (1) identify appropriate performance measures for intensified monitoring by senior officials in key management areas; (2) assess the adequacy of EE's corporate information management systems to provide critical program and financial management information; (3) review current EE program implementation practices, such as procurement execution strategies and planning; and (4) assist in the implementation of key management reforms, including the recommendations from the independent review to be completed by the National Academy.

The Team will include members from throughout the Department including representatives from the Office of the Chief Financial Officer, the Office of Contract Reform and Privatization, and the DOE Office of Procurement and Assistance Management.

INITIATIVES FOR PROLIFERATION PREVENTION PROGRAM (IPP)

Mr. Edwards. What is your reaction to the recent GAO report on this program, which raised some concerns?

Secretary Richardson. First, and most importantly, we were pleased that the GAO recognized the importance of this program and the contribution it is making to U.S. national security. As the report states in its first conclusion (p. 60): "DOE's effort to supplement the salaries of former weapons scientists so that they do not sell their services to terrorists, criminal organizations, or countries of proliferation concern is laudable and, we believe, in our national security interests."

In addition, DOE believes that this report provides important insight into our IPP program and will assist the Department to better manage this valuable effort. We agree with the vast majority of the report's recommendations and are already in the process of aggressively implementing measures to address them. For example, IPP is revising spending practices to increase the proportion of funds going to the Newly Independent States' (NIS) institutes and scientists. We expect that the IPP program will be significantly strengthened as the result of this independent, in-depth evaluation.

The Initiatives for Proliferation Prevention (IPP) program is succeeding in keeping Russian weapons scientists at home instead of selling their services to improper customers. There are several key points we would like to make in response to concerns raised in the GAO report:

- **Scope of success and metrics.** IPP is making a critical contribution to U.S. nonproliferation efforts and has helped employ over 5900 former Soviet scientists at over 170 institutes, thus helping to address the "brain drain" problem.

  However, IPP is not subsidizing Russian weapons activities, as GAO contends, because each project is designed to produce non-defense products and results in one or more specific deliverables. The deliverables are reviewed by a U.S. laboratory principal investigator who verifies that these meet the original terms of contract requirements. We take this oversight very seriously. DOE scientists spent the equivalent of ten man-years in the NIS in FY 1998 alone, ensuring that IPP projects were being properly conducted, according to firm, fixed-price contracts. Time spent by Russian scientists on these non-defense IPP contracts is time that they cannot spend working on Russian weapons projects -- or on weapons of mass destruction programs for third parties.

- **Program structure.** We know that senior Russian weapons scientists are devoting time to their IPP projects, because we are receiving work products, reports, equipment prototypes, and other deliverables that reflect their project work. Moreover, in many cases IPP program money is the only actual payment scientists are receiving, thus making IPP work more attractive to Russian participants than Russian-sponsored but currently non-paid defense-related assignments.

Dual-Use Items. The GAO claims that some IPP projects support the development of "dual-use" technology that may enhance Russian military capabilities. The cases cited by GAO provided no direct aid to Russia's weapons of mass destruction programs. Moreover, DOE has been extremely sensitive to this issue and has instituted an extensive review process in the mid-1997 time frame, including interagency participation, to screen out potential "dual-use" projects -- especially in the area of chemical and biological weapons. We will, however, implement GAO's recommendations to strengthen this process.

IPP Commercialization. GAO points out that only a few of the IPP projects have become fully commercialized. Commercialization efforts under IPP were intensified just over 18 months ago and it is important to note that such efforts take considerable time, even in the United States. Since that time the proportion of IPP project expenditures for pure R & D projects has diminished from two-thirds to one-third. The proportion spent on semi-commercial activities, i.e., involving industry investment of at least 50 percent of a project's funding, has risen from one-third to two-thirds, a major realignment of the program. Overall, U.S. industry has invested over $38 million in resources on IPP projects, another indication that the program is on the right track. On average, commercialization in the United States takes five to eight years. Although commercialization in Russia may take longer under current economic conditions, it is an important goal for providing scientists with long term, non-weapons employment. At the same time, the GAO report itself points out that even if commercialization success remains limited, the fundamental goal of the IPP program-- keeping former Soviet weapons-of-mass-destruction scientists at home -- is succeeding.

It should also be noted that NIS institutes assign patent rights to DOE National Laboratories, who in turn file the patents worldwide (except NIS) and then license to U.S. industries. By a previous agreement, 50 percent of the royalty income goes back to the NIS institutes.

Taxation of Assistance. The policy of the United States Government is not to pay taxes on U.S. assistance; we have raised this issue repeatedly to top levels of the Russian government and it was raised again during the March 1999 Gore-Primakov Commission meeting. The IPP program has not routinely paid Value Added Tax or customs duties under special arrangements made between the United States and Russia although in one or two instances, taxes were inadvertently paid on subcontracts. Like most other U.S. programs in Russia, however, we assume that recipients of funds will pay "social security" and related fees out of their salaries. The IPP program has experienced some success, albeit erratically, in deferring the personal income tax obligation of Russian Principal Investigators. Russian Principal Investigators have used the Panskov-Pickering Agreement extensively to defer their personal income tax obligations. However, the reason for the unevenness is that some Russian institutes have been more successful with their local office of the Russian Tax service in deferring such obligations than were others, in different localities.

- **U.S. vs Russian funding split.** IPP expenditures in the United States have been high because of the involvement of the DOE National Laboratories -- an involvement that is one of the core strengths of the IPP program and one that is mandated in the legislation founding the initiative. It is the close involvement of DOE National Laboratory scientists and engineers in the IPP projects that assures that the work done and the deliverables received, under firm, fixed-price contracts, are receiving stringent oversight. The principal investigators monitor each contract, collaborate with the NIS scientists and engineers working jointly on a given project, participate in selecting an industry partner in the U.S., arrange the CRADA agreements with the industrial partner, and then monitor the CRADA. Often, joint publications and joint inventions result from these collaborative efforts. This crucial involvement of DOE Laboratory personnel provides confidence that NIS scientists and engineers are not sending in old reports and data from their files as new deliverables. The hands-on involvement of DOE personnel also helps ensure that IPP funds are being spent on IPP projects and are not diverted to other purposes at the recipient institutes. IPP Principal Investigators from the laboratories spent the equivalent of nearly 10 man-years in the NIS in FY 1998 alone, ensuring that IPP projects were being done properly, with full attention to contract requirements. (It should be noted that although these days were worked in the NIS, the travel funds were counted as being spent in the United States, an accounting artifact that does not provide a full picture of resources devoted to work in the NIS.)

Another factor affecting the proportion of IPP funds expended in the United States is that IPP provides important support for other U.S. government programs. For example, since International Science and Technology Center (ISTC) funds cannot be spent in the United States, IPP funds are used for work at U.S. laboratories in support of ISTC work in Russia. Over the life of the Program, six IPP projects worth approximately $950,000 were funded in direct support to ISTC projects. In addition, IPP has been funding nearly $500,000 in ISTC salaries on an annual basis. Further indirect support to ISTC projects is being provided from National Laboratory overheads and other related sources.

Despite these factors, however, the IPP program is implementing changes to increase the commercial emphasis of IPP projects and to raise the overall proportion of project funds sent to the NIS to well above 50 percent. Our goal is 60 percent. This will be accomplished by requiring that each laboratory place more of its IPP project dollars on U.S. industry cost-shared projects, to which U.S. industry is contributing resources, as opposed to technology demonstration and feasibility projects not involving U.S. industry. For these U.S.-industry cost-share projects, an increased share of funding will go to the NIS. In addition, on-going technology demonstration projects that are not meeting project milestones or have only a slight chance of commercialization will be canceled and the funds made available for more commercially promising projects. As an aggregate, these measures will result in an increasing commercial emphasis, more U.S. industry cost-share and participation, and a greater percentage of overall IPP funds going to the NIS.

CHEM-BIO

Mr. Edwards. Is this nonproliferation program beyond the scope of the Department's mission, as some have argued?

Secretary Richardson. DOE and its national laboratories have a long history of supporting nonproliferation and national security policy. In pursuit of its primary nuclear science and technology mission, DOE has developed substantial capabilities in areas that are directly related to the chemical and biological threat. These capabilities, in areas such as genomic sequencing, development of new DNA-based diagnostics, and advanced modeling and simulation, combined with our expertise in nonproliferation and national security, form the basis for DOE's role in combating chemical and biological threats. We feel that using existing capabilities at the DOE laboratories is an efficient way of addressing the pressing chemical and biological threat and a service to the nation as a whole. We work closely with the DoD and other agencies to ensure that there is no duplication of effort.

The Department's capability to move quickly into the Chemical and Biological Nonproliferation Initiative underscores the Department's overall scientific and technical base that provides the flexibility to adapt quickly to the new challenges of the past cold war world.

Mr. Edwards. I understand that the Defense Department also has chem-bio programs. I assume your programs complement, rather than duplicate theirs. Correct?

Secretary Richardson. Correct. The DOE program is focused on addressing the domestic threat, with the goal of developing, demonstrating, and delivering systems and the supporting technologies that will lead to major improvements in the U.S. capability to prepare for and respond to chemical or biological attacks. We work quite closely with the Department of Defense, and now jointly sponsor a number of initiatives. The program leverages existing DOE capabilities and emphasizes the development of detection systems to improve our domestic preparedness, while at the same time supporting the needs of the Defense and Intelligence Communities. The program focuses not on incremental improvements, but major capability enhancements that can be achieved in the 3 – 5 year time frame.

MATERIALS PROTECTION, CONTROL AND ACCOUNTING PROGRAM

Mr. Edwards. Has this program succeeded in changing the Russians' view of the need to better manage their nuclear weapons material?

Secretary Richardson. Yes, the Material Protection, Control and Accounting (MPC&A) Program has made a significant change in the Russians' view towards securing their nuclear material. For example, much more emphasis is being placed on the insider threat. Our Russian partners are aware of the need to better manage their nuclear weapons material through enhanced material protection, control, and accounting upgrades and are working with us to achieve this improved security. However, we believe more work needs to be done over a longer period of time to foster a permanent safeguards culture in Russia. We have several technical training and education efforts underway that are educating the next generation of nuclear security experts and government officials in Russia on modern material protection, control, and accounting measures. These new efforts are in the early stages of laying a foundation for establishing a more permanent Russian safeguards culture in Russia. We remain optimistic that by reaching out to the next generation of Russian nuclear experts, coupled with our continued cooperation at the sites with the current nuclear experts, we are moving in a positive direction towards building a safeguards culture in Russia.

Mr. Edwards. Does this program have a completion date, and do you expect to meet that?

Secretary Richardson. The Materials Protection, Control and Accounting program based its original completion date on data contained in the 1995 Joint Atomic Energy and Intelligence Committee (JAEIC) Report. The report identified 80-100 buildings in the Former Soviet with weapons grade nuclear material which required rapid upgrades. The program determined that upgrading these 80-100 buildings would require a sustained effort through 2002. However, since the 1995 JAEIC Report, the program has greatly expanded due to improved knowledge of and access to sites and buildings containing weapons usable nuclear materials. To date, the program has identified approximately 400 buildings in total requiring upgrades at 55 sites. We also have expanded the work with the Russian Federation Navy to include all sites with fresh nuclear fuel and naval spent fuel of proliferation concern. Our initial planning did not expect such excellent cooperation with or access to so much of the Russian Naval complex. Also, economic and political uncertainties in Russia during 1998 have made security of the nuclear material more difficult and have slowed some work.

While the harsh Russian economic conditions have increased the risk of theft of nuclear materials, it also has created new opportunities to address proliferation risks. For example, the program is initiating a material consolidation program to simplify the nuclear security problem by moving material into fewer buildings at fewer sites. Prior to this crisis, this innovative approach would have been less likely to be supported by the Ministry of Atomic Energy (MINATOM). The recent violent acts at MINATOM and Russian Naval nuclear installations

have promoted a more proactive approach by the Russian Federation to reduce the size of the problem. We are now actively working with the Russian Federation to develop a strategy to consolidate nuclear material into fewer buildings at fewer sites.

Today, the program is still on track with the 2002 targeted date and expects to complete rapid upgrades at 100 of the most vulnerable buildings. However, in light of the expanded work, we are currently updating the plan. Our new estimate of 400 buildings requiring upgrades will likely be adjusted downward if we are able to undertake a vigorous consolidation effort with the Russians, which we fully expect at this time. Thus, as we develop our new work plan, we are necessarily factoring in some uncertainties. The President's Expanded Threat Reduction Initiative shows the program extending through FY 2004, but work may be required beyond that time. We will keep you informed as our new work plan develops.

PURCHASE POWER AND WHEELING

Mr. Clyburn. Mr. Secretary, as you well know, the Department of Energy has a significant presence in South Carolina. I take note, that on your first day on the job you were at the Savannah River Site. I hope I can count on your interest there not waning.

Mr. Secretary, I want to express my strong support for the SRS High Level Waste Alternate Salt Processing Vitrification Program. I know the Department has budgetary constraints and must balance competing interest, and it may be useful for you and I to meet privately where we can discuss this issue at length, but I want you to be aware of my interest in this program.

Now, Mr. Secretary, I understand your FY 2000 budget submission omits an appropriation for the Power Marketing Administrations. Can you explain to me the rational of omitting an account that is remitted back to the Treasury by electricity customers?

Secretary Richardson. The Administration is proposing no FY 2000 appropriations for Purchase Power and Wheeling for the PMAs but we are not proposing to eliminate the ability of the PMAs to engage in purchase power or wheeling activities. Rather, we are attempting in a narrow, focused manner to correct an anomaly in the appropriation process.

The purchased power and wheeling expenditures are immediately reimbursed by electricity customers -- yielding a net zero to the overall Federal budget. However, the resulting revenue goes directly to the U.S. Treasury. This imposes a burden on the Department's tight budget for discretionary funding. We have developed a proposal that encourages the development of external, non-governmental financial intermediaries to handle the flow of funds from PMA customers to their purchase power suppliers, eliminating this anomaly.

CHARACTERIZATION OF YUCCA MOUNTAIN

Mr. Clyburn. Finally Mr. Secretary, I want to go on record as a strong supporter of expediting the characterization of Yucca Mountain. In my opinion, the federal government has clearly failed to meet its responsibility, and the result is South Carolina electricity consumers are paying a disproportionate share of federal debt, and this is unfair. Can you briefly give me your vision of where we're going on this program?

Secretary Richardson. As stated previously, the Viability Assessment revealed that no "show stoppers" have been identified to date at Yucca Mountain and based on that, I have concluded that scientific and technical work should proceed at the site. It also identified issues that will need to be addressed before a decision can be made on whether or not Yucca Mountain should be recommended as a site for a repository. These issues include the key natural processes in Yucca Mountain, such as water movement, that would affect the long-term performance of the repository and waste package designs.

We are preparing the comprehensive technical documentation needed to complete the site characterization of Yucca Mountain and to support the decision whether to recommend the site to the President in 2001. The most challenging aspect of this effort is that we must provide scientific reasonable assurance that a repository at Yucca Mountain will adequately protect public health and safety and the environment for thousands of years after the repository is closed.

We are on schedule to complete a draft repository environmental impact statement in July 1999; a final repository environmental impact statement in 2000; and the scientific and technical work necessary to reach a decision on Yucca Mountain site suitability in 2001. We are also on schedule to submit the license application for repository construction to the Nuclear Regulatory Commission in 2002 if the site is suitable, and, if licensed, begin emplacement of waste in 2010.

ACCELERATED STRATEGIC COMPUTING INITIATIVE

Mr. Obey. This committee has recognized the value of the Accelerated Strategic Computing Initiative component of the Stockpile Stewardship program within Defense Programs by making it a priority in recent years. Given the need for continued upgrades in size and complexity of the computing infrastructure for this program over the next several years, could you comment on Department of Energy Defense Programs' budget plans for these future systems?

Also, do you believe the Department's budget plans are sufficient to provide the necessary hardware, specifically the supercomputers planned for installation in 2000 and 2001?

Dr. Reis. The FY 2000 budget request of $4.5 billion for the Stockpile Stewardship Program includes $341 million for the Accelerated Strategic Computing Initiative (ASCI) and $202 million for Stockpile Computing. In preparation for each fiscal year budget, Defense Programs carefully analyzes the advancements, both in hardware and software development, and evaluates the results based on the critical issues of time that face the Stockpile Stewardship Program.

At this time, ASCI is on track with the large computer systems necessary to accomplish the goal of providing the required computing capability to develop a predictive and reliable simulation capability for an integral nuclear weapon device by 2004. These computer acquisitions are multi-year and will require continued funding.

OFFICE OF THE SECRETARY

Mr. Packard. How many Department of Energy employees are currently assigned to work in the Executive Office of the President?

Mr. Farrell. As of March 4, there are 15 Department of Energy employees assigned to work in the Executive Office of the President. The Department of Energy employees who are currently assigned to work in the Executive Office of the President are assigned to work in the following areas.

Location	Number
White House Climate Change Task Force	4
National Partnership for Reinventing Government	1
Executive Office of the President	3
Committee on Critical Infrastructure	1
President's Council on Sustainable Development	6

Mr. Packard. Is the Department paying for the employees?

Mr. Farrell. The Department is currently paying salary and benefit expenses for 14 of those employees working at the Executive Office of the President as reflected in the following table. The Department is reimbursed by the Department of Defense for the one remaining employee. For the 6 employees working at the President's Council on Sustainable Development, all other costs are handled through an interagency reimbursable agreement with the Council on Environmental Quality Management Fund.

Mr. Packard. If so, what is the cost of each employee, which program organization is paying for the employee, and what are the specific duties of each employee?

Mr. Farrell. The following table shows the breakdown of each Departmental program organization responsible for paying for employees working at the Executive Office of the President, as well as the cost of each employee's annual salary. (The information follows:)

These employees provide representation for the Department in critical areas such as national security, climate change, and the communication with the Federal workforce of the National Partnership for Reinventing Government policies including incentive awards.

DEPARTMENT OF ENERGY EMPLOYEES
ASSIGNED TO WORK IN THE
EXECUTIVE OFFICE OF THE PRESIDENT

ORGANIZATION PAYING FOR EMPLOYEE	Number of Employees	Cost/Salary per Annum
Office of the Secretary	0	
Secretary Energy Advisory Board	0	
Chief Financial Officer	0	
Civilian Radioactive Waste Management	0	
Congressional & Intergovernmental Affairs	0	
Contract Reform & Privatization	0	
Counterintelligence	0	
Defense Programs	0	
Economic Impact & Diversity	0	
Energy Efficiency and Renewable Energy	3	$47,499
		$125,900
		$125,900
Energy Information Administration	0	
Environment, Safety & Health	0	
Environmental Management	0	
Field Management (Headquarter & Field Offices)	0	
Fissile Materials Disposition	0	
Fossil Energy	0	
General Counsel	0	
Hearings and Appeals	0	
Inspector General	0	
Intelligence	0	
Management and Administration	8	$33,650*
		$35,894

ORGANIZATION PAYING FOR EMPLOYEE	Number of Employees	Cost/Salary per Annum
		$43,428*
		$59,961*
		$61,895*
		$63,829*
		$65,763*
		$104,851
Nonproliferation and National Security	1	No Cost to Department
Nuclear Energy, Science and Technology	0	
Policy and International Affairs	0	
Public Affairs	1	$125,900
Science (formerly Energy Research)	2	$88,722
		$125,900
Worker and Community Transition	0	
Bonneville Power Administration	0	
Southeastern Power Administration	0	
Southwestern Power Administration	0	
Western Area Power Administration	0	
Total	15	$1,109,092

*Salary funding provided by the Office of the Assistant Secretary for Energy Efficiency and Renewable Energy.

REPORT ON UNCOSTED BALANCES

Mr. Packard. Please provide the Department's annual Report on Uncosted Balances for the record.

Dr. Telson. The Congressional Report on Carryover Balances for Fiscal Year End 1998 (Previously titled Report on Uncosted Balances) has been drafted and is undergoing internal review. We will provide the report immediately upon completion of the Departmental coordination process.

INTERNAL REPROGRAMMING AND USE OF PRIOR YEAR BALANCES

Mr. Packard. Did the Department approve any internal reprogrammings in fiscal year 1998 or fiscal year 1999 to date?

Dr. Telson. The Department has not approved any internal reprogramming actions in fiscal years 1998 or 1999 to date utilizing the general internal reprogramming flexibility. The Department's general internal reprogramming flexibility was suspended for FY 1998 and FY 1999 by direction contained in committee reports. However, the committees have restored internal reprogramming flexibility for the Departmental Administration account in FY 1998 and FY 1999. This limited flexibility was used once in FY 1998 to reprogram $1,000,000 from general administration contractual services to personnel compensation and benefits. In FY 1998 and FY 1999, the Department's field site managers utilized the Defense Environmental Restoration and Waste Management $5,000,000 temporary reprogramming authority in accordance with committee guidelines.

Mr. Packard. Did the Department approve the use of any prior year deobligations in FY 1998 or FY 1999 to date?

Dr. Telson. Yes, the Department has approved the use of some prior year deobligation amounts in accordance with committee guidelines. The use of prior year deobligations was limited to:

Fiscal Year 1998

Offsetting the FY 1998 reduction for use of prior year balances.

Science - $992,175.
Energy Supply R&D Activities - $3,142,188.
Uranium Supply & Enrichment Activities - $3,535,000.
Weapons Activities - $2,608,000.
Other Defense Activities - $2,852,019.
Southwestern Power Administration - $386,272.
Western Area Power Administration - Constr., Rehab., O&M - $3,683,646.

Funding to support the Department's implementation of Defense Nuclear Facilities Safety Board Recommendation 97-2.

Weapons Activities - $375,000.
Defense Environmental Restoration and Waste Management - $225,000.

Funding to cover a portion of the cost for a replacement helicopter at Western Area Power Administration.

Western Area Power Administration - Const., Rehab., O&M - $297,561.

Funding to support payment of an outstanding claim on the Volpe contract that resulted from an erroneous accounting adjustment.

Defense Environmental Restoration and Waste Management - $87,748.

Funding to support the Department's Strategic Management System and the R&D Tracking Data Base.

Weapons Activities - $250,000.
Defense Environmental Restoration and Waste Management - $300,000.
Energy Supply R&D Activities - $20,000.

Funding to replace an amount used as a source for the Brookhaven National Laboratory reprogramming action.

Defense Environmental Restoration and Waste Management - $1,078,000.

Funding to cover a liability identified during a DCAA closeout audit of the BETA contract with the Office of Policy.

Departmental Administration - $26,001.

Funding to support the Department's Summer Diversity Partnership Intern Program.

Weapons Activities - $60,000.

Funding to support the development of an International Science and Technology Strategic Plan.

Departmental Administration - $51,122.

Funding to cover travel and other operational costs associated with the development of a status report to the President on the implementation of the Presidential Decision Directive (PDD-61), "U.S. DOE Counterintelligence Program".

Other Defense Activities - $207,000.

Funding to support the Intellectual Property Program for the Office of General Counsel.

Departmental Administration - $135,544.

Funding to support the Department's efforts to estimate the environmental liability for active facilities.

Weapons Activities - $30,000.

Funding to support the Los Alamos firefighters pension refund.

Weapons Activities - $500,000.

Funding to support Fellowship Grants for the University Nuclear Science Program.

Energy Supply R&D Activities - $2,219.

Funding to cover litigation and settlement expenses on 2 separate legal actions at the Oak Ridge Operations Office, relating to the Oak Ridge Landlord program.

Energy Supply R&D Activities - $200,000.

Funding to support a legal obligation to repay the Department of Treasury Judgement Fund for a legal settlement involving KMS Fusion, Incorporated.
Weapons Activities - $48,123.

Funding to cover unforeseen requirements within the Office of Worker and Community Transitions' Program Direction; and to prevent a delay in the Work Force Information System (WFIS) implementation.
Other Defense Activities - $173,962.

Funding to support expanded inspection and oversight activities of the Office of Environment, Safety and Health with state and local governments.
Other Defense Activities - $320,758.

Funding to cover contract audit services for the Office of the Inspector General.
Inspector General - $450,000.

Funding reprogrammed to support the Molybdenum-99 (Moly-99) production initiative.
Uranium Supply and Enrichment Activities - $10,400.
Energy Supply R&D Activities - $793,529.

Funding reprogrammed to mitigate serious environmental problems at Brookhaven National Laboratory.
Science - $371,372.
Energy Supply R&D Activities - $602,000.

Funding reprogrammed to the Oak Ridge Landlord Program to remedy a safety problem.
Energy Supply R&D Activities - $1,404,007.

Fiscal Year 1999

Offsetting the FY 1999 reduction for use of prior year balances.
Weapons Activities - $1,610,367.
Other Defense Activities - $244,239.
Defense Environmental Restoration and Waste Management - $852,459.
Non-Defense Environmental Management - $67,576.
Southeastern Power Administration - $69,057.
Western Area Power Administration - $2,010,276.

Funding to cover closeout costs associated with New Production Reactors' contract with the Jupiter Corporation.
Other Defense Activities - $14,597.

Funding to cover the replacement of deteriorated submarine transmission cables.
Alaska Power Administration - $691,712.

Funding to cover Working Capital Fund and Support Service contract shortfalls in Public Affairs, Economic Impact and Diversity, and the Board of Contract Appeals.
Departmental Administration - $125,235.

Funding to cover closeout costs associated with the Office of Environment, Safety and Health's contract with Scientech, Incorporated.
Energy Supply R&D - $91,895.

Funding to support DOE's Information Assurance Outreach Program.
Other Defense Activities - $100,923.

Funding to support Y2K information system requirements for the Office of Environment, Safety and Health.
Energy Supply R&D - $141,078.

Mr. Packard. Did the Department approve the use of any construction project overrun funding in FY 1998 or FY 1999 to date?

Dr. Telson. Yes, the Department has approved the use of some funds from the construction project overrun account in accordance with direction contained in committee reports. The use of funding from the construction project overrun account was limited to:

Fiscal Year 1998

Reprogramming/appropriation transfer to support the Molybdenum-99 production initiative.
Energy Supply R&D Activities - $2,699,618.
Uranium Supply and Enrichment Activities - $196,453.

Reprogramming to cover settlement costs for the Fuel Processing Facilities Upgrade, project 82-D-136, at the Idaho Operations Office. The Department's notification letter dated August 20, 1998, advised of this action.
Defense Environmental Restoration and Waste Management - $100,223.

Reprogramming to the Oak Ridge Landlord Program to remedy a safety problem.
Energy Supply R&D Activities - $95,993.

Reprogramming/appropriation transfer to mitigate serious environmental problems at Brookhaven National Laboratory.
Science - $324,419.
Energy Supply R&D Activities - $123,114.

FiscalYear 1999

No action to date.

FUNCTIONAL SUPPORT COST REPORT

Mr. Packard. For the record, please provide the functional cost data by site for fiscal years 1994 through 1998. Please provide summaries which compare and analyze the cost elements by site.

Dr. Telson. A draft Functional Support Cost Report, for fiscal years 1995 through FY 1998, as required by the Energy and Water Subcommittee Conference Report, is in internal concurrence and not yet ready for final release. The first report from the system was released to the committee last year on March 4, 1998. Since then, several initiatives were completed and two sites were added. These initiatives will streamline the process as well as increase the functionality of the data. Specifically, the system now includes descriptive narrative (site profiles) prepared by each site, a joint review process with the Office of Chief Financial Officer and the cognizant Program Office, and a personal computer based system, with internal controls (such as single source data entry, reconciliation with the Central Accounting System, and database security to prevent unauthorized changes.) In addition, peer reviews have been conducted by the reporting contractors and, based on these reviews, definitions were clarified and expanded and data for each fiscal year was reviewed and adjusted, starting with FY 1995.

MANAGEMENT AND ADMINISTRATION
CORPORATE MANAGEMENT INFORMATION PROGRAM

Mr. Packard. The budget request for the Corporate Management Information Program (CMIP) is lacking any details to justify the increased funding request of $13 million in fiscal year 2000. For each detailed activity and task identified in the budget request, please provide the funding associated with it in fiscal year 1998, 1999, and 2000, and describe the need for the increased funding for each.

Mr. Farrell. Starting in FY 1998, the Corporate Management Information Program (CMIP) has been a corporate information technology investment initiative to replace major obsolete DOE business systems in an efficient and cost-effective way. The funding request increased by $5 million, from $8 million in FY 1999 to $13 million in FY 2000. The funding in these years for the activities associated with the CMIP are based on current requirements. As these activities are further developed, the requirements that would increase or decrease funding needs may be subject to change.

The corporate initiatives underscore the progress being made to ensure the effective use of information technology to help organizations achieve mission goals. This budget request is consistent with the scheduled acquisitions and implementations of the various corporate initiatives. The specifics of the detailed activities follow:

Corporate Management Information Program (CMIP)
(Dollars in Thousands)

	FY1998	FY1999	FY2000
Corporate Human Resources Information System (CHRIS)	**2,000**	**1,400**	**2,600**

During FY 1998, CHRIS replaced the PERS portion of the Departmentwide Payroll/Personnel System (PAY/PERS), which was nearing the end of its intended life. PERS was a custom built system, over ten years old, lacked flexibility to support increasing requirements, expensive to maintain, and not Y2K compliant.

On September 27, 1998, the new Corporate Human Resource Information System (CHRIS) went into production for personnel processing. As the official "personnel system of record," CHRIS capitalizes on the latest information technology using PeopleSoft Federal software. This commercial, off-the-shelf software provides the flexibility necessary to meet the Department's core and priority human resource mission functions. The software also makes the processing of personnel information compliant with Y2K Federal requirements.

On October 22, 1998, employee paychecks based on the personnel information in CHRIS were issued for the first time. CHRIS interfaces with the legacy payroll system, PAYS, that suffers from similar limitations as the PERS system did. The Department had planned to outsource payroll to another agency. But in late calendar year 1997, it was determined through negotiations that there was no assurance when the service would become available and that the costs were going to be substantially higher that originally expected. Therefore, it was decided that the requirements for replacing the payroll function were to be integrated with CHRIS. As a result, project staff had to ensure that CHRIS could meet these additional system-of-record requirements.

Initial development and tailoring of PeopleSoft payroll and time and labor began in calendar year 1999. CHRIS will be a fully integrated human resource, payroll, and time and labor system that satisfies DOE's plan to implement a Departmentwide, employee-accessible, automated human resource system.

FY 2000 budget request increase of $1,200,000 over FY 1999 permits us to begin the implementation of a fully integrated human resource management system, benefits, payroll, time and labor system. This includes the Peoplesoft upgrade to release 8.0 to ready the system for integrated testing of the human resources, payroll, time and labor. Also, Departmental employee self-services will be increased to the desktop.

Corporate Business Management Information System	FY1998	FY1999	FY2000
Financial Management (BMIS-FM)	1,100	2,300	5,600

The current Departmental financial systems are over ten years old, do not respond rapidly to changing requirements, are expensive to maintain, do not readily meet the business information needs of Department managers and customers, and do not fully support electronic commerce. Business Management Information System (BMIS) will provide real-time financial and business information for all parts of the Department.

In FY 1998, two major BMIS improvement efforts were initiated to improve access to corporate information: Corporate Executive Information System (Corporate EIS) and Financial Data Warehouse (FDW).

In FY 1999, a Strategic Information Management (SIM) process for BMIS was completed on financial management functions (i.e., planning, budgeting, accounting, and fiscal services) and a resulting business case is being completed. A COTS-based solution has been recommended to replace existing budgeting and accounting systems, e.g., the Departmental Integrated Standardized Core Accounting System (DISCAS), Financial Information System/Management Analysis Reporting System (FIS/MARS), budget formulation systems, Funds Distribution System (FDS), and shadow financial systems in most program organizations.

Graphical user interfaces, shortcut codes, and reengineered processes available through BMIS will provide financial, human resource, and procurement data with fewer personnel required for data entry and more reassigned to data analysis.

FY 2000 budget request increase of $3,300,000 over FY 1999 allows for the purchase of commercial off-the-shelf core financial system software, with minimal implementation and integration services, and training support sufficient to support two pilot sites. Also, hardware and utility software will be acquired and installed to support the pilot project.

	FY1998	FY1999	FY2000
Corporate Technology Supported Learning	0	0	400

This project will provide for using televideo technology on an interactive basis to conduct Departmentwide training in a consistent manner. For example, it is important that safety training be done in a manner that assures consistent information and techniques are shared and applied the same way at each site. Significant savings will be derived by reducing and eliminating the need for individual sites to develop the same training courses or having to send students to another site. FY 2000 initial budget request of $400,000 allows for a comprehensive assessment of Technology Supported Learning (TSL) training needs; analysis and design of a TSL infrastructure; the purchase and installation of pilot system hardware, equipment and network server software; the purchase of network services to support a pilot; and conducting pilot system tests.

	FY1998	FY1999	FY2000
Procurement Systems Modernization	0	0	400

The corporate procurement systems modernization will streamline procurement and property management processes and decrease reliance on a highly trained acquisition management staff. It will entail greater use of information technology in solicitation, negotiation, buying and administration processes. Plans include: property accountability, automatic archiving and recording, electronic commerce, and electronic interface to the corporate financial systems. The initial FY 2000 budget request of $400,000 allows for some of the electronic commerce tasks.

We will implement an industry interactive procurement process involving the electronic issuance of requests for proposals to offerors, offeror submission of proposals, electronic distribution and evaluation of those proposals and interactive communication with offerors during the negotiation process.

An Electronic Procurement System will be developed for purchases under $100,000. This will be an integrated, Web-based operational electronic simplified acquisition system that allows users to request the purchase of goods, secure supervisory approvals, commit funds, issue solicitations and/or orders to vendors, and approve invoices for payment.

	FY1998	FY1999	FY2000
Information Architecture, Capital Planning and Investment and Strategic Information Management	1,000	1,200	1,000

During FY 1998, the Chief Information Officer worked with various Departmental organizations to develop and publish a Departmental information architecture and information technology capital planning and investment process. In FY 1999, implementation of these processes are underway. Senior management has endorsed an information architecture project designed to identify the current state, the desired future state, and a five year migration plan for corporate information systems to support DOE missions. The information technology capital planning and investment process for corporate systems will be finalized and programmatic systems processes will be initiated. The Strategic Information Management (SIM) Program is a structured process to evaluate business requirements, determine systems needed and identify existing system shortfalls. The SIM process produces business case analyses leading to recommendations for new or enhanced corporate information technology investments. These efforts will continue through FY 2000 at nearly the same level as in the previous year to roll out these initiatives across the Department.

	FY1998	FY1999	FY2000
Infrastructure and Telecommunications Improvements	**1,900**	**3,100**	**3,000**

New corporate information systems are driving the need for a corporate telecommunications network with sufficient capacity for robust connectivity, data exchange, and access. In 1997, the Department identified having a corporate network as top priority to achieve the following objectives: provide high-speed access to corporate data and applications; serve as the Departmental Intranet; increase protection of proprietary (sensitive) data; and facilitate client/server and browser-based applications at reduced long-term cost.

In 1998, migration began from the existing DOE Business Network (DOEBN), sponsored by the Office of Environmental Management (EM), to a corporate network to support all of the corporate business systems of the Department. DOEBN, a Frame-Relay-based transport protocol network, provided connectivity to all 44 Federal sites, but lacked the full capacity and scalability required for a corporate network.

The first implementation phase, an upgrade to a hybrid ATM/Frame-Relay network, was begun in 1998. The upgrade has reduced data bottlenecks and improved response times significantly.

In FY 1999, after the upgrade is accomplished, traffic flowing over a significant number of independent, dedicated circuits will be consolidated onto a single network, yielding a notable cost avoidance. In the future, significant cost reductions will also be achieved in long-distance telephone charges with the use of the corporate network.

Also, the DOE network at Headquarters consists of individual segments attached to a high-speed communications channel backbone. Each segment was developed by and supports a single program office. This strategy resulted in numerous, disparate security policies and approaches with their attendant vulnerabilities, as documented in the 1997 Computer Incident Advisory Capability (CIAC) "white hat" information security assessment. Accordingly, a centralized firewall implementation strategy was endorsed and activated on September 1, 1998. Sensitive information resources were relocated within the firewall. Information resources that require public availability remain accessible.

In FY 2000, corporate network convergence upgrades will continue for multiple wide-area video and data networks. Upgrades to each site will: provide corporate network connectivity at 1.544 Mbps ATM service; and replace field site data routers with routers capable of supporting simultaneous voice, video, and data services. Also the initial implementation of the Defense Messaging System (DMS) will be integrated into the Headquarters infrastructure. DMS will provide secure (classified and unclassified) electronic messaging for the Department using components and technology developed by the Department of Defense. All work on the corporate network will strengthen the security of this critical component supporting corporate systems.

Summary	FY1998	FY1999	FY2000
Corporate Management Information Program Total	**6,000**	**8,000**	**13,000**

This program as described in initiatives above, is to replace major outdated Departmental corporate systems by providing a disciplined and cost-effective way to modernize a wide range of business systems in a coordinated manner that reflects use of emerging technologies.

MANAGEMENT AND ADMINISTRATION
CORPORATE MANAGEMENT INFORMATION PROGRAM

Mr. Packard. For each major initiative in the CMIP, please provide the total estimated cost and the cost by year from fiscal year 1998 through completion.

Mr. Farrell. The following table identifies total estimated costs from FY 1998 through completion for CMIP initiatives. (The information follows:)

ESTIMATED CMIP COSTS (In Millions) *

Initiative	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Totals
Corporate Human Resource Information System (CHRIS)	2.0	1.4	2.6	2.6	1.8	1.8	1.8	14.0
Corporate Business Management Information System-Financial Management (BMIS-FM)	1.1	2.3	5.6	8.4	9.0	1.3	0	27.7
Corporate Technology-Supported Learning Project			0.4	1.4	1.3	1.1	1.1	5.3
Corporate Procurement Systems Modernization			0.4	1.4	1.3	1.1	1.1	5.3
Information Architecture, Capital Planning and Investment and Strategic Information Management	1.0	1.2	1.0	2.6	2.6	2.6	3.0	14.0
Infrastructure and Telecommunications Improvements to Support Corporate Systems	1.9	3.1	3.0	4.0	3.0	0	0	15.0
Corporate Initiatives To Be Started **					1.9	9.5	9.2	20.6
Total	6.0	8.0	13.0	20.4	20.9	17.4	16.2	101.9

* These costs only include implementation costs, and do not include operation and maintenance costs.

** Senior executive investment board is expected to prioritize future corporate information technology investment initiatives starting in FY 2001 and extending beyond FY 2004.

MANAGEMENT AND ADMINISTRATION
YEAR 2000 MISSION CRITICAL SYSTEMS

Mr. Packard. Will all of your critical computer systems be modified by the year 2000? How many computer systems have been corrected out of a universe of how many systems? What are the most critical systems to correct? What are the possible problems in meeting the deadline?

Mr. Farrell. The Department of Energy has completed Y2K remediation on 368 of the 420 systems (88 percent) in the mission-critical inventory as of March 1, 1999. This is a dramatic increase over the 50 percent compliance rate reported as of October 31, 1998. Further, the Department is on track to complete 98 percent of its mission-critical systems by the March 31, 1999 milestone, with the remaining seven systems scheduled to be completed by October 31, 1999. We do not envision any problems with maintaining this schedule for completion.

The Department has classified those systems that are most critical to accomplishing our missions as "mission-critical." Mission-critical systems are tracked very closely and are required to undergo independent verification and validation, end-to-end testing, and have Y2K contingency plans in place in case of failure.

The Department has also placed attention on additional risk education and risk mitigation efforts that will help to ensure that no DOE mission is impeded because of the century date change. These efforts include the following:

1. The Department will ensure that a set of "independent eyes", through an independent validation and verification process, provides an independent assessment of residual Year 2000 risks for all mission-critical systems.
2. The Department will test, to the extent possible, systems working together in end-to-end configurations, thus confirming the Department's ability to meet its data exchange requirements.
3. The Department will perform contingency planning for all mission-critical systems and business continuity planning for all DOE sites to prepare for potential events beyond Departmental control.
4. The Department will address configuration management for its inventory of Year 2000 compliant systems to ensure future changes and/or upgrades do not introduce Year 2000 risks.

MANAGEMENT AND ADMINISTRATION
STAFFING LEVELS

Mr. Packard. For the record, provide a detailed staffing table by Headquarters and field organizations showing the Strategic Alignment Initiative (SAI) profile of both FTE and end of year staffing through fiscal year 2000, using fiscal year 1995 as the baseline. Include a staffing profile for the Power Marketing Administrations for each of those years as well.

Mr. Farrell. The following table contains the fiscal year 1995 allocation which is the SAI Baseline against which the 27% staffing reduction is based. Actual end-of-year on-board employment and FTE staffing levels for fiscal years 1996, 1997, and 1998 and projected on-board employment and FTE usage for fiscal years 1999 and 2000 are provided as requested. Organization and site specific allocations for FY 2000 are currently under review.

This table is not by appropriation, but rather is shown by organizational element. Therefore, it does not tie directly back to budget staffing control tables, as some organizational elements contain staffing supported by more than one appropriation. (The information follows:)

Department of Energy Year End Employment and FTE Usage Projections

Organization	FY 1995 SAI Baseline	FY 1996 Actual EOY Onbrd	FY 1996 Actual FTE Usage	FY 1997 Actual EOY OnBrd	FY 1997 Actual FTE Usage	FY 1998 Actual EOY OnBrd	FY 1998 Actual FTE Usage	FY 1999 Planned EOY OnBrd	FY 1999 Est. FTE Usage	FY 2000 Planned EOY OnBrd	FY 2000 Est. FTE Usage
Chief Financial Officer	280	251	259	211	218	204	202	210	210	210	210
Civil. Rad. Waste Mgt	220	216	221	201	203	168	181	165	178	155	175
Cong./ Pub. Intgov't Affairs	131	104	105	65	73	0	0	0	0	0	0
Congr'l & Intergov't Affairs	0	0	0	0	0	41	38	41	41	40	41
Public Affairs	0	0	0	0	0	27	27	32	32	31	32
Contract Reform and Privatization	0	0	0	0	0	3	1	7	5	7	7
Defense Programs	335	352	348	335	344	283	299	267	287	261	264
Econ Impact & Diversity	60	50	50	43	44	41	40	43	43	41	42
Energy Eff & Renewable Engy	649	521	567	489	495	469	477	471	495	458	474
Energy Info Admin	486	440	445	409	410	385	383	375	379	368	372
Science (formerly Energy Research)	359	313	313	286	295	265	269	271	269	266	274
Environmental Mgt	840	662	701	507	579	431	437	427	435	412	425
Env, Safety & Health	485	408	412	391	396	362	367	349	356	335	340
Field Management	99	66	68	49	53	47	47	48	48	47	48
Fissile Materials	20	20	20	23	21	28	25	28	28	28	35
Fossil Energy	257	219	223	209	207	201	204	200	202	195	197
General Counsel	224	194	197	179	181	167	171	173	173	170	169
Hearings & Appeals	89	57	64	53	55	48	49	47	43	45	46
Management & Administration	962	775	796	625	659	600	598	597	597	586	591
Inspector General	356	314	325	274	291	257	245	260	266	254	257
Nonpro & Nat'l Sec	359	347	343	354	358	291	315	316	317	308	312
Intelligence						38	19	38	38	36	37
Counterintelligence						8	4	15	20	15	36
Nuclear Energy	153	144	145	134	136	126	129	96	96	93	93
Naval Reactor HQ	60	55	58	55	54	57	55	57	57	57	57
Ofc of the Secretary	30	20	20	24	22	32	28	40	37	40	40
Ofc of Quality Mgt	12	11	11	8	9	0	0	0	0	0	0
Ofc of Policy	225	178	186	120	130	111	111	112	113	120	120
Research & Dev Mgt	18	0	6	0	0	0	0	0	0	0	0
Sec of Energy Adv Bd	9	4	5	5	4	5	5	5	5	5	5
Science Ed & Tech Info.	30	0	0	0	0	0	0	0	0	0	0
Worker Transition	18	16	16	29	27	25	27	22	24	21	22
Subtotal Headquarters	**6,766**	**5,737**	**5,904**	**5,078**	**5,264**	**4,720**	**4,753**	**4,712**	**4,794**	**4,604**	**4,721**

Organization	FY 1995	FY 1996 Actual		FY 1997 Actual		FY 1998 Actual		FY 1999 Planned	FY 1999 Est.	FY 2000 Planned	FY 2000 Est.
	SAI Baseline	EOY Onbrd	FTE Usage	EOY OnBrd	FTE Usage	EOY OnBrd	FTE Usage	EOY OnBrd	FTE Usage	EOY OnBrd	FTE Usage
Operations/Field Ofc											
Albuquerque Ops Ofc	1,606	1,462	1,482	1,386	1,398	1,299	1,310	1,324	1,347	1,310	1,313
Chicago Ops Office	596	505	522	479	483	462	457	461	469	465	468
Idaho Ops Office	462	415	425	393	400	380	381	377	386	375	377
Nevada Ops Office	410	366	372	340	345	316	320	306	325	292	302
Oakland Ops Office	441	399	412	362	371	344	346	337	366	324	331
Oak Ridge Ops Office	772	673	682	630	633	588	585	574	604	555	566
Ohio Field Office	250	230	223	229	234	217	223	224	224	225	225
Richland Ops Office	581	524	536	513	526	506	500	514	514	514	514
Rocky Flats Field Ofc	302	294	301	280	291	242	257	246	247	233	242
Savannah River Ops	623	572	574	556	547	513	523	490	509	473	493
Subtotal Ops Offices	**6,043**	**5,440**	**5,529**	**5,168**	**5,228**	**4,867**	**4,902**	**4,853**	**4,991**	**4,766**	**4,831**
Special Purpose Ofc											
OSTI	164	132	143	125	126	92	101	98	99	96	99
Naval Petroleum Res	57	54	54	47	50	29	37	25	26	21	27
Golden Field Office	42	55	48	49	49	48	48	47	48	46	46
Federal Energy Technology Center				537	531	513	518	518	540	507	518
Morgantown ETC	317	283	293	0	0	0	0	0	0	0	0
Pittsburgh ETC	309	266	269	0	0	0	0	0	0	0	0
Pittsburgh Naval Reactors	79	73	73	67	68	69	67	72	72	70	70
Schenectady Naval Reactors	70	66	63	65	65	64	64	65	65	64	64
Strategic Petroleum Reserve	130	114	116	108	109	102	103	101	110	99	100
Subtotal Spec Purpose	**1,168**	**1,043**	**1,059**	**998**	**998**	**917**	**938**	**926**	**960**	**903**	**924**
Over Allocation	80							122		-4	
Subtotal SAI Universe	**14,057**	**12,220**	**12,492**	**11,244**	**11,490**	**10,504**	**10,593**	**10,613**	**10,745**	**10,269**	**10,476**

NOTE: The 27% Staffing reduction was computed against an FY 1995 Staffing Allocation of 14,057.

Organization	FY 1995	FY 1996 Actual		FY 1997 Actual		FY 1998 Actual		FY 1999 Planned	FY 1999 Est.	FY 2000 Planned	FY 2000 Est.
	SAI Baseline	EOY Onbrd	FTE Usage	EOY OnBrd	FTE Usage	EOY OnBrd	FTE Usage	EOY OnBrd	FTE Usage	EOY OnBrd	FTE Usage
Organizations and Staffing not included in the Strategic Alignment Universe											
Former Bureau of Mines											
Pittsburgh BoM	0	0	0	30	28	30	29		29		29
Albany Research Center	0	0	0	86	81	79	81		85		85
Power Marketing Administrations											
Alaska Power Admin	35	20	26	8	10	2	6		1		0
Bonneville Power Admin	3,440	3,155	3,160	2,901	2,929	2,799	2,779		2,800		2,800
Southeastern Pwr Admin	41	42	41	43	41	38	41		41		42
Southwestern Pwr Admin	196	183	185	175	175	172	174		175		177
Western Area Pwr Admin	1,467	1,291	1,329	1,284	1,252	1,255	1,254		1,330		1,290
Subtotal PMAs	5,179	4,691	4,741	4,411	4,407	4,266	4,254		4,347		4,309
Federal Energy Regulatory Com	1,463	1,374	1,374	1,343	1,335	1,322	1,318		1,320		1,320
DOE Totals	**20,699**	**18,285**	**18,607**	**17,114**	**17,341**	**16,201**	**16,275**		**16,526**		**16,219**

CONTRACTOR EMPLOYMENT LEVELS

Mr. Packard. Provide for the record a table showing fiscal years 1994, 1995, 1996, 1997, 1998, 1999, and projected 2000 contractor employment levels by operations office, program, and facility. For example, contractor employment at Rocky Flats would be categorized by environmental management, defense programs, etc., while contractor employment at Oakland would be categorized by laboratory, and then program.

Mr. DeGrasse. By operations office, program, and facility, contractor employment levels for fiscal years 1994-1998, with projections for the end of fiscal years 1999 and 2000, are shown in the tables which I would like to insert in the record. During fiscal year 1999 these projections indicate that 1,523 position reductions will occur at DOE sites. These net reductions are offset by increases of 969 positions, primarily at the Department's laboratories. Initial estimates for fiscal year 2000 indicate a net reduction of approximately 3,000 positions, and changes in contract mechanisms and skill mix may impact additional workers over this period. These activities and potential offsets due to the creation of new positions are not reflected in the data on net changes in total contractor employment for fiscal year 2000. The information follows:

PRIME CONTRACTOR EMPLOYMENT BY SITE AND PROGRAM

Fiscal Year 1994

SITE	PROGRAM								
	DP	EM	NE	ER	EE	NN	WFO	Other	TOTAL
Albuquerque Operations Office									
Kansas City	2,873	88					48	280	3,289
Los Alamos National Laboratory	2,944	1,059	90	834	126		1,191	778	7,024
Pantex	3,102	50					47	31	3,230
Sandia National Laboratory	4,363	670	24	198	243		2,100	860	8,458
Waste Isolation Pilot Project		735							735
Pinellas	876	68					55	8	1,007
Chicago Operations Office									
Brookhaven National Laboratory	53	147	8	2,882	31			516	3,437
Argonne East-Chicago	12	259	786	474	81		373	1,659	3,644
Argonne West-Idaho		34		386			17	421	858
Idaho National Engineering Laboratory	142	4,290	796	125	70		489	1,612	7,524
Nevada	2,627	445						1,996	5,068
Oak Ridge	4,893	8,714	571	2,424	550		1,792	271	17,215
Oakland Operations Office									
Lawrence Livermore National Laboratory	3,271	879	61	393	10		2,148	759	7,321
Lawrence Berkeley National Laboratory		112		1,457	218		509	1,847	4,143
Ohio Field Office									
Mound	705	358	135					139	1,337
West Valley		970							970
Fernald		2,385							2,385
Richland	434	11,839	12	208	105		387	3,967	16,952
Rocky Flats	2,658	4,035						5	6,698
Savannah River	10,955	7,781					22	164	18,922
Subtotal	39,908	42,718	2,483	9,181	1,436		9,178	15,313	120,217
Other Sites	233	1,047	3,328	7,499	914		59	2,800	15,880
Grand Total	40,141	43,765	5,811	16,680	2,350		9,237	18,113	136,097

Note. Major Other Programs: RW, 1,824; FE, 2,423. NN created in FY 1995. Remaining positions include smaller programs and unallocated overhead.

PRIME CONTRACTOR EMPLOYMENT BY SITE AND PROGRAM

Fiscal Year 1995

SITE	PROGRAM								
	DP	EM	NE	ER	EE	NN	WFO	Other	TOTAL
Albuquerque Operations Office									
Kansas City	2,984	92					487		3,563
Los Alamos National Laboratory	3,059	934	122	685	94	291	1,490	33	6,708
Pantex	3,007	174					167		3,348
Sandia National Laboratory	4,171	800	73	186	242	606	2,378	71	8,527
Waste Isolation Pilot Project		640							640
Pinellas	561	108							669
Chicago Operations Office									
Brookhaven National Laboratory	46	141	10	2,585	27	64	376	72	3,321
Argonne East-Chicago	35	365	281	1,783	126	62	655	117	3,424
Argonne West-Idaho	0	167	593				14	4	778
Idaho National Engineering Laboratory	125	4,177	599	50	63	55	76	939	6,084
Nevada	2,406	368	1			85	597	483	3,940
Oak Ridge	5,225	6,570	442	2,089	357	185	1,142	570	16,580
Oakland Operations Office									
Lawrence Livermore National Laboratory	3,161	618	54	660	9	465	2,275	130	7,372
Lawrence Berkeley National Laboratory		94		1,339	187		579	41	2,240
Ohio Field Office									
Mound	679	281	146					16	1,122
West Valley		957							957
Fernald		2,203							2,203
Richland	252	9,535	74	192	669	98	489	2,448	13,757
Rocky Flats	935	3,467					4	12	4,418
Savannah River	7,534	7,896							15,430
Subtotal	34,180	39,587	2,395	9,569	1,774	1,911	10,729	4,936	105,081
Other Sites	59	302	6,105	4,431	926	22	50	4,885	16,780
Grand Total	34,239	39,889	8,500	14,000	2,700	1,933	10,779	9,821	121,861

Note. Major Other Programs: RW, 1,360; FE, 2,100; EH, 590. Remaining positions include smaller programs and unallocated overhead.

PRIME CONTRACTOR EMPLOYMENT BY SITE AND PROGRAM

Fiscal Year 1996

SITE	PROGRAM								
	DP	EM	NE	ER	EE	NN	WFO	Other	TOTAL
Albuquerque Operations Office									
Kansas City	3,055	73					533		3,661
Los Alamos National Laboratory	3,564	697	80	475	70	565	964	24	6,439
Pantex	3,016	208					103		3,327
Sandia National Laboratory	4,092	685	90	168	215	580	2,150	77	8,057
Waste Isolation Pilot Project	0	636							636
Pinellas	8	480						50	538
Chicago Operations Office									
Brookhaven National Laboratory	48	182	11	2,353	51	65	370	62	3,142
Argonne East-Chicago **	17	268	322	1,641	134	93	699	71	3,245
Argonne West-Idaho	0	174	511			32	36		753
Idaho National Engineering Laboratory	208	3,703	576	68	61	56	72	995	5,739
Nevada	1,852	426	5		6	119		357	2,765
Oak Ridge	4,155	6,287	540	2,163	407	216	1,620	427	15,815
Oakland Operations Office									
Lawrence Livermore National Laboratory	3,424	453	38	428	14	451	1,880		6,688
Lawrence Berkeley National Laboratory	0	84		1,529	183		576	51	2,423
Ohio Field Office									
Mound	33	752	134				5		924
West Valley **	0	905					7		912
Fernald **	0	1,986							1,986
Richland	154	8,436	94	182	100	110	345	2,678	12,099
Rocky Flats	467	3,017					47	3	3,534
Savannah River	1,384	12,811					59	125	14,379
Subtotal	25,477	42,263	2,401	9,007	1,241	2,287	9,466	4,920	97,062
Other Sites **	0	715	5,824	4,293	639	33	76	3,347	14,927
Grand Total	25,477	42,978	8,225	13,300	1,880	2,320	9,542	8,267	111,989

Note. Major Other Programs: RW, 475; FE, 1,980; EH, 475. Remaining positions include smaller programs and unallocated overhead.
** Slight adjustments made from earlier numbers.

PRIME CONTRACTOR EMPLOYMENT BY SITE AND PROGRAM

Fiscal Year 1997

SITE	PROGRAM								
	DP	EM	NE	ER	EE	NN	WFO	Other	TOTAL
Albuquerque Operations Office									
Kansas City	3,023	57					599		3,679
Los Alamos National Laboratory	3,702	563	76	460	78	611	1,037	160	6,687
Pantex	2,662	151					107		2,920
Sandia National Laboratory	4,055	457	79	155	229	613	1,915	73	7,576
Waste Isolation Pilot Project	0	636							636
Pinellas	0	5							5
Chicago Operations Office									
Brookhaven National Laboratory	35	162	16	2,312	43	70	403	32	3,073
Argonne East-Chicago	5	183	231	1,640	132	69	748	49	3,057
Argonne West-Idaho	0	85	526			24	117		752
Idaho National Engineering Laboratory	171	3,833	543	61	67	62	153	978	5,868
Nevada	1,597	325				76	309	38	2,345
Oak Ridge	4,555	4,505	400	2,163	400	30	1,423	570	14,046
Oakland Operations Office									
Lawrence Livermore National Laboratory	3,315	399	46	320	17	431	1,875		6,403
Lawrence Berkeley National Laboratory	0	84		1,529	183		576	51	2,423
Ohio Field Office									
Mound	19	676	40				5		740
West Valley	0	883					6		889
Fernald	0	1,989							1,989
Richland	154	8,200	94	182	100	110	311	2,179	11,330
Rocky Flats		3,360					47	3	3,410
Savannah River	1,401	11,756					39	35	13,231
Subtotal	24,694	38,309	2,051	8,822	1,249	2,096	9,562	4,166	91,059
Other Sites	0	650	5,824	3,970	620	33	76	3,065	14,238
Grand Total	24,694	38,959	7,875	12,792	1,869	2,129	9,638	7,233	105,297

PRIME CONTRACTOR EMPLOYMENT BY SITE AND PROGRAM

Fiscal Year 1998

SITE	PROGRAM								
	DP	EM	NE	ER	EE	NN	WFO	Other	TOTAL
Albuquerque Operations Office									
Kansas City	2,501	13					742		3,256
Los Alamos National Laboratory	3,951	591	80	479	80	620	1,048	160	7,009
Pantex	2,602	170					16	68	2,856
Sandia National Laboratory	3,958	425	90	168	215	580	1,991	74	7,501
Waste Isolation Pilot Project		613							613
Pinellas									0
Chicago Operations Office									
Brookhaven National Laboratory	34	134	19	2,295	34	92	411	21	3,040
Argonne East-Chicago	4	133	248	1,588	155	82	668	47	2,925
Argonne West-Idaho	11	44	509			31	151		746
Idaho National Engineering Laboratory	167	3,638	615	66	48	51	154	1004	5,743
Nevada	1,635	347	2		5	95	386	45	2,515
Oak Ridge	4,889	3,303	277	2,040	581	235	1,681	567	13,573
Oakland Operations Office									
Lawrence Livermore National Laboratory	3,396	418	48	359	15	456	517	1399	6,608
Lawrence Berkeley National Laboratory	51	131		1,159	145	7	749	24	2,266
Ohio Field Office									
Mound		673	35						708
West Valley		828							828
Fernald		1,977							1,977
Richland	129	8,000	105	271	98	145	229	2,007	10,984
Rocky Flats	1	3,150					12	3	3,166
Savannah River	1,299	11,502					89	192	13,082
Subtotal	24,628	36,090	2,028	8,425	1,376	2,394	8,844	5,611	89,396
Other Sites	0	542	5,758	4,078	620	33	75	2,509	13,615
Grand Total	24,628	36,632	7,786	12,503	1,996	2,427	8,919	8,120	103,011

PRIME CONTRACTOR EMPLOYMENT BY SITE AND PROGRAM

Fiscal Year 1999

SITE	PROGRAM			
	DP	EM	OTHER	TOTAL
Albuquerque Operations Office				
Kansas City	2,500	12	597	3,109
Los Alamos National Laboratory	4,550	407	2,316	7,273
Pantex	2,598	58	93	2,749
Sandia National Laboratory	3,990	377	3,054	7,421
Waste Isolation Pilot Project		665		665
Pinellas				0
Chicago Operations Office				
Brookhaven National Laboratory	10	126	2,889	3,025
Argonne East-Chicago	10	65	2,792	2,867
Argonne West-Idaho	11	11	703	725
Idaho National Engineering Laboratory	68	3,688	2,044	5,800
Nevada	1,635	347	533	2,515
Oak Ridge	4,871	3,295	5,364	13,530
Oakland Operations Office				
Lawrence Livermore National Laboratory	3,610	427	2,745	6,782
Lawrence Berkeley National Laboratory	56	143	2,275	2,474
Ohio Field Office				
Mound		747	35	782
West Valley		828		828
Fernald		1,877		1,877
Richland	90	7,625	2,930	10,645
Rocky Flats		3,038	10	3,048
Savannah River	1,555	11,154	281	12,990
Subtotal	25,554	34,890	28,661	89,105
Other Sites		540	12,802	13,342
Grand Total	25,554	35,430	41,463	102,447

Note: Projections for several sites are not yet public (e.g., Fernald)

PRIME CONTRACTOR EMPLOYMENT BY SITE AND PROGRAM

Fiscal Year 2000

SITE	PROGRAM			
	DP	EM	OTHER	TOTAL
Albuquerque Operations Office				
Kansas City	2,300	13	594	2,907
Los Alamos National Laboratory	4,650	407	2,316	7,373
Pantex	2,394	58	93	2,545
Sandia National Laboratory	3,899	322	3,100	7,321
Waste Isolation Pilot Project		732		732
Pinellas				0
Chicago Operations Office				
Brookhaven National Laboratory	2	126	2,847	2,975
Argonne East-Chicago	4	63	2,725	2,792
Argonne West-Idaho	5	5	540	550
Idaho National Engineering Laboratory	1	3,761	2,088	5,850
Nevada	1,635	347	533	2,515
Oak Ridge	4,295	2,914	5,581	12,790
Oakland Operations Office				
Lawrence Livermore National Laboratory	3,610	427	2,745	6,782
Lawrence Berkeley National Laboratory	61	154	2,450	2,665
Ohio Field Office				
Mound		740	35	775
West Valley		828		828
Fernald		1,777		1,777
Richland	55	7,600	2,900	10,555
Rocky Flats		2,914	10	2,924
Savannah River	1,493	11,156	281	12,930
Subtotal	24,404	34,344	28,838	87,586
Other Sites		540	12,535	13,075
Grand Total	24,404	34,884	41,373	100,661

Note: Projections for several sites are not public (e.g., Fernald)

DOE LEASED OR OWNED AIRCRAFT

Mr. Packard. Provide a detailed list of all aircraft leased or owned by the Department, and identify the field office and program to which the aircraft is assigned.

Secretary Richardson. A list of all aircraft leased or owned by the Department and the field officeand the mission(s) to which the aircraft is assigned is shown in the table below, which I would like to insert for the record. The information follows:

DEPARTMENT OF ENERGY LEASED OR OWNED AIRCRAFT

DOE FIELD OFFICE/ AIRCRAFT MODEL	MISSION
ALBUQUERQUE Fixed Wing: 2 DC-9s	- Carry classified and hazardous DOE cargo - Transport time critical, classified and/or hazardous materials to various DOD Military First Destinations - Used in emergency situations (e.g., Nuclear Emergency Search Team [NEST], Accident Response Group, etc.)
Lear-35	- Transport hazardous and/or classified materials that are time sensitive to ongoing R&D programs - Used in emergency situations (e.g., Accident Response Group)
King Air BE-200D	- Transport hazardous and/or classified materials that are time sensitive to ongoing R&D programs - Used in emergency situation (e.g., Accident Response Group)
2 deHavilland DHC-6s	- R&D for Sandia and Lawrence Livermore
NEVADA: Fixed Wing: 2 King Air BE-200s	- Supports the Department and civil nuclear reactor facilities with air sampling, radiation measurements & radioactive materials transportation - Used in emergency situations (e.g., NEST)
Cessna Citation II	- Photography, multispectral and radiation surveys - Used in nuclear emergency response situations
Helicopters: 4 BO-105s 2 Bell-412s	- Radiation measurements, multispectral and thermal scanner surveys, photo and video oblique flights, and providing support for site security missions
BONNEVILLE: Fixed Wing: 2 King Air BE-200s	- Transportation of passengers, parts and equipment
Helicopters: 6 Bell-206Ds	- Transmission line patrols for inspection and maintenance, i.e., infrared, low level photography, etc. - Used to transport people, tools and materials in emergency situations
WESTERN: Helicopters: 4 Bell-206s	- Transmission line patrols for inspection and maintenance, i.e., infrared, low level photography, etc. - Used to transport people, tools and materials in emergency situations
SAVANNAH RIVER: Helicopters 2 BK-117s	- Respond to security incidents and provide rapid transportation for the Special Response Team - Providing airborne intelligence gathering/relay station, airborne firing platform, escort/response vehicle, routine patrol of the general site and assistance to law enforcement

MANAGEMENT AND ADMINISTRATION
ADVISORY COMMITTEES BUDGET

Mr. Packard. Provide a list of advisory committees and the amount budgeted for each in fiscal years 1998, 1999, and 2000.

Mr. Farrell. The Department currently has 15 chartered advisory committees, either by statute, Executive Order or at the discretion of the Secretary of Energy. The Department uses advisory committees as a vehicle for allowing public participation in agency decision-making in critical, high risk areas such as: environmental restoration and waste management issues; and research, development, energy, and national defense responsibilities.

The actual expenditures for fiscal year 1998 and the estimated budgets for fiscal year 1999 are taken from the 27th Annual Report to the President on Federal Advisory Committees -- Fiscal Year 1998. The fiscal year 2000 data reflects fiscal year 1999 projection costs adjusted upward for inflation for all advisory committees. (The information follows:)

ADVISORY COMMITTEES
BUDGET INFORMATION

FEDERAL ADVISORY COMMITTEES	FY 1998 ACTUAL EXPENDITURES	FY 1999 PROJECTED COSTS	FY 2000 * BUDGET REQUEST
	(Whole Dollars)		
Advisory Committee on Appliance Energy Efficiency Standards	$97,704	$102,500	104,550
American Statistical Association Committee on Energy Statistics	52,282	49,500	50,490
Basic Energy Sciences Advisory Committee	154,459	190,500	194,310
Beryllium Rule Advisory Committee 1/	68,300	0	0
Biological and Environmental Research Advisory Committee 2/	213,039	103,800	105,876
Environmental Management Advisory Board	870,996	936,100	954,822
Environmental Management Site-Specific Advisory Board	3,439,618	4,067,269	4,148,614
Fusion Energy Sciences Advisory Committee	95,000	95,000	96,900
High Energy Physics Advisory Panel	105,200	107,200	109,344
Hydrogen Technical Advisory Panel	129,800	98,000	99,960
Metal Casting Industrial Advisory Board 3/	0	0	0
National Coal Council	45,265	50,000	51,000
National Electric and Magnetic Fields Advisory Committee 4/	69,439	29,600	0
Nuclear Energy Research Advisory Committee 5/	0	0	0
National Petroleum Council	76,320	125,000	127,500
President's Council on Sustainable Development 6/	868,835	835,093	851,795
Secretary of Energy Advisory Board	710,470	783,400	799,068

ADVISORY COMMITTEES
BUDGET INFORMATION

FEDERAL ADVISORY COMMITTEES	FY 1998 ACTUAL EXPENDITURES	FY 1999 PROJECTED COSTS	FY 2000 * BUDGET REQUEST
		(Whole Dollars)	
State Energy Advisory Board	172,000	195,000	198,900
Technical Advisory Committee on Verification of Fissile Material and Nuclear Warhead Controls 7/	0	0	0
Technical Panel on Magnetic Fusion 8/	0	0	0
TOTAL	7,168,727	7,767,962	7,893,129

* FY 2000 Budget Request column reflects FY 1999 projected costs adjusted upward for inflation for all advisory committees.

1/ Advisory Committee Terminated, June 1998

2/ Formerly the Health and Environmental Research Advisory Committee

3/ Advisory Committee Terminated, December 1997

4/ Advisory Committee Terminated, December 1998

5/ Advisory Committee Established, October 1, 1998

6/ Managed at the Department of Energy through an Interagency Agreement with the Executive Office of the President, Council on Environmental Quality

7/ Inactive, Statutory Advisory Committee

8/ Inactive, Statutory Advisory Committee

MANAGEMENT AND ADMINISTRATION
CONFERENCES

Mr. Packard. Provide a list of all conferences sponsored by DOE in fiscal years 1998 and 1999 to date. Include the number of DOE employees attending, the number of contractor employees, and the location and purpose of the conference.

Mr. Farrell. The Department does not maintain an official list of all DOE-sponsored conferences; however, we have asked each DOE organization to provide a list of key conferences for 1998 and 1999 to date. A table showing those conferences is provided, along with a list of acronyms. (The information follows:)

DEPARTMENTAL CONFERENCE ACTIVITIES
FISCAL YEAR 1998 THRU MARCH 1999

CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
Princeton University DOE/DP-18 DOE/ER	12th Topical Conference on High Temperature Diagnostics	1	25-30	Princeton, NJ	
DOE/DP-41	DP Program Direction Review	15	0	Irving, TX	
DOE/DP-45	DOE Backup Power Working Group Annual Meeting	5	20	Idaho Falls, ID	
DOE/DP-50	Principal Investigator Meeting and Alliances and Strategic Programs Kick-Off Meeting	8	280	Snowbird, UT	
DOE/DP-50	Implementation Plan Kick-Off Meeting	24	37	Alexandria, VA	
DOE/DP-50 National Science Foundation	Data and Visualization Corridors for Large Scale Computation Workshop Series -				
	1. The Framework Workshop	3	8	Oxnard, CA	
	2. User Requirements	7	24	Santa Fe, NM	
	3. The Vendor Projections Workshop	5	10	Bodega Bay, CA	
	4. Writing Session	3	7	Duck, NC	
	5. Writing Session	3	6	Queenstown, MD	
	6. Corridors at a Distance	7	36	Myrtle Beach, SC	
DOE/DP-51 ASCI	ASCI Principal Investigator Meeting	20	200	Snowbird, UT	
DOE/DP-51 IEEE	Super Computing 97	20	40	San Jose, CA	
DOE/DP-51 ASCI	Data and Visualization Corridors Meeting	10	30	Santa Fe, NM	
DOE/DP-51 ASCI	PSE/NEWS/DisCOM2 Integration	1	30	Santa Rosa, CA	
DOE/DP-51 AIAA	Joint Army Navy NASA AF Subcommittee on V&V of Simulations	1	3	Albuquerque, NM	
DOE/DP-41	DP Program Direction Review	15	0	Irving, TX	
DOE/DP-50	Principal Investigator Meeting	16	151	Kennedy Space Center, FL	
OIAF EIA	National Energy Modeling System/Annual Energy Outlook Conference - To bring together energy analysts, modelers, and decision makers to discuss current energy topics relevant to longer-term analysis and forecasting.	91 100	18 20	Arlington, VA	03/30/98 03/22/99
EH-2	Accident Investigation Training	42	17	Gaithersburg, MD	12/97
EH-2	Accident Investigation Core Team Training	38	1	Albuquerque, NM	01/98
EH-2	Emergency Preparedness Training	25	10	Gaithersburg, MD	01/98

DEPARTMENTAL CONFERENCE ACTIVITIES
FISCAL YEAR 1998 THRU MARCH 1999

CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
EH-2	EH Residents Meeting	25	3	Albuquerque, NM	05/98
EH-10	DOE PAAA Coordinators Workshop	50	2	Las Vegas, NV	12/98
EH-33	DOE Operating Experience Data Analysis Forum	49	83	Las Vegas, NV	01/99
EH-33	Annual Off-Site Meeting	10	1	Potomac, MD	03/99
DOE Technical Standards Program and various outsides agencies	1998 Federal Technical Standards Workshop	39	27	Washington, DC	
DOE Technical Standards Program	Technical Standards Program Topical Committees Meeting	15	15	Washington, DC	
DOE Technical Standards Program	Technical Standards Managers Committee Meeting	20	20	Washington, DC	
Department Standards Committee	Combined LL Focus Groups Meeting	40	20	Gaithersburg, MD	
Department Standards Committee	DSC Meeting #28 Committee Meeting	45	40	Gaithersburg, MD	
Department Standards Committee	Combined LL Focus Group Meeting	40	20	Arlington, VA	
Department Standards Committee	DSC Meeting #29 Committee Meeting	47	50	Arlington, VA	
Department Standards Committee	Combined Focus Groups Meeting	40 40	20 20	Gaithersburg, MD	
Department Standards Committee	DSC Meeting #30 Committee Meeting	50	38	Gaithersburg, MD	
Office of Nuclear Safety Policy and Standards, EH-31	Quality Safety Mgmt./Occurrence Reporting Special Interest Group Workshop	9	37	Pasco, WA	
EH-5	Team Leader Retreat	12	0	Shepherdstown, WV	11/98
EH-51 & Princeton Plasma Physics Lab	DOE/Contractor Fire Safety Workshop	40	90	Princeton, NY	
EH-51	DOE Electrical Safety Advisory Committee Meeting	20	89	Las Vegas, NV	
EH-51	DOE Construction Safety/Hoisting and Rigging Advisory Committee Meetings	14 16	8 10	g24 Las Vegas, NV	
EH-51/Yucca Mountain Project Office	Federal Employee Occupational Safety and Health (FEOSH) Annual Meeting	25	0	Las Vegas, NV	
EH-52	Biossay/Internal Dosimetry Workshop	22	65	Gaithersburg, MD	10/98
EH-61	Secondary Prevention in Occupational Medicine	25	100	Washington, DC	7/98

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
EH-61	DOE Semi-Annual Former Workers Meeting	12	3	Gaithersburg, MD	05/98
EH-62 and various Outside Agencies	Conference on Radiation and Health	1	0	San Diego, CA	06/98
MOCA General Counsel	MOCA/DOE Attorneys' Fall Meeting: To bring together contractors & DOE Attorneys to discuss issues of common interest.	43	99	Charleston, SC	
General Counsel	Chief Counsels Meeting: To bring together Chief Counsels to discuss issues of common interest.	25	0	Washington, DC	
EM Office of Planning, Policy & Budget	National Governor's Association (NGA) / DOE Federal Facility Compliance Act Work Group Semi-Annual Meeting	25 18	0 4	McLean, VA Washington, DC	03/98 12/98
EM Office of Planning Policy & Budget	National Association of Attorneys General Meeting - Site visit and semi-annual issues workshop.	7	0	Denver, CO	05/98
EM Office of Planning, Policy & Budget	National Association of Attorneys General Meeting/Issue Workshop	12	0	Washington, DC	12/98
EM Office of Planning Policy & Budget	EM Site Specific Advisory Board Chairs Semi-Annual Meeting	2	0	Dallas, TX	10/97
EM Office of Planning, Policy & Budget	EM Site Specific Advisory Board Low Level Waste Seminar	2	0	Las Vegas, NV	
EM Office of Planning Policy & Budget	EM Site Specific Advisory Board Chairs Semi-Annual Meeting	16	13	Boulder, CO	09/98
EM Office of Planning, Policy & Budget	State and Tribal Government Working Group Meeting	8	0	Richland, WA	04/98
EM Office of Planning Policy and Budget	EM Site Specific Advisory Board Chairs Meeting	2	1		02/99
EM Office of Waste Management (OWM)	Integration: Core Team Program Area Integration Team Kickoff	25	20	Washington, DC	
EM/OWM	Integration: Paths to Closure Gap Analysis	20	25	Crystal City, VA	
EM/OWM	Integration: Program Management Team Meeting	0 5	10 10	Las Vegas, NV Washington, DC	
EM/OWM	Integration: Roadmapping HLW Workshop	4	20	Idaho Falls, ID	
NE-60	Depleted Uranium Hexafluoride Management Programmatic Environmental Impact Statement (PEIS) Public Meeting	3	2	Paducah, KY	

DEPARTMENTAL CONFERENCE ACTIVITIES
FISCAL YEAR 1998 THRU MARCH 1999

CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
EM/OWM	Integration: High Level Waste (HLW) Spent Nuclear Fuel Transportation	20	40	Las Vegas, NV	
EM/OWM	Integration: National Spent Fuel Program	25	40	Salt Lake City, UT	
EM/OWM	Integration: Environmental Remediation Workshop	15	15	Salt Lake City, UT	
EM/OWM	Integration: Nuclear Materials Inventory Workshop	10	18	Oak Ridge, TN	
EM/OWM	HLW Steering Committee: Second Radioactive Waste Tank Closure Workshop	15	15	Las Vegas, NV	
EM/OWM	TRU (Transuranic) Waste Steering Committee Meeting	10 10	14 14	Boulder, CO Las Vegas, NV	
EM/OWM	DOE Waste Management Re-Engineering	30	15	Germantown, MD	
EM/OWM	TRU Waste Steering Committee Meeting	10	14	Las Vegas, NV	
EM/OWM	Integration: TRU Storage and Treatment Program Area Integration Team Workshop	6	8	Las Vegas, NV	
University of Arizona & DOE	Waste Management '98 Conference	150	350	Tucson, AZ	
University of Arizona & DOE	Waste Management '99 Conference (Pending)	150	350	Tucson, AZ	
EM/EM-40	Technology Information Exchange Workshop	70	200	Chicago, IL	10/98
Office of Science and Technology & Florida State University	WARSAW '98 - 4th International Symposium and Exhibition on Environmental Contamination in Central and Eastern Europe	3	11	Warsaw, Poland	09/98
DOE/American Nuclear Society and others	Spectrum '98 - Emphasize the exchanges of technology between government and commercial sectors.	95	315	Denver, CO	09/98
Office of Science and Technology	EMSP (Environmental Management Science Program) Workshop - Steering Committee Comprehensive Workshop	0	0	Chicago, IL	07/98
EM-70 & Richland Operations Office	National Pollution Prevention Conference XIV	39	169	Seattle, WA	
EM-70	Environmental Management Transportation External Coordination Working Group Semi-Annual Meeting	40	30	Milwaukee, WI Jacksonville, FL	01/98 07/98
EM-70	Transportation Emergency Management Semi-Annual Meeting	15	20	Las Vegas, NV	

DEPARTMENTAL CONFERENCE ACTIVITIES
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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
Office of Fissile Materials Disposition	Public meeting to obtain comments on the draft Surplus Plutonium Disposition Environmental Impact Statement in accordance with the Environmental Policy Act.	6 8 8 6 6	5 5 5 5 5	Richland, WA Amarillo, TX North Augusta, SC Idaho Falls, ID Portland, OR	
Korea Institute of Energy Reach/DOC	US Korea Workshop on Energy and Environment: To highlight US Technology and the potential for exports from the US to Korea.	5	0	Taejeon, Rep. of Korea	
Japanese Industries	DOE-Japan Meeting on Advanced Clean Coal Technology & Surface Gasification: To highlight US Technology and the potential for exports from the US to Japan.	4	1	Kita-Kyusyu, Japan	
DOE/FE & 24 Private Companies	Annual Meeting of the Geological Society of America: To present information on current technology.	4	4	Salt Lake City, UT	
Japanese Industries	US-Japan Meeting on Coal Technology: To highlight US technology and the potential for exports from the US to Japan.	4	1	Tokyo, Japan	
DOE/FE	Advance Turbine Systems Annual Program Review: To review results of research projects.	50	5	Morgantown, WV	
DOE/FE/ MMS/CEAC/ Canada Energy, UK Health & Safety, US Industries	Workshop on Composite Materials for Petroleum Offshore Operations: To advance composite materials technology by improving methods of manufacture and use and by fostering communication between developers and customers worldwide.	2	0	Houston, TX	
Asia-Pacific Economic Cooperation Experts' Group	Clean Fossil Energy Seminar: to tour the Sierra Pacific Company clean coal project and provide updates on research.	10	1	Reno, NV	
Power Gen Org. Comm.	Power Generation International '97: To present the FE exhibit about research done by DOE/FE	5	0	Dallas, TX	
DOE/FE/RMAG/GRI Schlumberger, Oil Producers	Fractured Reservoir Symposium: To share updates on technology	2	2	Denver, CO	
DOE/FE	Future Gas Hydrates Research & Resource Development Meeting	4	2	Denver, CO	
CARB/SCAQMD	Meeting on PM 2.5 "A Fine Particle Standard": To discuss the PM 2.5 standard as it effects industry in California	3	0	Long Beach, CA	
DOE/FE	Meeting on Impacts of SO_2 on the Electric Industry: To discuss the issues and their effects on industry	10	5	Pittsburgh, PA	
Coal Slurry Tech. Assn.	Conference on Coal Utilization and Fuel Systems: To share updates on technology	6	4	Clearwater, FL	

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
SPE & University of Texas	Permian Basin Oil & Gas Recovery Conference: To highlight technical advancement in the region	1	1	Midland, TX	
SPE & University of Texas	Pennsylvania-Permian Geology and Petroleum in the Southern Midcontinent Conference: To improve the efficiency of oil and gas recovery processes through increased geological and geophysical aspects of Midcontinent reservoirs.	1	0	Norman, OK	
DOE/FE/SPE	Improved Oil Recovery (IOR) Symposium: Exchange of information on current oil recovery research	104	20	Tulsa, OK	
DOE/FE/EPRI	Symposium on High Temperature Particulate Cleanup for Advanced Coal Based Power Systems: To share updates on technology	5	25	Birmingham, AL	
DOE/FE/ED	HBCU/OMI Annual Meeting: To review results of research projects	25	15	Princess Anne, MD	
DOE/FE	Unburned Carbon Utility Fly Ash Conference	8	2	Pittsburgh, PA	
DOE/FE/PDVSA/CNPC	International Conference on Heavy Crude and Tar Sands: To disseminate research and operational results concerning the production, refining, utilization, handling and transportation of heavy crude and tar sand.	6	2	Beijing, People's Republic of China	
DOE/FE	Conference on Selective Catalytic and Non-Catalytic Reduction for Nox Control: To share updates on technology.	8	2	Pittsburgh, PA	
DOE/FE	University Coal Research Annual Contractors Review: To review progress on research projects	10	90	Greentree, PA	
AID	Conference on Low Emission Abatement and Energy Efficiency: To share technology updates and review the Krakow Clean Fossil Fuels and Energy Efficiency Program	8	2	Krakow, Poland	
DOE/FE	Industry-University-Government Stakeholders Workshop on Carbon Sequestration Options: To solicit information about Global Climate Change and potential industrial responses from MIT energy Lab experts.	20	5	Boston, MA	
DOE/FE/19 State & Federal groundwater groups	Ground Water Protection Council Annual Forum and Technical Exchange Exposition: To promote and ensure the use of best management practices and fair but effective laws regarding comprehensive ground water protection.	3	2	Sacramento, CA	
DOE/FE/AAPG/KGS & USGS	Conference on Meeting the Societal Resource and Environmental Requirements for 21st Century: To address issues of energy and minerals supply and environmental quality.	2	2	Taos, NM	
DOE/FE	Advanced Pressurized Fluidized Bed Combustion Workshop: To share updates on technology.	10	3	Morgantown, WV	

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
DOE/FE & University of Tulsa	International Petroleum Environmental Conference: One of several meetings organized to consider environmental issues related to the petroleum industry.	5	10	Albuquerque, NM	
DOE/FE & University of Hawaii	US Japan Workshop on Carbon Dioxide Sequestration : To review progress at the Ocean Sequestration Experimental Station.	6	2	Kona, HI	
DOE/FE	National Fuel Cell Workshop: To share updates on technology.	10	5	Morgantown, WV	
DOE/FE/UN/ UK/ Japan/Australia & World Bank	IEA Workshop on Financing Clean Power generation: To explore how clean power generation projects can be financed in Asia-Pacific Area.	5	3	Singapore, Malaysia	
DOE/FE Conference Committee	Clean Power Technologies: To highlight US technology and potential for exports from the US to Mexico.	3	1	Mexico City, Mexico	
Power Gen Org. Committee	Power Generation International '98: To present the FE exhibit about US research and technology.	5	0	Orlando, FL	
DOE/FE	Vision 21 Workshop: To present Vision 21 concepts.	5	5	Pittsburgh, PA	
DOE/FE/MMS	International Workshop on Corrosion Control for Marine Structures: To address methods and application of corrosion protection, testing, and maintenance and provide an international forum for exchange of information and experience.	1	0	Galveston, TX	
DOE/FE	DOE Fossil Energy Gas Program Outlook	5	2	Houston, TX	
DOE/FE/AG/I/ Exxon/ USGS/NSF	Academic Corporate Associates Conference: To provide an annual forum for exchange of information and experience	1	0	Houston, TX	
DOE/FE	US-Japan Coordinating Committee and Joint Technical Workshops: To highlight US technology and the potential for export from the US to Japan.	4	1	Tokyo, Japan	
DOE/FE/API/EPA/ GRI/SPE	Exploration & Production Environmental Conference	6	4	Austin, TX	
Coal Slurry Association	Conference on Coal Utilization & Fuel System	6	0	Clearwater, FL	
DOE/FE/ED	HBCU/OMI Annual Meeting	25	15	Miami, FL	
LLNL	Nuclear Materials Stewardship: Policy Review Workshop 2: To explore and identify policy level issues, obstacles, and potential opportunities related to systematic stewardship of U.S. nuclear materials.	30	20	Arlington, VA	
DOE/PO-3 & Russian Federal Energy Commission	Seminar on the Regulation of Natural Gas: Share experiences with the Russian Federal Energy Commission on natural gas regulation in the United States.	2	0	Moscow, Russia	

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
DOE/FO-3/EPA & Russian Ministry of Fuel and Energy	Seminar on Management of Waste Discharges from Offshore Platforms	3	10	Moscow, Russia	
Office of the Chief Information Officer & the Office of Safeguards and Security	Computer Security Group (CSG) Training Conference: Provide training to unclassified and classified computer security programs and provide a forum for DOE and DOE contractor personnel.	67	181	St. Petersburg, FL	04/27-30/98
Office of the Chief Information Officer	Information Management Council (held with CSG) (held with Records Management Conference)	23	8	St. Petersburg, FL	04/27-28/98
Office of the Chief Information Officer	Information Management Council (held with Records Management Conference)	38	4	Washington, DC	07/21-23/98
Office of the Chief Information Officer	Information Management Council (held with AIMC)	32	8	Pittsburgh, PA	
Office of the Chief Information Officer	Telecommunication Conference	35	73	Houston, TX	06/01-04/98
Office of the Chief Information Officer	Records Management Conference: Provides a forum for Department Federal and contractor staff to meet for direct interchange of information on records management.	67	176	Washington, DC	07/20-23/98
Office of the Chief Information Officer, RW & Office of Science	Annual Information Management Conference (AIMC)	60	101	Pittsburgh, PA	10/20-23/98
MA-3	Servicing Personnel Officers Conference: To share human resources materials and information.	40	0	Washington, DC	10/97
MA-3 /ED	Joint Diversity/Human Resources Conferences: To share information on joint human resources and diversity programs.	65	0	Las Vegas, NV	02/98
MA-3	Servicing Personnel Officers Conference: To share information on joint human resources and diversity programs.	35	0	Las Vegas, NV	02/98
MA-3	1998 Human Resources Forum: To share human resources information DOE Wide	75	0	Denver, CO	06/98
MA-2	Partners for Progress: Forum for dissemination of information on printing, mail and library services	30	36	Las Vegas, NV	07/14-15/98
MA-52	Performance Based Contract Lessons Learned for FY'97	30	0	Metairie, LA	
MA-52	Performance Based Contracts: Planning for FY'98	30	0	Argonne, IL	
MA-5	Procurement Director's Meeting	30	0	Augusta, GA	
NE-20	Workshop regarding the Nuclear Research Initiative	19	45	Washington, DC	

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
NE-70	Accomplishments with Medical Isotopes/Health Care for 21st Century (co-sponsored with Society of Nuclear Medicine and Nuclear Energy Institute) (Pending)	12	6	Washington, DC	
NE-20	Attend Nuclear Energy Research Initiative Review Panel I Meeting	15	14	Gaithersburg, MD	
NE-20	Attend Nuclear Energy Research Initiative Review Panel II Meeting	11	20	Gaithersburg, MD	
DOE & Argonne National Laboratory	RERTR Meeting: (Reduced Enrichment for Research and Test Reactors)	9	33	Jackson Hole, WY	10/5-10/97
DOD & Argonne National Laboratory	Reverse Engineering Workshop	0	10	Del Mar, CA	01/5-8/98
DOE & Argonne National Laboratory	Annual Atmospheric Chemistry Program (ACP) Meeting	3	35	Falls Church, VA	02/24-26/98
Argonne National Laboratory (ANL)	DOE SSI (Scientific Simulation Initiative) Computational Science Writing Meeting	0	22	Chicago, IL	05/13/98
DOE & Argonne National Laboratory	DOE Scientific Simulation Planning Workshop	6	58	Willowbrook, IL	07/20-22/98
Argonne National Laboratory	Grids '98	2	16	Chicago, IL	07/27-28/98
Argonne National Laboratory	Globus Retreat	0	32	Oak Brook, IL	08/2-4/98
Intl. Organizing Comm. For XIX Intl. LINAC Conference, Argonne Natl. Lab. & Fermi Natl. Accelerator Laboratory	LINAC98 Conference/Biannual International Exchange of LINAC Science and Technology	2	192	Chicago, IL	08/23-28/98
Argonne National Laboratory	Computing and High Energy Physics Conference (CHEP)	0	132	Chicago, IL	08/31-09/04/98
Fermi National Accelerator Laboratory	German-American Academic Council/Young Cosmologist Workshop	0	7	Aspen, CO	
Fermi Natl. Accelerator Lab., Notre Dame, DOE NSF, ANL, Biogeneral Inc., Collimated Holes Inc. Electron Prod B.V., Electron Tube Inc., Hamamatsu Photonics K.K., Kurary Corp., LeCroy Corp.	SciFi97: Conference on Scintillating Fiber Detectors	0	30	Westbend, IN	
Fermi National Accelerator Laboratory	Pierre Auger Project/Collaboration Meeting	0 0	4 4	Gaithersburg, MD Arlington, VA	

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
Fermi National Accelerator Laboratory	US Particle Accelerator School	0 1	55 53	Austin, TX Palo Alto, CA	
Fermi National Accelerator Laboratory	US Particle Accelerator School, US-CERN Japan-Russia Joint Program	0	0	Montreux, Switzerland	
Princeton Plasma Physics Laboratory	12th Topical Conference of High Temperature Plasma Diagnostics	0	27	Princeton, NJ	
DOE & Brookhaven Group Office	Brookhaven Science Associates/Brookhaven Group Office Management Retreat	12	20	Huntsville, NY	
Brookhaven Science Associates (BSA)	M&O Contractor Managers Steering Committee Meeting	2	13	Tucson, AZ	
Brookhaven National Laboratory	Space Charge Physics in High Intensity Hedron Rings	1	36	Shelter Island, NY	
Brookhaven National Laboratory & Nuclear Regulatory Commission (NRC)	25th Water Reactor Safety Meeting	0	42	Bethesda, MD	
Brookhaven Science Associates	U.S. DOE Inter-Laboratory Conference	0	10	Las Vegas, NV	
Argonne National Laboratory	X-Ray Surface Scattering Workshop	0	9	Princeton, NJ	
Argonne National Laboratory	Structural Genomics Advisory Board	1	8	Chicago, IL	11/16/98
Fermi National Accelerator Laboratory	Atmospheric Chemistry Program Annual Meeting	0	35	Vienna, VA	02/23-25/99
Fermi National Accelerator Laboratory	U.S. Particle Accelerator School	2	38	Nashville, TN	01/18-29/99
Fermi National Accelerator Laboratory	Fritzker Symposium and Workshop on the Status of Inflationary Cosmology	0	12	Chicago, IL	
Fermi National Accelerator Laboratory	VLHC at Fermilab Workshop on Physics	1	28	Fontana, WI	02/22-24/99
Fermi National Accelerator Laboratory	Pierre Auger CoLaboration Pre-Presentation Meeting	0	20	Gaithersburg, MD	02/16/99
Brookhaven National Laboratory & National Forestry Service	Environmental Carbon Observatory	0	19	Chicago, IL	
Brookhaven & Argonne National Laboratories	Inelastic X-Ray Scattering	0	33	Montauk, NY	
Fermi National Accelerator Laboratory	Physics Advisory Committee Meeting/Review Fermilab's current and future High-Energy research program.	2	40	Aspen, CO	

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
Brookhaven National Laboratory, American Physical Society & Office of Naval Research	PAC '99	10	600	New York, NY	
Brookhaven National Laboratory	Probing Hadron Structures	0	3	Honolulu, Hawaii	
Brookhaven National Laboratory & NRC	26th Water Reactor Safety Meeting	1	45	Bethesda, MD	
Brookhaven National Laboratory, Fermi National Accelerator Lab. & LBNL	Very Large Hadron Collider	2	40	Port Jefferson, NY	
Ames Laboratory	Center for Computational Materials Science Workshop	5	30	Gaithersburg, MD	
Environmental Management	Applied Cost Engineering and Committee for Method Development Meeting: Discuss the "Train the Trainer" session on practical cost estimating and validation lessons learned workshop.	26	36	San Francisco, CA	
Safeguards and Security	Quarterly Director's Conference: To share information and resolve issues	40	5	Pleasanton, CA	
Oakland Operations Office	Strategic Management Meeting: Develop strategies and options for accommodating Strategic Alignment Initiative (SAI) staffing targets and funding levels.	23	0	Sacramento, CA	
Oakland Operations Office LLNL/LBN/Stanford Linear Accelerator Center, & SNLL	DOE and Contractors' Diversity Conference: To enhance the information base regarding EEO, diversity and related subjects within the DOE community.	80	120	Oakland, CA	
DOE/Bechtel Jacobs Co., LLC/East Tennessee Environmental Business Associates	14th Annual Oak Ridge Environmental Conference.	64	753	Oak Ridge, TN	
DOE	Oak Ridge Operations Office (ORO) DOE/ Contractor Attorney Meeting	14	5	Asheville, NC	03/18-20/98
DOE Oak Ridge Operations Office (ORO)	DOE Oak Ridge Meeting with Coalition for a Healthy Environment	9	4	Knoxville, TN	02/18/99
Thomas Jefferson National Accelerator Facility (TJNAF)	Energy Sciences National Site Coordinating Committee	2	53	Berkeley, CA	
TJNAF	System of Laboratories' Computing Coordinating Committee	5	25	Washington, DC	
TJNAF	Program Advisory Committee Workshop on Few Body Physics Program	0	20	Williamsburg, VA	

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
TJNAF	Program Advisory Committee Executive Session and Mini-Workshop on Nuclear Form Factors and Sum Rules	0	25	Duck, NC	
LMES	Energy Systems Strategic Leadership Program	0	20	Knoxville, TN	09/28-10/02/97
ORNL	Interlab '97 (Inter-Laboratory Internet Information Workshop)	5	41	Gatlinburg, TN	10/01-03/97
IEA/ORNL	IEA Annex 22 Workshop International Energy Agency Workshop Compression Systems with Natural Working Fluids	0	3	Gatlinburg, TN	10/01-04/97
DOE/ ORNL	37th ORNL-DOE Conference on Analytical Chemistry	5	100	Gatlinburg, TN	10/06-09/97
DOE/ORNL	CFCC Workshop (Continuous Fiber Ceramic Composite Program). The use of these products in industrial applications	6	40	Lake Tahoe, NV	10/06-10/97
DOE/ORNL	41st Materials Mgt. Workshop (Material's Workshop of DOE Facilities	0	25	Knoxville, TN	10/14-17/97
DOE/ ORNL/ACS & AICLE	10th Symposium on Separation Science & Technology	1	60	Gatlinburg, TN	10/20-24/97
DOE/ORNL	AIS Workshop (Organizing Committee Meeting prior to AIS Expo)	0	1	Nashville, TN	11/01/97
NCSL/LMES/ORCMT	Fall '97 National Conference of Standards Laboratories Eastern Division Workshop	0	8	Gatlinburg, TN	11/02-04/97
DOE/ORNL	US/DOE Moscow Working Group on Energy (Meeting with energy officials & products personnel on energy questions)	1	1	Moscow, Russia	11/06/97
DOE	DOE Review of Lighting Review of ongoing research	3	11	Washington, DC	11/10-14/97
ORNL	Safe Skies Seminar on Aviation/Airport Security 3-day Executive Seminar Workshop	0	4	Daytona Beach, FL	11/17-19/97
DOE/ORNL	POLYSYS Review (Policy Analysis System - Modeling System for Agricultural Concerns)	5	6	Knoxville, TN	11/19/97
DOE	DOE Technical Standards Managers Meeting	14	5	Denver, CO	12/4-5/97
LMES	Energy Systems Strategic Leadership Program	0	17	Knoxville, TN	12/7-11/97
LMES/ ORCMT	ORCMT Manufacturers Breakfast (To showcase ORCMT capabilities to try to bring work to Oak Ridge	0	3	Chattanooga, TN	12/18/97
ORNL	ORNL- DAAC users Working Group (Data Center for Atmospheric Trace Gas Cycling)	0	5	Atlanta, GA	01/8-9/98

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
DOE	Crosscutting for Energy (Identify Cross-cutting Themes for Energy Research)	40	46	Washington, DC	01/08-10/98
DOE/ORNL	AIS Coordinators Meeting	0	1	Irving, TX	01/8-9/98
Federal Emergency Management Agency (FEMA)/ORNL	CSEPP National Conference Committee Meeting (Organizing Committee Meeting prior to Chemical Stockpile Emergency Preparedness Program National Conference)	0	2	Denver, CO	01/14/98
ORNL	Field Release for Landmine Detection	0	2	Atlanta, GA	01/16/98
ORNL/IEA	IEA Annex 24 Experts Meeting	0	1	San Francisco, CA	01/21-22/98
ORNL	Adventures in Super Computing (Discussions)	0	1	Nashville, TN	01/24/98
NIST/ DO/ NSF/ DOD	IMTR Integrated Manufacturing Technology Roadmap Initiatives Info Systems Workshop	6	8	West Palm Beach, FL	01/26-30/98
DOE	DOE/ER Science Themes (To choose specific research directions and methods of implementation)	3	5	Washington, DC	01/27-28/98
ORNL	ORNL Leadership Program	0	26	Forge, TN	02/08-13/98
DOE	United States Air Quality Consortium	1	3	Tampa, FL	02/16-17/98
DOE/OTT	DOE Office of Technology Transfer & Aluminum Association Meeting	3	1	San Antonio, TX	02/16/98
DOE	Center for Excellence for the Synthesis & Processing of Advanced Materials	5	14	San Antonio, TX	02/17/98
LMES	Energy Systems Strategic Leadership Program	0	24	Knoxville, TN	02/22-26/98
NRC/ORNL	CSNI Program ICAS Workshop Comm. On On Safety Nuclear Installations Proj. Reactor Pressure vessel International Comp. Assessment Study	0	10	Orlando, FL	02/24-28/98
FEMA/ORNL	CSEPP Organizing Committee Meeting	0	1	Salt Lake City, UT	02/25/98
LMES	Lockheed Martin Energy Systems Advanced Development & Production Technology Discussions	2	4	Washington, DC	02/26-27/98
DOE/ORNL	Scientific & Industrial Opportunities for the SNS	6	90	Washington, DC	03/2-4/98
DOE/ORNL	SNS Collaboration Team Meeting	3	45	Washington, DC	03-5-6/98
DOE	Acute Exposure Guideline Levels	1	6	Washington, DC	03/10-12/98
LMES	Leadership Steering Committee	0	35	Oak Ridge, TN	03/17/98

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DOE/ORNL	Efficient Separation & Processing Crosscutting Technical Exchange Mid Year Review	3	30	Augusta, GA	03/17-19/98
ORNL	Switchgears Review; Evaluation of Projects for Efficiency & Scientific Credibility	1	9	Knoxville, TN	03/27/98
ORNL	Distributive Computing Environmental Distributive Files Services Internal Course	0	8	Dallas, TX	03/30-4/03/98
ORNL	ORNL/Swiss/SNL Workshop (Distributed Computing Infrastructure workshop to develop strategy for resource management)	0	21	Charleston, SC	03/30-4/02/98
ORNL	Mercury Working Group (Meeting to pull together national initiatives to test mercury - contaminated mixed wastes streams)	2	10	New Orleans, LA	04/06-8/98
DOE/ORNL	Utility Industry Deregulation Workshop	0	4	Arlington, VA	04/7-8/98
FEMA/ORNL	CSEPP Organizing Committee Meeting	0	2	Baltimore, MD	04/07/98
DOE/ORNL/ UT & GENRAC	Partnering for Functional Genomics	1	0	Oak Ridge, TN	04/16-17/98
LMES	Energy Systems Strategic Leadership Program	0	20	Knoxville, TN	04/19-23/98
ORNL	22nd Annual Actinide Separations Conference	0	73	Chattanooga, TN	04/20-23/98
NIST/DOE/NSF/ DOD	IMTR Meeting (IMTR Planning Meeting)	0	5	Gatlinburg, TN	04/21-25/98
DOE/ORNL	DOE/AMS Workshop on Mathematics Aspects of Material Science Modeling	1	36	Gatlinburg, TN	04/26-29/98
ORNL	Weather & Climate Modules Workshop (on results of dynamical core tests)	0	5	Gatlinburg, TN	04/27-5/1/98
ORNL	M&C Strategic Planning Offsite	0	13	Kingston, TN	04/29-5/01/98
DOE/ORNL	AIS Expo	0	7	Nashville, TN	04/30/98
DOE/ORNL/NREL	20th Biotechnology Symp. (symposium on the use of biotechnology to provide fuels and chemicals for renewable source)	2	24	Gatlinburg, TN	05/03-07/98
DOE/ORNL	Separations Workshop on Crystallization, Distillation, and Extraction Methods	5	12	Oak Ridge, TN	05/11-13/98
DOE	12th Fossil Energy Materials Conference	10	37	Knoxville, TN	05/12-14/98
ORNL	Energy Div. Strategic Planning Offsite	0	8	Kingston, TN	05/14-15/98
DOE	Technology Roadmap Workshop (Discussions with Industry Representatives)	1	1	Baltimore, MD	05/18-19/98

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
DOE/LMER	Fissile Material Disposition Program Mixed Oxide Industry Conference	7	46	Atlanta, GA	05/20-21/98
DOE	DOE Benefits Managers Conference	0	16	Nashville, TN	05/21-22/98
DOE	Alpha Emitters Workshop	3	9	Toronto, Canada	06/04-05/98
DOE/ORNL	Middle School AIS Summer Institute	0	1	Summertown, TN	06/07-12/98
ORNL	AEGL #10	1	3	Washington, DC	06/08-10/98
ORNL	ORNL - DAAC Users Workshop Group	0	7	Gatlinburg, TN	06/17-19/98
DOE/ORNL	AIS National Expo	0	1	Washington, DC	06/19-20/98
DOE/LMER	Advanced Industrial Materials Annual Information Meeting	4	41	Jackson Hole, WY	06/22-25/98
IEA/ORNL	IEA, HPC Mtg. (International Energy Agency Committee Mtg on Heat Pumps)	0	1	Toronto, Canada	06/22/98
DOE	Annual DOE Electrical Safety Meeting	14	46	Las Vegas, NV	06/22-26/98
FEMA/ORNL	1998 CSEPP National Conference	0	29	Baltimore, MD	06/29-07/01/98
DOE/ORNL	CFCC Workshop Group Mtg. (The industrial applications of continuous fiber Ceramic Composite Program.)	2	25	Houston, TX	06/29-07/01/98
ORNL	LSET/EES Offsite Strategic Planning	0	40	Gatlinburg, TX	07/22-24/98
DOE/ORNL	Structural Biology Meeting	0	9	Arlington, VA	07/23/98
LMES	Energy Systems Strategic Leadership Program	0	22	Knoxville, TN	07/26-30/98
LMES/LMER/BRC/DOE	Strategic Planning Offsite	6	7	Kingston, TN	07/26-27/98
ORNL/LMER	High Performance Storage Systems Users Forum (Computer Information Exchange)	0	15	Dallas, TX	07/28-30/98
NIST/ DOE/NSF/DOD	HMTR Planning Meeting	0	5	Gatlinburg, TN	08/3-8/98
DOE	Federal Technical Standards Meeting (Annual)	40	20	Washington, DC	08/03-07/98
DOE	DOE/ER Science Themes and Strategic Planning (To discuss Martha Krebs research agenda to the year 2010)	37	47	Chantilly, VA	08/05-08/98
ORNL	Nuclear Structures '98	0	43	Gatlinburg, TN	08/09-15/98
LMES	Senior Management Offsite	0	13	Kingston, TN	08/9-11/98

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CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
NIST/ DO/ NSF/ DOD	IMTR (IMTR Red Team Review Workshop)	7	7	Hilton Head, SC	08/19-20/98
ORNL	Lab Directors Meeting	0	5	Chicago, IL	08/21/98
ORNL	ORNL Leadership Program	0	20	Pigeon Forge, TN	08/23-28/98
ORNL	Switchgrass Contractors Workshop	2	13	Atlanta, GA	08/30-31/98
DOE/ORNL	Energy Performance Workshop (For the chemical, pulp, and paper industries)	10	10	Cincinnati, OH	08/31-09/02/98
LMES/ORC,T/NCSL	NCSL Fall Workshop	0	5	Asheville, NC	09/9-11/98
ORNL	SARE4/SATIF4 Meetings (Simulating Accelerator Radiation Environments/ Shielding Aspects of Accelerators, Targets and Irradiation Facilities)	0	17-26	Knoxville, TN	09/13-18/98
ORNL	Advanced Information Systems Security Course - 211	0	6	Oak Ridge, TN	09/14-18/98
ORNL	Transportation Meeting Workshop on the feasibility of Electronic Driver's Licensing and improved highways safety	0	3	Irvine, CA	09/19-21/98
DOE/ORNL	AIS Coordinators Quarterly Meeting	0	1	Albuquerque, NM	09/19/98
NIST/NSF/DOE/DOD	IMTR Planning Meeting	0	6	Gatlinburg, TN	09/20-23/98
DOE	Natural Gas & Oil Technology Partnership To Conduct an Industry Review of National Laboratory Proposals to DOE/FE	2	23	Houston, TX	09/22-23/98
ORNL	In-Tank Precipitation Alternatives	0	3	Knoxville, TN	09/27/98
INTDS/ORNL	INTDS (19th World Congress of the International Nuclear Target Development Society)	0	5	Oak Ridge, TN	10/04-09/98
DOE/ORNL	Carbon Sequestration Focus Group Meeting (Soils and Vegetation Team)	1	7	Denver, CO	10/05-06/98
LMER	Carbon Dioxide Separation & Caption Meeting	1	3	Pittsburgh, PA	10/06/98
DOE/ORNL	CIDI R&D Review (Compression-Ignition, Direct Injection Engine R& D Review)	3	12	Oak Ridge, TN	10/06-07/98
IEA/DOE/ORNL	IEA Heat Pump Program Exchange Meeting	1	2	Syracuse, NY	10/13-16/98
FEMA/ORNL	CSEPP Organizing Committee Meeting	0	2	Salt Lake City, UT	10/14/98
DOE/ORNL	ASAC (SNS) Meeting (Accelerator Systems Advisory Committee)	2	52	Des Plaines, IL	10/14-16/98
ORNL	M &C Administrative Support Offsite	0	11	Kingston, TN	10/15-16/98
DOE/ORNL	Carbon Sequestration Working Group	1	2	Knoxville, TN	10/16/98

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DOE/ORNL	Carbon Sequestration Roadmap Meeting	0	27	Gaithersburg, MD	10/28-29/98
NIST/NSF/DOE/DOD	IMTR (IMTR Planning Meeting. Intelligent Controls)	6	6	Pittsburgh, PA	10/28-29/98
NIST/NSF/DOE/DOD	IMTR Executive Review Board (IMTR Planning Meeting)	0	5	Pikeville, TN	11/01-03/98
DOE	ATS Meeting. (Annual Review For Advanced Turbine Systems)	32	29	Washington, DC	11/02-05/98
DOE/ORNL	SNS Users Workshop	4	36	Knoxville, TN	11/08-11/98
DOE	Vision 2020 Workshop (Industry, Government, and Academia Discussions on Materials Technology	2	5	College Park, MD	11/09-10/98
DOE	5th U.S./Russian Technical Specialist Meeting	1	12	Oak Ridge, TN	11/11-13/98
ORNL	ORNL - DAAC Users Working Group	0	7	Cincinnati, OH	11/11-12/98
DOE/ORNL	RTDF Environmental Reactive Barriers Action Team Mtg	1	2	Oak Ridge, TN	11/17-18/98
DOE	DOE EE Review (Energy Efficiency & Renewable Energy Programs)	7	4	Washington, DC	11/30-12/03/98
DOE	AEGL	1	6	Washington, DC	12/07-09/98
DOE/ORNL	Thermal VII - Thermal Performance of the Exterior Envelopes of Buildings	4	20	Clearwater, FL	12/7-11/98
ORNL/ORAU/ Vanderbilt	Wireless Medical Conference	1	22	Nashville, TN	01/05-07/98
FEMA/ORNL	CSEPP Organizing Committee Meeting	0	2	Salt Lake City, UT	01/12/99
NIST/NSF/DOE/DOD	IMTR Meeting (IMTR Planning meeting)	0	4	Gatlinburg, TN	01/18-22/99
DOE	DOE EE Review (Review on going research on Energy Efficiency and Renewable Energy Program)	7	8	Bethesda, MD	02/01-04/99
DOE/ORNL	Cracking of Composite Tubes Project Review	1	9	Atlanta, GA	02/04/99
ORNL	Forging Industry Associations at ORNL	0	1	Nashville, TN	02/04/99
ORNL	Lab Directors Meeting	0	4	Chicago, IL	02/04/99
LMES	Energy Systems Strategic Leadership Program	0	20	Knoxville, TN	02/21-25/99
DOE	DOE EE Review (Review ongoing research on Energy Efficiency and Renewable Energy Program)	7	12	Oak Ridge, TN	02/22-25/99
ORNL	ETV Meeting (Environmental Technology Verification)	0	0	Orlando, FL	03/04-06/99

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ORNL	ORNL Leadership Program	0	25	Pigeon Forge, TN	03/07-12/99
DOE/ORNL/Monsanto	Biosepartions Workshop	2-3	45-50	St. Louis, MO	03/09-11/99
DOE	Lab Expo	0	0	Washington, DC	03/18/99
DOE/ORNL/PNNL	ICFRM Organizing Committee Meeting and Abstracts Review (Pending)	1	10-15	Colorado Springs, CO	03/28-30/99
DOE	DOE EE Review (Review on going research on Energy Efficiency and Renewable Energy Program) (Pending)	10	12	Chicago, IL	03/29-04/01/99
EH	Epidemiologic Surveillance Date Coordinator's Meeting	3	14	Oak Ridge, TN	
NN-60	EMI SIG Meeting	14	92	Richland, WA	
DOE/DP-2 Dr. Victor Reis	Accelerated Strategic Computing Initiative (ASCI) Blue Ribbon Panel Working Session #1	6	12	Cambridge, MA	
EH-31	TRADE Quality and Safety Mgmt. Special Interest Group (QSM SIG) and Occurrence Reporting Special Interest Group (OR SIG) Joint Spring Meeting and Workshop	9	37	Pasco, WA	
Fluor Daniel-Hanford	1998 TRADE Training Managers Workshop: Share best practices and recommend DOE-wide standards in four areas of training management.	22	74	Pasco, WA	
EH-31 & EH-10	Quality and Safety Management and Price-Anderson Act Amendments Workshop. Update and share information on policy and practice in these areas.	40	67	Las Vegas, NV	
RFO/ORO/SPRO MA-30/RLO	TRADE DOE Federal Trainers Special Interest Group (DFT SIG) spring workshop. Work on products such as evaluation tools and issues of mutual concern.	27	1	New Orleans, LA	
DP-45/EH-33/FM-10/ FE-6/PO-4/SPRO	TRADE Performance-Based Management Special Interest Group (PBM SIG) Fifth Annual Spring Meeting	62	33	Washington, DC	05/27-28/98
NN-60	TRADE Emergency Management Issues SIG Spring Workshop	14	92	Richland, WA	
EH-30	DOE Data Analysis Forum: Share innovative techniques for collecting data, analyzing data to reveal insights, and present results so that so that decision-makers could act and or the public could be informed.	44	60	Las Vegas, NV	
NN-50	TRADE Security Education Special Interest Group (SE SIG) workshop	9	18	Richmond, VA	

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DOE/DP-2 Dr. Victor Reis	Accelerated Strategic Computing Initiative (ASCI) Blue Ribbon Panel Workshop Session #2. Provide systematic, objective evaluation of the overall ASCI.	12	24	Washington, DC	
DOE-DP-50	DVC PI Meeting: Exchange information about current and planned research efforts associated with visualization strategies for the Stockpile Stewardship Program.	2	12	Pasadena, CA	
DOE/American Nuclear Society	SPECTRUM Conference	200	1300	Denver, CO	09/98
DOE-EM Chief Information Officer	Data Team Meeting to determine data requirements for the Integrated Planning, Accountability and Budgeting System (IPABS)	1 1	0 0	McLean, VA Washington, DC	
DOE/American Nuclear Society	Review technical papers for the SPECTRUM conference	2	0	Denver, CO	
DOE	DOE Project Management Conference	15	0	Westminister, CO	03/22-26/98
DOE-EM	FY 2000 Budget Call meeting	1	0	McLean, VA	
NIST	Water Sampling Tests (This occurred 5 times in the reporting period)	1	0	Boulder, CO	
Nuclear Materials Stewardship Program	Nuclear Materials Integration Study	1	0	Oak Ridge, TN	
DOE-HQ	Integration Executive Committee	1	0	Atlanta, GA	
Citizen's Advisory Board	Monthly Board Meeting	1	0	Westminister, CO	
League of Women Voters/ DOE HQ	Intersite Stakeholder Meeting	1	0	Chicago, IL	
DOE-Pacific Northwest National Lab (PNNL), University of IL	High Frequency Electron Magnetic Resonance: Scientific Opportunities and Challenges	3	10	Washington, DC	
DOE/PNNL/GRI & EPRI	Energy Sector Forum Management of Risks to Information and Physical Assets in the New Corporate Environment	8	7	Arlington, VA	
DOE/PNNL	Manhattan Cyber Project Seminar	2	16	Seattle, WA	
DOE/PNNL	US-Ukraine Conference on Nuclear Trade and Corporation	20-25	20	Washington, DC	
RL/Science and Technology Office	Information Exchange - Discuss international nuclear safety directions; accomplishments 1998, FY'99 Budget	20	30	Washington, DC	
RL & Battelle	Intellectual Property Information System Design Workshop	0	24	Salt Lake City, UT	

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DOE/PNNL	Contractor's Exchange - Discuss current international nuclear safety objectives and challenging experiences encountered when working with host country partners	12	61	Washington, DC	
RL-Concerns	Steering Committee Meeting	2	6	New Orleans, LA	
RL-Concerns	Senior Management Retreat/Alignment	20	2	Yakima, WA	
Resolution and Quality Resource	Initiative	20	2	Kennewick, WA	
RL-Radiological Nuclear Process Safety (CRO)	Design Safety Features Deliverable	2	2	Richland, WA	12/01/98
RL/CRQ	Tank Waste Remediation System Privatization: Swimmic Peak Ground Acceleration and Related Topics	2	0	Richland, WA	12/15/98
RL/CRQ	Design Safety Features Submittal (Pending)	2	0	Richland, WA	03/30/99
RL/Office of External Affairs (OEA)	Hanford Openness Workshop: To enhance openness at Hanford	4 4 2	0 6 0	Portland, OR Seattle, WA Richland, WA	
RL/OEA	Hanford Advisory Board (HAB) Meeting	5 10 6 12 10	4 8 3 10 8	Portland, OR Richland, WA Seattle, WA Kennewick, WA Richland, WA	11/06-07/97 12/04-05/97 02/05-06/98 04/02-03/98 06/04-05/98
RL/OEA	Hanford Advisory Board (HAB) Meeting (Pending)	15 10 10 15 14	10 5 8 10 10	Pendleton, OR Richland, WA Portland, OR Kennewick, WA Richland, WA	09/09-11/98 11/05-06/98 12/03-04/98 02/1-12/99 03/25-26/99
RL-Facilities Transition (AMF)	Fast Flux Test Facility (FFTF)	4	2	Portland, OR	01/04/98
RL/AMF	FFTF Public Meeting	4 6 4	2 4 2	Seattle, WA Richland, WA Hood River, OR	01/28/98 01/22/98 02/12/98
RL-Business Management Chief Financial Officer (CFO)	FY2000 Budget Public Meeting	10 10 10	5 5 5	Portland, OR Seattle, WA Richland, WA	03/09/98 03/10/98 03/12/98
RL/Waste Management Office (AMW)	Solid Waste Draft EIS Scoping Meeting	3 3	5 5	Richland, WA Pendleton, OR	11/12/97 11/13/97
DOE-HQ	Draft Surplus Plutonium Disposition EIS Public Meeting	3 3	2 2	Richland, WA Portland, OR	08/04/98 08/18/98
DOE/AMW	Spent Nuclear Fuel Public Meeting	5	2	Richland, WA	11/05/98

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DOE-HQ	Radioisotope Thermoelectric Generator Public Meeting	4	2	Richland, WA	11/09/98
DOE-HQ	Pu-238 Public Meeting	4	2	Richland, WA	11/19/98
RL-Environmental Assurance, Permits, and Policy (EPA)	100 Area Cleanup Public Forum	6	3	Kennewick, WA	02/10/99
RL-AMF	Plutonium Finishing Plant Public Forum	10	5	Kennewick, WA	02/11/99
RL-CFO	FY2001 Budget Public Meeting/Workshop (Pending)	15	8	Richland, WA	02/25/99
RL-CFO	FY2001 Budget Public Meeting/Discussion Group (Pending)	10	5	Portland, OR	03/09/99
RL-CFO	FY2001 Budget Public Meeting (Pending)	10	5	Seattle, WA	03/10/99
RL-CFO	FY2001 Budget Public Meeting (Pending)	5	2	Spokane, WA	03/11/99
RL- Office of River Protection (ORP)	Tank Waste Privatization Public Forum (Pending)	12	6	Richland, WA	03/24/99
DOE/SR	12th Biannual Technology Workshop "Preserving the Past...Protecting the Future"	10	50	Charleston, SC	
DOE/SR	DOE High Level Waste Tank Closure Lessons Learned Workshop	12	18	Atlanta, GA	
Savannah River Institute	Erosion Control Symposium	0	7	Rock Hill, SC	
DOE-SR/Bechtel SR & DOE-RL/Bechtel Hanford	Joint Bechtel/DOE Planning & Controls Communications	20	7	Las Vegas, NV	
DOE-SR	Groundwater Technology End User Conference: To discuss groundwater contamination issues and identify cost-effective solutions.	26	18	Augusta, GA	
DOE-HQ	Purchasing Manager's Conference: Network and exchange lessons learned; hear issues; share best practices and benchmark data.	20	115	Charleston, SC	
DOE-HQ	Property Manager's Conference : Share ideas, promote best practices, learn about upcoming changes in regulations and practices.	14	59	Charleston, SC	
DOE-HQ	Pollution Prevention Workshop: Review issues and promote ideas	3	52	Charleston, SC	
APT Project Office	APT External Review Committee Conference Review the technical status of the APT Project	0	200	Augusta, GA	

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WSRC/College of Charleston, Environmental Physics	43rd Bioassay, Analytical, and Environmental Radiochemistry Conference	2	78	Charleston, SC	
DOE-HQ/CLWR	TRITIUM Extraction Facility Quarterly Meeting: To review and discuss status on the TEF	6	19	Atlanta, GA	
DOE-HQ	Software Quality Assurance Subcommittee (SQAS)	25	0	Augusta, GA	
American Nuclear Society	3rd Topical Meeting—Spent Nuclear Fuels	28	154	Charleston, SC	
DOE/NETO	Environmental Training Partnership Office	13	28	Pasco, WA	
EM-52/DOE-SR	Environmental Management Science Program : A workshop on integration of end user needs with research projects for the focus on deactivation and decommissioning	10	18	Savannah River, SC	
DOE-SR/WSRC	DOE Integrated Safety Management Feedback & Improvement Workshop	75	125	Atlanta, GA	
Sandia National Labs. Albuquerque Site	Explosives Processing Meeting to discuss production and Safety issues for explosives	0	21	Albuquerque, NM	10/97
Sandia National Labs. Albuquerque Site	Using Integrated Circuits in Critical Applications Workshop	0	27	Albuquerque, NM	11/97
Sandia National Labs. Albuquerque & California Sites	Tri-Lab Meeting between SNL, LANL, LLNL for strategic planning purposes	0 0	22 24	San Diego, CA Pleasanton, CA	01/98 08/98
Sandia National Labs., California Sites	Scalable Cluster Workshop: To discuss issues relating to building large clusters	1	35	Monterey, CA	11/97
Sandia National Labs. Albuquerque Site	Technical Conference for Mesh Generation	0	17	Park City, UT	10/97
Sandia National Labs. Albuquerque & California Sites	Accelerated Strategic Computing Initiative - Principal Investigator Updates regarding programs to Gil Wiegand, DOE/ Washington	22	163	NASA Kennedy Space Center, FL	01/99
EE-11/Office of Power Technologies/EERE	UPVG--Annual Utility PV Experience Exhibition and Conference: To examine restructuring impacts on development of PV.	1 2	12 6	Albuquerque, NM San Diego, CA	10/28-30/97 09/28-30/98
EE-11/NREL PV Program/EERE	3rd International Conference on Solar Electricity: Forum for direct interactions of local decision makers and US industry to enhance collaborations	5	3	Sharjah ,United Arab Emirates (UAE)	03/21-25/98
EE-11/NREL PV Program	Materials Research Society Spring Meetings	0	5	San Francisco, CA	04/13-17/98

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EE-11 PV Photovoltaic (PV) Program, Solar Buildings Program, Concerning Solar Power Program	SOLTECH - Annual conference on solar industry	26	48	Orlando, FL	04/25-30/98
EE-11/ PV Photovoltaic (PV) Program, Solar Buildings Program, Concerning Solar Power Program/EERE	ASES Solar '98 Conference: Annual conference to share advances in solar research and development.	8	15	Albuquerque, NM	06/14-18/98
EE-11/NREL PV Program	PV Standards and Codes Workshop: To discuss PV systems standards committee and working groups meetings with industry.	0	8	Winter Park, CO	07/20-23/98
EE-11/NREL PV Program/EERE	8th Workshop on Crystalline Silicon Solar Cell Materials	25	30	Copper Mountain, CO	08/17-19/98
EE-11/NREL/SNL PV Programs	NCPV review Meetings: Highlight recent developments in PV technology from the laboratory to the market.	4	10	Denver, CO	09/9-11/98
EE-11/NREL/SNL	PV performance and Reliability Workshop	1	25	Cocoa Beach, FL	11/3-5/98
PV Programs/EERE	Forum to discuss PV system and module reliability progress and issues	0	0	Vail, CO	10/18-21/99
EE/11-Power Technologies and Million Roofs Initiative	Million Solar Roofs Quarterly Meetings: Review status of initiative with respect to major partnerships and roofs committed.	8	5	Los Angeles, CA	12/09/98
EE-11/Wind-American Wind Energy Association	WindPower-Annual Conference for wind energy in the U.S.	3	30	Bakersfield, CA	
EE-11/Wind-OPT Office and Solar Energy Organizations	Solar 98-American Solar Energy Society Annual Conference	0	0	Albuquerque, NM	
EE-12/Stanford University	Geothermal Reservoir Workshop Annual Meeting	4 44 4	24 25	Stanford, CA	01/26-28/98
EE-12	Geothermal Program Review XVI Annual Meeting	88	38	Berkeley, CA	
EE-12/ International Ground Source Heat Pump Association	1998 Geothermal Heat Pump Technical Conference and Expo Annual Technical Meeting	2 4 4	7 8	Stillwater, OK Chicago, IL	
EE-12/ International Ground Source Heat Pump Association	Geothermal: The Clean & Green Energy Choice for the World Annual Meeting	55	30	San Diego, CA	
EE-12/Geothermal Heat Pump Consortium	Southeastern GeoExchange Conference Regional Meeting	2	6	Orange Beach, AL	
EE-12/Superconductivity Program	Peer Review of Program	7	40	Washington, DC	
EE-12/Superconductivity Program	Technical Workshop	3	60	Florida	
EE-20	Advanced Ceramics in Glass Production: Needs and Opportunities	35	64	Washington, DC	
EE-20/Advanced Turbine Systems	Advanced Turbine Systems Annual Program Review	35	64	Washington, DC	
EE-20	Renewable Vision 2020 Industry Executive Steering Group - "Technology Road-map Workshops for Renewables Vision 2020"	6	9	Indianapolis, IN	

DEPARTMENTAL CONFERENCE ACTIVITIES
FISCAL YEAR 1998 THRU MARCH 1999

CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
EE-20/Northeast Regional Center for Inventions and Innovations/NY Research and Development Authority	Networking for Commercialization Success	2	1	Albany, NY	
EE-31/ Office of Transportation Technologies	Ethanol in the 21ST Century: Pursing the opportunities to produce and market ethanol in the new millennium	4	6	Sacramento, CA	04/01-03/98
EE-31/ Office of Transportation Technologies	Twentieth Symposium on Biotechnology for Fuels and Chemicals	3	100	Gatlinburg, TN	05/03-07/98
EE-32	"Bioenergy '98" Eighth Biennial Conference	7	9	Madison, WI	10/04-08/98
EE-32	Advanced Nonaqueous Battery Technology Research and Development Workshop	100	100	Hunt Valley, MD	
EE-32	OAAT Employees Workshop and Seminar	40	6	Charlottesville, VA	
EE-32	Advanced Battery Readiness Ad Hoc Working Group	100	100	Washington, DC	
E-32	Merit Review and Peer Evaluation of FY 1998 DOE National Laboratory Automotive CIDI Engine Combustion and After Treatment R&D	5	31	Oak Ridge, TN	
EE-32	Env '98	600	100	Ypsilanti, MI	
EE-33	Fuels and Engine Workshop	5	4	Tucson, AZ	
EE-34	OHVT Program Review OHVT Peer Review	17 5	31 3	Gatlinburg, TN Livermore, CA	
EE-33	Diesel Engine Emissions Reduction Workshop	4	20	Castine, ME	
EE-33	Workshop on Alternative Fuels	3	4	Tucson, AZ	
EE-34	5th Annual Clean Cities Conference: Conference brings together alternative fuel industry and supporters from across the nation; the primary event of the year for DOE Clean Cities program.	10	3	Washington, DC	
Natural Gas Vehicle Coalition/Propane Vehicle Council	Annual Conference opportunity for propane vehicle industry and stakeholders to hear speakers; network; see new products	3 1	3 0	Providence, RI San Antonio, TX	
EE/41Office of Building Technologies & State & Community Programs (George James)	Energy Efficient Building Museum Conference: To support dissemination of whole building technology information	4	2	Washington, DC	
EE-41 Mark Bailey	Rebuild America Annual Conference: The Major meeting where all Rebuild partners cross communicate	12	8	San Antonio, TX	

DEPARTMENTAL CONFERENCE ACTIVITIES
FISCAL YEAR 1998 THRU MARCH 1999

CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
EE-41/ Hawaiian Electric Utility Co. (Mark Bailey	Hawaiian Electric Utility Company Annual Conference	2	2	Honolulu, HI	
EE-41 Sam Taylor/ EE-1/PO/U.S. Russian Commission on Economic Technological Corp. (The Gore Chernomyrdin Commission)	Energy Efficient Windows-2 Conference	2	3	Moscow, Russia	
EE-43 Margo Appel	1998 Building Standards Program Conference: National Conference provided states, industry, code proponents and stakeholders groups with an opportunity to learn about a variety of code officials, and other members of the building industry.	2	6	Overland Park, KS	
EE-44	Weatherization/State Energy Program (WX/SEP) Headquarters - Field Meeting to plan fiscal year program priority objectives	31	3	Atlanta, GA	
EE-13	Semi-Annual Review Meeting: Review status of Biopower program/projects and FY'99 Budget	4 4	50 50	Orlando, FL	01/98 07/98
EE-13/Edison Electric Institute	Co-firing Meeting: Develop new project initiative	3 1	30 15	Washington, DC	04/98 06/98
NBIA (National Biomass Industries Association)	Biomass Energy: Dynamic Solutions to Global Problems	3	30	Washington , DC	12/97
EPRI (Electric Power Research Institute)	EPRI Biomass Co-Firing Interest Group	1	10	Washington, DC	05/98
EE-20/NIST Office of Industrial Technologies	Workshop on Metabolic Engineering	0	6	Rockville, MD	
EE-20	Industry Oversight Panel (IOP), ad hoc, informal group of industry experts. *Meeting held to discuss current and upcoming Metal Casting Program activities, its research portfolio, and the upcoming FY00 research solicitation	0	35	Rosemont, IL	
EE-20	3rd Symposium & EXPO	12	146	Washington, DC	
EE-20	OIT Off-Site Meeting Integrated Delivery/ Strategic Planning	0	60	Falls Church, VA	
EE-20	CHP Summit-Dialogue on combined heat and power	20	89	Arlington, VA	
EE-20	Micro Turbine Technology Summit-Discussion of status and future prospects for micro turbines as power generation technologies	8	57	Orlando, FL	

DEPARTMENTAL CONFERENCE ACTIVITIES
FISCAL YEAR 1998 THRU MARCH 1999

CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
EE-20/NACE Ceramics	Cutting Edge Solutions for Corrosion Control	13	25	Houston, TX	
EE-20	Energy Performance Workshop for the Chemical and Pupl and Paper Industries, 2000-2002	13	25	Cincinnati, OH	
EE-20	Advanced Stationary, Reciprocating Natural Gas Engine Workshop	9	12	San Antonio, TX	
EE-44	State Energy Program (SEP) Planning Committee Meeting: To plan the agenda and session events for the 1998 SEP All State Conference	10	2	Orlando, FL	
EE-44	WX/State Energy Program Headquarters-Field Meeting	40	7	Washington, DC	
EE-44	WX/State Program Managers Planning Committee: To plan the agenda and events for the 1998 WX State Program Managers Conference: To plan the agenda and events for the 1998 WX State Program Managers Conference	10	2	Brooklyn, NY	
EE-44	SEP All State Conference: To plan, train, and network regarding critical program issues.	54	9	Orlando, FL	
EE-44	WX State Program Managers Meeting: To plan program structure and policy for the year 2000	29	8	Brooklyn, NY	
EE-44	WX/SEP Headquarters-Field Meeting: To plan program objectives for FY 1999	39	7	Washington, DC	
EE-44	Brookhaven National Laboratory (BNL) Oil Heat Technology Conference: To present current results and research findings from the DOE/BNL Oil Heat R&D Program to the private sector.	4	12	Upton, NY	
EE-90 - Office of Federal Energy Management Programs	Energy 99	20	10	Bellevew, WA	
Office of Worker and Community Transition	National Stakeholders Workshop: To address the full range of work force and community transition issues.	63	79	Alexandria, VA	
IN-1	Nuclear Energy and Proliferation Intelligence Workshop, Part 1: To acquaint intelligence analysts, collectors, managers and consumers, with the technical aspects of proliferation.	3 3 2	17 18 17	Washington, DC	11/17-21/97 03/02/98 05/18-22/98
IN-1	Nuclear Energy and Proliferation Intelligence Workshop, Part 2: To provide intelligence officers with hands-on experiences in nuclear proliferation field.	0 0 3 1	31 28 17 21	Albuquerque, NM	03/23-27/98 08/10-14/98 01/12-16/98 06/01-05/98

DEPARTMENTAL CONFERENCE ACTIVITIES
FISCAL YEAR 1998 THRU MARCH 1999

CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
IN-1	Overview of Oak Ridge Operations: To provide intelligence analysts, collectors, managers, and Consumers with an opportunity to learn about nuclear proliferation, dismantlement, and production at the DOE's Oak Ridge Complex.	3	17	Oak Ridge, TN	01/12-16/98 06/01-05/98
IN-1	Underground Nuclear Weapons Testing Orientation Program (UNWTOP): To provide intelligence analysts, collectors, managers and consumers with information on the planning and execution of nuclear experiments at the Nevada Test Site.	7	22	Las Vegas, NV	
IN-1	Overview of Pantex Plant Operations: To familiarize intelligence analysts, collectors, managers, and consumers with the US nuclear weapons production operations, the US nuclear weapons dismantlement issues focusing on nuclear weapons manufacturing, assembly, disassembly, storage, and transportation of nuclear weapons.	8 1 2 3	15 24 29 29	Amarillo, TX	11/13/97
IG-1	Planning Meeting	24	0	St. Michaels, MD	
IG-33/IG-35/Audit Services Western Region Office	Team Leader Meeting	14 11 12	0 0 0	Las Vegas, NV Seattle, WA Grand Junction, CO	
IG-35/Audit Services Eastern Region Office	Team Leader Meeting	18 15 5 5	0 1 0 0	Oak Ridge, TN Augusta, GA Augusta, GA Oak Ridge, TN	
IG-34/Audit Services Capital Region Office	Team Leaders Meeting (Pending)	15 20	0 0	Gettysburg, PA Frederick, MD	
IG-30/Audit Services	Executive Workshop (Pending)	6	0	Livermore, CA	
IG-20/Office of Investigations	Criminal Investigator In-Service Training	34	0	Livermore, CA	
DOE-CFO/ORISE	Financial Management Systems Improvement Council (FMSIC) All-Contractors Meeting/ Budget Results Council (BRC) Annual Conference (Pending)	18	70	Chicago, IL	04/26-30/99
ED/Office of Employee Concerns	Employee Concerns Managers Meeting	20 20	2 2	Oakland, CA Washington, DC	
ED/Office of Civil Rights and Diversity	Contractor EEO/Diversity Conference	50-75	50-75	Oakland, CA	
ED/Office of Civil Rights and Diversity	Joint/EEO/SPO Managers Meeting	50	0	Las Vegas, NV Washington, DC	
ED/Office of Economic Impact and Diversity	Native Indian Business Association Rubasse Conference	3	1	Albuquerque, NM	

DEPARTMENTAL CONFERENCE ACTIVITIES
FISCAL YEAR 1998 THRU MARCH 1999

CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
ED/Office of Economic Impact and Diversity	Historically Black Colleges and Universities/ Energy Research and Development Technology Transfer Conference	10	5	Ocean City, MD	
DOE/LMITCO	Inventions and Innovations Conference: To announce that the DOE-OIT, Inventions and Innovation Program has emerging technology with significant commercial potential.	4	6	Idaho Falls, ID	
DOE/LMITCO	1998 ATR Users Conference: The purpose of the ATR Users Conference is to provide an opportunity for information exchange on current and future uses of the ATR.	5	15	Jackson Hole, WY	
DOE/LMITCO	6th Annual Nondestructive Assay Waste Characterization Conference: The conference is provided as a forum for technical and programmatic issues associated with the technical status of nondestructive waste assay and other acceptable methods.	16	84	Salt Lake City, UT	11/17-19/98
DOE/LMITCO	19th Annual U.S. Department of Energy Low-Level Radioactive Waste Management Conference	20	71	Salt Lake City, UT	
CFO	1998 Financial Management Conference: The conference serves as the primary vehicle for the dissemination and discussion of financial management policies and issues between Headquarters and Field components.	95	0	Las Vegas, NV	
DOE-OIT/INEEL & Western Regional Resource Center for Innovations	Inventions for Economic Sustainability: To announce that the DOE-OIT, Inventions and Innovation Program has emerging technology with significant commercial potential. (Pending)	11	10	Sun Valley, ID	05/12-15/99
DOE/NV Operations Office and various sponsors	Seventh Annual Nevada Regional Science Bowl: Students representing high schools in Nevada and Utah competed for prizes.	100100	100	Las Vegas, NV	
DOE/NV Operations Office	Historical Nuclear Weapons Test Film Festival	1515	10	Las Vegas, NV	
DOE/NV Operations Office and various sponsors	Working Towards One America	1515	15	Las Vegas, NV	
DOE/NV Operations Office and Desert Research Institute	Community Technical Liaison Program (CTLP	15	15	Las Vegas, NV	
DOE/NV Operations Office	Community Advisory Board (CAB)	15	15	Las Vegas, NV	
DOE/NV Operations Office	Heat Source/Radioisotope Thermoelectric Generator Assembly and Test Operations (HS/RTG)	0	0	Las Vegas, NV	
EERE	International Conference on Solar Electricity: Photovoltaic & Wind Technologies	3	2	Alexandria, Egypt	11/08-11/98

DEPARTMENTAL CONFERENCE ACTIVITIES
FISCAL YEAR 1998 THRU MARCH 1999

CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
DOE/NV Operations Office; Desert Research Institute; and Subsurface Contaminants Focus Area	Tritium Monitoring Workshop	18	52	Las Vegas, NV	
EERE	Ethanol Producers and Consumers Annual Conference: To focus on how to educate the public about fuel performance.	4	3	Helena, MT	01/24-26/99
EERE	SATIS '99: This is a forum to disseminate the use and development of renewable energy technologies systems in the Caribbean.	5	2	San Juan, Puerto Rico	03/25-27/99
EERE	9th Annual CRC On-Road Vehicle Emissions Workshop	2	3	San Diego, CA	04/19-21/99
EERE	Enzyme opportunities in the Next Millenium (4th Annual): Conference will focus on the commercial application, economics and marketing factors in enzyme industry worldwide.	5	5	Chicago, IL	05/05-07/99
EERE	21st Symposium on Biotechnology for Fuels and Chemicals: Biotechnology of Fuels & Chemicals	0	0	Ft. Collins, CO	05/02-06/99
EERE	IEEE-SCC21 Standards Development Coordination for Fuel Cells, Photovoltaic, Dispersed Generation and Energy Storage: To discuss Energy Storage Utility	10	1	Washington, DC	12/09-11/98
EERE	2nd Workshop on Satellites for Solar Energy Assessments: To discuss Solar Energy and Utilities	11	0	Golden, CO	02/03-04/99
EERE	Fourth Biomass Conference of the Americas "Biomass: A Growth Opportunity in Green Energy"	0	0	Oakland, CA	08/29-09/02/99
EERE	AWEA WindPower '98: Exchange of information on wind technology and the associated application, institutional, and environmental issues.	25	10	Bakersfield, CA	04/27-05/01/98
EERE	Ethanol in the 21st Century	2	1	Sacramento, CA	04/01-03/98
EERE	MRS Spring meeting - Symposium A	5	2	San Francisco, CA	04/13-17/98
EERE	Gordon Research Conference	10	3	New London, NH	05/12-17/98
EERE	NESA Review '98 Conference	12	4	Westfield, MA	07/23-26/98
EERE	Photovoltaics for the 21st Century (Pending)	10	2	Seattle, WA	05/02-07/99
EERE	Conference on Forest Management and Bioenergy Development	10	10	Lake Tahoe, CA	10/14-15/98
EERE	Utility PV Experience Conference and Exposition (UPEx)	2	6	San Diego, CA	09/28-30/98

DEPARTMENTAL CONFERENCE ACTIVITIES
FISCAL YEAR 1998 THRU MARCH 1999

CONFERENCE SPONSOR & CO-SPONSOR	TITLE/PURPOSE	DOE EMPLOYEES	DOE CONTRACTORS	LOCATIONS	DATES
NE-30 now NN-30	Chernobyl Center Dedication Ceremony: Ceremony commemorating completion of construction and opening of the Chornobyl Center Center for Nuclear Safety, Radioactive Waste and Radioecology Laboratory.	3	8	Slavutych, Ukraine	
NE-40	Safety of Nuclear Reactor Operations Meeting	22	15	Idaho Falls, ID	
NE-40	Depleted Uranium Hexafluoride Management PEIS Public Meeting	3 3	2 2	Oak Ridge, TN Piketon, OH	
NE-40	Depleted Uranium Hexafluoride Management Industry Meeting	3 3 3	2 2 2	Cincinnati, OH Knoxville, TN Lexington, KY	
NE-40	Tri-State/DOE Depleted Uranium Hexafluoride Management Working Group Meeting	6	1	Cincinnati, OH	
SC-50 AL Opdenaker	International Thermonuclear Experimental Reactor (ITER) Project Panel Meeting: To review and recommend the level of U.S. participation in the ITER project during the construction phase.	1	2	Newport News, VA	
SC-50 AL Opdenaker	International Thermonuclear Experimental Reactor (ITER) Project Subpanel Meeting: To review and recommend the level of U.S. participation in the ITER project during the construction phase.	1	0	Washington, DC	
SC-50 AL Opdenaker	Fusion Energy Sciences Advisory Committee Meeting: To allow the full committee to hear the report of its panel that is reviewing the Fusion Materials Research Program, and to prepare a letter on the results of that review to DOE.	0 2 1 7	4 1 1 8	Gaithersburg, MD Gaithersburg, MD Pleasanton, CA San Diego, CA	
TJNAF	Free Electron Laser Conference	1	57	Williamsburg, VA	

MANAGEMENT AND ADMINISTRATION
SCHEDULE "C" EMPLOYEES

Mr. Packard. Please provide the number of Schedule "C" employees by organization for fiscal years 1997, 1998, and 1999.

Mr. Farrell. The following table contains the number of Schedule C employees by organization for Fiscal Year 1999 to date as compared to Fiscal Years 1997 and 1998. (The information follows:)

TABLE OF DOE SCHEDULE C (Sch C) EMPLOYEES
BY ORGANIZATION

ORGANIZATIONS	FY97	FY98	FY99
	Sch C	Sch C	Sch C
Office of the Secretary	4	7	8
Secretary Energy Advisory Board	0	0	0
* Congressional, Public & Intergovernmental Affairs	9	---	---
* Congressional and Intergovernmental Affairs	---	4	4
* Public Affairs	---	5	7
Chief Financial Officer	1	3	2
Civilian Radioactive Waste Management	1	1	1
Contract Reform and Privatization **	---	---	0
Counterintelligence **	---	---	0
Defense Programs	1	1	1
Economic Impact & Diversity	2	3	3
Energy Efficiency and Renewable Energy	11	11	11
Energy Information Administration	0	0	0
Environment, Safety & Health	3	3	3
Environmental Management	10	7	6
Field Management (Headquarter & Field Offices)	1	2	3
Fissile Materials Disposition	---	0	0
Fossil Energy	3	3	4
General Counsel	0	0	0
Hearing and Appeals	0	0	0
Intelligence **	---	---	1
Management and Administration (formerly Human Resources and Administration)**	6	9	15
Nonproliferation and National Security	3	3	2

ORGANIZATIONS	FY97	FY98	FY99
Nuclear Energy, Science and Technology	3	2	0
Office of Science (formerly Energy Research) **	3	5	5
Policy and International Affairs	6	6	4
Quality Management (merged w/HR; now MA FY98)	0	0	—
Worker and Community Transition	2	3	3
Bonneville Power Administration	0	0	0
Southeastern Power Administration	0	0	0
Southwestern Power Administration	0	0	0
Western Area Power Administration	0	0	0
TOTAL***	69	78	83

* In FY96 Public Affairs was separate from Congressional and Intergovernmental Affairs. The two offices merged in FY97 to form Congressional, Intergovernmental and Public Affairs; but separated in FY98.
** In FY99 Human Resources and Administration became Management and Administration. Also in 1998 the Office of Quality Management merged with the Office of Human Resources and Administration now known as the Office of Management and Administration. Energy Research became the Office of Science. Two new organizations were formed in late FY98 with functions from Nonproliferation and National Security - Counterintelligence and Intelligence. Also in late FY98, the Office of Contract Reform and Privatization was formed.
*** FY 97 & FY 98 reflect year end totals, while FY 99 reflects data as of 02-26-99.

HEADQUARTERS SUPPORT CONTRACTORS

Mr. Packard. Which M&O or M&I contractors maintain offices in the Washington metropolitan area in support of DOE programs? How many employees are assigned to each office? What are their duties? What is the annual cost of maintaining each office including rent, salaries, etc.? How much of the cost of each office is charged directly to a DOE program? Identify the amount each contractor Washington office charges to each DOE program office.

Mr. Farrell. Currently there are 11 M&O contractor offices in the Washington area funded partially or totally by the Department. A list of these offices, office locations, annual rents and an estimation of the number of staff supporting DOE activities, as reported in November 1998, are included in the following table. Brookhaven National Laboratory (BNL) currently has no staff assignments in the contractor office, but provides space for visiting staff from the laboratory. (The information follows:)

The Washington Offices provide space for employees assigned to DOE projects, for visiting staff from the laboratory, or for staff assigned to other projects not reimbursed by the Department. Most offices also have staff providing administrative or overhead functions which are charged to overhead. In many offices the number of employees assigned to DOE may vary from month to month depending on task assignments. Costs for the operation of these offices, including overhead functions, are charged to cost centers at the cognizant laboratory. Program Offices are charged with direct labor charges of persons assigned to their program as well as all overhead costs for supporting these employees. These costs will include the appropriate share of the Washington office costs as well as an allocation of laboratory overhead costs. Currently total costs for maintaining support offices in Washington are not reported. The Department is in the process of issuing a DOE Order which requires the M&O contractors to set up a segregatable line of accounting for the costs associated with contractor employees located in the Washington, D.C. area and to report this information annually.

The current duties of the M&O employees assigned to the Washington area in 1998 are included in our Annual Report to Congress (January 1999), which is included later in the record. A listing of all administrative and overhead support staff are also included by Laboratory. The assignments listed are those inventoried in November 1998. Of the total number of employees assigned to the Washington area, over a third are located in DOE facilities, and several are located at other agencies.

M&O CONTRACTOR WASHINGTON OFFICES

POST OFFICE	LAB	CONTRACTOR	LOCATION	RENT	ESTIMATED NUMBER OF STAFF SUPPORTING DOE ACTIVITIES
Albuquerque	SNL	Lockheed Martin	L'Enfant Plaza	$140K	6
Albuquerque	LANL	Uni. of California	12th & D	$109K	4
Chicago	ANL	Uni. of Chicago	L'Enfant Plaza	$464K	25
Idaho	INEEL	LMITCO	L'Enfant Plaza North Bethesda Germantown	$145K $113K $11K	16
Oak Ridge	ORISE	ORAU	19th & K	$85K	30
Oak Ridge	ORNL	Lockheed Martin LMER/LMES	7th & C Germantown	$128K $52K	11
Oakland	LBNL	Uni. of California	12th & D	$308K	12
Oakland	LLNL	Uni. of California	L'Enfant Plaza Germantown	$185K $100K	18
Richland	PNNL	Battelle	9th & D	$1.2M**	76
Golden	NREL	MRI	12th & D	$253K	23

**Contractor Lease. Space subleased to BNL.

Note: Offices are also utilized by visiting staff from the laboratories as well as staff supporting other clients and not reimbursed by DOE. Costs for the operation of these offices are charged to cost centers at the cognizant laboratory which are allocated as part of employee's overhead charges to the client. Number of staff located in each office may vary from month to month.

CONTRACTOR CONGRESSIONAL SUPPORT

Mr. Packard. How many M&O employees are currently assigned to Congressional offices? What is the total annual cost to the Department including salaries, per diem, rent, etc., for M&O contractor employees assigned to Congressional offices in fiscal year 1997, 1998, and estimated for 1999? Has DOE been reimbursed for any of these costs?

Mr. Farrell. Over the past three years, four M&O employees have been assigned to Congressional offices, as shown below. Currently there are three contractor employees assigned to Congressional offices. The total annual costs in FY 1998 and 1997 for these assignments was approximately $825,000. Projected costs for FY 99 are approximately $550,000. None of these costs are reimbursed.

Previously assigned:

• T. Palmieri	Advisor to Senator Brownback	4/97-9/98	SNL

Currently assigned:

• R. Lyons	Advisor to Senator Domenici	2/97-12/00	LANL
• R. Perret	Assistance to Senator Reid	5/96-5/99	LLNL
• D. Alpert	ASME Fellow-Senator Bingaman	? -1/99	SNL
	Science Advisor-Senator Bingaman	1/99-1/00	SNL

HUMAN RESOURCES AND ADMINISTRATION
TRAINING

Mr. Packard. Provide detail on funding of fiscal years 1997, 1998 and 1999 training activities by (1) field element and (2) DOE headquarters. The response should include: (1) the cost of training organizations, the cost associated with contracting for training (i.e., course instructors, training materials, facility and equipment rental, etc.) and the value of the time for federal/contractor personnel being trained (that is, the value of salary/fringes/other costs for the time involved in the training). The response should identify dollars for the following categories:

- support for technical qualifications (93-3) - federal personnel.
- support for DOE Order 5480.20a - contractor personnel.
- professional development - federal personnel. Note: Intended to capture the balance of all federal training (exclusive of (a) above.)
- professional development - contractor personnel. Note: Intended to capture the balance of all contractor-related training (exclusive of (b) above.)

Mr. Farrell. We have actual expenditures for fiscal years 1997 and 1998 and projected expenditures for 1999 training activities. These are shown by field element, Headquarters, and combined for the entire Department in a table which I would like to insert for the record. (The information follows:)

U. S. Department of Energy
Funding for Training Activities
(whole dollars)

Field Elements

Category		Actual Fiscal Year 1997		Actual Fiscal Year 1998		Projected Fiscal Year 1999	
		Federal	Contractor	Federal	Contractor	Federal	Contractor
Cost of Training Organizations	93-3/5480.20A	1,538,600	88,020,400	955,541	72,238,140	1,013,459	76,039,241
	Professional Development	6,871,600	51,792,100	5,382,182	61,600,169	5,598,651	64,625,229
Total Cost of Training Organizations:		8,410,200	139,812,500	6,337,723	133,838,309	6,612,110	140,664,470
Costs Associated With Contracting for Training	93-3/5480.20A	1,946,800	10,631,000	3,317,850	11,989,394	3,510,715	14,269,390
	Professional Development	8,329,216	20,856,400	7,514,815	22,457,798	7,870,358	22,868,041
Total Costs Associated with Contracting for Training:		10,276,016	31,487,400	10,832,665	34,447,192	11,381,073	37,137,431

Headquarters Elements

Category		Actual Fiscal Year 1997		Actual Fiscal Year 1998		Projected Fiscal Year 1999	
		Federal	Contractor	Federal	Contractor	Federal	Contractor
Cost of Training Organizations	93-3/5480.20A	898,296	0	809,162	0	815,892	0
	Professional Development	4,423,744	2,332,486	4,158,835	2,248,479	4,057,968	2,251,306
Total Costs of Training Organizations:		5,322,040	2,332,486	4,967,997	2,248,479	4,873,860	2,251,306
Costs Associated With Contracting for Training	93-3/5480.20A	1,778,950	3,173,950	976,074	5,522,000	1,445,000	5,522,000
	Professional Development	5,685,627	4,055,301	5,053,456	3,897,805	5,461,107	3,769,000
Total Costs Associated with Contracting for Training:		7,464,577	7,229,251	6,029,530	9,419,805	6,906,107	9,291,000

U. S. Department of Energy
Total Funding for Training Activities
(whole dollars)

	Category	Actual Fiscal Year 1997		Actual Fiscal Year 1998		Projected Fiscal Year 1999	
		Federal	Contractor	Federal	Contractor	Federal	Contractor
Cost of Training Organizations	93-3/5480.20A	2,436,896	88,020,400	1,764,703	72,238,140	1,829,351	76,039,241
	Professional Development	11,295,344	54,124,586	9,541,017	63,848,648	9,656,619	66,876,535
Total Cost of Training Organizations:		13,732,240	142,144,986	11,305,720	136,086,788	11,485,970	142,915,776
Costs Associated With Contracting for Training	93-3/5480.20A	3,725,750	13,804,950	4,293,924	17,511,394	4,955,715	19,791,390
	Professional Development	14,014,843	24,911,701	12,568,271	26,355,603	13,331,465	26,637,041
Total Costs Associated with Contracting:		17,740,593	38,716,651	16,862,195	43,866,997	18,287,180	46,428,431

VALUE OF TIME FOR FIELD ELEMENTS

Value of Time for Federal/ Contractor Personnel Being Trained	93-3/5480.20A	3,426,750	78,827,700	2,882,268	89,747,850	3,129,192	87,524,670
	Professional Development	14,777,522	59,802,300	14,238,998	72,210,015	14,991,529	73,215,636
Total Value of Time:		18,204,272	138,630,000	17,121,266	161,957,865	18,120,721	160,740,306

VALUE OF TIME FOR HEADQUARTERS ELEMENTS

Value of Time for Federal/ Contractor Personnel Being Trained	93-3/5480.20A	302,500	0	243,713	0	325,298	0
	Professional Development	7,250,496	3,339,046	6,835,545	2,377,407	7,312,227	2,248,894
Total Value of Time:		7,552,996	3,339,046	7,079,258	2,377,407	7,637,525	2,248,894

TOTAL DEPARTMENT OF ENERGY VALUE OF TIME

Value of Time for Federal/ Contractor Personnel Being Trained	93-3/5480.20A	3,729,250	78,827,700	3,125,981	89,747,850	3,454,490	87,524,670
	Professional Development	22,028,018	63,141,346	21,074,543	74,587,422	22,303,756	75,464,530
Total Value of Time:		25,757,268	141,969,046	24,200,524	164,335,272	25,758,246	162,989,200

GENERAL COUNSEL

Mr. Packard. How many employees in the Office of General Office are funded by other program organizations, what is the cost of those employees, and which programs provide the funding?

Secretary Richardson. Pursuant to the full cost recovery provisions of the Nuclear Waste Policy Act, 5 General Counsel positions are funded by the Office of Civilian Radioactive Waste Management. The cost is $620,000 per year. This funding reflects the work done within General Counsel to support that program. No other employees within General Counsel are funded by other program organizations.

LEGISLATION TO IMPLEMENT BUDGET

Mr. Packard. Please describe all proposals contained in the fiscal year 2000 budget which will require legislation to implement and identify the congressional committee with jurisdiction over the issue. Indicate whether the request for legislation has been formally submitted to the appropriate committees.

Secretary Richardson. No legislation is required to implement the fiscal year 2000 budget.

ANTICIPATED LITIGATION COSTS

Mr. Packard. Are there any lawsuits currently outstanding at DOE facilities which may be settled in the next two years and (1) which could require DOE funds for substantial settlements and/or (2) involve substantial costs to comply with court-mandated materials/etc.?

Secretary Richardson. The outstanding lawsuits at DOE facilities that potentially present the most substantial exposure to the Department are mass tort actions brought against former or current contractors at Rocky Flats, Hanford, Mound, Portsmouth and Brookhaven. Under the terms of DOE's (or its predecessor agencies') contracts with the defendants in these cases, as well as under the terms of the Price-Anderson Act, the Department generally would be required to pay the costs of any settlements or judgments in these lawsuits.

Mr. Packard. Please provide a summary listing of litigation costs incurred by each DOE contractor in fiscal years 1997, 1998, and estimated in 1999. Provide totals for each year.

Secretary Richardson. The Office of General Counsel compiles cost information by case and costs approved for reimbursement by the Department. The summary listing of litigation costs approved for cases involving both current and former DOE contractors in fiscal years 1997, 1998 and the first quarter of 1999 is attached. Contractor litigation costs for fiscal year 1999 are expected to be similar to 1998 levels.

Approved Contractor Litigation Costs

Contractor	FY1997	FY1998	FY1999 (1st qtr)
ALLIED SIGNAL	$83,637	$33,792	$7,379
ARGONNE	$1,266,354	$523,032	$0
ASSOCIATED UNIVERSITIES, INC.	$525,327	$0	$0
BATTELLE	$588,609	$395,025	$78,346
BECHTEL	$78,347	$258,434	$92,963
BPS (British Petroleum)	$0	$563	$0
DYNMCDERMOTT	$287,947	$24,587	$36,194
DOW CHEMICAL	$5,803,378	$3,287,889	$193,204
DUPONT	$3,562,239	$3,004,294	$232,494
EG&G	$734,992	$1,477,831	$74,632
FLUOR DANIEL	$620,143	$1,177,060	$46,035
GENERAL ELECTRIC	$8,544	$4,462	$13,728
GOODYEAR	$288,126	$536	$0
ICF KAISER	$9,332	$10,209	$388
KAISER-HILL	$4,919	$82,672	$20,411
LOCKHEED MARTIN	$1,738,995	$2,391,375	$1,216,828
MASON & HANGER	$251,842	$127,977	$100,632
MK-FERGUSON	$1,839,213	$1,095,038	$2,801
MONSANTO	$15,151	$1,719	$2,981
NLO	$93,835	$23,983	$0
NREL (National Renewable Energy Laboratory)	$122,324	$324,483	$191,445
ORAU (Oak Ridge Associated Universities)	$0	$9,234	$13,458
PRINCETON PLASMA LAB	$94,461	$24,497	$0
REECO	$445,549	$97,434	$22,560
ROCKWELL	$91,344	$6,150	$0
RSN (Raytheon Services Nevada)	$26,995	$101,256	$15,380
SANDIA	$287,833	$359,529	$108,521
TRW	----	$66,412	$14,811
UNIVERSITY CALIFORNIA	$4,482,910	$3,439,401	$673,328
URA (Universities Research Association)	$36,749	$725	$0
U.S. MODULAR	$12,900	$5,685	$0
WEMCO (Westinghouse Environmental Mgmt. Co. of Ohio)	$753	$0	$0
WESTINGHOUSE ELECTRIC	$313,924	$2,088,382	$271,548
WSI (Wackenhut Services, Inc.)	$185,434	$101,574	$4,053
WSRC (Westinghouse Savannah River)	$402,715	$261,560	$112,676
WVNS (West Valley Nuclear Services)	$308,635	$75,638	$67,494
TOTAL	$24,613,456	$20,882,438	$3,614,290

HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

HISPANIC-SERVING INSTITUTIONS

Mr. Packard. List by DOE program organization and field element the total funding provided for Historically Black Colleges and Universities and Historically Spanish Institutions in fiscal years 1997, 1998, and estimated 1999.

Ms. Summerville. We have provided a listing of each Departmental program organization's funding for fiscal years 1997 and 1998 for Historically Black Colleges and Universities and Hispanic-serving Institutions. The listing for fiscal year 1999 will be provided to you by December 31, 1999 when all Departmental program organizations have compiled final funding data through September 30, 1999. We have proposed a five (5) percent increase in funding to these institutions in fiscal year 1999.

ATTACHMENT

SUPPORT TO HISPANIC-SERVING EDUCATIONAL INSTITUTIONS

(IN THOUSANDS OF DOLLARS)

	1997	1998
CIVILIAN RADIOACTIVE MANAGEMENT	$0	$70
DEFENSE PROGRAMS	12,325	11,109
ECONOMIC IMPACT AND DIVERSITY	170	75
ENERGY EFFICIENCY AND RENEWABLE ENERGY	1,450	1,572
ENERGY INFORMATION ADMINISTRATION	24	26
ENVIRONMENTAL MANAGEMENT	23,464	12,503
ENVIRONMENT, SAFETY AND HEALTH	0	0
FOSSIL ENERGY	200	919
NONPROLIFERATION AND NATIONAL SECURITY	0	0
NUCLEAR ENERGY SCIENCE AND TECHNOLOGY	50	123
POLICY AND INTERNATIONAL AFFAIRS	0	0
SCIENCE	5,250	5,643
WORKER AND COMMUNITY TRANSITION	150	0

ATTACHMENT

SUPPORT TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

(IN THOUSANDS OF DOLLARS)

	1997	1998
CIVILIAN RADIOACTIVE MANAGEMENT	$227	$204
DEFENSE PROGRAMS	3,010	2,480
ECONOMIC IMPACT AND DIVERSITY	563	269
ENERGY EFFICIENCY AND RENEWABLE ENERGY	1,590	1,322
ENERGY INFORMATION ADMINISTRATION	176	201
ENVIRONMENTAL MANAGEMENT	13,891	10,093
ENVIRONMENT, SAFETY AND HEALTH	130	88
FOSSIL ENERGY	1,228	1,616
NONPROLIFERATION AND NATIONAL SECURITY	220	0
NUCLEAR ENERGY SCIENCE AND TECHNOLOGY	527	585
POLICY AND INTERNATIONAL AFFAIRS	25	30
SCIENCE	9,728	6,831
WORKER AND COMMUNITY TRANSITION	30	0

HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

HISPANIC-SERVING INSTITUTIONS

Mr. Packard. Please provide a list of each Historically Black College and University and Historically Spanish Institution that have received DOE funding in fiscal years 1997, 1998, and 1999.

Ms. Summerville. We have provided a list of each Historically Black College and University's funding for fiscal years 1997 and 1998. We are in the process of compiling the fiscal year 1997 and 1998 information for Hispanic-serving Institutions, and will provide it to you by April 30, 1999. The remainder of information for fiscal year 1999 will not be available until after September 30, 1999. We will provide these data by December 31, 1999.

FY 1998
FEDERAL AGENCY AWARDS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES
WHOLE DOLLARS

STATE/INSTITUTION	R&D	PE	TRAINING	F&E	FELLOWS	SFA	DIS	TPA	PSI	AI	OTHER	TOTALS
ALABAMA												
ALABAMA A&M	160,864	0	0	0	0	17,150	0	100,116	0	0	25,636	303,766
ALABAMA STATE	0	0	0	0	0	7,520	0	0	0	0	0	7,520
BISHOP STATE COMM.	0	0	0	0	0	0	0	0	0	0	0	0
CARVER CAMPUS	0	0	0	0	0	0	0	0	0	0	0	0
CONCORDIA COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
FREDD STATE TECH	0	0	0	0	0	0	0	0	0	0	0	0
LAWSON STATE	0	0	0	0	0	0	0	0	0	0	0	0
MILES COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
OAKWOOD COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
SELMA UNIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
J.F. DRAKE TECH	0	0	0	0	0	0	0	0	0	0	0	0
STILLMAN COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
TALLADEGA COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
TRENHOLM STATE TECH	0	0	0	0	0	0	0	0	0	0	0	0
TUSKEGEE UNIVERSITY	709,009	0	0	0	24,000	0	0	202,162	0	0	76,960	1,012,131
ARKANSAS												
ARKANSAS BAPTIST	0	0	0	0	0	0	0	0	0	0	0	0
PHILANDER SMITH	0	0	0	0	0	0	0	0	0	0	0	0
SHORTER COLLEGE	0	0	0	21,999	0	0	0	0	0	0	0	21,999
U. OF ARKANSAS @ PB	0	0	0	0	0	0	0	0	0	0	0	0
DELAWARE												
DELAWARE STATE	100,000	0	0	0	0	0	0	0	0	0	0	100,000
DISTRICT OF COLUMBIA												
HOWARD UNIVERSITY	1,051,017	0	0	0	33,625	214,394	101,000	280,700	0	0	59,960	1,740,696
UNIV. OF D. C.	150,000	0	0	0	25,960	0	0	0	0	0	0	175,960
FLORIDA												
BETHUNE COOKMAN	0	0	0	0	40,000	0	25,000	21,000	0	0	0	86,000
EDWARD WATERS	0	0	0	0	0	0	0	0	0	0	0	0
FLORIDA A&M	2,547,882	0	5,000	0	52,000	0	73,000	50,110	0	0	21,385	2,749,137
FLORIDA MEMORIAL	0	0	0	0	0	0	0	0	0	0	0	0

R&D = Research and Development	FELLOWS = Fellowships, Traineeships, Internships, Recruitment and IPA's	PSI = Private Sector Involvement
PE = Program Evaluation	SPA = Student Tuition A	AI = Administrative Infrastructure
TRAINING	DIS = Direct Institutional	OTHER
F&E = Facilities and Equipment	TPA = Third Party Awards	

FY 1996

FEDERAL AGENCY AWARDS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

WHOLE DOLLARS

STATE/INSTITUTION	R&D	PE	TRAINING	F&E	FELLOWS	SFA	DIS	TPA	PSI	AI	OTHER	TOTALS
GEORGIA												
ALBANY STATE	10,000	0	0	0	0	0	0	0	0	0	0	10,000
CLARK ATLANTA U.	744,779	12,757	0	20,000	11,303	88,156	278,000	10,500	0	1,102,529	3,055,112	5,323,136
FORT VALLEY STATE	152,000	12,500	0	0	0	0	100,000	0	0	0	0	264,500
INTERDENOMINATIONAL THEOLOG	0	0	0	0	0	0	0	0	0	0	0	0
MOREHOUSE COLLEGE	68,872	0	0	0	0	0	0	48,200	0	0	0	117,072
MOREHOUSE MEDICAL	0	0	0	0	0	0	0	0	0	0	0	0
MORRIS BROWN	0	0	0	0	0	0	0	10,200	0	0	0	10,200
PAINE COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
SAVANNAH STATE	0	0	0	0	8,818	9,250	0	0	0	0	0	18,068
SPELMAN COLLEGE	76,995	0	0	0	0	0	251,768	0	0	0	0	328,763
KENTUCKY												
KENTUCKY STATE	0	0	0	0	0	0	0	0	0	0	0	0
LOUISIANA												
DILLARD UNIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
GRAMBLING STATE	0	0	0	0	0	0	0	3,900	0	0	0	3,900
SOUTHERN U. & A&M	26,000	0	0	0	20,000	20,800	0	135,652	0	0	0	202,452
SOUTHERN/BATON ROUGE	685,971	0	0	0	29,687	0	0	3,800	0	0	14,329	933,587
SOUTHERN/NEW ORLEANS	0	0	0	0	0	0	0	0	0	0	0	0
SOUTHERN/SHREVEPORT	0	0	0	0	0	0	0	0	0	0	0	0
XAVIER UNIVERSITY	162,255	0	0	0	12,844	0	0	112,800	0	0	35,842	323,741
MARYLAND												
BOWIE STATE	0	0	0	0	29,419	0	0	0	0	0	0	29,419
COPPIN STATE	0	0	0	0	0	0	0	0	0	0	0	0
MORGAN STATE	300,000	500	13,500	0	0	9,000	0	30,000	0	4,500	0	357,500
U. OF MARYLAND ES	400,000	57,500	0	0	0	0	0	10,500	0	0	0	468,000
MICHIGAN												
LEWIS COLLEGE OF BUS.	0	0	0	0	0	0	0	0	0	0	0	0

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FY 1998

FEDERAL AGENCY AWARDS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

WHOLE DOLLARS

STATE/INSTITUTION	R&D	PE	TRAINING	F&E	FELLOWS	SFA	DIS	TPA	PSI	AI	OTHER	TOTALS
MISSISSIPPI												
ALCORN STATE	0	0	0	0	0	19,961	0	0	0	0	0	19,961
COAHOMA JR. COLLEGE	0	0	0	0	0	0	0	9,339	0	0	0	9,339
HINDS COMM. COLLEGE	180,000	0	0	0	0	0	0	0	0	0	0	180,000
JACKSON STATE	17,617	0	0	0	39,400	10,260	0	64,176	0	0	43,983	184,436
MARY HOLMES	0	0	0	0	0	0	0	0	0	0	0	0
MISSISSIPPI VALLEY	0	0	0	0	0	44,600	0	0	0	0	0	44,600
RUST COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
TOUGALOO COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
MISSOURI												
HARRIS STOWE STATE	0	0	0	0	0	0	0	0	0	0	0	0
LINCOLN UNIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
NORTH CAROLINA												
BARBER-SCOTIA	0	0	0	0	0	0	0	0	0	0	0	0
BENNETT COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
ELIZABETH CITY STATE	429,000	40,000	0	0	0	0	0	0	0	0	0	469,000
FAYETTEVILLE STATE	27,000	0	0	0	0	0	0	0	0	0	0	27,000
JOHNSON C. SMITH	0	0	0	0	0	0	0	0	0	0	0	0
LIVINGSTONE COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
N. C. A&T STATE	1,301,779	0	4,967	0	26,512	51,681	5,000	306,292	0	0	44,200	1,742,431
N. C. CENTRAL	0	0	0	0	0	0	0	105,000	0	0	0	105,000
ST. AUGUSTINE	0	0	0	0	0	0	0	0	0	0	0	0
SHAW UNIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
WINSTON-SALEM STATE	0	0	0	0	0	0	0	0	0	0	0	0
OHIO												
CENTRAL STATE	0	0	0	0	0	22,400	0	0	0	0	0	22,400
WILBERFORCE UNIV.	0	0	0	0	0	65,200	0	0	0	0	0	65,200
OKLAHOMA												
LANGSTON UNIV.	50,000	0	0	41,492	0	50,000	0	0	0	0	0	141,492
PENNSYLVANIA												
CHEYNEY UNIV.	0	0	0	0	0	0	0	0	0	0	0	0
LINCOLN UNIV.	0	0	0	0	0	75,530	3,000	10,500	0	0	0	89,030

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FY 1998

FEDERAL AGENCY AWARDS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

WHOLE DOLLARS

STATE/INSTITUTION	R&D	PE	TRAINING	F&E	FELLOWS	SFA	DIS	TPA	PSI	AI	OTHER	TOTALS
SOUTH CAROLINA												
ALLEN UNIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
BENEDICT COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
CLAFLIN COLLEGE	0	0	0	0	0	13,068	0	10,500	0	0	0	23,568
CLINTON JR. COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
DENMARK TECH.	0	0	0	0	0	0	0	0	0	0	0	0
MORRIS COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
S. C. STATE UNIV.	168,485	0	9,974	0	17,000	51,111	2,000	0	0	0	8,000	256,550
VOORHEES COLLEGE	0	0	0	0	0	0	0	20,400	0	0	0	20,400
TENNESSEE												
FISK UNIV.	450,000	0	0	0	0	0	0	0	0	0	0	450,000
KNOXVILLE COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
MORRISTOWN CAMPUS	0	0	0	0	0	0	0	60,000	0	0	0	60,000
LANE COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
LEMOYNE-OWEN	0	0	0	0	0	0	0	0	0	0	0	0
MEHARRY MEDICAL	60,000	0	0	0	0	0	0	0	0	0	0	60,000
TENNESSEE STATE	75,000	0	9,974	0	0	56,748	5,000	68,859	0	0	18,000	233,581
TEXAS												
HUSTON-TILLOTSON	0	0	0	0	0	0	0	0	0	0	0	0
JARVIS CHRISTIAN	0	0	0	0	0	0	0	0	0	0	0	0
PAUL QUINN COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
PRAIRIE VIEW A&M	1,145,118	0	0	0	38,888	0	0	107,150	0	0	43,912	1,334,878
SAINT PHILLIP'S	166,750	0	0	0	0	0	0	0	0	0	0	166,750
SOUTHWESTERN CHRIST.	0	0	0	0	0	0	0	0	0	0	0	0
TEXAS COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
TEXAS SOUTHERN	83,856	0	0	0	15,300	122,500	0	0	0	0	37,844	259,500
WILEY COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA												
HAMPTON UNIV.	444,172	0	20,000	0	30,526	0	0	214,900	0	0	0	709,598
NORFOLK STATE	1,382,000	0	0	0	6,528	0	0	170,000	0	0	12,820	1,571,348
SAINT PAUL'S	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA STATE	0	0	0	0	0	15,900	0	0	0	0	0	15,900
VIRGINIA UNION	103,000	0	0	0	0	0	0	20,400	0	0	0	123,400

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FY 1996

FEDERAL AGENCY AWARDS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

WHOLE DOLLARS

STATE/INSTITUTION	R&D	PE	TRAINING	F&E	FELLOWS	SPA	DIS	TPA	PSI	AI	OTHER	TOTALS
WEST VIRGINIA												
BLUEFIELD STATE	0	0	0	0	0	0	0	0	0	0	0	0
W. VIRGINIA STATE	0	0	0	0	0	0	0	0	0	0	0	0
U.S. VIRGIN ISLANDS												
UNIV. OF THE V. I.	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	70,500	0	283,464	24,000	250,000	0	0	6,800	125,416	760,180
GRAND TOTALS	13,606,681	123,257	133,935	83,491	741,100	968,709	1,063,768	2,209,256	0	1,113,828	3,623,379	23,719,605

R&D = Research and Development	FELLOWS = Fellowships, Traineeships, Internships, Recruitment and IPA's	PSI = Private Sector Involvement
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TRAINING	DIS = Direct Institutional	OTHER
F&E = Facilities and Equipment	TPA = Third Party Awards	

FY 1997

FEDERAL AGENCY AWARDS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

WHOLE DOLLARS

STATE/INSTITUTION	R&D	PE	TRAINING	F&E	FELLOWS	SFA	DIS	TPA	PSI	AI	OTHER	TOTALS
ALABAMA												
ALABAMA A&M	218,400	0	0	0	0	32,490	0	185,050	0	0	0	435,940
ALABAMA STATE	0	0	0	0	0	600	0	0	0	0	0	600
BISHOP STATE COMM.	0	0	0	0	0	0	0	0	0	0	0	0
CARVER CAMPUS	0	0	0	0	0	0	0	0	0	0	0	0
CONCORDIA COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
FREDD STATE TECH	0	0	0	0	0	0	0	0	0	0	0	0
LAWSON STATE	0	0	0	0	15,063	0	0	6,000	0	0	15,000	36,063
MILES COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
OAKWOOD COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
SELMA UNIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
J.F. DRAKE TECH	0	0	0	0	0	0	0	0	0	0	0	0
STILLMAN COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
TALLADEGA COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
TRENHOLM STATE TECH	0	0	0	0	0	0	0	0	0	0	0	0
TUSKEGEE UNIVERSITY	369,877	0	0	0	0	38,400	0	700	0	0	0	408,977
ARKANSAS												
ARKANSAS BAPTIST	0	0	0	0	0	0	0	0	0	0	0	0
PHILANDER SMITH	0	0	0	0	0	0	0	0	0	0	0	0
SHORTER COLLEGE	0	0	0	21,999	0	0	0	0	0	0	0	21,999
U. OF ARKANSAS @ PB	0	0	0	0	0	0	0	6,500	0	0	0	6,500
DELAWARE												
DELAWARE STATE	100,000	0	0	0	0	0	0	0	0	0	0	100,000
DISTRICT OF COLUMBIA												
HOWARD UNIVERSITY	2,847,551	0	1,815	0	71,321	236,499	55,000	345,250	0	0	23,591	3,581,027
UNIV. OF D. C.	0	0	0	0	6,658	0	0	32,500	0	0	0	39,158
FLORIDA												
BETHUNE COOKMAN	0	0	0	0	0	0	0	0	0	0	0	0
EDWARD WATERS	0	0	0	0	0	0	0	0	0	0	0	0
FLORIDA A&M	2,757,568	0	0	0	10,000	0	80,000	54,800	0	0	33,631	2,935,999
FLORIDA MEMORIAL	0	0	0	0	0	0	0	0	0	0	0	0

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TRAINING	DIS = Direct Institutio	OTHER
F&E = Facilities and Equipment	TPA = Third Party Awards	

FY 1997
FEDERAL AGENCY AWARDS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES
WHOLE DOLLARS

STATE/INSTITUTION	R&D	PE	TRAINING	F&E	FELLOWS	SFA	DIS	TPA	PSI	AI	OTHER	TOTALS
GEORGIA												
ALBANY STATE	0	0	0	0	0	0	0	13,025	0	0	0	13,025
CLARK ATLANTA U.	2,228,442	0	0	0	248,309	45,455	1,381,161	102,800	0	1,075,461	0	5,081,428
FORT VALLEY STATE	0	12,500	0	0	30,000	300,000	0	0	0	0	516,749	859,249
INTERDENOMINATIONAL THEOLOGI	0	0	0	0	0	0	0	0	0	0	0	0
MOREHOUSE COLLEGE	220,000	0	0	0	0	0	0	43,200	0	0	0	263,200
MOREHOUSE MEDICAL	0	0	0	0	0	0	0	0	0	0	0	0
MORRIS BROWN	0	0	0	0	15,000	0	0	5,000	0	0	38,002	58,002
PAINE COLLEGE	0	0	0	0	8,592	600	0	0	0	0	0	9,192
SAVANNAH STATE	200,000	0	0	0	12,040	15,835	0	0	0	0	0	227,875
SPELMAN COLLEGE	635,554	0	0	0	0	0	0	114,400	0	0	0	749,954
KENTUCKY												
KENTUCKY STATE	0	0	0	0	0	0	0	0	0	0	0	0
LOUISIANA												
DILLARD UNIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
GRAMBLING STATE	0	0	0	0	10,000	0	0	23,400	0	0	47,000	80,400
SOUTHERN U. & A&M	445,000	0	0	0	0	0	0	66,700	0	0	200,000	711,700
SOUTHERN/BATON ROUGE	447,516	50,000	0	0	18,093	600	0	74,625	0	0	0	590,834
SOUTHERN/NEW ORLEANS	0	0	0	0	5,575	0	0	0	0	0	0	5,575
SOUTHERN/SHREVEPORT	0	0	0	0	0	0	0	90,400	0	0	0	90,400
XAVIER UNIVERSITY	4,284,479	0	0	0	0	0	0	6,400	0	0	1,800	4,292,479
MARYLAND												
BOWIE STATE	0	0	12,500	0	4,681	0	12,500	27,000	0	0	0	56,681
COPPIN STATE	0	0	0	0	0	0	0	0	0	0	0	0
MORGAN STATE	417,014	0	0	0	10,000	0	0	0	0	0	0	427,014
U. OF MARYLAND ES	199,949	0	0	10,000	2,884	0	0	13,000	0	0	0	225,833
MICHIGAN												
LEWIS COLLEGE OF BUS.	0	0	0	0	0	0	0	0	0	0	0	0

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PE = Program Evaluation
TRAINING
F&E = Facilities and Equipment
FELLOWS = Fellowships, Traineeships, Internships, Recruitment and IPA's
SPA = Student Tuition
DIS = Direct Institutio
TPA = Third Party Awards
PSI = Private Sector Involvement
AI = Administrative Infrastructure
OTHER

FY 1997

FEDERAL AGENCY AWARDS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

WHOLE DOLLARS

STATE/INSTITUTION	R&D	PE	TRAINING	F&E	FELLOWS	SFA	DIS	TPA	PSI	AI	OTHER	TOTALS
MISSISSIPPI												
ALCORN STATE	0	0	0	0	14,980	0	0	5,000	0	0	15,000	34,980
COAHOMA JR. COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
HINDS COMM. COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
JACKSON STATE	10,000	0	0	0	13,556	800	0	72,700	0	0	13,000	109,856
MARY HOLMES	0	0	0	0	0	0	0	0	0	0	0	0
MISSISSIPPI VALLEY	0	0	0	0	14,900	0	0	10,400	0	0	0	25,300
RUST COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
TOUGALOO COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
MISSOURI												
HARRIS STOWE STATE	0	0	0	0	0	0	0	0	0	0	0	0
LINCOLN UNIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
NORTH CAROLINA												
BARBER-SCOTIA	0	0	0	0	0	0	0	0	0	0	0	0
BENNETT COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
ELIZABETH CITY STATE	0	0	0	0	44,000	0	0	0	0	0	0	44,000
FAYETTEVILLE STATE	27,000	0	0	0	0	0	0	0	0	0	0	27,000
JOHNSON C. SMITH	0	0	0	0	0	0	0	0	0	0	0	0
LIVINGSTONE COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
N. C. A&T STATE	1,760,556	2,000	0	0	62,000	50,758	1,000	181,678	0	0	36,900	2,114,890
N. C. CENTRAL	0	0	0	0	0	1,454	0	53,025	0	0	0	54,479
ST. AUGUSTINE	0	0	0	0	0	0	0	0	0	0	0	0
SHAW UNIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
WINSTON-SALEM STATE	0	0	0	0	0	0	0	0	0	0	0	0
OHIO												
CENTRAL STATE	0	0	0	0	8,000	7,500	0	0	0	0	26,400	42,900
WILBERFORCE UNIV.	0	0	0	0	0	21,000	0	0	0	0	0	21,000
OKLAHOMA												
LANGSTON UNIV.	0	0	0	41,492	0	0	0	0	0	0	21,539	63,031
PENNSYLVANIA												
CHEYNEY UNIV.	0	0	10,870	0	22,583	89,216	5,000	0	0	0	0	127,669
LINCOLN UNIV.	42,945	0	0	0	0	0	0	26,050	0	0	0	68,995

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FY 1997

FEDERAL AGENCY AWARDS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

WHOLE DOLLARS

STATE/INSTITUTION	R&D	PE	TRAINING	F&E	FELLOWS	SFA	DIS	TPA	PSI	AI	OTHER	TOTALS
SOUTH CAROLINA												
ALLEN UNIVERSITY	0	0	0	0	0	0	0	0	0	0	0	0
BENEDICT COLLEGE	170,538	0	0	0	0	0	0	0	0	0	0	170,538
CLAFLIN COLLEGE	0	0	0	0	30	800	0	13,025	0	0	0	13,855
CLINTON JR. COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
DENMARK TECH.	0	0	0	0	0	0	0	0	0	0	0	0
MORRIS COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
S. C. STATE UNIV.	221,625	0	0	0	5,418	22,752	1,000	0	0	0	0	250,795
VOORHEES COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
TENNESSEE												
FISK UNIV.	193,229	0	0	0	0	0	0	103,500	0	0	109,212	405,941
KNOXVILLE COLLEGE	2,500	0	0	0	0	0	0	0	0	0	0	2,500
MORRISTOWN CAMPUS	0	0	0	0	0	0	0	0	0	0	0	0
LANE COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
LEMOYNE-OWEN	0	0	0	0	0	0	0	0	0	0	0	0
MEHARRY MEDICAL	0	0	0	0	0	0	0	0	0	0	0	0
TENNESSEE STATE	142,063	0	0	0	0	63,095	3,000	5,000	0	0	0	213,158
TEXAS												
HUSTON-TILLOTSON	0	0	0	0	0	0	0	0	0	0	0	0
JARVIS CHRISTIAN	0	0	0	0	0	0	0	0	0	0	0	0
PAUL QUINN COLLEGE	0	0	0	0	15,000	0	6,000	0	0	0	15,000	36,000
PRAIRIE VIEW A&M	721,000	0	75,000	0	9,899	10,255	97,100	0	0	0	66,156	979,410
SAINT PHILLIPS	0	0	0	0	0	0	0	0	0	0	0	0
SOUTHWESTERN CHRIST.	0	0	0	0	0	0	0	0	0	0	0	0
TEXAS COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
TEXAS SOUTHERN	355,000	0	0	0	0	17,500	0	0	0	15,000	0	387,500
WILEY COLLEGE	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA												
HAMPTON UNIV.	768,147	0	20,000	0	28,425	0	0	296,850	0	0	3,200	1,116,622
NORFOLK STATE	1,389,361	0	0	0	14,048	0	0	150,000	0	0	0	1,553,409
SAINT PAUL'S	0	0	0	0	0	0	0	0	0	0	0	0
VIRGINIA STATE	0	0	1,815	0	4,436	19,300	1,000	0	0	0	0	26,551
VIRGINIA UNION	0	0	0	0	0	0	0	0	0	0	0	0

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FY 1997
FEDERAL AGENCY AWARDS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES
WHOLE DOLLARS

STATE/INSTITUTION	R&D	PE	TRAINING	F&E	FELLOWS	SFA	DIS	TPA	PSI	AI	OTHER	TOTALS
WEST VIRGINIA												
BLUEFIELD STATE	0	0	0	0	0	0	0	0	0	0	0	0
W. VIRGINIA STATE	0	0	0	0	0	0	0	0	0	0	0	0
U.S. VIRGIN ISLANDS												
UNIV. OF THE V. I.	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	60,000	0	0	2,088,837	2,148,837
GRAND TOTALS	21,195,114	64,500	122,000	73,491	726,510	974,549	1,642,761	2,169,776	0	1,090,461	3,268,817	31,345,979

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DEPARTMENTAL FOREIGN TRAVEL

Mr. Packard. How much was spent on foreign travel by federal employees and contractors, in fiscal years 1997, 1998 and estimated for 1999?

Dr. Telson. The Department spent approproximately $32.4 million on foreign travel in FY 1997 and $36.6 million in FY 1998. The majority of the increase in FY 1998 is associated with activities in support of national security, nonproliferation, and nuclear safety activities in the newly Independent States of the Former Soviet Union. In FY 1999 it is estimated that Departmental foreign travel will be at the FY 1998 level of $36.6 million.

MAJOR FOREIGN ENERGY TECHNOLOGY R&D PROGRAMS

Mr. Packard. Provide a brief synopsis of major energy technology research and development programs outside the United States. What are the comparable spending levels with DOE programs?

Secretary Richardson. Data compiled by the International Energy Agency (IEA), the only major source of comparable data for energy R&D expenditures for major energy development programs in the industrialized world, and available only through 1997, shows more than 95 percent of government support for energy technology R&D to be concentrated in nine countries, led by Japan and the United States. All US dollar figures shown are at 1997 prices and exchange rates.

In 1997, Japan and the United States together accounted for more than 75 percent of government R&D expenditures in IEA member countries. Japan led the industrialized world in energy R&D expenditures with a total expenditure of $3,700 million, followed by the United States ($2,200 million), France ($591 million), Germany ($292 million), Italy ($ 252 million), Canada ($198 million), the Netherlands ($150 million), Switzerland ($136 million) and Spain ($69 million).

Trends in R&D by Energy Technology

Over the 1987-1997 decade, energy technology R&D expenditures in all IEA member countries, including the United States, declined some 17 percent, from an estimated $ 9,500 million in 1987 to $ 7,900 million in 1997. Over this 1987-1997 period, the most significant declines were in fossil fuels R&D, which declined 54 percent from $1,400 million to $643 million, technologies for nuclear fission, which declined 23 percent from $ 4,400 million to $3,400 million, and in fusion, which declined 34 percent from $1,300 million to $ 855 million. Government expenditures have been relatively stable for renewable technologies in recent years and have increased substantially for energy conservation technology development. Over the 1987-1997 decade, R&D expenditures for renewable energy declined a mere 5 percent from $ 657 million to $621 million. For energy conservation, government R&D expenditures increased 35 percent from $683 million in 1985 to $924 million in 1997.

DOE Program Spending Levels Compared with Total IEA Member Countries

Nuclear Fission and Fusion - In 1997, the U.S. R&D budget for nuclear fission and fusion technologies stood at $349 million, equal to 8 percent of the total nuclear fission/fusion budget of all IEA countries of $4,200 million. This compared with the 1997 Japanese R&D nuclear budget expenditures of $2,900 million, equal to 69 percent of the nuclear budget of all IEA member countries.

Fossil Fuels - In 1997, the U.S. fossil fuels R&D budget stood at $173 million, equal to 27 percent of the total for all IEA member countries. Japan's fossil fuel R&D budget stood at $318 million, equal to some 49 percent of total IEA countries' fossil fuels R&D budgets.

Conservation - In 1997, the conservation R&D budget for the United States stood at $420 million, equal to 45 percent of total conservation R&D for all IEA countries of $ 924 million. This was followed by Japan's conservation R&D budget at $274 million, equal to 30 percent of the total, and the Netherlands conservation R&D budget at $57 million, equal to 6 percent of the total.

Renewables - In 1997, the renewable energy R&D budget for the United States stood at $257 million, equal to about 41 percent of the total renewable energy R&D of all IEA member countries. This was followed by Japan with a renewable energy R&D budget of $109 million (18 percent of total) and Germany with $78 million (13 percent of total).

NET OIL IMPORTS INTO THE UNITED STATES

Mr. Packard. Please provide the amounts and percentage of net oil imports into the United States for each year since 1978. What is the forecast for the year 2000 and 2015?

Dr. Hakes. The amount and percentage of net oil imports into the United States for each year since 1978, and the forecasted level of net oil imports for the years 2000 and 2015 are presented in a table which I would like to insert in the record. The percentage of net oil imports refers to the percentage of net oil imports to the United States to the total amount of oil used by the United States for the year cited. The information follows:

NET OIL IMPORTS INTO THE UNITED STATES SINCE 1978 AND FORECASTED NET OIL IMPORT LEVEL FOR 2000 and 2015
(Million Barrels per Day)

Year	Net Oil Import	
	Amount	Percentage
1978	8.00	42.5
1979	7.99	43.1
1980	6.37	37.3
1981	5.40	33.6
1982	4.30	28.1
1983	4.31	28.3
1984	4.72	30.0
1985	4.29	27.3
1986	5.44	33.4
1987	5.91	35.5
1988	6.59	38.1
1989	7.20	41.6
1990	7.16	42.2

Year	Net Oil Import	
	Amount	Percentage
1991	6.63	39.6
1992	6.94	40.7
1993	7.62	44.2
1994	8.05	45.5
1995	7.89	44.5
1996	8.50	46.4
1997	9.16	49.2
1998	9.26	49.1
1999	9.43	49.1
2000	10.65	53.5
2015	14.76	62.3

CONGRESSIONAL AND INTERGOVERNMENTAL AFFAIRS

Mr. Packard. How many employees in your office are funded by other program organizations, what is the cost of those employees, and which programs provide the funding.

Mr. Angell. The Office of Congressional and Intergovernmental Affairs has one FTE funded by the Office of Civilian Radioactive Waste Management. The annual salary rate is approximately $56,500.

OFFICE OF PUBLIC AFFAIRS

Mr. Packard. How many employees in your office are funded by other program organizations, what is the cost of those employees, and which programs provide the funding.

Ms. Anderson. The Office of Public Affairs has one FTE funded by the Office of Civilian Radioactive Waste Management. The cost for this FTE is approximately $93,491.

DISTRIBUTION OF PUBLIC AFFAIRS' FEDERAL AND CONTRACTOR STAFF OUTSIDE WASHINGTON, D.C.

Mr. Packard. What is the size of the public affairs office maintained by site by each DOE contractor in fiscal years 1998, 1999, and 2000? Provide totals for each site. (In your analysis, please describe what criteria are used by each contractor to define the public affairs function to ensure that the information from each contractor is compatible.)

Ms. Anderson. We have queried DOE field sites and contractors to determine the number of people that support public affairs activities. DOE Headquarters does not control field office or contractor staffing levels, nor do these offices report directly to Headquarters. Each site and each contractor has unique responsibilities and therefore some offices' activities and functions are more diverse than others. Staffing numbers, along with specific functions reported for both our contractor and field offices, are the following.

		FY 1998	FY 1999	FY 2000
Albuquerque Operations Office (Total)		**48.25**	**95.25**	**95.25**
Albuquerque Operations Office:	11.5*			
Contractor:	83.75			

0.0 Director (Vacant)
1.0 Deputy Director
6.0 Media, Congressional, Community and Tribal Relations, Emergency Management, Internal Communications and Protocol
1.0 Kirkland Area Office
0.5 Kansas City Area Office
0.5 Grand Junction Office
1.0 Amarillo Area Office
1.5 Los Alamos Area Office

* Increase from FY 1998 to FY 1999 for Federal employees is a result of filling the vacancies at the Los Alamos Area Office and the inclusion of Emergency Management and Protocol activities which were not in the FY 1998 count.

Grand Junction Office (WASTREN and MACTECH) (3)
- 3.0 Community Relations/Public Affairs Specialists

Kansas City Plant (Allied Signal) (1)
- 1.0 Media Relations and Internal Communications

Los Alamos National Laboratory (University of California) * (45.5)
- 2.0 Director (1 Media and 1 Community Involvement)
- 1.0 Deputy Director (Media and Community Involvement)
- 8.0 Media Relations
- 6.0 Internal Communications
- 18.0 Community Involvement
- 10.5 Museum Staff

* Increase is a result of hiring of Deputy Director in Media, increase in community involvement staff (contract renewal mandated improvement in community involvement) and addition of museum staff that was not included in the FY 1998 count.

Pantex Plant (Mason & Hangar Corporation) (5)
- 1.0 Director
- 4.0 Media Relations, Community Involvement, Employee Information

Sandia National Laboratories N.M. and CA (Lockheed Martin) * (29)
- 1.0 Director
- 4.0 Media Relations
- 5.0 Internal Communications
- 8.0 Community Involvement/Issues Management
- 9.0 National Atomic Museum
- 2.0 Media, Internal Communications and Community Relations

* Increase is a result of miscount of community involvement staff in FY 1998 and the inclusion of National Atomic Museum staff which were not included in the FY 1998 count.

Uranium Mill Tailings Project, N.M. (Jacobs Engineering) (.25)
- 0.25 Media Relations

	FY 1998	FY 1999	FY 2000
Carlsbad Area Office (Total)	**9.5**	**12**	**12**
Carlsbad Area Office: 3.0			
Contractor: 9.0			

- 1.5 Public Affairs Specialist
- 0.5 Secretary
- 1.0 Team Leader

Westinghouse Waste Isolation Division (8)
- 0.5 Manager, Information Services
- 0.5 Senior Manager
- 0.5 Secretary
- 0.5 Manager, Public Affairs
- 0.5 Exhibits Program
- 0.5 Speakers' Bureau
- 2.5 Media Relations
- 2.5 Tour Guides

Carlsbad Area Office Technical Support Contractor (1)
- 0.5 Manager
- 0.5 Public Involvement Specialist

	FY 1998	FY 1999	FY 2000
Chicago Operations Office (Total)	**48**	**56.5**	**56.5**
Chicago Operations Office: 6.0*			
Contractor: 50.5			

1.0 Director
3.0 Public Affairs Specialists
1.0 Administrative
1.0 Community Relations Officer*
* Inclues one (1) FTE from the DOE Brookhaven Group, currently reporting to the Office of Science

Ames Laboratory (Iowa State University) (4.5)
- 1.0 Manager/Media Relations
- 2.5 Publications, Public Information Tours, Science Education
- 1.0 Clerical

Argonne National Laboratory (University of Chicago) (15)
- 1.0 Director
- 5.5 Community Affairs & Special Events
- 4.0 Publications
- 3.0 Media Relations
- 1.5 Administrative

Brookhaven National Laboratory (Brookhaven Science Associates) (25)
- 1.0 Assistant Lab Director for Community Involvement, Governmental and Public Affairs
- 1.0 Deputy
- 7.0 Internal and External Communications
- 6.0 Museum Education and Tour Program
- 7.0 Community Outreach and Involvement–(4 of these positions are associated with the environmental restoration program, two of these 4 FTEs are one-year term positions)
- 3.0 Clerical

Fermi National Laboratory (Universities Research Association, Inc.) (5)
- 1.0 Director
- 2.0 Writer/Editors
- 1.0 Clerical
- 1.0 Administrative

Princeton Plasma Physics Laboratory (Princeton University) (1)
- 1.0 Director/Public Affairs Officer

	FY 1998	FY 1999	FY 2000
Golden Field Office (Total)	**6.5**	**7.5**	**7.5**
Golden Field Office: 1.5			
Contractor: 6.0			

- 1.0 Director
- 0.5 Support Services Contractor

National Renewable Energy Laboratory (Midwest Research Institute) (6)
- 2.0 Media Relations/Public Inquiries
- 2.0 Public Outreach/Visitors/Visitors Center/Tours
- 1.0 Manager/Public Participation/Community Relations
- 1.0 Employee Communications

	FY 1998	FY 1999	FY 2000
Idaho Operations Office (Total)	**45**	**46**	**46**
Idaho Operations Office: 7.5			
Contractor: 38.5			

- 1.0 Director
- 1.0 Deputy Director (Lead on Internal Communications & Intergovernmental)
- 1.0 Media Relations
- 1.0 Internal Communications
- 1.0 Community Relations
- 1.0 Tribal
- 1.0 Congressional/Economic Development
- 0.5 Clerical

LMITCO (Idaho Falls) (3.5)
- 1.0 Director
- 2.0 Secretary
- 0.5 Tribal Liaison

Media Relations (5)
- 1.0 Manager
- 4.0 Media Relations

Employee & Community Communications (8)
- 1.0 Manager
- 1.0 Emergency Preparedness
- 1.0 Speakers' Bureau & Charitable Program
- 3.0 Employee Communications
- 1.0 Special Events
- 1.0 Public Affairs Site Office

Community Relations (9)
- 1.0 Manager
- 7.0 Community Outreach
- 1.0 INEEL Tour Director

Economic Development (2)
- 2.0 Employees

LMITCO (has Intergovernmental/Program Affairs personnel in Boise, Idaho and Washington, DC)

Office in Boise (4)
- 1.0 Director
- 1.0 Administrator
- 1.0 Governmental Affairs employee
- 1.0 Operation Specialist

Office in Washington, DC (7)

- 1.0 Director
- 1.0 Secretary
- 4.0 Intergovernmental & Program Affairs employees
- 1.0 Administrative Assistant

	FY 1998	FY 1999	FY 2000
Nevada Operations Office (Total)	**13**	**13**	**13**
Nevada Operations Office: 6.0			
Contractor: 7.0			

- 1.0 Director
- 4.0 Public Affairs Specialists
- 1.0 Educational Outreach Specialist

Bechtel Nevada (7)

- 1.0 Manager, Communications
- 2.0 Communications Specialists
- 4.0 Administrative Assistant/Public Tours

	FY 1998	FY 1999	FY 2000
Oakland Operations Office (Total)	**37**	**34**	**36**
Oakland Operations Office: 6.0			
Contractor: 28.0			

- 1.0 Director
- 1.0 Congressional/Intergovernmental Officer
- 1.0 Public Affairs Specialist
- 1.0 Public Reading Room Manager
- 1.0 Freedom of Information Act Specialist
- 1.0 Community Relations Specialist

Lawrence Berkeley National Laboratory (University of California) (10)

- 1.0 Director
- 1.0 Secretary
- 1.5 Employee Communications
- 4.5 External Communications
- 1.0 Congressional Relations Officer
- 1.0 Community Relations Coordinator

Lawrence Livermore National Laboratory (University of California) (14)

- 1.0 Director
- 1.0 Administrator
- 4.0 Media Relations PIOs
- 3.0 Clerical
- 2.0 Internal Communications PIOs
- 1.0 Internal Communications Designer
- 1.0 Internal Communications Manager

1.0 External Relations Manager

Stanford Linear Accelerator Center (Stanford University) (4)
- 1.0 Director, Media and Community Relations
- 1.0 Manager, Tour Program
- 2.0 Clerical

	FY 1998	FY 1999	FY 2000
Oak Ridge Operations Office (Total)	**59.25**	**50.5**	**50.5**
Oak Ridge Operations Office: 6.0			
Contractor: 44.5			

- 1.0 Director
- 2.0 Public Affairs Specialist
- 1.0 Community Relations Specialist
- 2.0 Administrative

American Museum of Science & Energy (Enterprise Advisory Services Inc.) (1)
- 1.0 Public Affairs Specialist

Environmental Management & Integration - Oak Ridge (Bechtel Jacobs LLC) (8)
- 1.0 Director
- 1.0 Secretary
- 4.0 General Public Affairs Specialists
- 2.0 Community Relations Specialists

Environmental Management & Integration - Paducah (Bechtel Jacobs LLC) (2.5)
- 1.0 Director
- 1.0 Community Relations Specialist
- 0.5 Secretary

Environmental Management & Integration - Portsmouth (Bechtel Jacobs LLC) (2)
- 1.0 Director
- 0.5 Secretary
- 0.5 Public Information Center Support

Oak Ridge National Laboratory (Lockheed Martin Energy Research) (13.5)
- 1.0 Director
- 2.0 Secretary
- 6.0 General Public Affairs
- 2.0 Employee Communications
- 1.0 Protocol
- 1.5 Honors and Awards

Oak Ridge Y-12 Plant (Lockheed Martin Energy Systems) (11)
- 1.0 Director
- 3.0 Secretary
- 7.0 General Public Affairs

Thomas Jefferson National Accelerator Facility (Southeastern Universities Research Associates) (4)
- 1.0 Director
- 1.0 Secretary
- 0.5 Special Events Coordination

0.5 Staff Writer
1.0 Student

Weldon Spring Site Remedial Action Project (MK Ferguson) (2.5)
1.0 Director
1.5 Public Involvement

	FY 1998	FY 1999	FY 2000
Ohio Field Office (Total)	**26**	**26**	**26**

Ohio Field Office: 5.0
Contractor: 21.0

1.0 Director
3.0 Public Affairs Specialists
1.0 Editorial Assistant

Ashtabula Decommissioning Project (RMI Titanium) (.5)
0.5 Media Relations

Columbus Office (Battelle) (.5)
0.5 Community Relations

Fernald Site (Fluor Daniel) (13)
1.0 Director
1.0 Manager
1.0 Senior Public Affairs Specialist
3.0 Technical Specialists
4.0 Public Affairs Specialists
2.0 Secretary
1.0 Administrative Assistant

Mound Laboratory (EG&G/Mound Applied Technologies) (1)
1.0 Public Affairs/Media Relations/Internal Communications

West Valley, N.Y. (Westinghouse West Valley Nuclear Services, Inc.) (6)
1.0 Public and Employee Communications Manager
2.0 Community Relations Specialists
1.0 Community and Environmental Affairs Specialist
1.0 Lead Technical Writer
1.0 Secretary

	FY 1998	FY 1999	FY 2000
Richland Operations Office (Total)	**41**	**68**	**68**

Richland Operations Office: 12.0
Contractor: 56.0

1.0 Director
1.0 Administrative Support Assistant
3.0 Public Affairs Specialist
1.0 Intergovernmental Affairs Specalist
1.0 Public Involvement Manager
2.0 FOIA

1.0 VIP Visits/Information Specialist
1.0 Indian Nations Program Manager
1.0 Indian Nations Program Specialist

Battelle Memorial Institute (24.5)
- 1.0 Director
- 2.5 Clerical
- 6.0 External Communications
- 4.5 Internal Communications
- 10.5 Direct Project Support Communications

Bechtel Hanford, Inc. (4)
- 1.0 Manager
- 1.0 Media Relations
- 2.0 Public Involvement

BNFL Inc. (2)
- 1.0 Manager
- 1.0 Public Affairs Specialist
  (BNFL Inc. is a prime contractor at Hanford responsible for the Tank Waste Remediation System Privatization contract. Both public affairs representatives are funded with private BNFL Inc. funds.)

Critique, Inc. (1)
- 1.0 FOIA Support
- 1.0 VIP Visits/Information Support
- 1.0 Public Affairs Support

Dames & Moore (3)
- 1.0 Indian Nations Program Specialist

Fluor Daniel Hanford, Inc. (11.4)

Office of Communications & Media Relations
- 1.0 Director
- 3.0 Communications Specialists
- 3.0 Part-time Communications Specialists (Contracted)
- 2.0 Graphics/Layout Support (Contracted) (1 Full Time/ 1 Part Time)
- 1.4 Administrative Support (Tours, Newsclips, etc.)
- 1.0 Temporary Administrative Support

Office of Public Involvement (1.6)
- 1.0 Director
- 0.6 Administrative Support

Office of Community Programs (7.5)
- 1.0 Director
- 3.0 Communications Specailists
- 1.0 HAMTEC (Bargaining Unit) Liaison (Matrixed from Industrial Relations)
- 1.0 Communications Specialists (Matrixed to ESH&Q/Joint Information Center - Emergency Response)
- 1.5 Administrative Support

Hanford Environmental Health Foundation (1)
1.0 Public Affairs Officer

	FY 1998	FY 1999	FY 2000
Rocky Flats Field Office (Total)	**23**	**26**	**25**
Rocky Flats Field Office: 10.0			
Contractor: 16.0			

1.0 Director
2.0 Community Relations
1.0 Media Relations
2.0 Employee Communications
1.0 FOIA/PA
1.0 Tours & Visits
2.0 Educational Outreach/Web Master

Kaiser-Hill LLC (13)
1.0 Director
1.0 Secretary
4.0 Internal Communications
2.0 Community Relations
2.0 Media Relations
2.0 Tours & Visits
1.0 Special Projects

Support Service Contractor (3)
1.0 Secretary
2.0 Presentation Support

	FY 1998	FY 1999	FY 2000
Savannah River Operations Office (Total)	**31**	**32.75**	**32.75**
Savannah River Ops Office: 7.75			
Contractor: 25.0			

1.0 Director
1.0 Senior Public Affairs Specialist
4.0 Public Affairs Specialist
1.75 Administrative

Westinghouse Savannah River Company (20)
1.0 Director
4.0 Media Operations
2.0 Community Relations (Tour Program)
10.0 Internal Communications
3.0 Community Outreach (Intergovernmental)

Wackenhut Services, Inc. (2)
2.0 Public Affairs Generalists, Media/Internal Communications

Savannah River Ecology Laboratory (University of Georgia) (2)
- 1.5 Public Affairs Specialist, Media Relations
- 0.5 Public Affairs Specialist, Education Outreach

Savannah River Natural Resources and Research Institute (U.S. Forest Service) (1)
- 1.0 Public Affairs Specialist

	FY 1998	FY 1999	FY 2000
Yucca Mountain Project Office (Total)	**35**	**35**	**35**
Yucca Mountain Project Office: 3.0			
Contractor: 32.0			

- 1.0 Director
- 1.0 Public Affairs Specialists
- 1.0 Intergovernmental Affairs Specialist

TRW, Inc. (32)
- 3.0 Manager and Administrative/Budget Support
- 2.0 Manager and Secretary for Intergovernmental Programs
- 1.0 Media Relations
- 2.0 Community Relations
- 1.0 Stakeholder Relations
- 1.0 Manager for Outreach Programs
- 4.0 Visitor Centers (three facilities)
- 1.0 Product Distribution Warehouse
- 4.0 Public Information Response
- 3.0 Speakers' Bureau and Tour Programs
- 2.0 Manager and Administrative Support for Product Development
- 4.0 Publication Writers/Editors
- 3.0 Product Development
- 1.0 Exhibit Program

DISTRIBUTION OF PUBLIC AFFAIRS' FEDERAL STAFF
WITHIN AND OUTSIDE OF WASHINGTON, D.C.

Mr. Packard. What is the size of the public affairs office maintained by each DOE operations, field, area, site or support office outside of Washington? (Do not consolidate by major office, but include each individual office.) What is the size of the public affairs office at Headquarters?

Ms. Anderson. The following table provides the breakout of Federal FTEs for each of our operations, field, area, site or support office and that table also includes our FTE level for our Headquarters office in Washington. Some public affairs offices have more diverse functions than others. Services within offices could range from researching and responding to Freedom of Information Act inquiries to library services, public participation and even tour guides for a particular site. Other offices' primary function is to work with the news media only.

Staffing Levels for DOE Public Affairs
Headquarters and Field Offices

	FY 1998	FY 1999	FY 2000
Headquarters, Washington D.C.	31*	31*	31*
Albuquerque Operations Office	8.75	11.5	11.5
Carlsbad Area Office	3	3	3
Chicago Operations Office	5	6	6
Golden Field Office	1	1.5	1.5
Idaho Operations Office	8	7.5	7.5
Nevada Operations Office	6	6	6
Oakland Operations Office	5	6	5
Oak Ridge Operations Office	6	6	6
Ohio Field Office	5	5	5
Richland Operations Office	4	12	12
Rocky Flats Field Office	10	10	10
Savannah River Operations Office	7	7.75	7.75
Yucca Mountain Project Office	4	3	3
Total	103.75	116.25	115.25

* Excludes an FTE funded by the RW program.

WORKING CAPITAL FUND

Mr. Packard. The budget request notes that use of the USPS for outgoing mail and use of internal distribution within DOE have both dropped off, and there has been a decline in the number of mail stops and a large decrease in incoming USPS mail requiring sorting and distribution. However, the cost of mail services increases by $100,000 in fiscal year 2000. Why is there an increase in costs when mail use is declining? Provide a detailed breakout of all the costs associated with mail services (including any contracts and the number of contractor employees associated with each task) in fiscal years 1998, 1999, and 2000.

Mr. Farrell. Amounts shown in the Working Capital Fund budget represent projected billings by the Fund to program customers under the pricing policies set by the Working Capital Fund Board. Over time, the billings for each business are expected to balance with costs.

For the Mail Services business line, the two major elements for pricing are a charge per mail stop for internal distribution and the actual meter costs for outgoing United States Postal Service (USPS) mail. The projected billing increase from FY 1999 to FY 2000 reflects a decision to rebate $105,000 in non-USPS charges to customers in FY 1999 because of cost savings through FY 1998. It also reflects the USPS postal rate increases that went into effect during FY 1999.

When the FY 2000 budget was prepared, it was not clear whether the non-USPS price reduction could be extended past FY 1999, so the FY 2000 budget projections conservatively assumed that the prices in effect for FY 1998 would resume in FY 2000. It now appears increasingly likely, as reflected in the cost projections below, that we will be able to extend the lower non-USPS prices into FY 2000 to offset the USPS price increases. A decision on this pricing policy change is expected to be made after the FY 1999 mid-year review.

The following table provides a detailed breakout of the costs associated with mail services:

($ in thousands)

	Actual FY 1998	Estimated FY 1999	Estimated FY 2000
Contractual Support Services (National Institute of Severe Handicap, NISH)	$959	$915	$920
USPS Metered Mail	835	880	885
Special Mail Services	50	72	72
TOTALS:	$1,844	$1,867	$1,877

The table below shows the number of contractor employees associated with the Mail Services Support Contract for fiscal years 1998, 1999 and 2000:

Services	Forrestal Facility	Germantown Facility
Mail Delivery	11	5
Mail Room Operations	9	5
Total:	20	10

THURSDAY, MARCH 11, 1999.

ENERGY RESOURCES AND SCIENCE BUDGET OVERVIEW

WITNESSES

DAN REICHER, ASSISTANT SECRETARY, OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

WILLIAM D. MAGWOOD, IV, DIRECTOR, OFFICE OF NUCLEAR ENERGY, SCIENCE AND TECHNOLOGY

DR. MARTHA KREBS, DIRECTOR, OFFICE OF SCIENCE

Mr. PACKARD. Ladies and gentlemen, it is a pleasure to welcome you to this hearing this morning. As we announced last time, we intend to start our hearings on time; and I appreciate my Democratic colleagues being here. I have been told there are several hearings being held today and so some are divided between committees.

This important agency hearing is regarding three major areas: the Office of Energy Efficiency and Renewable Energy; the Office of Nuclear Energy, Science and Technology; and the Office of Science. We have the Directors of each of these areas, the Assistant Secretaries and Directors, and we are grateful to have the witnesses here. I have had the privilege of meeting with them individually, in most instances; and I appreciated that opportunity.

So we are going to—unless you have an opening statement, Mr. Visclosky, I think we will proceed.

I might just mention that we are anticipating a series of six votes around 10:30, and so I would kind of like to have the witnesses complete their statements by then. And then if we are interrupted in the question and answer, that is not a problem. That means that I would like you to summarize your statements.

I think most of the members of the committee have your statements. I have read them. It was not an easy night last night. I haven't read such technical information since I was in dental school. But I appreciated your statements. As I said, I read them throughout and made several notes; and we will have several questions.

I might also mention that there will be many, many questions that will be submitted for the record. We will not ask them all, of course. We will ask you or your staff to help you in submitting answers to questions for the record.

With that, I am going to ask if Mr. Magwood will begin; and then we will hear from Dr. Krebs and Mr. Reicher.

Mr. PACKARD. Mr. Magwood, welcome and thank you for being here.

ORAL STATEMENT OF MR. MAGWOOD

Mr. MAGWOOD. Mr. Chairman and Mr. Visclosky and members of the subcommittee, I am Bill Magwood, Director of the Department's Office of Nuclear Energy, Science and Technology. I am pleased to appear before you today to discuss our fiscal year 2000 budget request. I have submitted a written statement for the record, but I have a few summary points I would like to make today.

Over the last year, my office has worked very hard to focus and prioritize our programmatic activities along two primary goals: first, to reassert U.S. leadership in nuclear technology; and second, to conduct research and other activities that we believe are required to prepare for the next American century. I believe we have made considerable progress toward both goals.

NUCLEAR ENERGY ACCOMPLISHMENTS

First, I would like to highlight a few points. I think it is important to reflect on some of our past accomplishments to understand how the Federal nuclear R&D program can best serve the American people in the future. The Department has a rich and successful history in the development of nuclear technology, dating back to the Atoms for Peace Program. Our accomplishments have benefited the Nation in many ways.

As we all know, nuclear power technology itself was born in Federal research programs. But fewer people know that our programs also gave birth to nuclear medicine, which both saves lives and reduces health care costs. Further, as shown on this first chart, even after nuclear power was launched as a commercial business, our past work resulted in improvements that save American taxpayers millions of dollars every year.

We are also proud of our work on the advanced light water reactor program. Working with industry, we helped make a new generation of safe and cost-effective nuclear power plants available to utilities in the United States and around the world.

Today, three U.S. companies have brought three advanced technology nuclear power plants to the market. Further, any doubts that anyone may have harbored about whether these technologies would perform as advertised, need only go to Japan, or look at my next chart, to see the first two advanced BWRs in operation at the Kashiwazaki Kariwa Nuclear Power Station. This seven-unit facility is, I believe, the largest power station on the planet; and it supplies about 23 percent of Tokyo's electric capacity. These advanced plants can now be routinely built in Japan in less than 4 years. A similar, but U.S. standard plant will be built in Taiwan. Many U.S. jobs will be generated by these activities and by other advanced nuclear power projects in Korea and quite likely other nations in coming years.

These examples demonstrate how our past accomplishments have enabled the United States to maintain its leadership role in nuclear technology. However, the outlook for the future is uncertain. As you see in the next chart, the U.S. has dramatically decreased its funding for nuclear R&D over the last 20 years. In fact, in an

event that reverberated throughout the international community, our R&D budget reached essentially zero in fiscal year 1998.

The next chart shows that we have been out of step and outpaced by many of our economic competitors. The blame for this, I believe, rests with us. We did not change with the times nor did we plan sufficiently for the future.

I believe that we are now on a positive track. I think we know what is needed and what our role should be in the future. But while research dollars are not everything—we have, for example, been able to demonstrate our leadership by engaging the U.S. nuclear community and the international community in various important discussions—such funding is essential in showing that we are serious and credible participants in the international exploration of nuclear technologies.

We were, therefore, very pleased that Congress approved our proposed Nuclear Energy Research Initiative for fiscal year 1999. Universities, industry, laboratories and the international research community have shown great interest and excitement in the NERI program. We have received over $100 million worth of research proposals for NERI's first year. Further, research organizations all over the world are anxious to re-establish cooperation with the United States through the NERI program. For the coming fiscal year, we are requesting a modest increase for NERI from $19 million in fiscal year 1999 to $25 million in fiscal year 2000.

We are also proposing two other new, modest programs. One, the Advanced Nuclear Medicine Initiative, is needed to apply the Department's unique expertise in isotopes to fight against cancer, arthritis and many other illnesses. The other is the Nuclear Energy Plant Optimization program.

The NEPO program is designed to conduct research into technologies that will be needed to optimize the efficiency and safety of today's nuclear power plants as they continue operating for the long term. NEPO can help assure that operating nuclear plants can continue to serve our interests in reducing harmful air emissions.

As you can see on the next chart, efficiency enhancements to nuclear power plants over the 7 years leading to the year 2000 comprise the largest contribution to utility plants' CO_2 emission reductions.

The next chart demonstrates that the operation of nuclear power was essential to states striving to meet Clean Air Act requirements. Increased generation of nuclear plants in these states enabled them to meet 37 percent of the emission reduction targets required by the Clean Air Act. Operation of nuclear plants can continue to provide these benefits into the middle of the next century.

Finally, I note that we are relying, more than at any time in our history, on independent, external advice. The best example of this, was in October, 1998, Secretary Richardson established the Nuclear Energy Research Advisory Committee, or NERAC, to help us plan for the future.

As you can see on this last chart, there are 28 independent, prominent individuals on NERAC, including experts in fields such as nuclear technology, medicine, education, policy, economics and nonproliferation. NERAC is chaired by Dr. James Duderstadt, a former president of the University of Michigan.

This group is working with us to develop a nuclear energy long-term R&D plan, a road map of the Nation's nuclear science and technology infrastructure, and a long-term isotope research and production plan. In addition, NERAC has formed a special subcommittee to analyze the long-term technology requirements of existing nuclear power plants and to guide, if approved by Congress, the NEPO program.

In closing, nuclear power and nuclear technology benefit Americans in many ways. All the members of this subcommittee come from states that depend on nuclear power plants for electricity. Nuclear medicine is a part of everyday life, with more than 36,000 imaging procedures performed in U.S. hospitals daily. We believe that nuclear energy can continue to benefit the American people in the future and that with your help, support and counsel, the Department will have a role in pointing the way.

I will be happy to answer any questions you may have.

Mr. PACKARD. Thank you very much, Mr. Magwood.

[The information follows:]

U.S. Department of Energy
Washington, D.C. 20585

BIOGRAPHY

William D. Magwood, IV
Director
Office of Nuclear Energy, Science and Technology

William D. Magwood, IV is the Director of the Office of Nuclear Energy, Science and Technology in the U.S. Department of Energy (DOE). He was assigned to this position by Secretary of Energy, Bill Richardson, on November 8, 1998.

As the Director of Nuclear Energy, Science and Technology, Mr. Magwood is the senior manager for all of the Office's programs. This organization is responsible for development of next-generation nuclear power plants; advanced nuclear energy technologies; producing, distributing, and conducting research associated with isotopes such as those required for medical treatment, diagnosis and research; university education program; and developing advanced nuclear power systems required for NASA deep space exploration and special terrestrial national security applications. In addition, the Office oversees the Naval nuclear propulsion research and development program; the operation of DOE test and research reactors; and various research, environmental and facility management activities.

Prior to assuming his current position, Mr. Magwood served as the Associate Director for Technology and Program Planning in the Office of Nuclear Energy, Science and Technology for four years. In that capacity he was responsible for nuclear energy R&D program development, the direction of Nuclear Energy's university nuclear engineering and science education programs, the formulation of the Nuclear Energy budget, and planning of key program initiatives. He also served as the Executive Secretary of the interagency Highly Enriched Uranium Oversight Committee.

From 1984-1994, Mr. Magwood held technology management positions with two energy-related organizations. He managed utility research and nuclear policy programs at the Edison Electric Institute, Washington, DC; and he was a scientist at Westinghouse Electric Corporation, Pittsburgh, PA, where he analyzed radiological and hazardous waste disposal, treatment, and handling systems.

Mr. Magwood holds a B.S. degree in Physics and a B.A. degree in English from Carnegie-Mellon University in Pittsburgh, Pennsylvania, and a M.F.A. degree from the University of Pittsburgh.

Statement of William D. Magwood, IV
Director of the Office of Nuclear Energy,
Science and Technology
U.S. Department of Energy
FY 2000 Appropriations Hearings

Mr. Chairman and Members of the Subcommittee, I am William D. Magwood, IV, Director of the Department of Energy's Office of Nuclear Energy, Science and Technology. I am pleased to have this opportunity to present our fiscal year 2000 budget request to you today. As you know, this is my first time before this committee as Director and I look forward to working with the Committee as you review our priorities and allocate resources for the next fiscal year.

As we stand at the threshold of a new century, the United States remains the most powerful force for peace, prosperity, and democracy in the world. We remain a nation with abundant resources and capabilities. The United States remains at the forefront of technological and scientific advancement -- ranging from air flight and space exploration, harnessing the atom, to medicine and computing. Throughout, government has been a partner in developing technology for the American people -- meeting vital national security interests and providing for the well being and prosperity of the nation and its people. For the Office of Nuclear Energy, these interests are represented by the following strategic objectives:

- providing for energy diversity and security,
- developing Department of Energy mission critical technologies,
- maintaining vital nuclear research facilities and supporting a strong knowledge base for nuclear technology in the 21st century, and
- securing our nation's environmental future.

This program has a rich history, dating back to the Manhattan Project and the Atoms for Peace Program. For over 50 years, we have supported research and development that produced the prototypes for reactor technologies that are in commercial use throughout the world today. Similarly, for over 50 years, the Department, with its infrastructure of reactors, accelerators, and hot cells, has developed and brought to the American people, vital isotopes used for medicine, research and industrial applications. Today, we are working in partnership with clinicians, researchers, and industry to respond to the needs of the 21st century. For almost 40 years, we have produced radioisotopic generators and heat sources for space and for national security missions -- missions that we expect to continue well into the next century. And as leaders in development and operation of nuclear reactor technology, for over 50 years we have managed the safe operation of nuclear energy's research reactors. Today, we support the important work of the Office of Science and others by managing the safe operation of all of the Department's

research reactors. Finally, we take seriously our stewardship responsibilities associated with prior missions of Nuclear Energy, Science and Technology and our landlord responsibilities at the Test Reactor Area at the Idaho National Engineering and Environmental Laboratory and the former government gaseous diffusion sites.

Overarching our strategy for the 21st century is the fundamental belief that the United States must retain its leadership position in nuclear energy -- to be a player in shaping the international landscape and advancing the interests of the American people at home and abroad.

ROADMAP FOR THE 21ST CENTURY

Our strategic framework, which flows down from the President's *National Security Strategy for a New Century*, October 1998 and the Department's *Comprehensive National Energy Strategy*, April 1998, provides the basis for our fiscal year 2000 budget request. In addition, the resources applied to implement this strategy are shaped in part by the recommendations of the President's Committee of Advisors on Science and Technology (PCAST)[1] and by the response to these recommendations provided by the laboratory directors of seven of our national laboratories.[2]

In 1997, the PCAST panel on Federal Energy Research and Development (R&D) identified nuclear energy as one of the technologies that could alleviate global climate change and address other energy challenges, including reducing dependence on foreign oil, diversifying the U.S. domestic electricity supply system, expanding exports of U.S. energy technologies, and reducing air and water pollution. PCAST recommended that the Department establish nuclear energy R&D programs initially funded at $60 million, growing over five years to over $100 million. Although our funding levels do not approach the levels recommended by PCAST, we are optimistic about the future of our nuclear energy research and development activities as we demonstrate the value of this work to the Nation. Today, the Office of Nuclear Energy, Science and Technology remains focused on its core R&D missions and we are working hard to establish meaningful plans and direction for the future.

This past October, Secretary of Energy Richardson established the Nuclear Energy Research Advisory Committee (NERAC) to provide advice to the Department on the direction of our nuclear technology and research programs in the 21st century. This committee, chaired by

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[1]The President's Committee of Advisors on Science and Technology, *Federal Energy Research and Development Challenges of the Twenty-First Century, Report of the Energy Research and Development Panel*, November 5, 1997.

[2]U.S. Department of Energy National Laboratory Directors, *Recommendations for a Department of Energy R&D Agenda*, December 1997.

Dr. James Duderstadt, former President of the University of Michigan, is comprised of 28 eminent senior policy, science and technology experts from academia, industry, and our national laboratories with expertise ranging from reactor operations and nuclear engineering to biological sciences and nuclear medicine, to environmental sciences, economics and strategic planning. The membership of this committee is diverse, including an environmental advocate, senior officials from industry, researchers in nuclear medicine, laboratory directors, and a former Member of the Senate.

As their initial charges, I have asked this group to help us formulate our Nuclear Science and Technology Infrastructure Roadmap, to help us develop long-term plans for our nuclear energy research program and our medical isotope production and research programs, and to help us identify the technology needs of current U.S. nuclear power plants.

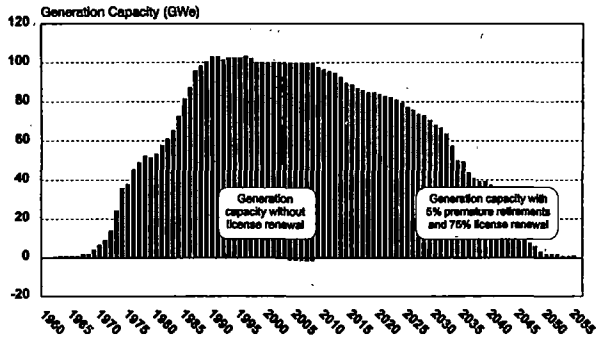
This spring, the NERAC will complete the Nuclear Science and Technology Infrastructure Roadmap, evaluating our present and future requirements for neutron generating facilities and assessing the viability of our existing infrastructure of hot cells, accelerators, and reactors to meet the Nation's needs for basic science research, applied technology research, national security, space nuclear power, and isotope production and related missions over the next 20 years. This roadmap represents the first step in managing our long-term nuclear R&D infrastructure and in the short-term, it is an important tool in balancing future missions at our nuclear R&D facilities and in identifying strengths and weaknesses in our current infrastructure. Additionally, Secretary Richardson has tasked NERAC to provide in the roadmap, their recommendations on whether the Fast Flux Test Facility should be considered to meet the Nation's requirements for isotope production or other important and enduring missions of the Department.

The expertise of NERAC is deep and their mandate broad, ranging from helping us to define the direction and character of our future programs, to providing independent oversight of our research programs, to providing recommendations on our priorities.

PROVIDING FOR ENERGY DIVERSITY AND SECURITY

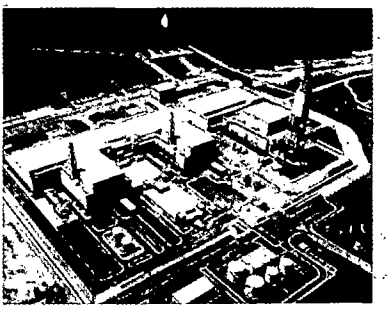
Today, as in the past, our research and development initiatives are the centerpiece of our program. Although our focus has changed over time, our R&D is based on the fundamental belief that nuclear energy and technology is and will remain an important element in our energy mix and will continue to provide important technological benefits and advancements for the nation. Today, with increasing pressure to reduce the discretionary spending and with R&D dollars more constrained in both government and industry, we must adopt new approaches to advance nuclear technology -- through leveraging our federal R&D dollars with others and greater collaboration among our universities, our laboratories, and the private sector --- to get the best return on investment for the nation. And to further leverage our investment, I am committed to expanding international cooperation.

Today, 104 reactors are operating to provide about 20 percent of the electricity generated for the American people. This is the second largest source of electricity behind coal. As we look to the future, these plants are critical to maintaining compliance with our existing emission laws and to assuring the nation maintains a flexible portfolio of energy supply options. By 2010, about 10 percent of plants will reach the end of their operating lifetimes, about 50 percent by 2020, and the remainder by 2030. Re-licensing and extending operations for these plants for another 20 years can have a dramatic impact on sustaining generating capacity, with the added benefit of offsetting carbon emissions from other sources. Without re-licensing, we face a significant decrease in capacity and dramatic increases in emissions in the near term. With the right strategies by government and industry, these plants can continue to operate safely, reliably, and efficiently well into the next century.



U.S. Nuclear Generation Capacity

As you know, in the 1980's and 1990's, Congress funded nuclear energy research that the Department cost-shared with industry to develop the advanced light water reactors, a program established to ensure the viability of nuclear energy and to advance energy security and diversity in the 21st century. Today, three vendors have brought two "evolutionary" designs and one "passive design" technology to commercialization, with the first two advanced boiling water reactors in operation today overseas. In November, I visited the Kashiwazaki Kariwa Nuclear Power Station, where the first General Electric Advanced Boiling Water Reactors are operating. An impressive sight, this is the world's largest nuclear power station, with seven units supplying about 23 percent of Tokyo Electric's total capacity. In addition, the two GE boiling water reactors represent today's state-of-the-art technology.



Kashiwazaki Kariwa Nuclear Power Plant

Today, with the completion of the advanced reactor design program, our R&D initiatives are focused on two primary areas:

- The Nuclear Energy Research Initiative (NERI), a new program funded in fiscal year 1999 by the Congress at a level of $19 million, aimed at reducing the barriers to the long-term use of nuclear energy at home and abroad. I am pleased to report to you that the response to this program has been exceptional. The Department received 307 proposals for this program, representing over $300 million in potential research. We are not only pleased with the number of proposals, but with the teaming occurring among the laboratories, our universities, and industry and with the innovative ideas coming forward. In fiscal year 2000, we are requesting an increase of this program to $25 million, to continue the important work begun this year and for a modest increase in the number of proposals that can be selected.

- The Nuclear Energy Plant Optimization (NEPO) program, a new program in fiscal year 2000 to meet our national interest for safe, secure, and reliable access to energy in the 21st century. These plants are significant to our nation's energy portfolio and represent a critical infrastructure that is needed beyond the timeframes under which the existing plants are licensed. This program, aimed at reducing barriers to efficient and safe operation – increasing plant capacity from 71 percent in 1997 to 85 percent in 2010 and addressing issues associated with plant aging – would be 50-50 cost-shared with industry through the Electric Power Research Institute, guided by a joint EPRI/DOE strategic plan, and coordinated with the Nuclear Regulatory Commission.

These initiatives are based on the recognition of a clear distinction between the respective roles of government and industry in advancing nuclear technology in the 21st century. Industry must continue to carry the burden of short term research and they are meeting this challenge very well with an investment well in excess of $100 million annually. On the other hand, there is a clear role for the Department in providing for the longer term research of initiatives such as NERI and working with industry to fill the void on intermediate term research – research equally needed to protect our critical energy supply infrastructure.

DEVELOPING DEPARTMENT OF ENERGY

MISSION CRITICAL TECHNOLOGIES

For well over 50 years, we have been developing, producing, and delivering hundreds of types of stable and radioactive isotopes for research, industrial applications, and for medicine. The dramatic advancements made in nuclear medicine during the second half of this century are, in large part, because the Department and its predecessors had the foresight to pursue development of isotopes as a mission that was ancillary to other historical missions of the Department.

In medicine alone, the application of stable and radioactive isotopes for research, diagnosis, and therapies is an indispensable and growing component of our health care. Isotopes reduce health care costs and improve the quality of patient care. Each day, 40,000 patients benefit from isotope-based medical imaging techniques. In industry, isotopes are used for a multitude of applications, ranging from radiography, to sterilization of medical instruments, to lasers and smoke detectors. The NERAC projects that demand for medical isotopes can be expected to increase between 8 and 17 percent per year over the next 20 years.

Today, and in the future, our mission remains focused on bringing new and improved isotope applications, products, and services to the American people for use in medicine, industry, and research and on assuring that a reliable supply of isotopes exists for the nation. This program operates with a revolving fund, with about two-thirds derived from federal appropriations and one-third from annual sales. It is our policy to aggressively pursue opportunities for private sector involvement in production, distribution, and sales of isotopes, particularly commercial isotopes, and we have successfully privatized several key operations, which previously had required a federal appropriation. These privatizations allow us to decrease our cost of operations while providing a revenue stream from the royalties derived from the privatization.

In the last two years, we completed two important privatizations -- one, of hot cell facilities for production and processing of iridium-192 and other isotopes in Idaho and another, of a technology developed and patented by the Department for production of a promising new cancer isotope, yttrium-90, derived from strontium left over from weapons production at Hanford. Although each of these privatizations were different, both are examples of DOE doing what it does best -- developing an isotope for treatment of devastating illnesses or for other applications -- and industry doing what they do best -- bringing the product to market with no additional cost to the taxpayer.

PRIVATIZATION INITIATIVES

- [redacted] ♦ Hot cells operations to support reactor at Idaho National Engineering and Environmental Laboratory
- [redacted] ♦ Iridium target fabrication for Oak Ridge National Laboratory reactor
- [redacted] ♦ Yttrium-90 production at Pacific Northwest National Laboratory
- IN PROGRESS ♦ Calutron operations at Oak Ridge National Laboratory
- IN PROGRESS ♦ Molybdenum-99 production at Sandia National Laboratory and Los Alamos National Laboratory
- 9/1999 ♦ Marketing, sales, billing, and collection to support all production sites
- 9/1999 ♦ Hot cell operations at Oak Ridge National Laboratory
- 4/2000 ♦ Hot cell operations to support accelerators at Brookhaven National Laboratory and Los Alamos National Laboratory

In fiscal year 2000, we are requesting funding to continue the construction of the beam spur at the Los Alamos Neutron Science Center (LANSCE) facility so that it can be accomplished while the facility is in an outage and can come on line in fiscal year 2001 with no significant interruption in the supply of isotopes. The beam spur enables us to continue to provide vital short lived isotopes that can only be produced in an accelerator of this size.

By the end of this fiscal year, modifications to the Annular Core Research Reactor and associated Hot Cell Facilities at Sandia National Laboratories will be completed and the facilities will be ready for private sector use as a backup source of molybdenum-99, a precursor isotope to the most widely used diagnostic imaging isotope, technetium-99m . With this accomplishment, the goal of achieving the capacity for an emergency backup supply will be met and no appropriation in fiscal year 2000 is requested.

Lastly, we propose to launch the Advanced Nuclear Medicine Initiative, a new program for fiscal year 2000, to apply the Department's unique expertise and capabilities in isotopes to advance nuclear medicine technology. This initiative will sponsor nuclear medical science through university scholarships and internships in nuclear medicine and support peer-reviewed research including use of the Department's large inventory of alpha-emitting isotopes available from DOE to fight a spectrum of illnesses, including various types of cancer. This initiative responds to a need not currently addressed by existing Departmental programs.



RTG technology January 16, 1959. President Eisenhower and AEC officials.

Additionally, we will continue to provide safe, proven, reliable, maintenance-free radioisotope power systems for use in deep space and national security applications as we have for 38 years. In 1997, the National Aeronautics and Space Administration (NASA) launched the Cassini spacecraft to Saturn using electric power from radioisotope thermoelectric generators provided by the Department. Previous NASA space exploration missions that have used radioisotope power systems include the Apollo lunar module and the Pioneer, Viking, Voyager, Galileo and Ulysses, Cassini and Mars Pathfinder spacecrafts.

Future NASA missions will require even lighter, lower power systems, more efficient energy conversion, and new materials. Efforts are underway to meet this requirement by developing an Advanced Radioisotope Power System that uses a new technology. In fiscal year 2000, the program will complete fabrication and initiate testing of module units of this technology, proceed to design and fabrication of a full-scale qualification unit. In fiscal year 2000, we will continue to develop the state-of-the-art power supplies that could cover a range of power levels required to support future NASA space missions. These technologies include advanced conversion concepts, new materials, and heat source technologies. Potential new NASA missions over the next six to eight years requiring radioisotope power systems include missions to Mars, Europa, and Pluto and the Solar Probe mission to the Sun.

Because our supply of plutonium-238 used in these systems will be exhausted in the first half of the next decade, we are conducting an environmental impact analysis. The EIS on re-establishing a plutonium-238 production capability will be completed early in fiscal year 2000. Facilities at Oak Ridge, Idaho, and Hanford are currently being evaluated and the Department has also sought expressions of interest from the private sector for irradiation services. Additionally, we are currently evaluating whether assembly and test operations performed at the Mound Site should remain at Mound or should be transferred to another site.

DEVELOPING DEPARTMENT OF ENERGY

MAINTAINING VITAL NUCLEAR RESEARCH FACILITIES

AND SUPPORTING A STRONG EDUCATIONAL INFRASTRUCTURE

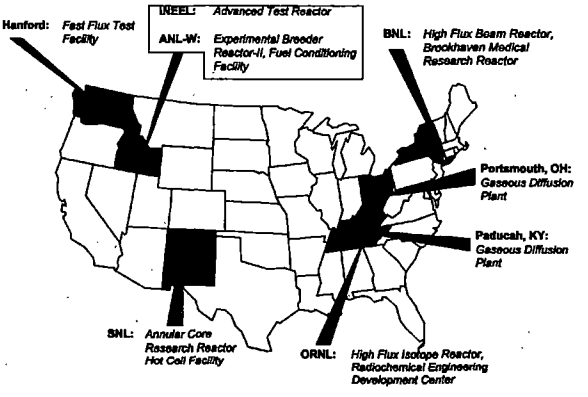
Government, industry, and academia alike face similar challenges today as we seek to sustain our critical nuclear science and technology infrastructures -- our facilities and our human resources. Like much of the industrial base which took shape during and in the years following World War II, the nuclear industry is a mature industry, comprised of scientists and engineers, many of whom are currently retiring or will retire over the next decade. Along with this, our nuclear science and engineering programs at universities and colleges are challenged by declining enrollments and aging facilities. The Department as well faces these same challenges to our own workforce and our own facilities.

Inextricably linked with our R&D programs are our initiatives to arrest the eroding nuclear energy infrastructure. Opportunities for new and exciting R&D serves not just to advance breakthrough technologies for the American people, but serves to attract the best and brightest to our universities, our laboratories, and our industry in general. To strengthen our knowledge base, in fiscal year 2000 we propose to apply a total of $11.3 million to enhance nuclear research and education programs at universities and colleges across the country. This Committee has been a strong proponent for this program and we have seen it grow over the last several years. I am pleased to submit it again at about the level you appropriated last year. I am also pleased to include in it, the Nuclear Engineering Education Research (NEER) program, vital to attracting and retaining faculty, at the same level as appropriated last year. These initiatives under the university programs will help ensure the future ability of the U.S. to continue to apply the nuclear sciences to medical research, the development of new materials, and future environmental and energy challenges.

To strengthen the infrastructure at our universities and ensure that university research reactors are available into the next decade, we are proposing a modest increase in the program in fiscal year 2000 to assist in the maintenance and modernization of university research reactors by replacing outdated equipment and upgrading experimental capabilities under the reactor upgrade activity. University research reactors are a little-known but essential part of the nation's

scientific infrastructure. Currently, there are 28 university research reactors at 26 universities in 21 states. These research reactors have contributed to innumerable important scientific discoveries ranging for analysis of moon rocks to dating of dinosaur bones, to new methods of targeting and destroying rare brain tumors. Quoting John Bernard from the Massachusetts Institute of Technology, "the public thinks they are all producing electricity, but these research reactors are much like a microscope. You're producing a beam of neutrons to see the world."

In the 1990's the Department concentrated the responsibility for management of the Department's reactors in the Office of Nuclear Energy, Science and Technology, where the core of the U.S. government's expertise in nuclear energy research, technology and engineering resides. Among the reactors under our purview are the High Flux Isotope Reactor, the High Beam Flux Reactor, our Annular Core Research Reactor, the Advanced Test Reactor (ATR), and the Fast Flux Test Facility. We also serve as landlord for the Test Reactor Area site at Idaho National Engineering and Environmental Laboratory, where the ATR is located, and where we are responsible for providing utility services and maintaining the site area in a safe and



Locations Of NE-Managed Facilities

environmentally compliant configuration. As many of you know, there was an accident last year at the TRA during a maintenance operation at a facility occupied by another DOE program in which carbon dioxide inadvertently discharged from a fire suppression system. The accident caused one death and several life-threatening illnesses. I want to underscore the sincere regret expressed by Secretary Richardson when he said, "our hearts go out to the family and friends of Kerry Austin." This is an accident that never should have happened and I pledge that the Office of Nuclear Energy, Science and Technology will work hard to ensure that safety remains at the forefront of all of our activities.

My office is also responsible for the Fast Flux Test Facility (FFTF), the most recently deployed reactor in the Department, operating between 1982 and 1992. Today, it is shutdown and maintained in standby and this spring Secretary Richardson will decide whether to shut it down permanently or pursue civilian missions for the reactor. To provide a more informed decision, NERAC will complete this month, the Nuclear Science and Technology Infrastructure Roadmap, to assess our present and future requirements for neutron generating facilities in light of our existing and currently planned infrastructure of hot cells, accelerators and reactors. This roadmap will include recommendations on whether there is a future need for FFTF to meet mission critical requirements.

SECURING OUR ENVIRONMENTAL FUTURE

The Department is responsible for safe storage and disposal of approximately 8,000 tons of spent nuclear fuel containing about 2,700 metric tons of uranium and transuranic elements from various civilian and defense-related programs. Some of this fuel contains materials that are highly reactive or are in a condition that precludes their disposal in a geologic repository. A technology which may someday assist the Department in dealing with this spent fuel challenge is the electrometallurgical treatment technology under development at Argonne National Laboratory (ANL). The demonstration of this technology will be completed this August on a portion of sodium-bearing spent fuel removed from the Experimental Breeder Reactor-II (EBR-II) located at ANL–West in Idaho. In fiscal year 2000, we expect to complete an Environmental Impact Statement on the use of this technology for the remaining EBR-II spent fuel as well as certain other spent fuels. In concert with this, we expect the National Research Council to report back to the Department in that same time frame with their final assessment of the technology. Together, these activities will provide the technical basis for a decision on whether to proceed with full scale operations of the Fuel Conditioning Facility and treatment of the fuel.

Additionally, we will complete the processing of the sodium coolant from the EBR-II and Fermi-I reactors in fiscal year 2000, enabling us to shut down the last of the EBR-II facilities, with the exception of the Fuel Conditioning Facility, used for the demonstration project. It will be retained in standby pending a decision on treatment of the remaining sodium bonded fuel.

My office is also responsible for important activities related to the Federal uranium enrichment program that were not transferred to USEC, Inc. when it was privatized in July 1998, including, sale of surplus natural assay uranium and management of the about 57,000 14-ton depleted uranium hexafluoride cylinders located at the gaseous diffusion sites in Paducah, Kentucky; Portsmouth, Ohio; and the Oak Ridge Site in Tennessee. For the past several years, we have worked to improve storage conditions for the cylinders through inspections,

maintenance, and monitoring. As required by Public Law 105-204, signed by the President last July, the Department is required to prepare a plan to begin by January 31, 2004, construction of plants at Portsmouth and Paducah to treat and recycle the depleted UF_6 inventory. This plan will be submitted to this Committee in the near future and we are confident it will meet the intent expressed by Congress in the enacted legislation.

Mr. Chairman, Nuclear Energy's fiscal year 2000 funding request is outlined in the following table:

Budget Authority
($ in Thousands)

Program Element Request		Fiscal Year 2000
Nuclear Energy R&D		$ 87,345
Advanced Radioisotope Power Systems	37,000	
Test Reactor Area	9,000	
University Reactor Fuel Assistance and Support	11,345	
Nuclear Energy Research Initiative	25,000	
Nuclear Energy Plant Optimization	5,000	
Isotope Support		21,000
Termination Costs		65,000
Fast Flux Test Facility		30,000
Uranium Programs		41,000
Program Direction		24,960
TOTAL NUCLEAR ENERGY, SCIENCE AND TECHNOLOGY REQUEST		$269,305

I will now provide the Committee with greater detail regarding the importance of our programs and the benefits they provide.

NUCLEAR ENERGY RESEARCH AND DEVELOPMENT (R&D)

The mission of the Nuclear Energy R&D program is to conduct advanced research and development in areas such as nuclear power and space power systems. In addition, this program supports nuclear engineering education and enhancement of the Nation's nuclear science infrastructure. It also supports the infrastructure needs for the Test Reactor Area at the Idaho National Engineering and Environmental Laboratory (INEEL).

ADVANCED RADIOISOTOPE POWER SYSTEMS

The Department of Energy and its predecessor agencies have provided radioisotope power systems for use in space and terrestrial applications for 38 years. These systems are safe, proven, reliable, maintenance-free, and capable of producing either heat or electricity for many years under the conditions required for deep space and national security missions. The unique characteristics of these systems make them especially suited for applications where large arrays of solar cells or batteries are not practical, for example, at large distances from the sun where there is little sunlight or in harsh environments. To date, the Department has provided over 40 radioisotope power systems for use on a total of 25 spacecraft. In fiscal year 1998, NASA launched the Cassini spacecraft to Saturn, entirely electrically powered by three radioisotope thermoelectric generators provided by the Department. Critical national security activities and NASA missions to explore deep space and the surfaces of planets could not occur without these systems.

In fiscal year 2000, the program will continue developing new, state-of-the-art power supplies required to support both future NASA space exploration, such as a mission to Jupiter's moon Europa, a mission to Pluto, and the Solar Probe mission to the Sun, and national security applications. In keeping with NASA's new philosophy of smaller, lighter weight and more technologically advanced spacecraft, these future NASA missions will require lower power, highly efficient lighter radioisotope power systems. In fiscal year 1998, DOE initiated the development of the next generation radioisotope power system, using a more efficient energy conversion technology to achieve a lighter weight, more efficient power system. In fiscal year 2000, the focus will be completing the design of the new system and proceeding to fabricate a flight qualification unit to more accurately assess its performance against NASA needs.

The outyear planning for future space missions reflects arrangements with the national security users and NASA that the Department will sustain the facility infrastructure to produce radioisotope power systems. This infrastructure represents the sole national capability to produce radioisotope systems. In accordance with arrangements with our customer agencies, NASA or other users will provide funds to the Department to pay for mission-specific costs, including mission-specific development, hardware fabrication, and other mission support costs.

A key factor in the ability to provide radioisotope systems for future missions is to have an adequate supply of the radioisotope Pu-238 that is used in all of these systems. It is very important to note that Pu-238 is not weapons-grade material and is not usable as an explosive in nuclear weapons. The current inventory of this isotope, with the exception of approximately nine kilograms that were purchased from Russia, was produced in the Savannah River reactors and processed in the HB-Line facilities that are shutdown or are in the process of being shut down. For the long-term, the Department has initiated an environmental analysis to evaluate sites for supporting domestic production of Pu-238. Sites to be evaluated include DOE's Hanford Site, the INEEL, and the Oak Ridge National Laboratory.

The Department is currently analyzing whether the assembly and test operations performed in Building 50 at Mound should be retained at the Mound Site or whether the functions should be moved to another site. As you know, this site is being environmentally restored by DOE's Office of Environmental Management and they plan to turn the site over to the private sector and exit the site in 2005. In general, it is the Department's policy to reduce our footprint where it can be demonstrated to produce a savings for the taxpayer and we are currently reassessing the cost involved in retaining operations at Mound versus costs of consolidating at other sites. In the meantime, progress on the environmental impact statement, begun this fiscal year, will continue at a slower pace until we complete this important assessment.

The Advanced Radioisotope Power Systems Program is an important part of the nuclear energy research and development efforts, and the Department will continue to manage this program in an effective and cost-efficient manner. We are submitting a report to Congress summarizing the status of actions taken to streamline the program. In conjunction with the user agencies, the Department will responsibly maintain the capability to supply these systems for future missions that are important to the exploration of space and vital to U.S. national security interests.

TEST REACTOR AREA LANDLORD

The Office of Nuclear Energy, Science and Technology is responsible for the landlord program for the Test Reactor Area of the INEEL. The TRA Landlord Program provides essential services to the Advanced Test Reactor (ATR) and its related facilities, including the ATR Critical Facility reactor, the TRA Hot Cells that were recently privatized for isotope production, and the INEEL Applied Engineering and Development Laboratories, as well as a machine shop that supports the entire site. These facilities are operated primarily to support vital nuclear reactor testing and materials testing for the Office of Naval Reactors, but are also operated for other programs, including our isotope program. This area of the site is expected to continue to perform national security and civilian missions well into the 21st century. As such, we must protect this critical infrastructure – maintaining facilities and services at a level that ensures protection of the workers and the public, the environment and minimizes programmatic disruptions

In fiscal year 2000, we are requesting $9 million for the landlord program, a $2.3 million increase over last year. Most of the increase is directed to ensuring that we meet commitments in managing our legacy waste and in continuing the electric utility line item project, which will be completed in 2003. The electrical utility project reconfigures the 40 year old electrical utility system to meet current needs and replace aged switchgear, panels, and transformers for which replacement parts are not available or which have reached the end of their useful lifetime and are not economical to repair. Additionally, we will continue the fire protection upgrade line item in fiscal year 2000, at a lower level than previous years, and then with a slightly increased level of effort the following year to bring it to completion. The fire protection line item was initiated several years ago to retrofit existing facilities to meet provisions of the National Fire Protection Agency's Life Safety Code and provide an adequate level of protection, as needed, for building occupancy. We feel that this project is particularly important in light of the suppression system-related accident that occurred last year in this area of the site.

NUCLEAR ENERGY RESEARCH INITIATIVE

World leadership in nuclear science and technology is vital to the United States from the perspective of national security, international influence, and global security. The United States has more nuclear power plants in operation today than any other nation in the world and most of the world's operating nuclear power plants are based on United States technology. Many countries, especially the fast-growing economies in Asia and the Pacific Rim, are interested in building new plants using our designs. Given the projected growth in global electrical energy demand as developing nations industrialize, our vital strategic interests in addressing global climate change, nuclear nonproliferation, nuclear safety, and economic competitiveness, and our need to satisfy the growing domestic needs for energy in an environmentally responsible manner, the United States must maintain its scientific and technological leadership in nuclear energy.

Recognizing this need, the PCAST Panel on Federal Energy Research and Development recommended in 1997 that the Department establish a new nuclear energy research effort to address the key issues affecting nuclear energy's potential as a future energy source. The key issues affecting nuclear energy's future include disposal of spent fuel, concerns about nuclear proliferation, plant safety and uncompetitive economics. PCAST recommendations are that the Department competitively select, through a peer-review process, proposals from universities, national laboratories and industry to conduct scientific and engineering research in the areas of proliferation-resistant reactors and fuel cycles; new reactor designs with higher efficiency, lower cost, and improved safety; lower output reactors for use in the global market; and new techniques for the management and storage of nuclear waste.

The Department's Office of Nuclear Energy, Science and Technology implemented the PCAST recommendations in fiscal year 1999 by establishing the Nuclear Energy Research Initiative (NERI) to fund new and innovative scientific and engineering research on these key

issues and to preserve our nation's nuclear science and technology leadership. The initiative has as its primary mission the advancement of nuclear science and engineering research over the long-term.

We are very pleased with the response to the NERI program. The Department received 307 final proposals from national laboratories, universities, and industry, representing over $300 million in potential research. Additionally, a significant fraction of the proposals submitted by the national laboratories included teaming with universities and others. These individual and collaborative research proposals are being peer-reviewed by independent experts for scientific and technical merit and will be evaluated for relevance to the Department's nuclear energy objectives prior to funding selection. The process by which grants are awarded under NERI is modeled after other successful investigator-initiated independent peer review processes, such as those used by the National Science Foundation and DOE's Office of Science. As with all of the nuclear research programs, the NERI will receive guidance from the Nuclear Energy Research Advisory Committee.

The Department strongly supports the continuation of this vital scientific and engineering research effort in fiscal year 2000 and we request $25 million for this program, an increase of $6 million over fiscal year 1999 to continue important research begun this year and to award a modest number of new proposals in fiscal year 2000. In doing so, we seek to address key obstacles affecting the expanded future use of nuclear energy in the U.S.; advance the state of nuclear technology to maintain our competitive position in overseas and future domestic markets; promote and maintain nuclear science and engineering capabilities to meet future technical challenges; and improve the performance, efficiency, proliferation resistance, reliability, and economics of nuclear energy applications.

NUCLEAR ENERGY PLANT OPTIMIZATION PROGRAM

Over the last couple of years, there have been significant changes in the strategic landscape -- a growing recognition of the importance that our existing nuclear power plants play in meeting the needs of the nation for electricity during the first half of the next century and their importance in meeting international commitments on climate change. These plants are also critical to helping utilities meet state implementation plans and EPA requirements for Clean Air Act compliance.

Two years ago, with electricity restructuring looming and concerns over regulatory uncertainty, the prediction was that the existing nuclear plants were doomed -- that fewer plants would seek license extensions and that many would shut down prematurely. Today, with consolidations in ownership occurring and several plants announcing their intention to seek license extensions, it is clear that there is a future for many of the U.S. nuclear power plants. However, for these plants to remain viable beyond 2020, both government and industry must take action – government reducing regulatory and other barriers to operation and industry,

investing capital in the upgrading their facilities for the future and investing in short-term R&D. Also, together, government and industry should explore intermediate-term evolutionary technologies to sustain these plants. For these reasons, the Department is resubmitting its proposal for the Nuclear Energy Plant Optimization (NEPO) program in fiscal year 2000 to address the issues that could prevent continued operation of existing U.S. nuclear power plants.

The DOE Energy Information Administration projects that even with aggressive energy efficiency measures, U.S. electricity consumption will increase 1.4 percent per year through 2020 – the equivalent of seven large 1000-megawatt power plants each year. During this same period, about 127,000 megawatts of existing electricity generating capacity could be retired because of age, competitive pressures, and as part of U.S. utility measures to meet clean air standards. In order to meet the demand for new baseload capacity, the Energy Information Agency estimates that the U.S. would need to build the equivalent of over 1,000 new fossil plants by 2020. This magnitude of building would require a huge economic investment over the next 20 years with the potential for significant increases in air emissions.

However, continued operation of our existing nuclear power plants can mitigate this need and dramatically reduce or offset air emissions. For example, continued operation of 90 percent of the existing nuclear power plants through their current license terms would displace over 3,950 million metric tons of carbon emissions between 1995 and 2035. Extending the licenses of 75 percent of these nuclear plants could reduce emissions by 64 million metric tons between 1995 and 2010, 208 million metric tons by 2015, and 2260 million metric tons by the middle of the next century, when the last existing plant would shutdown.

The Department's Nuclear Energy Plant Optimization (NEPO) program is proposed to address issues associated with operating existing nuclear power plants, in cost-shared cooperation with the Electric Power Research Institute (EPRI) and in coordination with the Nuclear Regulatory Commission. As a collaborative program, industry would share a minimum of 50 percent of the cost and the program would be guided by a joint DOE/EPRI strategic plan. The proposed program would involve the nation's national laboratories, universities, and industry and although no federal research dollars would be allocated internationally, the program would benefit from substantial international collaboration and coordination.

Specifically, we propose the following R&D initiatives:

- *Managing the long-term effects of nuclear plant aging.* R&D conducted under NEPO would provide a better understanding of material degradation mechanisms and how they occur, enabling development of cost-effective aging management strategies which will provide capabilities to easily prevent, detect, or repair the degradation.

- *Improving nuclear power plant capacity factors from 71 percent in 1997 to 85 percent in 2010.* This initiative focuses on improving the long-term economic performance of current plants through development of technologies that will improve

equipment reliability, lower operating costs, and increase power output while maintaining high levels of safety.

- *Optimizing power generation through efficiency and productivity improvements.* Current nuclear plants were designed and are operating with technology developed over 25 years ago. As plants age, components and parts degrade or become obsolete, introducing inefficiencies, added costs, and unreliability. There have been significant technology advancements over the last 25 years that are applicable to power generation, particularly in computers, communications, materials, sensors and digital electronics, and artificial intelligence that provide more accurate, reliable and cost-effective technologies; however, most of these technologies are not qualified to meet Nuclear Regulatory Commission requirements. Further R&D developments will produce new technology applications that meet regulatory requirements and that will improve plant operation and maintenance, increasing overall plant output. This initiative is focused on demonstrations of technologies necessary to achieve regulatory acceptance of the new technologies.

Research performed under this program would be prioritized by the NERAC subcommittee on operating nuclear power plant research, coordination and planning.

UNIVERSITY REACTOR FUEL ASSISTANCE AND SUPPORT

The Department of Energy's University Nuclear Science and Reactor Support Program conducts the important task of supporting nuclear science education and research in the United States. Under this program, we work with universities and colleges across the nation, with assistance from private industry, to maintain nuclear education programs, support outstanding students, undertake innovative nuclear engineering research, and continue the operation of research reactors. Much of the program funding is used to provide fresh fuel to these reactors, to remove spent fuel, and to upgrade the operational capabilities at the university research reactors at 26 universities in 21 states.

To ensure that these valuable educational tools remain available into the next decade, in fiscal year 2000, for the third straight year we plan to support U.S. universities and colleges in their efforts to modernize reactor safety systems and improve their operational capabilities. These reactors are critical and unique assets of the U.S. scientific infrastructure. They are used for educational purposes, to conduct important medical and materials research, and to make vital isotopes. In fiscal year 2000, we will continue to supply fresh fuel to, and transport spent fuel from, universities requiring assistance. In addition, we will continue converting university reactors that currently use highly enriched uranium fuel to low enriched uranium fuel, thus advancing our nonproliferation goals. Additionally, through our reactor sharing program we will provide a means for students at universities without reactors to have access to another university's reactor for education, training, and research purposes.

We will continue the very important and successful Nuclear Engineering Education Research grants initiative that provides much needed funding to faculty for innovative research at universities at the same level of funding you appropriated in fiscal year 1999. This program is vital to the research needs of the U.S. universities' nuclear engineering departments and, in particular, to attracting and retaining faculty.

We plan to maintain our growing number of partnerships with the electric utility industry and other private sector entities by providing research grants to universities that receive similar commitments from the utilities and private companies. As in the past, we intend to provide funding equal to the amount contributed by private organizations, to a maximum of $50,000 in Department of Energy grants per university. In fiscal year 2000, we expect to fund $800,000 in grants to 17 universities that will be matched by participating companies.

We also plan to continue our support of scholarships for outstanding students in undergraduate and graduate nuclear engineering and health physics programs at our universities and colleges, including fellowships for outstanding students at our minority institutions. These fellowships and scholarships provide for the education of approximately 18 outstanding graduate engineering students across the country and approximately 62 undergraduate students. We will continue an initiative, begun in fiscal year 1999, which provides practicums at national laboratories for 30 undergraduates in their junior or senior year, thus giving them valuable real-world experience in nuclear engineering. In fiscal year 2000, we will begin an initiative to support nuclear engineering recruitment activities in conjunction with professional societies to ensure a highly informed group of college freshmen enter university nuclear engineering and related scientific courses of study. Also, we will continue a radiochemistry initiative begun this year to help educate a new generation of radiochemists, prepared to address the technical challenges associated with operating nuclear plants.

ISOTOPE SUPPORT

Our isotope program develops, produces, sells, leases, and ships hundreds of different stable and radioactive isotopes for medical applications, scientific research, and commercial use throughout the United States and to approximately 25 other countries. Consistent with our mandate in the Atomic Energy Act of 1954, it is our longstanding policy to produce isotopes when no domestic or private sector capability exists; where unique government production facilities are needed, such as nuclear reactors and isotope enrichment facilities; or where other productive capacity is insufficient to meet the Nation's needs. Over the last several years, we have aggressively pursued private sector investment in new isotope production ventures and in fiscal year 2000, we will complete privatization of our commercial isotope production activities, including privatization of our business functions. In instances where the private sector can produce isotopes more efficiently than the government, we will sell, lease, or license existing facilities, technologies and inventories for commercial purposes.

The isotope program operates with a revolving fund and maintains financial viability through revenues from sales and annual appropriations. We function like a business, and as such, must have sufficient operating cash to fill customer orders and maintain solvency during market changes. Our fiscal year 2000 budget request, which funds about two-thirds of the program, will provide the minimum necessary operating cash. The revolving fund is audited annually by an independent public accounting firm, KPMG Peat Marwick, and since the first audit in 1992, the isotope program has continuously received an unqualified opinion which states that the financial statements are presented fairly in all material respects. The audited financial statements are an essential management tool for the Isotope Program.

Although we are not obligated to provide all isotopes requested, we strive to meet our customers' requests subject to inventory, production capability, and financial constraints. This fiscal year, to obtain a better understanding of our customers' requirements, a panel of medical experts convened to develop a consensus on the growth of demand for medical isotopes between now and the year 2020 and to identify future support the Department of Energy will need to provide to the nuclear medical community. The panel's report has been accepted by NERAC as the basis for its development of a long-term isotope research and development plan. The report indicates that the need for medical isotopes used in diagnostics, therapy, and research will increase between 8 and 17 percent per year over the next 20 years. Although the cost of meeting this demand is not insignificant, it is a fraction of that which would be saved in health care costs by the use of isotopes for diagnosis and treatment.

The isotope program has negotiated a number of cooperative arrangements with foreign suppliers, to assure an uninterruptible supply of isotopes in the U.S. For example, in 1997 we completed a cooperative production agreement with the Institute for Nuclear Research (INR) in Troitsk, Russia, for production of strontium-82, which was followed by FDA qualification of the Russian strontium-82 in 1998. This agreement resulted in the supply of material to Los Alamos for chemical processing and eventual distribution to hospitals at a time in which no large accelerator, necessary for strontium-82 production, was operating in the U.S. We are making similar cooperative efforts for reactor-produced isotopes.

Because until recently the United States was dependent on a single supplier of molybdenum-99, a major initiative of the past several years has been to bring our facilities at Sandia National Laboratories – the Annular Core Research Reactor (ACRR) and associated Hot Cells to the point that emergency production of this important medical isotope could be established if needed. molybdenum-99 is a precursor of technetium-99m, an isotope used for diagnostic imaging, including body organ functions, in more than 36,000 medical procedures each day in the United States alone. This isotope allows physicians to accurately diagnose cancer and other diseases without resorting to exploratory surgery. Substantial modifications have been undertaken at these facilities to ensure a stable production source that is capable of meeting part or all of the U.S. demand is available if needed. Modifications will be completed to both the ACRR and Hot Cell Facility this year that will place them in a condition where

emergency production of molybdenum-99 could be constituted if needed. The demand for molybdenum-99 continues to grow due to the application of this cost-saving diagnostic technique, thus making it attractive to privatization. For this reason, we are pursuing privatization of molybdenum-99 production and related business activities. A draft Request for Proposal (RFP) will be issued this month, followed by the final RFP in May 1999, with a contract award anticipated by the end of the fiscal year.

Our fiscal year 2000 request includes funding for relocation of the Los Alamos isotope target irradiation station at the Los Alamos Neutron Science Center (LANSCE), a facility owned by and operated primarily for the Office of Defense Programs. Because of the research community's identified year-round need for short-lived radioisotopes that can only be produced in a large accelerator, we are continuing the modifications to the LANSCE facility to construct a beam spur that can be dedicated to isotope production. Without this beam spur, the nation will lose the ability to make certain isotopes when LANSCE shuts down later this year. The total estimated cost for the relocation of the LANSCE target irradiation station is $14 million. Conceptual design and planning activities for this project began in fiscal year 1998 to support construction of the relocated target station and tie into the accelerator beam, scheduled to take place in fiscal year 1999, in a time-frame dictated by Defense Programs' accelerator maintenance schedule. By the end of fiscal year 2000, construction should be 60 percent complete and with the additional $8 million requested, the new station will be completed and commissioned in fiscal year 2001. The fiscal year 2000 funding request is essential to minimizing the time that the country is unable to produce these isotopes.

Additionally, the President's fiscal year 2000 request includes a recommendation to establish a new program, the Advanced Nuclear Medicine Initiative, initially funded at $2.5 million. This initiative will apply the Department's unique expertise and capabilities in isotopes to advance nuclear medicine technology in the U.S. Under the initiative, the Department will sponsor nuclear medical science using a peer-review selection process, encourage the training of individuals in nuclear medicine methods by establishing scholarships and fellowships for nuclear medicine specialists and by sponsoring summer internships at appropriate institutions, and initiate a focused program to apply alpha-emitting isotopes to fight a spectrum of malignant diseases including most common cancers and infectious diseases such as meningitis and AIDS.

TERMINATION COSTS

The termination costs program funds the deactivation of the Experimental Breeder Reactor–II (EBR-II) facility located at Argonne National Laboratory-West (ANL-West) in Idaho. The objective of the program is to place the EBR-II facility and other surplus facilities at ANL-West in a radiologically and industrially safe shutdown condition, for low-cost and long-term surveillance and maintenance, pending final decontamination and decommissioning. The principle components of this program are completing the electrometallurgical treatment

demonstration project, which will occur this fiscal year; completing processing of the sodium coolant from the shutdown reactor, and closing the last of the EBR-II facilities.

The Department is responsible for the safe storage and disposal of approximately 8,000 tons of spent nuclear fuel containing about 2,700 metric tons of uranium and transuranic elements from various civilian and defense-related programs. Some of these spent fuels contain materials or are in a condition that may preclude their direct disposal in a geologic repository. The electrometallurgical treatment technology under development at ANL is a technology that has the potential to assist the Department in dealing with this spent fuel challenge, a challenge which is unique to the Department.

In particular, this technology may be the best way to deal with the sodium-bearing spent fuel removed from EBR-II. This spent fuel contains metallic sodium, a material which can cause an explosion when brought into contact with water. This spent fuel must be treated if it is ever to be relocated to a geologic repository. Under the Consent Agreement between the State of Idaho and the Department (Batt Agreement), this spent fuel as well as other sodium bonded fuel onsite must be removed from the State by 2035. Consequently, this technology may be crucial to the Department's success in meeting those obligations. If this technology is not successful, new R&D activities will have to be initiated to find other alternatives for treating the Department's sodium-bonded fuel.

The Department will complete the electrometallurgical treatment demonstration this fiscal year. In fiscal year 2000, the Department will complete an environmental impact statement on using this technology. In parallel with this, the National Research Council will complete their review of the technology and will issue a final report to the Department during the first quarter of fiscal year 2000. Together, these activities will form the basis for a decision early in fiscal year 2000 on whether to proceed with this technology for treatment of the rest of the inventory of EBR-II spent fuel as well as certain other spent fuels in the Department's inventory.

In 1994, the Department began the permanent shutdown of EBR-II and associated support facilities at ANL-West. During fiscal year 2000, our efforts to place these facilities in a radiologically and industrially safe shutdown condition will continue. The Sodium Process Facility, designed and constructed to convert the highly reactive sodium coolant to an environmentally acceptable form suitable for routine disposal, will complete its mission in early fiscal year 2000. The facility will be placed in a safe configuration, awaiting further deactivation and eventual decontamination and decommissioning. With exception of the Fuel Conditioning Facility, used for electrometallurgical treatment, all facilities will be in a shutdown configuration by the end of fiscal year 2000.

FAST FLUX TEST FACILITY

Nuclear Energy also provides program management and technical direction for the Fast Flux Test Facility (FFTF) located at the Hanford Reservation in Washington. FFTF is a 400 megawatt thermal, sodium cooled reactor that operated between 1982 and 1992. Originally designed to provide irradiation testing of nuclear reactor fuels for the U.S. liquid metal reactor program, it operated for materials testing for fusion, space reactor, and the international fast reactor programs. In 1992, the Department shut down the facility and placed it in standby, pending a decision on using the facility as a bridge for tritium production until an accelerator or a commercial light water reactor could come on line to produce tritium. In December 1998, Secretary Richardson announced that FFTF is not required for tritium production or other defense missions. However, the Secretary indicated that he will decide, this spring, whether to begin permanent deactivation of FFTF or consider using it for other missions, such as medical isotope production, plutonium-238 production for space missions, advanced materials research, and nuclear energy R&D. If so, the Department would initiate an Environmental Impact Statement on the potential restart of the facility.

To provide a more informed decision, the Nuclear Energy Research Advisory Committee will complete their evaluation this spring of the Nuclear Energy, Science and Technology Infrastructure Roadmap. This road map is important not just to assessing the need for FFTF but for assessing the existing facilities and capabilities for neutron science and isotope production across the Department as well as the needs of the Nation over the next 20 years.

The funding requested in fiscal year 2000 is the absolute minimum level required to continue to maintain the facility in a safe condition and in compliance with federal and state safety and environmental regulations. Neither the fiscal year 1999 appropriated level nor the fiscal year 2000 requested levels are sufficient for either option of beginning permanent deactivation or pursuing restart for other missions. Responsibility for funding FFTF standby activities transferred from the Office of Environmental Management to the Office of Nuclear Energy, Science and Technology in fiscal year 1999.

URANIUM PROGRAMS

The Office of Nuclear Energy, Science and Technology retains important government activities related to the Federal uranium enrichment program that were not transferred to the United States Enrichment Corporation (USEC Inc.). In particular, this program addresses the facility and environmental legacies associated with the enrichment program, management of government assets, and associated research and development.

One of the principal missions of Uranium Programs activities is to effectively manage the Department's depleted uranium hexafluoride (depleted UF_6) inventories. A key responsibility of the Department is to ensure that an estimated 46,400 cylinders of depleted UF_6 are maintained in

an environmentally responsible manner by conducting annual cylinder inspections, and developing and implementing options to repair cylinders exhibiting accelerated corrosion. The Department is currently evaluating alternative long-term management strategies for the material. In December 1997, we issued a draft programmatic environmental impact statement (EIS) for public comment, and we expect to issue the final programmatic EIS and the record of decision shortly.

Maintaining safe cylinder storage in the interim requires substantial work, with costs ranging from $12 to $15 million per year. Many of these cylinders date back to the Manhattan Project and have been in outside storage for up to 50 years. To improve storage conditions, one cylinder yard has been reconstructed, and three new cylinder yards have been built to date. A pilot cylinder painting program has been completed, and 12,000 cylinders are being painted over 3 years to reduce accelerated corrosion of the cylinders. We are also applying advanced technologies to facilitate inspections, detect leaks, and evaluate cylinder wall condition.

In addition to appropriations received for management of DOE-generated depleted UF_6, the Department received $66 million in fiscal year 1998 from the United States Enrichment Corporation (USEC Inc.) for the management and disposition of about 11,200 additional USEC-generated depleted uranium cylinders. In accordance with fiscal year 1999 appropriations report language, the Department submitted, on December 17, 1998, its initial plan for applying the $66 million received from USEC. These funds are administered in accordance with the terms of the two Memoranda of Agreement (MOAs) and related correspondence for activities required to accept and maintain the USEC material. Also, in July 1998, the President signed Public Law 105-204, requiring the Department to prepare a plan to begin by January 31, 2004, construction of plants at Portsmouth and Paducah to treat and recycle the depleted UF_6 inventory. This plan will be submitted to this Committee in the near future and we are confident it will meet the intent expressed by Congress in the enacted legislation. The Department's fiscal year 2000 budget requests $5 million to be used in addition to the MOA funds to begin activities to begin the process of constructing depleted UF_6 conversion plants.

Other Uranium Programs activities at the gaseous diffusion plants in Portsmouth, Ohio; Paducah, Kentucky; and Oak Ridge, Tennessee include maintenance of facilities and grounds, cleaning legacy spills in the leased areas of the diffusion site consistent with the Federal Facilities Compliance Act, and guarding and protecting highly enriched uranium stored at the Portsmouth site.

Since the Department shut down highly enriched uranium production at the Portsmouth Plant in 1992, we have been removing the highly enriched uranium residues and placing the facility in a safe shutdown condition. Progress on the removal of highly enriched uranium has been substantial, and all highly enriched uranium oxides not planned for transfer to USEC will be removed from the site by the end of fiscal year 1999.

More than 70 facilities at the enrichment plants were not leased by USEC, Inc. and remain the responsibility of the Department. As landlord, my office maintains these facilities and their associated permits and is responsible for completing environmental corrective actions. We are also responsible for satisfying financial obligations associated with enrichment operations before the transition to USEC, Inc. Chief among these obligations is payment of post-retirement life and medical benefits to the Department's enrichment plant operating and power supply contractors and assisting in litigation involving claims against the Department for its prior operations. Lastly, after assisting in the transfer of regulatory oversight of the leased facilities and obtaining an initial certificate of compliance from the Nuclear Regulatory Commission, the Department continues to review and update safety documentation as necessary, for the non-leased facilities and assist the NRC in preparing annual congressional reports on the status of the diffusion plants.

My office is also responsible for the management and disposition of the Department's surplus natural uranium inventories. The Department currently has an inventory of approximately 24 million pounds of natural uranium, with a total value of about $260 million, that may be sold in the commercial market. All of the uranium to be sold under this program is currently held at the Portsmouth or Paducah gaseous diffusion plants. The USEC Privatization Act and the Energy Policy Act allow the Department to sell excess uranium stockpiles subject to certain conditions. Before the Department sells any of its excess natural uranium, the USEC Privatization Act requires the Secretary to determine that "... the sale of the material will not have an adverse material impact on the domestic mining, conversion, or enrichment industry, taking into account the sales of uranium under the U.S./Russian Highly Enriched Uranium (HEU) Agreement and the Russian Suspension Agreement ..."

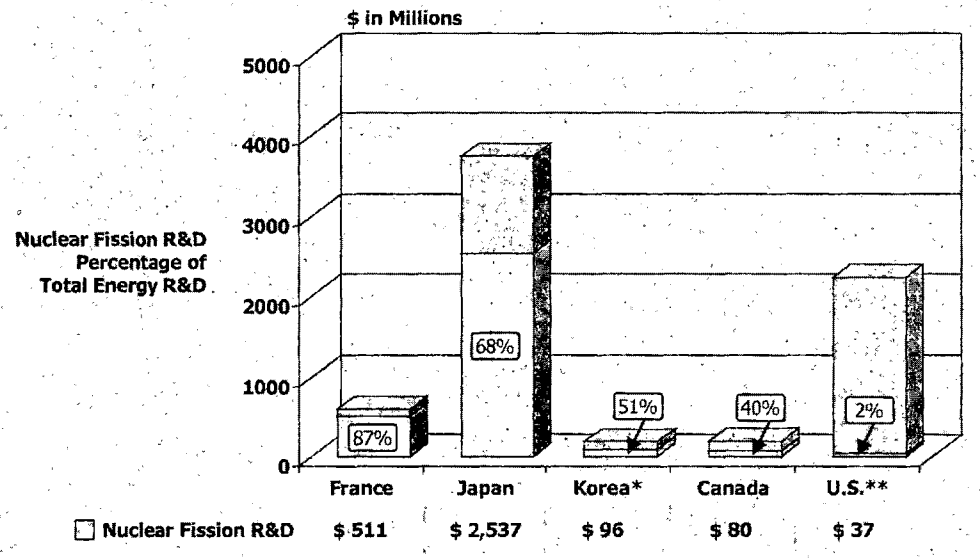
Finally, my office is also responsible for administering the $325 million authorized in Public Law 105-277 for the purchase of natural uranium pursuant to 1997 and 1998 deliveries under the U.S./Russian HEU Agreement. The purchase of this material is contingent on the Russian and Western uranium suppliers reaching a long-term agreement on purchases of the natural uranium component of the low enriched uranium delivered under the U.S./Russian Highly Enriched Uranium Purchase contract. I understand these negotiations are going very well and an agreement may be reached soon.

PROGRAM DIRECTION

In fiscal year 2000, we are requesting $25 million for salaries, travel, support services, and other administrative expenses for 144 Headquarters and Operations Office personnel providing technical direction to uranium, isotope support, and other nuclear energy programs. This budget item includes management and staff support funded by other Department of Energy accounts (*e.g.*, technical direction for the operation of the Department's research reactors funded by the Office of Energy Research); other Federal agencies; and foreign governments. It also funds the activities of the Nuclear Energy Research Advisory Committee (NERAC).

Mr. Chairman, this concludes my prepared statement. I will be happy to answer any questions. Again, I look forward to working with you and the Subcommittee this year as we examine important questions and issues concerning the allocation of federal resources to strengthen our universities and colleges, protect our critical infrastructures, bring vital isotopes and technology to the American people, support deep space and related missions, and meet our important stewardship responsibilities.

International Nuclear R&D Funding, 1997

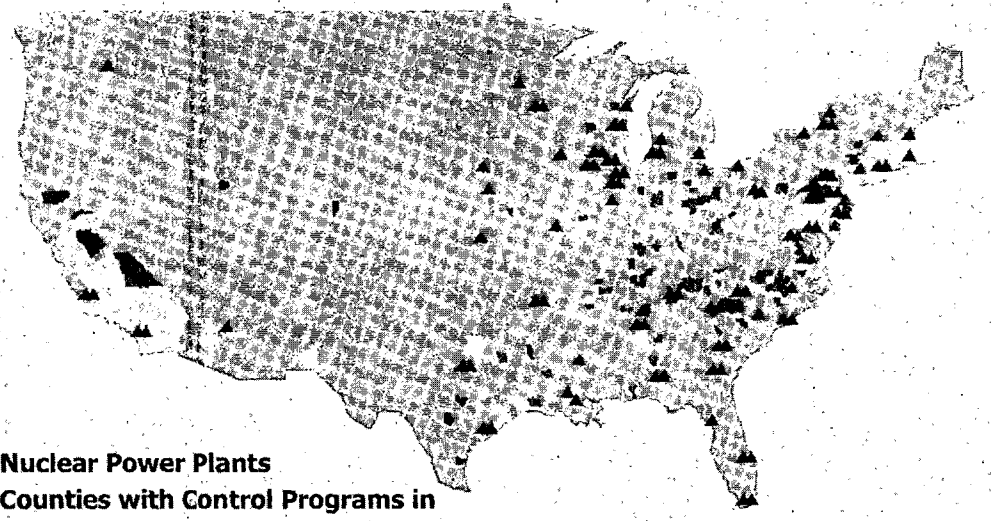


Sources: "Energy Policies of IEA Countries -- 1998 Review" Annex B.: OECD/IEA

* *Korea Ministry of Science and Technology Website*

** *U.S. DOE 1997 Budget*

A Vital Player in the Clean Air Act's Fight Against Ozone



▲ Nuclear Power Plants

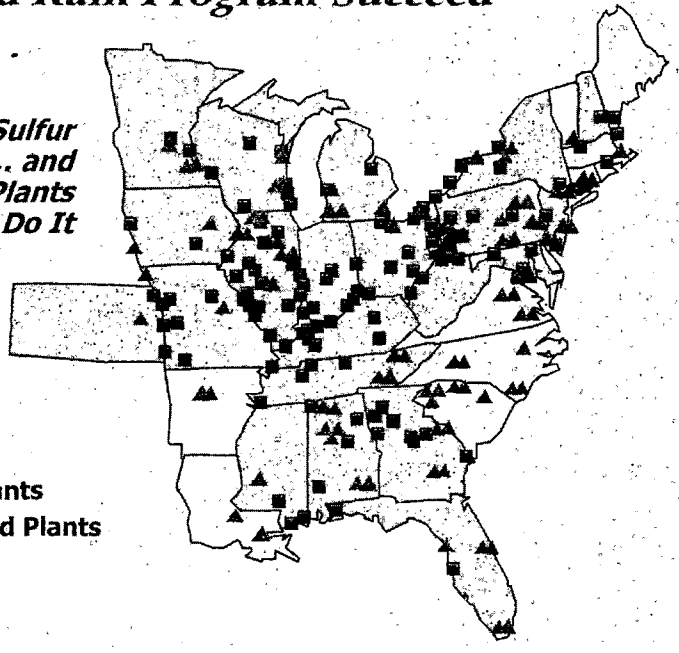
Counties with Control Programs in Place Under the Prior Ozone Standards*

■ Counties that will not Meet EPA's Revised 1997 Ozone Standards*

* Source: U.S. Environmental Protection Agency

How Nuclear Energy Helped the U.S. Acid Rain Program Succeed

States Required to Cut Sulfur Dioxide by 1995 ... and the Nuclear Power Plants That Helped Them Do It



- Phase I States
- ▲ Nuclear Power Plants
- ■ Phase I Fossil-fired Plants

Source: Energy Resources International, Inc.

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C. Bruce Tarter, Lawrence Livermore National Laboratory

John J. Taylor, Electric Power Research Institute (Ret)

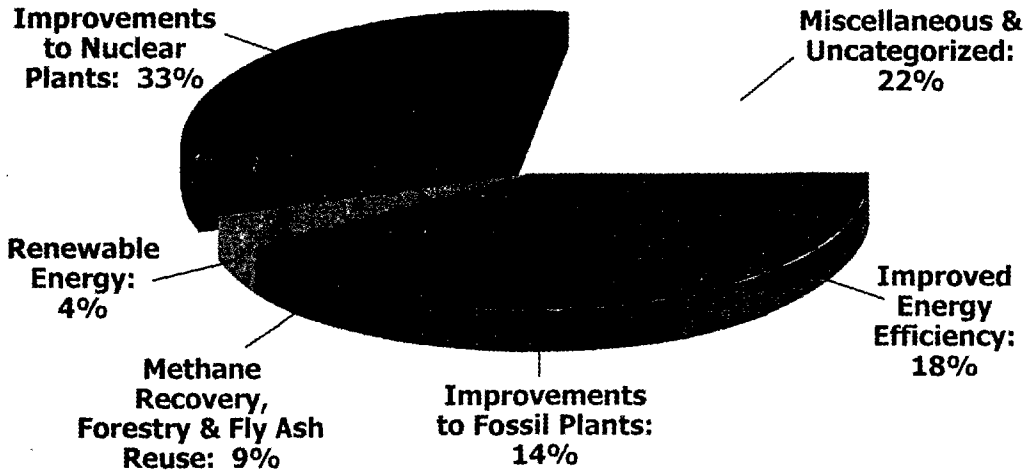
Charles E. Till, Argonne National Laboratory (Ret)

Neil E. Todreas, Massachusetts Institute of Technology

World's Largest Nuclear Power Station -- 8.2 GWe
Kashiwazaki Kariwa Nuclear Power Plant, Japan

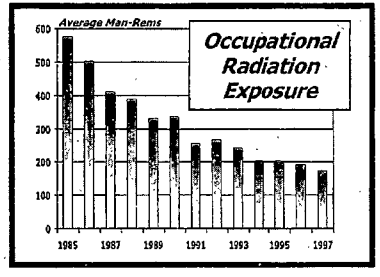
Nuclear Energy: Essential in Reducing CO_2 Emissions

Utility Pledges to Reduce Greenhouse Gases



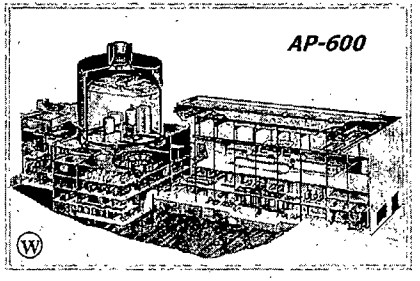
National Benefits of Past DOE-Nuclear Energy R&D

Radiation Exposure Reduction in LWRs



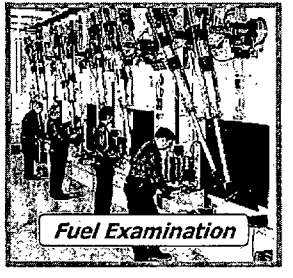
DOE R&D programs have reduced commercial plant occupational radiation exposures by 67% since 1985. In addition to benefiting American workers at nuclear power plants, this R&D has saved U.S. ratepayers more than $40 million annually.

Advanced Light Water Reactors (ALWR)



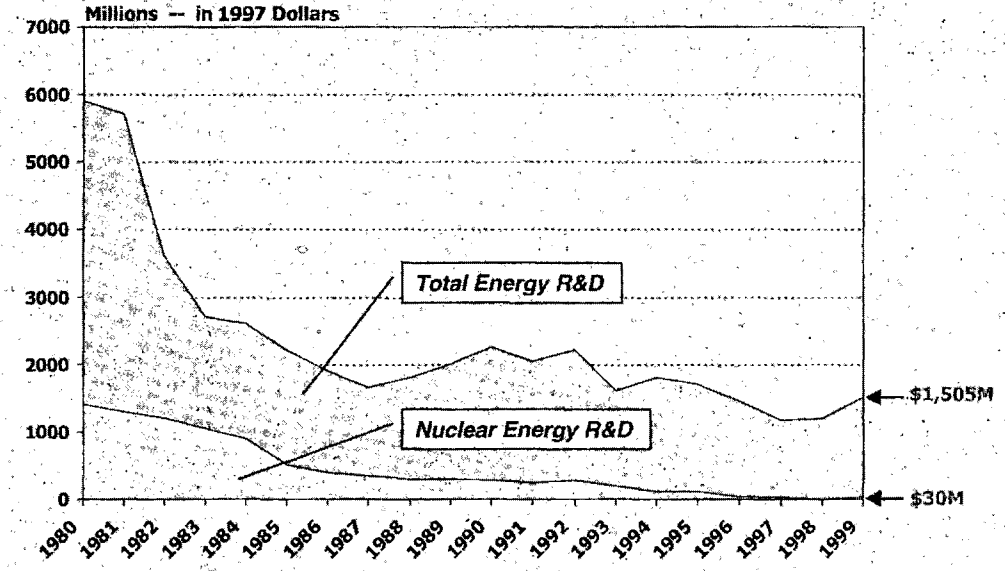
Three ALWR designs have been preapproved by the NRC. Export of ALWRs will generate royalty payments for the Government DOE and hundreds of millions of dollars for the U.S. economy.

High Burnup Fuel



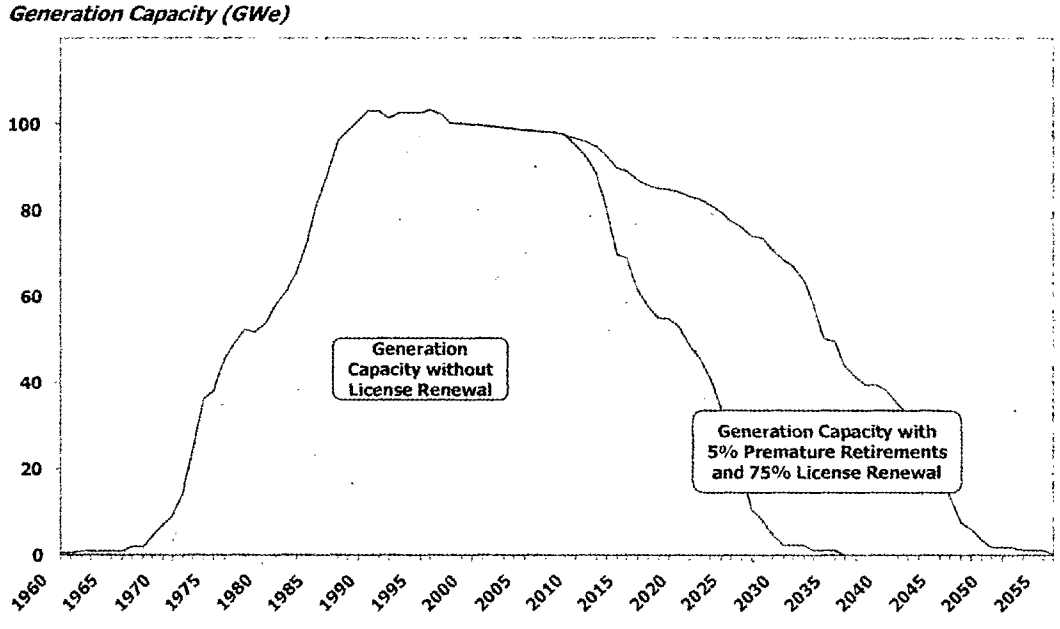
High burnup fuel increases the fuel energy output by 50% and reduces spent fuel generation by one third. Also it helps increase the average interval between refuelings by 50% and results in annual savings of about $200 million to U.S. ratepayers.

DOE Energy R&D Profiles



Source: PCAST Energy R&D Panel Report, November 1997, Figure 2.6 (Years 1980-1987)

U.S. Nuclear Generation Capacity



Mr. PACKARD. Dr. Krebs comes to this committee with a great deal of experience. She is Director of the Office of Science and has served there for several years. We are very grateful to have you and welcome you to the committee.

ORAL STATEMENT OF DR. MARTHA KREBS

Ms. KREBS. Thank you, Mr. Chairman.

Mr. Chairman, Mr. Visclosky, members of the subcommittee, I am delighted to be here today to describe the fiscal year 2000 budget for the Department of Energy Science programs. As a matter of perspective, it is important to keep in mind that the whole Department of Energy in terms of its investments in basic and applied research ranks second only to the Department of Defense in terms of the Federal investment in research in this country. And, within that, the Office of Science in terms of its investment in basic research with the National Science Foundation; in particular, we are a primary funder of physical science in this country by comparison to other agencies.

But more importantly, from my perspective, we are an integral part of the Department of Energy, both carrying out its science and technology commitments in terms of understanding the fundamental building blocks of the physical and living world that we are part of but, also in terms of meeting the science and technology underpinnings for the energy and the environmental missions of DOE as well as providing what we like to think of as extraordinary tools for extraordinary science in terms of the unique accelerators and reactors that we support at our national laboratories for research. And each year we get results.

OFFICE OF SCIENCE DEVELOPMENTAL RESULTS

Let me tell you about some of the most recent results. For example, we have new findings in corrosion resistance that will enable better protective coatings for high-temperature, high-wear environments in furnaces, turbines and engines.

We are exploring the new world of nanostructures, and we have created new materials that have 50 to 100 times more conducting power than copper. The day will come when we can show what kind of devices can use these new materials to conduct electricity.

We have been able to seek the genome of something called deinococcus radiodurans which we like to call "Conan the Bacteria". It is a thousand times more resistant to radiation than human beings and we are now systematically studying its properties because we believe it can have some long-term value in bioremediation of severely contaminated sites such as Hanford.

We have also developed the use of positron emission tomography to explore the chemical pathways of addiction; and, most recently, our scientists at the Brookhaven National Laboratory have been able to identify a drug available in Europe that is essentially a blocker of cocaine and nicotine addiction.

Science Magazine annually identifies a breakthrough of the year. Most recently, this year's breakthrough is something called the accelerating universe which was led by one of the teams at the Lawrence Berkeley National Laboratory, my old laboratory in Cali-

fornia. That is basically the result of a 10-year effort led now by a person who used to be a postdoc when I was at the laboratory and basically has found a countervailing force to gravity that may result in the universe expanding forever as opposed to having a big bust.

OFFICE OF SCIENCE FY 2000 FUNDING REQUEST

Going to this year's budget, let me simply say that our total budget request of $2.835 billion is $138 million above 1999; and if you take into account some one-time projects, our total investment for new activity in FY 2000 is $184 million.

It is composed of three major elements: the increase in construction costs in FY 2000 for the Spallation Neutron Source to keep it on schedule, an increase of $70 million for a new initiative called the Scientific Simulation Initiative, and $10 million for an initiative in science education that I will describe shortly.

Despite these increases for major initiatives, difficult decisions were made within the base program that are defensible but not comfortable given the tight budget constraints that the Administration followed and that you are also facing. New projects and new scientific directions have to be followed. Science doesn't stand still, and it means that operation of existing facilities have to be balanced with these new initiatives and directions, as well as with the support for research and researchers that use the facilities.

So the budget request has a number of important elements. Let me talk about a few of them as briefly as I can.

SPALLATION NEUTRON SOURCE

First, the Spallation Neutron Source, a $1.36 billion facility located at Oak Ridge National Laboratory in Tennessee. Scheduled construction begins this year. This is scheduled for completion in December of 2005. It is a five-lab collaboration involving the Oak Ridge Lab, Argonne Lab in Illinois, the Lawrence Berkeley Laboratory in California, Brookhaven in New York, and the Los Alamos Laboratory in New Mexico.

It has been a high priority for the scientific community since 1984. It was reconfirmed as the highest priority for the material science community in the recent 1999 study by the National Academy of Sciences, and it can have major impacts on the understanding and fabrication of new and unique materials that range from metals to ceramics to polymers to magnetic materials, and it also has an opportunity for changing the way we understand biological structures and their functional properties in living systems.

We have recently had a biannual review that has been the subject of another review by the General Accounting Office that called into question and made some critical recommendations about project management. We have replaced the project director of this facility, and the project is undergoing a review that will be completed in early April that we will be ready to share with you shortly thereafter.

The new leader of the project is a Dr. David Moncton from the Argonne National Laboratory who brought in the Advanced Photon Source, one of our big facilities on time and budget. And so I believe we have moved quickly to get this project on a path that will

allow us to move forward and complete this project in a responsible way.

SCIENTIFIC SIMULATION INITIATIVE

Let me move quickly to the Scientific Simulation Initiative. It is the Department's contribution to the President's Information Technology for the 21st Century Initiative. It is aimed at providing the science base that will build the computer and information technology for the second decade of the next century. NSF and DARPA have the primary responsibility for this long-term base development, but the Department of Energy and other mission agencies, NOAA, NASA, National Institutes of Health as part of this initiative are investing in the computers that are called terascale, or trillions of operations per second, and the software that will enable them to be used. We are investing in them for science in this initiative.

We have a special role in the Department of Energy because the Defense Programs and the ASCI program are in the process of developing these terascale machines to enable the certification of the safety and security of the stockpile and comprehensive test ban regime, because they are developing those machines, we can now foresee that tens of these teraops will be available in the next decade for science, but we have to start now investing in that science, developing the algorithms and building the models that will match the capability of those machines.

In DOE, we have chosen two primary applications to drive the development of the machines for science: the climate modeling global systems application and combustion.

We chose those applications with three criteria in mind. We needed complex scientific problems for which an order of magnitude or several orders of magnitude increase in computing capability was going to transform our understanding of the problem. Going from, for example, just being able to say something about temperature change to what will happen in different regions of our country if the temperatures climb, if carbon dioxide continues to increase, and if it has an impact on climate.

The second criteria is a scientific community that is comfortable and sophisticated about large-scale computing and putting their problems on big computers. And then some other sort of external factors that justify choosing these applications because they need prompt development and exploitation of the coming technology.

Climate models, whatever your perspective may be on the impact of human actions on climate, we are engaged for the next decade or two in an international environment as to what the impacts might be and what or how we might mitigate or change our behavior. And the Department of Energy and the United States needs to be in that discussion in an informed and scientifically credible way, and that is what we are aimed at providing by putting our models on terascale computing soon.

Similarly, combustion, we have emission targets that are coming at us in the next decade for transportation that right now we don't fully know how to predict the behavior of engines as we know them, and this will help us do a better job of that.

In summary, for the Scientific Simulation Initiative, DOE has critical scientific problems. We are in the middle of the technology development, and we have an interagency collaboration that will help us work this problem.

In terms of other things that are in the budget, we are trying to take care of the unique facilities that we have had responsibility for. We are going to start the operation of the Relativistic Heavy Ion Collider at Brookhaven, the B-Factory at Stanford, the Combustion Research Facility at the Sandia Laboratory in Livermore. We are doing upgrades of neutron sources at Los Alamos and the reactor at Oak Ridge, and we are making successful progress on the Large Hadron Collider collaboration. That is an international high energy physics collaboration with CERN.

We are moving forward on the Next Generation Internet. I can talk further about that later.

HUMAN GENOME PROGRAM

The human program problem is funded at $90 million. We are about to start the large scale sequencing operation. In fact, it has started. We are about to dedicate the sequencing facility Joint Genome Institute in California. We expect to be moving from 20 million base pair sequence in 1998 up to 50 million in 2000. And in the science education programs, we have a $10 million increase to bring faculty, student teams and K through 12 teachers to our laboratories to expose them to our research programs.

In terms of program direction, I simply want to say very briefly that the people of the Office of Science are some of the best that I have ever worked with. Program direction supports them to do the work that you pay us to do. We have done a lot of work at trying to make our programs more efficient. We have gotten some kudos for it, and I won't tell you any more about that.

In closing, I would say that this is a good budget. It will enable exciting science. We believe that we are managing effectively in the face of uncertainty. There is room for improvement, and I look forward to working with you.

Mr. PACKARD. Thank you very much, Dr. Krebs.

Just informational, when did you serve on the staff of the Science and Tech Committee?

Dr. KREBS. I believe we overlapped. I was there from 1977 to 1983. I think it was your first term.

Mr. PACKARD. Thank you.

[The information follows:]

U.S. Department of Energy
Washington, D.C. 20585

BIOGRAPHY

MARTHA KREBS

Martha Krebs was nominated by President Clinton on October 21, 1993, to be the Director of the Office of Energy Research (since renamed the Office of Science) in the Department of Energy (DOE). She was confirmed by the U.S. Senate on November 10, 1993, and sworn into office on November 15, 1993.

As Director, Dr. Krebs manages the Office of Science (OSC), one of the largest sponsors of basic research in the Federal government. The OSC annual budget of approximately $2.7 billion funds DOE programs in basic energy sciences, high energy and nuclear physics, biological and environmental research, fusion energy sciences, advanced scientific computing research, and science education.

In addition to serving as Director of OSC, Dr. Krebs is also the Department's Science and Technology Advisor. In this position she advises the Secretary on science and technology issues that cut across DOE programs; on the transfer of technology from DOE laboratories to industry, on science education and training activities, and on the management of the Department's laboratories. Dr. Krebs is also responsible for the management of the Department's five multi-program and ten single-program non-weapons laboratories.

From July 1983 until assuming her current position, Dr. Krebs was Associate Laboratory Director for Planning and Development at the Lawrence Berkeley Laboratory. While at the Laboratory, she was responsible for a strategic scientific program planning process, and for technology transfer planning and policy development. She established the Laboratory's Center for Science and Engineering Education, which provides collaborative research experiences at the Laboratory for students, teachers and University of California faculty. Before joining the Laboratory, Dr. Krebs was Staff Director of the Subcommittee on Energy Development and Applications of the House of Representative's Committee on Science and Technology.

Dr. Krebs earned an A.B. and Ph.D. in Physics from the Catholic University of America, in 1975. Her field of research was statistical mechanics. She graduated summa cum laude and is a member of Sigma Xi and Phi Beta Kappa. She is also a National Science Foundation Fellow and American Association for Advancement of Science Fellow.

March 1999

Statement of Dr. Martha Krebs
Director of the
Office of Science
U.S. Department of Energy
FY 2000 Appropriations Hearings

Mr Chairman and Members of the Subcommittee:

This is the sixth time I have had the honor of testifying before this subcommittee on behalf of the budget for the newly renamed Office of Science (SC). The FY 2000 budget request for the Office of Science supports: Basic Energy Sciences, Fusion Energy Sciences, High Energy Physics, Nuclear Physics, Biological and Environmental Research, Computational and Technology Research, Energy Research Analyses, Multiprogram Energy Laboratories-Facilities Support, and supporting Science Program Direction. The Technical Information Management program budget is located within the Energy Supply R&D account. Continued leadership in science and technology is a cornerstone of the President's and Vice President's vision for America. During the past six years, the Administration and this committee have provided substantial growth for scientific research and enabling technology programs despite tight overall fiscal constraints. This budget request builds upon and strengthens those vital investments for the Twenty-first Century.

Scientific research and the knowledge and technologies that follow have been credited with about half of the productivity growth of the United States' economy in the past fifty years. What growth it has been -- millions of high-skill, high-wage jobs; the longest life expectancy in human history; agricultural output to confound Malthus; new means of working and communicating on a global basis; and exciting new frontiers to explore. The Department of Energy, and its predecessor agencies, have been a proud sponsor of science-driven growth through the combined efforts of the National Laboratories, 66 Nobel Laureates and thousands of other outstanding university and industry based researchers nationwide. As we begin the Twenty-first Century, we prepare for the next fifty years with focused investments in science and scientific tools for the future.

The Department of Energy (DOE) budget for FY 2000 plans for the next century by providing for a $138 million increase in the Office of Science, to invest in thousands of individual research projects at hundreds of research facilities across the U.S., primarily in our national laboratories and research universities. The FY 2000 request will allow for continued construction of the Spallation Neutron Source, the first world class neutron source built by the U.S. in over 30 years; the pursuit of a new Scientific Simulation Initiative that will revolutionize our ability to solve scientific problems of extraordinary complexity and enable us to apply these new resources toward advancing DOE missions; and participation in the Next Generation Internet effort with a focus on R&D and implementation of the technologies and tools that help meet mission requirements and contribute to the Scientific Simulation Initiative.

OUR MISSION HASN'T CHANGED

As the Office of Science, our mission remains to: produce the scientific and technical knowledge needed to develop energy technology options; understand the health and environmental implications of energy production and use; maintain U.S. leadership in understanding the fundamental nature of energy and matter; provide and operate the large-scale facilities required in the natural sciences; ensure U.S. leadership in the search for scientific knowledge; and support the availability of scientific talent for the next generation.

Achieving our mission contributes to the goals of the Department and the Administration while advancing science and contributing to U.S. economic growth. Our history of success continued in FY 1999 with the following:

- Hundreds of principal investigators, funded by SC, yearly win dozens of major prizes and awards sponsored by the President, the Department, the National Academy of Sciences, the National Academy of Engineering, and the major professional societies including: the 1997 Nobel Prize for Chemistry; National Medal of Science; Presidential Young Investigator Award; 1998 Fermi and Lawrence awards; National Science Foundation Career Award; eight 1998 R&D 100 awards; two 1998 Discover Awards; 1998 Federal Laboratory Consortium Award; Gordon Bell Prizes and Fernbach Award; IBM's Supercomputer Award; and many other awards and honors from scientific societies.

- Researchers supported by the Office of Science showed that the universe is not only expanding but that the outward motion appears to be speeding up, not slowing down. The implication is that Einstein was right when he suggested that there is a mysterious energy that fills "empty" space and that most of the energy of the universe is in this form. The finding raises profound questions about the nature of space and the ultimate fate of the universe including fundamental new questions for physics. As a result, *Science* Magazine named *The Accelerating Universe* "the 1998 Breakthrough of the Year ".

- SC also provided support for the $100 million detector, Super-Kamiokande, operated by a collaboration of 120 physicists from 23 institutions headed by the University of Tokyo's Institute for Cosmic Ray Research (ICRR). This experiment demonstrated that the supposedly massless neutrino must, in fact, have a non-zero rest mass. Once verified, this discovery will force a revision in the Standard Model, which assumes a massless neutrino and may alter our estimates of the total mass of the universe, with implications for understanding its origin and eventual fate.

- Incredibly light synthetic metals with a potential electrical conductivity 50-100 times better than copper per weight are being made from carbon nanotubes doped with metals. First discovered in 1991, nanotubes are a new class of materials formed from graphite-like sheets of carbon rolled into exquisitely small cylinders (one-billionth of a meter).

- Microbial genomics, one of today's most exciting and high profile fields in biology, was initiated by DOE in 1994. *Science* Magazine also identified microbial genomics as one of the top 10 fields of discovery in 1998. Two of the 1997 "11 hottest papers in biology" were for microbial genomic sequences funded by SC. For example, SC research on "Conan the Bacterium" - *D. radiodurans R1*, has shown extreme resistance to genotoxic chemicals, oxidative damage, high levels of ionizing and UV radiation, and desiccation. The ability to survive such extreme environments is attributed in part to a unique DNA repair system in combination with its chromosome copy number and structure. The remarkable capabilities of this microbe may enable scientists to engineer a form of D. Radiodurans that can help us clean up some of our most troublesome waste problems.

- The Human Genome Program was initiated by the Department of Energy (DOE) in 1986 to map and determine the complete DNA sequence of the human genome. A Memorandum of Understanding was established with the National Institutes of Health (NIH) in 1988 to coordinate the U.S. Genome Project. The latest joint five-year plan was published in *Science* Magazine in October 1998. This plan calls for determining the complete sequence of the human genome by the year 2003, two years ahead of the original target date. Recent successes include identifying the gene for kidney disease.

- SC has renewed our commitment to forging more effective partnerships that leverage our research investments and connect us more closely with other federal science programs and the direct beneficiaries of our research. We are fostering new kinds of partnerships among our national laboratory, university and industry based researchers to maximize the effectiveness and impact of research activities. In partnership with the Department's applied programs, SC is also working to bridge the gap between basic research and application through: joint planning of critical long-term research; joint solicitations and funding of targeted research efforts; and annual integration workshops that bring together program managers and researchers from across DOE.

- New scientific research facilities coming on-line include: the William R. Wiley Environmental Molecular Sciences Laboratory; the Jefferson Lab's Large Acceptance Spectrometer; SLAC's B-Factory, the Oak Ridge Free-Air CO2 Enrichment Facility, the JGI Production (DNA) Sequencing Facility and the Relativistic Heavy Ion Collider (RHIC). Initiation of RHIC operations in FY 2000 opens an exciting new era of nuclear physics studies: the behavior of hot, dense nuclear matter and an expected new state of matter, the quark-gluon plasma. Projects completed on time and budget include: Fermilab's Main Injector, and the Combustion Research Facility Phase II.

- Bringing science to the researcher's desktop became a reality as over 30,000 technical reports (2 million full-text pages) of DOE's R&D results became accessible and searchable over the World Wide Web via the Information Bridge (www.doe.gov/bridge). Researchers are regularly downloading 4,000 reports per week from this web site.

The Department of Energy is a science agency because its mission and goals require technologies and scientific knowledge far beyond that which is currently available. From safeguarding the nuclear stockpile to ensuring our nation's energy supply for the next century, DOE continues to challenge the frontiers of science and technology.

The DOE Strategic Plan outlines the vision, goals and strategic objectives that will, through leadership in science and technology, help the DOE to meet those challenges. In keeping with the Government Performance and Results Act (GPRA), the Office of Science FY 2000 budget request includes program specific goals, strategies, and measures that focus our research activities and ensure continuity with Departmental plans and national goals.

RETHINKING OUR GOALS AND STRATEGIES

In the past year, the Department has begun to rethink how we characterize our R&D efforts across business lines to assemble the key information for improving our analysis and management of these investments. The result is a set of R&D Portfolios, scheduled for public release this month, that capture the spectrum of DOE R&D efforts in each Business Line.

The basic research of the Office of Science presses forward on the frontiers of fundamental understanding but also supports and enables the R&D of the other business lines. Thus, a Science Portfolio has been developed so as to clarify and improve the integration of our program results in the Department. As the Department R&D Portfolios evolve, the Office of Science will continue to integrate basic research with the applied R&D in the other business lines' Portfolios to ensure strong linkages between technology needs and science.

A revised Strategic Plan of the Office of Science, also scheduled for release at the end of the month, will articulate the long-range vision, goals, objectives, and strategies for our programs. The Science Portfolio complements and supports the Strategic Plan by providing a near-term "snapshot" of our investments that dovetails with the new strategic framework.

The motivations behind this planning effort are to develop a shared long-term focus for SC programs, their scientific communities and performers; to describe our present scientific programs and position them for the future; to provide a framework for cooperation and risk taking; to illustrate the unique and coordinated role of SC programs within the DOE and the federal science investment; and to inform and inspire our sponsors and the general public.

The new SC Strategic Plan, and supporting Science Portfolio, is structured around five high-level goals with twelve strategic objectives, listed in Figure 1. These goals were developed through a series of planning activities and workshops that drew on the experience and knowledge of our research scientists and stakeholders to capture both what is necessary and what is possible for our science as we look to the next century.

The first goal, **Fueling the Future**, is centered on science for affordable and clean energy options for the future. Some of the questions that motivate this goal are: *How can we tap and harness affordable, clean fuels? What clean new electric power systems will fuel the future?* and *How can energy systems be made more efficient and environmentally sound?* Development of this goal has been closely connected with the development of the Energy R&D portfolio and the objectives directly map onto the energy portfolio.

- **Fueling the Future**
  - New Fuels
  - Clean and Affordable Power
  - Efficient Energy Use
- **Protecting Our Living Planet**
  - Sources and Fate of Energy By-Products
  - Impacts on People and the Environment
  - Prevention and Protection
- **Exploring Energy and Matter**
  - Components of Matter
  - Origin and Fate of the Universe
  - Complex Systems
- **Extraordinary Tools for Extraordinary Science**
  - Instrumentation for the Frontiers of Science
  - Scientific Simulation
  - Institutional Capacity
- **Enabling World Class Science**

Figure 1

The second goal, **Protecting our Living Planet**, is centered on understanding energy impacts on people and the biosphere. Some of the questions that motivate this theme are: *What are the sources and fate of energy-related by-products? What factors affect global climate and how can they be controlled?* and *How do complex biological and environmental systems respond to our energy use?* This goal also contributes to both the Energy R&D portfolio and the Environmental R&D portfolio.

The third goal, **Exploring Matter and Energy**, is centered on discovering the building blocks of atoms and life. Some of the questions that motivate this theme are: *What are the fundamental components of matter? How can the origin and fate of the Universe reveal the secrets of energy, matter and life?* and *How do atoms and molecules combine to form complex dynamic systems?* This goal captures the most fundamental research in the Office of Science. The complex systems question links to R&D efforts in all of the DOE business lines.

The fourth goal, **Extraordinary Tools for Extraordinary Science**, is centered on the national assets that DOE provides for forefront, multidisciplinary research. This goal builds on the unique role of the Office of Science in providing the nation with forefront research facilities at our National Laboratories such as research accelerators, reactors, computational centers, and other unique instrumentation. In addition, the National Laboratories as a system of institutions is increasingly becoming an extraordinary tool beyond the set of specific facilities located on their sites. The Office of Science will continue to ensure that these critical research tools remain accessible to peer reviewed researchers from all across the nation and meet the technical challenges of forefront scientific investigation. This goal looks to the future and to training and educating the next generation of scientists and engineers.

Some of the questions that motivate this goal are: *How can we explore the frontiers of the natural sciences? How can we predict the behavior of complex systems?* and *How can we strengthen the nation's capacity for multidisciplinary science?* This goal enables research in all of the DOE business lines. By organizing future facility needs, as identified by the scientific community, this theme ensures that America's research capability will remain both accessible and state of the art.

The fifth goal, **Enabling World Class Science**, conveys the commitment of DOE and National Laboratory staff to continuously improve their operational processes. Of paramount importance is the selection and conduct of excellent, productive science that is carried out safely and with care for the environment and involvement of local communities.

IMPLEMENTING THE STRATEGIES - INITIATIVES FOR FY 2000

	Fuel the Future	Protect Our Living Planet	Explore Energy & Matter	Extraordinary Tools for Extraordinary Science
Science Simulation Initiative	✓	✓	✓	✓
Spallation Neutron Source	✓		✓	✓
Large Hadron Collider			✓	✓
Scientific User Facilities	✓	✓	✓	✓
Next Generation Internet				✓
Climate Change Technology Initiative	✓	✓		
Genome	✓	✓	✓	✓

Figure 2

The five goals provide a framework for current programs and a platform for future efforts. FY 2000 initiatives and priorities that support these goals include: utilizing the advances in computation that are flowing from the Accelerated Strategic Computation Initiative (ASCI) to aid scientific research in critical complex areas as part of The President's *Information Technology for the Twenty-first Century* (IT^2); continuing progress made toward returning U.S. **International Leadership in Neutron Science;** carefully managing our partnership in the **Large Hadron Collider**; ensuring wide utilization of our **Scientific User Facilities**; developing and applying DOE applications and technologies for the **Next Generation Internet**; providing the scientific basis for DOE's **Climate Change Technology Initiative;** and providing unique services in the exploding field of **Genome Research**. Figure 2 depicts the cross-connection between the goals above and the priorities in the FY 2000 request.

Scientific Simulation Initiative - It is now possible to obtain computational capabilities 100 times faster than currently in common use through the application of technologies developed for the Accelerated Strategic Computing Initiative (ASCI). Therefore the Department of Energy, in coordination with the National Science Foundation and other federal science programs, has developed a Scientific Simulation Initiative (SSI) in support of the President's Information

Technology for the Twenty First Century (IT^2) Initiative. The purpose of the SSI is to further develop and employ an emerging generation of very high performance computers as major tools for scientific inquiry. These resources will revolutionize our approach to solving complex problems in such areas as *energy, the environment, and fundamental research.* This initiative will require close collaboration between scientists in many disciplines: chemistry, fluid flow, global systems, mathematics, computer science, etc. However, it is important to remember that this is a research program and that even the operation of computing facilities at this scale presents significant research issues.

Within the Office of Science, the SSI will be an integrated effort with the Computational and Technology Research (CTR) program coordinating and overseeing competitive, peer reviewed selections of sites for computational centers and basic science applications. In addition, CTR will manage the leading edge research programs in computer science and enabling technologies which will be required to transform the SSI computing and communications facilities into tools for science. The element of the program that addresses enabling hardware and software will be directed by a joint SC/Defense Programs ASCI effort. The management of the research programs required to use these facilities for scientific discovery will be led by the appropriate programs within the Office of Science: Basic Energy Sciences for Combustion; Biological and Environmental Research for Global Systems; and the Offices responsible for the scientific disciplines selected in the basic science applications competition.

The first scientific applications to be run on these new massively parallel computers have been chosen carefully. Combustion and global systems are complex scientific problems for which terascale computing will provide a transformation in our level of understanding. The scientific communities in these areas are also experienced in using computational tools. Finally, these two problems are central to DOE's mission.

Combustion - Currently, eighty-five percent of U.S. energy use is derived from the combustion of fossil fuels and this dependence on combustion is not likely to change in the coming decades. Combustion remains one of the primary causes of lowered air quality in urban environments. At present, engineers have neither sufficient knowledge nor the computational tools to understand and predict the chemical outcome of combustion processes with any degree of practical reliability. Existing models that guide the design process are of very limited usefulness because of the extraordinary complexity of the combustion process. With very high end computing resources and a concerted research program in combustion modeling, we can develop the next generation of combustion modeling tools for accelerated design of combustion devices meeting national goals of emission reduction and energy conservation.

Global Systems - Unlike many disciplinary areas of research, the complex workings of the global environmental system cannot be studied in a laboratory setting. The integration of knowledge from the many disciplines that together describe the global system can only be performed in computer simulation models. It is only through such general circulation models that it is possible to understand current climate and climate variability and to predict future climate and climate

variability, including prediction of the possible effects of human activities on the global system. Advances in scientific understanding are therefore predicated upon the successful development of modeling tools to keep pace with the rapid advances in the quality and quantity of data available. These tools will lead to the development of detailed fully coupled global system models that accurately reproduce, and ultimately predict, the behavior of the interacting components of the system, i.e. the global atmosphere, the world ocean, the terrestrial land surface and both glacial and sea ice.

Fundamental Research - Whereas the scientific accomplishments of this century have resulted in seeking and understanding the fundamental laws that govern our physical universe, the science of the coming century will be characterized by synthesis of this knowledge into predictive capabilities for understanding and solving a wide range of scientific problems, many with practical consequences. In this endeavor, the computer will be a primary instrument of scientific discovery. Many areas of scientific inquiry, critical to the Department's mission, will be advanced dramatically with access to high-end computation - including, but not limited to, materials sciences, structural genomics, high energy and nuclear physics, subsurface flow, and fusion energy research.

The **Spallation Neutron Source** (SNS) - The importance of neutron science for fundamental discoveries and technological development has been enumerated in all of the major materials science studies over the past two decades, including a major study by the National Research Council entitled "Major Facilities for Materials Research and Related Disciplines" (Seitz-Eastman Report).

As the needs of our high-technology society have changed, so has the way in which we conduct the R&D that helps us to meet those needs. It has become increasingly important to develop new materials that perform under severe conditions and yet are stronger, lighter, and cheaper. Major research facilities are used to understand and "engineer" materials at the atomic level so that they have improved macroscopic properties and perform better in new, demanding applications. The SNS is a next-generation facility for these types of applications. Neutron scattering will play a major role in all forms of materials design and understanding. This research will lead to the development of advances such as: smaller and faster electronic devices; lightweight alloys, plastics and polymers for transportation and other applications; magnetic materials for more efficient motors and for improved magnetic storage capacity; improved understanding of form and function in biological structures and the development of new drugs for medical care. Upon completion, the SNS will be the world's most powerful neutron source, accommodating more than 1,000 researchers and 30 to 40 special purpose instruments.

The SNS Total Project Cost (TPC) is estimated to be $1,360 million over a 7.25-year schedule. Throughout the life of the project, semi-annual reviews will track cost and management. FY 1999 funding provides for the start of Title I design activities, initiation of subcontracts and long-lead procurement, and continued R&D to reduce technical and schedule risks. The FY 2000 budget request of $214 million would support Title II (detailed) design for the technical components and

control systems. Construction, on some of the conventional facilities, is scheduled to begin in FY 2000 along with the procurement of key technical equipment.

The SNS project is an example of DOE's commitment to use the DOE laboratories as a system. Oak Ridge National Laboratory is responsible for the project with participation from Lawrence Berkeley National Laboratory, Los Alamos National Laboratory, Brookhaven National Laboratory, and Argonne National Laboratory. The laboratories have been working together in an increasingly effective manner and R&D is proceeding smoothly with no technical barriers in sight.

In January 1999, an Office of Science construction management review of the SNS made recommendations with respect to the project director and staff experienced in the oversight and integration of all aspects of the large complex project. The Laboratory Director has hired a new Associate Laboratory Director for the project and is assembling the necessary senior management team. As a first step, I tasked the laboratory to undertake a comprehensive assessment of the project. The assessment is due to the Department in the first week in April. These construction management reviews have been a key tool for keeping SC projects on time and on budget. The prompt action in response to the review's recommendations will allow us to deliver the SNS as well.

Scientific Facilities Utilization - This FY 2000 budget request continues to strongly support Scientific Facilities Utilization in the following programs: Basic Energy Sciences, High Energy Physics, Nuclear Physics, Fusion Energy Sciences, Biological and Environmental Research, and Computational and Technology Research. Each year, over 15,000 university, industry, and government sponsored scientists conduct cutting edge experiments at these particle accelerators, high-flux neutron sources, synchrotron radiation light sources, and other specialized facilities, such as the Combustion Research Facility (CRF) at Sandia National Laboratories, Livermore, California. The CRF is an internationally recognized facility for the study of combustion science and technology, which will begin its first year of operation after its Phase II development project. The user community continues to be pleased with the results of the Science Facilities Initiative as evidenced by their many letters of support and by the positive results of surveys conducted at the facilities.

The **Large Hadron Collider** - The foremost high energy physics research facility of the next decade will be the Large Hadron Collider (LHC) at CERN, the European Center for Particle Physics. The primary physics goals of the LHC will impact our understanding of the relation of mass, fundamental forces, and the structure and origin of the universe. U.S. participation in the LHC is required to provide U.S. access to the high energy frontier in order to maintain the U.S. as a world leader in this fundamental area of science.

The LHC is an outstanding example of international cooperation in large scientific projects, as well as interagency and inter-laboratory cooperation. An International Cooperation Agreement has been negotiated between CERN, DOE and NSF. The Agreement provides for U.S. participation in the construction of the accelerator, and of the two very large detectors, ATLAS

and CMS. Carefully defined lists of deliverables and costs have been agreed upon for each of these areas of participation. U.S. costs are capped at $531 million ($450 million DOE and $81 million NSF), consistent with Congressional guidance. In return, participating U.S. universities and laboratories will join, as full partners, in LHC experiments. In addition, a Memorandum of Understanding (MOU) has been executed between DOE and NSF that defines the relationship between the agencies relative to programmatic coordination of U.S. LHC activities including joint oversight and execution of the U.S. LHC Construction Program.

Under the terms of this MOU, Fermilab is the Lead Laboratory for the accelerator portion of the program, which it will execute in cooperation with Brookhaven (BNL) and Lawrence Berkeley (LBNL) National Laboratories. BNL is the host laboratory for the ATLAS portion of the program, which also involves Argonne National Laboratory (ANL) and LBNL along with 28 university groups. Similarly, Fermilab is the host laboratory for the CMS detector portion of the program, along with 33 university groups. Cost and schedule baselines have been reviewed and validated for each of the three programs and management systems are in place to monitor progress against baselines.

The **Next Generation Internet** (NGI) - The program is creating the foundation for more powerful and versatile networks of the Twenty-first century, just as previous federal investments in information technology R&D created the foundation for today's Internet. This program is critical to DOE's science and technology missions because enhancements to today's Internet from commercial R&D will not be sufficient to enable: effective use of petabyte/year (would fill the hard drives of millions of today's desktop PCS) High Energy and Nuclear Physics facilities such as the Relativistic Heavy Ion Collider (RHIC); remote visualization of terabyte to petabye data sets from computational simulation; development of advanced collaboratories; and effective remote access to tomorrow's advanced scientific computers.

For example, typical RHIC experimental collaborations involve hundreds of scientists at dozens of institutions across the country and the world. Using the current Internet, it would take about 2,500 hours to transmit one day's data from RHIC to one remote site for analysis. Using NGI it would take 25 hours.

Thus, DOE's NGI research program is focused on discovering, understanding, developing, testing and validating the networking technologies needed to enable wide area, data intensive and collaborative computing. The DOE applications share two important characteristics. They all involve extremely large data sets and they all require that scientists be able to interact with the data in (nearly) real time. Current network technology limitations significantly limit our ability to address these characteristics.

The DOE program includes research in advanced protocols, special operating system services for very high speed, and very advanced network control, the components needed to enable wide area, data intensive and collaborative computing. In addition the DOE program addresses issues that result from the many different kinds of network devices, network-attached devices, and services

that need to be integrated together. Examples of the components and services that need to be integrated include: network resources, data archives on tape, high performance disk caches, visualization and data analysis servers, authentication and security services, and the computer on a scientist's desk. This type of integration, as well as the issues of improving the performance of the individual components, all require significant research because the issues are currently not well understood. Indeed, the first identification of many of these issues is the result of previous work in collaboratories and visualization supported by DOE.

Thus, DOE's participation in the NGI builds on previous DOE research and its over two decades of success in using advanced networks as tools for science. Furthermore, the differences between the requirements of commercial networks and networks for scientific research require DOE to conduct this research because these tools and technologies will not be developed by commercial R&D. However, the results and "spinoffs" of this research, after testing and prototyping by the scientific community, will impact broad commercial use of networks. DOE's FY 2000 NGI program will build on the results of the competitive research solicitations conducted in FY 1999.

Climate Change Technology Initiative (CCTI)- Eighty-five percent of our Nation's energy results from the burning of fossil fuels, a process that adds carbon to the atmosphere. Because of the potential environmental impacts of increases in atmospheric carbon dioxide, carbon management has become an international concern and is a focus of the CCTI.

The Office of Science is well positioned to make significant contributions to the many solutions needed to address this problem. SC can build on the fundamental discoveries of core research programs in carbon and non-carbon energy sources, carbon sequestration, and carbon recycling, extending them to the new discoveries needed to make carbon management practical and efficient.

Activities in both Basic Energy Sciences and Biological and Environmental Research support the DOE and Administration CCTI efforts in: *science for efficient technologies; fundamental science underpinning advances in all low/no carbon energy source; and sequestration science.*

The SC portion of the CCTI leverages the foundation of excellent research already underway. The additional SC effort will also have a major impact on many scientific disciplines by advancing the state of knowledge in such fields as genome science, molecular, cellular and structural biology, biochemistry, chemical dynamics, solid state chemistry, photochemistry, ecology, nano- and meso-phase materials science, condensed matter physics, engineering, theoretical chemistry and physics.

For example, the BER microbial genome program has made significant investments in the technology that enables genome sequencing at rates previously unattainable. Capitalizing on these investments, the genomes of microbes that produce methane and hydrogen from carbonaceous sources will be sequenced as part of the first awards under CCTI. This will enable identification of key genetic components of the organisms that regulate the production of these gases. The carbon sequestration research program will focus on understanding the natural terrestrial sequestration

cycle and the natural oceanic sequestration cycle as part of the first awards under the CCTI. The ultimate goal is to enhance the natural carbon cycle in both the terrestrial and oceanic systems. The search for new fuel sources and carbon sequestration research are key elements of the carbon management science program.

CCTI research and related activities within the Office of Science will continue to be coordinated with the Office of Fossil Energy. FY 1999 integration efforts include the coordination of new CCTI proposal solicitations and preparation of a detailed carbon dioxide sequestration roadmap.

Genome - In its first full year of operation, the DOE Joint Genome Institute (JGI) became a leading producer of high quality human DNA among U.S. sequencing centers. The JGI is scaling up its sequencing capacity from 21 million finished bases in FY 1998 to 30 million finished bases and 40 million high quality draft bases in FY 1999. In total, SC will complete sequencing of 50 million finished and 70 million high quality draft subunits of human DNA to submit to publicly accessible databases in FY 2000. In addition, SC will complete the full genetic sequencing of more than 10 microbes that have significant potential for waste cleanup and energy production.

Improvements in high throughput human DNA sequencing technology and sequence data management are needed to complete the first human genome by 2003 and to efficiently and cost effectively use that sequence information for future medical diagnoses and scientific discovery. The Joint Genome Institute, in which the National Laboratories work as a system, are primarily focused on high throughput sequencing. FY 2000 is the third year of a major 3-5 year scale-up in DNA sequencing capability for this virtual institute. DOE will continue to work with the private sector, where appropriate, to accelerate progress and reduce cost in the Human Genome project. The SC program is actively involved with other federal agencies funding, human, plant and microbial research to encourage effective and efficient management of the total federal genome research portfolio. Genomics is the foundation for future biological research and is the reason that the next century has been called "the century of biology."

Program Direction - The Science Program Direction budget funds the staff and related expenses that are necessary to develop, direct and administer a complex and broadly diversified program of mission-oriented basic and applied research. The Office of Science continues to achieve technical excellence in its programs despite managing one of the largest and most diversified and complex basic research portfolios in the Federal Government with a relatively small Federal and support contractor staff compared to other programs both within and outside the Department and will strive to meet staffing levels as outlined in its Workforce Management Plan. Enhanced business processes that are built from our Activity Based Management activities and Strategic Information Planning will enable the staff to carry out the mission and functions of the organization effectively and efficiently. Work will continue on piloting the transfer of management responsibility of newly generated wastes at SC sites from Environmental Management to the Office of Science. I am proud to recognize SC efforts that have resulted in: lower prior year uncosted balances; reduced unnecessary duplication through external peer review; support for new initiatives, such as the Scientific Simulation Initiative (SSI); and more than six years of on-time, on-budget construction

projects due to an effective SC construction management review program that has been recognized by the National Research Council (NRC).

The scientific and technological challenges of the Department's missions demand an adequate supply of scientists, engineers and technicians. For over 50 years, DOE and its predecessor agencies have supported science and engineering education programs involving university faculty as well as pre-college teachers and students. Tapping the significant human and physical resources of the DOE National Laboratories is perhaps the most distinguishing feature of the agency's contribution to science education. Within the FY 2000 request for Program Direction is SC's core program for science education, supporting such activities as: the Undergraduate Research Fellowship Program, the National Science Bowl, and the Albert Einstein Distinguished Educator Fellowship. In addition, two new initiatives, developed in partnership with NSF, will be supported through the five SC scientific programs. The first initiative will be focused on providing pre-college science and math teachers with research opportunities that will improve their knowledge and skills of scientific discovery and enhance their ability to apply them in their classrooms. The second initiative will allow university faculty and undergraduate student teams to participate in long-term research projects at DOE Laboratories. Historically, over two-thirds of undergraduates who have participated in DOE programs have gone on to graduate school in disciplines directly related to DOE missions. These activities will help to fulfill SC's responsibilities in developing the next generation of scientists and engineers and to address the daunting demographic trends that suggest these new scientists will have to come from the ranks of women and minorities, two groups traditionally under-represented in scientific fields.

SCIENCE PROGRAMS

BASIC ENERGY SCIENCES

FY 1999 Appropriation - $799.5 M; FY 2000 Request - $888.1 M

The Basic Energy Sciences (BES) program is one of the Nation's primary sponsors of fundamental research in materials sciences, chemical sciences, geosciences, plant and microbial sciences, and engineering sciences. Performance measurement helps determine the distribution of activities supported within BES. All BES research programs undergo rigorous peer evaluation through competitive grant proposals, program reviews, and advisory panels. The program funds more than 2,400 researchers at 200 institutions nationwide. BES-supported research also underpins the Department of Energy missions in energy, the environment, and national security. Strategic directions are set through working relationships with other DOE programs, research workshops with public and private scientific communities nationwide, and policy directives.

Within the base research effort in FY 2000, a program in Complex and Collective Phenomena will continue to support work at the frontiers of basic research that hold the promise of delivering

revolutionary breakthroughs. This effort is designed to obtain fundamental knowledge of increasingly complex systems in order to help bridge the gap in our understanding between the atomic and molecular properties and the bulk structural and mechanical properties of materials, for example. In addition, BES will continue its Partnership for Academic-Industrial Research (PAIR) program to facilitate research partnerships between academic researchers, their students, and industrial researchers.

In FY 2000, BES also plays a major part in the Climate Change Technology Initiative (CCTI) and the Scientific Simulation Initiative (SSI). The BES research under CCTI will primarily focus on carbon recycling, improved efficiency in the use of fossil carbon energy sources, and new and improved non-carbon energy sources. Examples of the types of research areas in each of the four BES subprograms are: high-temperature materials for more efficient combustion; electrochemical energy storage; mechanical stability of porous and fractured reservoirs/aquifers; and the biological process of photosynthesis. The BES research under SSI includes Combustion Systems Integrated Applications, an integrated effort bringing together computational and communication resources, focused research in scientific disciplines, and research in computer science and other enabling technologies to solve the complex problems that characterize DOE's scientific research needs.

In addition to directly supporting research performers, BES is also the steward of 17 major national user facilities. Included among these facilities are the four major synchrotron radiation light sources, four high-flux neutron sources, and a number of specialized facilities for electron beam microcharacterization, materials synthesis and processing, combustion research, pulsed radiolysis, and ion beam studies. The facilities are planned in collaboration with the scientific community and permit scientists to carry out forefront experiments that cannot be done in any other way. A major part of the FY 2000 BES budget request is for the continuation of the Spallation Neutron Source project to provide the Nation with a next-generation short-pulse spallation neutron source for neutron scattering and related research in broad areas of the physical, chemical, materials, biological, and medical sciences.

BES scientific user facilities enable researchers to gain the new knowledge necessary to achieve the Department's missions and, more broadly, to advance the Nation's entire scientific enterprise. The number of scientists conducting research at the BES user facilities has grown dramatically in recent years. BES user facilities are open to all qualified investigators in academia, industry, and government laboratories on a no-charge basis to all qualified researchers whose intention is to publish in the open literature. Over 6,000 users were accommodated at the BES scientific user facilities in FY 1998. These facilities have an enormous impact on science and technology, ranging from determinations of the structure of superconductors and biological molecules to the development of wear-resistant prostheses, from atomic-scale characterization of environmental samples to elucidation of geological processes, and from the production of unique isotopes for cancer therapy to the development of new medical imaging technologies.

Materials Sciences - The Materials Sciences subprogram supports basic research in condensed matter physics, metals and ceramics sciences, and materials chemistry. This basic research seeks

to understand the atomistic basis of materials properties and behavior and how to make materials perform better at acceptable cost through new methods of synthesis and processing. Basic research is supported in corrosion, metals, ceramics, alloys, semiconductors, superconductors, polymers, metallic glasses, ceramic matrix composites, catalytic materials, non-destructive evaluation, magnetic materials, surface science, neutron and x-ray scattering, chemical and physical properties, and new instrumentation. Ultimately the research leads to the development of materials that improve the efficiency, economy, environmental acceptability, and safety in energy generation, conversion, transmission, and use. These material studies affect developments in numerous areas, such as the efficiency of electric motors and generators; solar energy conversion; batteries and fuel cells; stronger, lighter materials for vehicles; welding and joining of materials; plastics; and petroleum refining.

Chemical Sciences - The Chemical Sciences subprogram has two major components. The disciplinary areas within each component are connected to and address needs of the principal DOE and BES mission goals and objectives. One major component is comprised of atomic, molecular and optical physics; chemical physics; photochemistry; and radiation chemistry. This research provides a foundation for understanding fundamental interactions of atoms, molecules, and ions with photons and electrons. This work also underpins our fundamental understanding of chemical reactivity. This, in turn, enables the production of more efficient combustion systems with reduced emissions of pollutants. It also increases knowledge of solar photoconversion processes resulting in new, improved systems and production methods. The other major component of the research program is comprised of inorganic chemistry, organic chemistry, analytical chemistry, separations science, heavy element chemistry, and aspects of chemical engineering sciences. The research supported provides a better molecular level understanding of homogeneous and heterogeneous reactions occurring at surfaces, interfaces, and in bulk media. This has resulted in improvements to known heterogeneous and homogeneous catalytic systems and to new catalysts for the production of fuels and chemicals, better analytical methods in a wide variety of applications in energy processes and environmental sciences, new knowledge of actinide elements and separations important for environmental remediation and waste management, and better methods for describing turbulent combustion and predicting thermophysical properties of multicomponent systems.

Engineering and Geosciences - The Engineering and Geosciences subprogram conducts research in two disciplinary areas, engineering and geosciences. In Engineering Research, the goals are to extend the body of knowledge underlying current engineering practice to create new options for improving energy efficiency and to broaden the technical and conceptual knowledge base for solving the engineering problems of energy technologies. In Geosciences Research, the goal is on fundamental knowledge of the processes that transport, concentrate, emplace, and modify the energy and mineral resources and the byproducts of energy production. The research supports existing energy technologies and strengthens the foundation for the development of future energy technologies. Ultimately the research impacts control of industrial processes: to improve efficiency and reduce pollution; to increase energy supplies; and to lower cost and increase the effectiveness of environmental remediation of polluted sites.

Energy Biosciences - The Energy Biosciences subprogram supports mechanistic research on fundamental biological processes related to capture, transformation, storage and utilization of energy. The research focuses on plants and non-medical microorganisms to form a broad scientific foundation for support of Department of Energy's goals and objectives in energy production, environmental management, and energy conservation. Basic research on plants includes photosynthetic mechanisms and bioenergetics in algae, higher plants, and photosynthetic bacteria; control mechanisms that regulate plant growth and development; fundamental aspects of gene structure, function, and expression; plant cell wall structure, function and synthesis; and mechanisms of transport across membranes. Research supported in these areas seeks to define and understand the biological mechanisms that effectively transduce light energy into chemical energy, to identify the biochemical pathways and genetic regulatory mechanisms that can lead to the efficient biosynthesis of potential fuels and petroleum-replacing compounds, and to elucidate the capacity of plants to remediate contaminated environments by transporting and detoxifying toxic substances. The research focus in the microbiological sciences includes the degradation of biopolymers such as lignin and cellulose, anaerobic fermentations, genetic regulation of microbial growth and development, thermophily, e.g., bacterial growth under high temperature, and other phenomena with the potential to impact biological energy production, conversion and conservation. Organisms and processes that offer unique possibilities for research at the interface of biology and the physical, earth and engineering sciences are also studied.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH

FY 1999 Appropriation - $436.7 M; FY 2000 Request - $411.2 M

For over 50 years, the Biological and Environmental Research (BER) program has been bringing revolutionary solutions to energy-related biological and environmental challenges. Through its support of peer-reviewed research at the Department's national laboratories, universities, and private institutions, the program develops the fundamental knowledge needed to identify, understand, and anticipate the long-term health and environmental consequences of energy production, development, and use. The BER program contributes to a healthy citizenry, cleanup of the environment, and understanding global environmental change, and operates the world class facilities essential to the scientific breakthroughs of the future.

As part of the President's **Scientific Simulation Initiative**, the BER request includes funding to accelerate the development of advanced global climate models with the high regional resolution needed for definitive predictions. This fundamental research will support the U.S. Global Change Research Program.

The BER request also includes funding for the President's **Climate Change Technology Initiative**. The BER contribution to the initiative includes research to sequence microbes for alternative fuel production (methane and hydrogen production) and to develop natural carbon sequestration processes in terrestrial and ocean systems.

Life Sciences - The Human Genome Program continues to be the centerpiece of our Life Sciences Research program, both in terms of its contribution to the international effort to sequence the human genome, and in terms of the spin-off technologies. Through efforts at the Joint Genome Institute and its Production Sequencing Facility, DOE does its share of high-throughput human DNA sequencing and develops, validates, and integrates new DNA sequencing technologies into the production of DNA sequencing. FY 2000 is the third year of a 3-5 year scale-up in DNA sequencing capacity for the Joint Genome Institute. The DOE's share of the funding for the U.S. Human Genome Program is about 25 percent of the national effort.

The field of microbial genomics continues to be one of the most exciting and high profile fields in biology today. Initiated by DOE in 1994, microbial genomics and microbial genomic sequencing were identified by *Science* Magazine as one of the top 10 fields of discovery each of the past two years. The broad impacts of this research emphasizes a central principle of the BER genome programs - complete genomic sequences yield answers to fundamental questions in biology. Microbes are being sequenced and characterized in several parts of the BER program because of potential impacts across several DOE missions. These include the Climate Change Technology Initiative (sequencing methane or hydrogen producing microbes or microbes involved in carbon dioxide sequestration), environmental cleanup (microbes for bioremediation), alternative fuel sources (methane production or energy from biomass), industrial processes (industrial useful enzymes), and biological nonproliferation (understanding and detecting biowarfare agents). The FY 2000 request includes funds for determining the DNA sequence of 10 microbes with significant potential for waste cleanup, energy production, or carbon sequestration.

The FY 2000 request provides continuing support for both the national user facilities for scientists and the research support needed to determine the molecular structure and function of enzymes, antibodies, and other important biological molecules. Computational structural biology research combines computer science, structural biology, and genome research to predict the functions of biological molecules. This information will enable the design or more efficient use of biological molecules for drugs to control or treat a great variety of diseases, environmental cleanup, or energy-production and use.

The low dose radiation research program uses molecular level knowledge gained from the Department's human genome and structural biology research to determine the human health impacts, all the way from effects on single molecules to people, of exposures to low doses of energy and defense-related radiation. This information will provide an improved scientific basis for remediating contaminated DOE sites and achieving acceptable levels of human health protection, both for cleanup workers and the public, in a more cost-effective manner that could save billions of dollars. A key aspect of this program is the regular communication between scientists who propose and conduct the research and regulators who develop and implement risk policy.

Environmental Processes - The Environmental Processes subprogram conducts research on a range of issues related to the mission of the U.S. Global Change Research Program (USGCRP).

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Activities are focused on understanding and predicting the potential consequences on climate and ecological systems and resources of the emissions of aerosols and trace gases, especially carbon dioxide from fossil fuel combustion. Additional efforts support the Climate Change Technology Initiative (CCTI).

As the major federal agency supporting research into climate predictions on the decade-to-century time scale, the DOE continues an integrated observational and modeling program focused on predicting climate variability and climate change 10 to 100 years in the future. The BER Climate Change Prediction Program will continue to extend its modeling breakthrough in ocean simulation to develop a fully coupled atmosphere-ocean model useful for climate prediction. Because of the limited high-end computational resources, computer-intensive climate modeling at regional spatial resolution has been difficult to perform. To address this need, BER will support a Scientific Simulation Initiative (SSI) in collaboration with other agencies, including the National Science Foundation, National Oceanic and Atmospheric Administration, and National Aeronautics and Space Administration to accelerate the development of advanced global climate change models with higher spatial resolution than currently available. The SSI will make high-end computational resources more available to the climate modeling community than at present, improve climate models capable of simulating the principal components of a coupled atmosphere-ocean climate system, and increase the availability and usability of climate change projections to the broader climate change research and assessment communities.

The BER request includes funding to operate three Atmospheric Radiation Measurement sites and eighteen AmeriFlux sites to provide data to improve climate models and understand the magnitude and variation in carbon sequestration in major terrestrial ecosystems in North and Central America. The BER Environmental Processes subprogram will also continue to support major experimental studies to develop data to improve understanding of the ecological effects of climate and atmospheric changes.

As part of the CCTI, BER will support research to better understand the biophysical processes controlling carbon sequestration in terrestrial and ocean systems, with the long term objective of both developing approaches to manipulate these processes to enhance carbon sequestration on land and in the ocean and understand the environmental and economic implications of implementing such approaches. These studies will complement previously noted efforts to sequence the microbial genomes as part of the BER CCTI program.

The Environmental Processes subprograms provide a scientific basis for assessing both the effects of human activities on the Earth's climate and the need for action to mitigate any adverse effects. They also provide information needed to determine the potential of natural processes in terrestrial and ocean systems to help mitigate the increase in atmospheric carbon dioxide from fossil fuel combustion. The Environmental Processes subprograms are coordinated with other agencies through the National Science and Technology Council's Committee on Environment and Natural Resources.

Environmental Remediation - Research in the Environmental Remediation subprogram is focused on understanding the fundamental physical, chemical, geological, and biological processes that must be marshaled for the development and advancement of new, effective, and efficient processes for the remediation and restoration of the Nation's nuclear weapons production sites. The two highest priorities of this subprogram are bioremediation research and operation of the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL) as a national scientific user facility to investigate fundamental molecular processes and properties that affect the environmental transformation, mobility, and biological availability of contaminants. The EMSL focuses on molecular-level collaborative research in the environmental sciences, and provides support to over 600 users, with over half of those from academia. The subprogram also addresses both natural bioremediation, which relies on naturally occurring microbial and plant processes, and accelerated bioremediation, which seeks to accelerate desirable processes through, for example, environmental modifications or the addition of amendments to contaminated environments.

The Environmental Remediation subprogram request also includes the infrastructure funding for BER program activities. The funding enables minor construction activities associated with upkeep of buildings and building systems at these research facilities. It includes such items as new roofs and heating, ventilation, and air-conditioning upgrades and replacements.

Medical Applications and Measurement Science -The Medical Applications program fosters research to enable beneficial applications of nuclear and other energy-related technologies for medical diagnosis and treatment. The program promotes a fertile partnership among the sciences, advanced technologies and medicine in three major research areas: nuclear medicine; boron neutron capture therapy (BNCT); and instrumentation. Research in radiopharmaceutical chemistry and imaging techniques and investigation of a broad range of potential diagnostic and therapeutic applications provide the scientific and technological foundation for the expansion of nuclear medicine as a major medical specialty and for the continued vitality of the national industries for radiopharmaceutical development and production and medical imaging instrumentation. The technologies developed under this program are directed at solving major problems in medicine, such as the non-invasive detection and localization of small malignant lesions in the body, the quantitative measurement of dynamic organ function, and the treatment of cancers that resist conventional therapies. Nuclear medicine at the Department has accelerated with many recent contributions in areas as diverse as medical imaging technologies for improved diagnostic accuracy and radiopharmaceuticals for the study and treatment of substance abuse. Medical Applications research, in partnership with the Department's human genome and life sciences research, is forging new technologies to find not only where disease-causing processes take place, but to locate and study the action of genes involved in still-mysterious normal functions such as learning and memory.

Our measurement science program focuses on research and development of new instrumentation to meet the needs of our environmental and life sciences programs for better ways of characterizing samples ranging from living cells to subsurface contaminants. The FY 2000 request

provides for a variety of activities, with particular emphasis on using the advanced technologies developed in the Department's National Laboratories for environmental and biomedical research.

HIGH ENERGY PHYSICS

FY 1999 Appropriation - $695.5 M; FY 2000 Request - $697.1 M

High energy physics research seeks to understand the nature of matter and energy at the most fundamental level, as well as the basic forces which govern all processes in nature. The Department of Energy provides more than 90 percent of the Federal support for the Nation's high energy physics (also called elementary particle physics) research program. The balance is provided by the National Science Foundation (NSF). Our knowledge of the universe, the fundamental constituents of matter, and the laws of nature that underlie all physical processes continues to grow as a result of this research.

High energy physics research not only helps us learn how the world works, it also contributes to the Nation's economic competitiveness in the high-technology marketplace. High energy physics research requires accelerators and detectors utilizing state-of-the-art technologies in many areas, including fast electronics, particle detectors, high speed computing, superconducting magnets, and high power radiofrequency devices. In these areas, high energy physics research frequently drives the technology, which not only contributes to other scientific disciplines, but also has led to many practical applications having major economic and social impacts. Who could have predicted that research that went into the building of accelerators and particle detectors and the subsequent technology would contribute so much to today's medical imaging capabilities. And who could have predicted that particle physicists seeking new ways of communicating and sharing large amounts of data would change the way in which the world communicates--yet that is just what the World Wide Web has done.

The High Energy Physics program also has a history of attracting and training some of the best and brightest young minds. The training they receive prepares them for careers not just in high energy physics, but also in other disciplines as well, including computer sciences, teaching, industrial research. It is the unique problem solving abilities learned from this scientific discipline that make them attractive. More than half of the Ph.D.'s trained for high energy physics find permanent employment outside the field.

Carrying out high energy physics research effectively depends on many elements including the availability of forefront experimental capabilities, effective use of specialized facilities, and the availability of new and upgraded facilities to take advantage of new technologies and research opportunities. The Department supports two major high energy physics accelerator centers--the Fermi National Accelerator Laboratory (Fermilab) and the Stanford Linear Accelerator Center (SLAC). Each of these laboratories provides unique capabilities and is operated as a national facility available to qualified experimenters around the Nation and abroad on the basis of the scientific merit of their research proposals. In addition, the high energy physics program makes

limited use of the AGS at BNL. (The AGS will be transferred to the nuclear physics program, at the end of FY 1999, to be operated as an integral part of the RHIC facility). Approximately 2,000 U.S. scientists and 200-300 foreign scientists work at these facilities at any given time.

Experimental and theoretical researchers from more than 100 universities conduct about three fourths of the research, with the remainder being done by national laboratory staff. In general, the laboratories and universities perform different, but complementary, activities. University scientists provide the primary intellectual base for the program, performing experimental research at accelerators and non-accelerator facilities, technology R&D, and theoretical research. University grantees are selected and retained based on the quality, appropriateness, and performance of their research activities. All research proposals received are subjected to a rigorous multi-stage review, especially including peer review by technical experts from the high energy physics community.

National laboratories primarily provide major accelerator facilities at which university scientists perform their research. In addition, the laboratories provide the related technical and scientific expertise, as well as day-to-day liaison between university researchers and laboratory experts and management. Responsibility and authority for setting the program at a national laboratory and for determining which experiments are awarded running time rest primarily with the laboratory directorate within the general guidelines provided by the Department. Research requiring the use of a facility at one of the laboratories is reviewed extensively by the laboratory including by the laboratory's Program Advisory Committee (PAC), another form of peer review. The Department carries out its oversight responsibilities by conducting annual reviews of the laboratories' scientific programs. In addition, the Department tracks project progress against budget and schedule milestones using semiannual project reviews.

The Fermi National Accelerator Laboratory (Fermilab) is home to the world's highest energy superconducting accelerator, the Tevatron, which provides both fixed target and colliding beam research programs. The colliding beam research program has two major detector facilities, the Collider Detector at Fermilab (CDF) and the D-Zero Detector, which complement each other in their different technical capabilities. Fermilab completed a very successful fixed target run this past year prior to shutting the Tevatron down to bring the Main Injector on line. These two collaborations continued to produce new scientific knowledge during this run. The CDF collaboration of university and laboratory scientists from around the world observed the predicted B meson which contains a charm quark; this discovery completes the theoretically predicted family of B mesons. In addition, the KTeV experimental collaboration of university and laboratory scientists made the first observation of the decay of a kaon into two charged pions plus an electron-positron pair. This collaboration also made the first observation of violation of time-reversal invariance (T-violation), by making precise measurements of these decays. T-violation had been predicted on the basis of other results, but had never been directly observed.

Construction of the Fermilab Main Injector project was completed on schedule and within budget. Commissioning is proceeding very well, and the first physics run is expected later in FY 1999. The CDF and D-Zero upgrades are progressing well; and the upgraded detectors will be moved

back into position on the Tevatron beam line and commissioning will begin with them late in FY 2000. This project will provide a fivefold increase in collider luminosity and a doubling of intensity for the fixed target program, as well as allowing simultaneous operation of the collider and fixed target programs, a capability previously not possible. The Main Injector will greatly enhance the physics capabilities of the Tevatron accelerator and its detector facilities and increase the likelihood for major new scientific developments early in the next century.

Also at Fermilab, the NuMI/MINOS (Neutrinos at the Main Injector) project design got underway in FY 1998. The experiment will study the possible oscillations between different types of neutrinos to determine if neutrinos have mass. The beam of neutrinos for the project will be produced at Fermilab and aimed at two detectors--one on site and the other at the Soudan Underground Laboratory in northern Minnesota. The project baselines for cost, scope, schedule, and management were established in November 1998. Detailed design for the NuMI underground enclosure and technical components will be developed in 1999, and excavation of the cavern in Minnesota for the MINOS detector is also expected to begin later this year.

In addition, Fermilab continues to play an active role in the Large Hadron Collider. Fermilab is the host and center of the U.S. CMS detector effort of university and laboratory scientists, and host and center of the U.S. LHC accelerator collaboration, with specialized expertise in the design and fabrication of superconducting magnets.

At the Stanford Linear Accelerator Center (SLAC), the Stanford Linear Collider (SLC), the world's only high energy linear collider, continued during FY 1998 to achieve record high luminosities in positron-electron collisions, and the SLD detector reached more than 20,000 Z^0 events per week. Researchers from universities and laboratories conducting research at SLAC are in the process of analyzing the large amounts of data collected. In FY 1999, the SLC was shut down to allow for the B-factory to be brought on line. Construction of the B-factory PEP-II storage rings was completed in FY 1998 on schedule and within budget. Commissioning began in mid-May 1998, resulting in first electron-positron collisions in July 1998. Commissioning has continued to go very well, and substantial progress toward achieving design luminosity has already been made. Data-taking with the BaBar detector will begin later in FY 1999, and about 39 weeks of operation is planned for FY 2000. The B-factory will provide a high luminosity, asymmetric electron-positron colliding beam facility to study the preponderance of matter over anti-matter in our universe. It will also provide opportunities for university and laboratory scientists to pursue a rich program of experiments in a large number of other areas of intense interest in high energy physics. In addition to all-out running of the B-factory in FY 2000, emphasis will continue on R&D in support of a future linear collider. Participation with NASA and university scientists in a non-accelerator-based experiment, the Gamma-ray Large Area Space Telescope (GLAST), is also planned.

The Alternating Gradient Synchrotron (AGS) at Brookhaven National Laboratory (BNL) will be transferred later in FY 1999 to the Nuclear Physics program to be operated as the injector for RHIC. Operation of the AGS for the high energy physics program in FY 2000 and beyond will be

on an incremental cost basis. Recently, U.S. university and laboratory researchers working at the AGS recorded a first observed decay of a charged kaon to a pion and two neutrinos, first observation of the decay of a neutral kaon to an electron-positron pair, as well as evidence for the existence of an unusual meson. AGS operation for high energy physics in FY 2000 will be for the high precision measurement of the anomalous magnetic moment of the muon. Brookhaven is also a key participant in the LHC project as host and center of the U.S. ATLAS detector collaboration of university and laboratory scientists, as well as a participant in the U.S. accelerator collaboration. BNL's Accelerator Test Facility (ATF), a small, low energy electron linac, has achieved one of the brightest electron beams in the world. It is used by universities, national laboratory groups, and industry for testing new advanced accelerator concepts.

The Large Hadron Collider (LHC), a machine that will be about seven times the energy of the Fermilab Tevatron, is in the process of being built at the European Laboratory for Particle Physics (CERN) in Geneva, Switzerland. The U.S. and CERN have signed an agreement that provides for U.S. support and participation in the project. The LHC will become the foremost high energy physics facility in the world around the middle of the next decade. With the LHC at the energy frontier, American scientific research on the frontier depends on participation in the LHC. It will ensure continued world class excellence of our university and national laboratory scientists and will provide training to many students in leading edge science and technology.

The Department will provide a total contribution of $450 million for the specifically agreed to components of the two detectors and the LHC accelerator over the period FY 1996 through FY 2004. Of the $450 million, $250 million will support U.S. activities on the LHC detectors, while $200 million will support U.S. activities working on the LHC accelerator. NSF will provide approximately $81 million for U.S. work on the detectors. Almost all of this funding will be spent in the U.S. for in-kind contributions from U.S. laboratories, universities, and industry. Funding in the amount of $70 million is being requested by the Department in FY 2000.

During the past year, progress continued to be made on the technical components for the LHC and many management details were finalized. Technical, cost, and schedule baselines for the three subprograms--ATLAS detector, CMS detector, and the accelerator--were reviewed and approved; a Memorandum of Understanding between DOE and NSF on U.S. participation in the LHC project was negotiated and signed; and Project Management Plans were finalized and put in place for the accelerator, ATLAS detector, and the CMS detector, as well as the overall U.S. LHC Project Execution Plan. In FY 2000, the fabrication of components for the LHC continues. The U.S. LHC project continues to be on schedule and within budget.

NUCLEAR PHYSICS

FY 1999 Appropriation $334.6 M, FY 2000 Request $342.9 M

The primary goal of nuclear physics research is to understand the structure and properties of atomic nuclei and the fundamental forces between the constituents that form the nucleus. Nuclear processes determine essential physical characteristics of our universe and the composition of the matter that forms it.

Beyond maintaining world leadership in basic research, the Nuclear Physics program develops and transfers knowledge to enhance the Nation's technological and economic competitiveness in such fields as nuclear medicine. The Nuclear Physics program continues to be a vital source of trained people for fundamental research and for these applied technology areas. The program supports the graduate training of approximately 450 students per year, and typically 100 Doctorates in nuclear physics are awarded each year in DOE-supported nuclear physics programs. A majority of these highly trained researchers will take positions in high-technology private industry.

Many future nuclear physics investigations will study questions related to the quark presence in composite nuclei. Until the last few years, the fundamental understanding of nuclear properties has been based on the idea of a nucleus composed of protons and neutrons that interact through a combination of weak, strong, and electromagnetic forces. It became clear that achieving a real knowledge of many nuclear properties depends on understanding nuclear structure based on quarks, and particles called gluons that bind the quarks together. Quarks and gluons are the building blocks of protons and neutrons (nucleons). The Long Range Plan for the U.S. Nuclear Physics Program, prepared by the nuclear physics community every five years, provides the definition of the pressing issues in nuclear science and the priorities for pursuing important scientific problems in various budget scenarios.

Studies of nuclear structure require ultra-high resolution "microscopes", accelerators that produce particle beams of various energies, depending on the problems to be studied. The request is designed to provide the sufficient hours for these facilities, so that researchers may take advantage of their unique capabilities.

Research programs at the Thomas Jefferson National Accelerator Facility (TJNAF), formerly CEBAF, are studying effects due to the presence of quarks in nucleons in the nucleus. Two principal focuses of these studies are to continue to develop an understanding of how the "spin" of a nucleus originates in the quarks, and how the size of a quark cluster in a nucleus affects the strength of the interaction of that cluster with other nucleons in the nucleus. It is interesting to note that no one has ever observed a single free quark; they always travel in closely knit groups of threes within nucleons and twos within mesons. In FY 2000, TJNAF will operate for 4,500 hours to allow several high priority experiments to study the quark presence in nuclei. The laboratory is fully operational, and all three experimental halls are being utilized for experiments.

In FY 2000, the new Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory, a second major facility for the study of new "quark-based" nuclear physics, will be searching for a predicted quark-gluon plasma. Construction of RHIC will be complete in the third quarter of FY 1999, and the new facility will be fully operational in FY 2000. It is predicted that if a collection of nucleons could be compressed and heated to a very high temperature by collisions of high energy heavy nuclei, there would be a phase transition to a new state of nuclear matter in the collision region where the quarks are "freed" from their nucleon boundaries to form a so-called quark-gluon plasma.

RHIC will be a unique, world-class facility with colliding relativistic heavy ion beams that will permit exploration of this hot, dense nuclear matter and recreate the transition from quarks to nucleons which characterized the early evolution of the universe. Studies with colliding heavy ion beams will provide researchers with their first laboratory opportunity to explore this new region of nuclear matter and nuclear interactions which up to now has only been studied theoretically. In FY 2000, RHIC will begin its first full year of operations with a 33 week running schedule and a goal of 22 weeks (3,300 hours) for research and 11 weeks for accelerator studies.

Some of the most critical nuclear reactions in stellar burning processes involve nuclei which, because of their short lifetimes, have not been available for laboratory studies. Three Nuclear Physics facilities will be investigating these reactions by generating radioactive beams as new probes of nuclear structure.

Another new generation facility, the Holifield Radioactive Ion Beam Facility (HRIBF) at Oak Ridge National Laboratory is now producing some of the previously unavailable nuclear beams so that these important stellar processes can be studied in the laboratory. Beams for experiments became available in FY 1998 and it is possible for the first time to study many processes which are crucial to our understanding of how nuclei were synthesized in the Big Bang. In FY 2000, the HRIBF will operate for 2,400 hours for studies of these processes and for studies of very proton rich nuclei far from stability. Radioactive ion beams, in addition to the stable beams normally provided, are also being produced at the ATLAS accelerator at Argonne National Laboratory and the 88-inch Cyclotron at Lawrence Berkeley National Laboratory. These laboratories are pursuing research as well as developing new techniques for the generation of radioactive beams. The experience gained and ideas generated at all three laboratories will provide important input to the design of a proposed new Isotope Separator On Line (ISOL) radioactive beam facility presently being studied by the Nuclear Physics Program.

Subsequent to submission of the FY 2000 budget request, the Department has determined that the MIT/Bates accelerator will continue to operate. The Department will work with the Administration to submit a budget amendment and an amended budget request.

The solar neutrino problem remains one of the great challenges in astrophysics. The predicted rate of neutrino production by the sun is significantly higher than the observed rate. There are two possible explanations for the discrepancy. Either our understanding of solar burning is very

wrong, or the neutrino has a small mass, in contradiction to the long-held belief that it is massless. Construction of a third major new facility to study this problem, the Sudbury Neutrino Observatory (SNO), 7000 feet below the surface of the earth in Canada, was completed in FY 1998. In FY 1999, preliminary data is being accumulated as the detector is being filled with "heavy water". SNO, which will be fully operational in FY 2000, is designed to sort out this long standing solar neutrino problem. The project involves an international collaboration among the U.S., Canada, and the United Kingdom.

FUSION ENERGY SCIENCES

FY 1999 Appropriation - $222.6 M, FY 2000 Request - $222.6 M

The FY 2000 budget request for the Fusion Energy Sciences program continues a broad-based, fundamental research effort to acquire the knowledge base needed for an economically and environmentally attractive fusion energy source.

Fusion research provides two major benefits--in the near term there are advances in plasma science and technology spinoffs and in the long term there is the basis for development of a new energy source. Advances in plasma science have contributed to numerous other areas of science. In astrophysics, it has allowed an understanding of the behavior of plasma and magnetic fields in the earth's magnetosphere, in the sun and other stars and the galaxies. Plasma physics is integral to our understanding of magnetic storms, solar flares, shock waves in space, magnetic fields, black holes, and star formation. In the area of large-scale scientific computing, fusion research pioneered the use of supercomputers to solve complex problems. Novel optical and magnetic diagnostics have been created to provide access to the extreme temperature, density, and magnetic fields prevalent in fusion experiments. In addition, fusion and other plasma based research has provided a stimulus to the development of large superconducting magnets, development of advanced materials, advancement in pulsed-power technology, and plasma aided manufacturing processes such as those used in semiconductor device fabrication.

Although there is no schedule for developing and deploying fusion energy systems, the availability of fusion, as an option for large central station power plants, would be valuable insurance against possible environmental concerns about fossil and nuclear energy. As fusion is one of the few potential sources capable of providing an appropriate energy intensity for urbanized society in an environmentally sustainable fashion, development of fusion as a practical energy source may be essential for the longer term. In addition, there may also be non-electric applications of fusion in the transmutation of wastes and isotope production.

The quality of the research in this program is continuously evaluated through the use of merit based peer review and scientific advisory committees. In addition, the Department has requested the National Academy of Sciences to review the quality of science in the fusion program in FY 1999. We will also be carrying out a review of fusion energy technologies using the Secretary of Energy Advisory Board. The Fusion Energy Sciences Advisory Committee has also been asked

to assess program restructuring and the overall balance of research efforts. A program plan/roadmap for fusion, including both magnetic and inertial and based on the above reviews, will be completed by the end of 1999.

As a part of the ongoing restructuring of the program, the major U.S. experimental facilities -- the DIII-D at General Atomics, the Alcator C-Mod at the Massachusetts Institute of Technology, and the new National Spherical Torus Experiment (NSTX) at the Princeton Plasma Physics Laboratory (PPPL) -- are being managed as national resources with multi-institutional topical teams addressing the scientific issues and coordinating efforts on relevant facilities. The FY 2000 budget request provides for substantial operation of all three facilities, along with modest upgrades.

The Tokamak Fusion Test Reactor (TFTR) located at PPPL was closed down in FY 1997 after 13 years of pioneering experiments yielding significant scientific results from producing actual fusion power in a laboratory. In FY 2000 we will begin a 3-year program to decontaminate and decommission the TFTR facility. This will provide for the removal of the TFTR tokamak and activated components from the experimental test cell and basement.

Fabrication of the NSTX, a vital new device of a much smaller scale than TFTR, will be completed in April 1999. This proof-of-principle facility will provide the scientific basis for an innovative magnetic confinement concept that has indicated the potential for reactor-scale plasma performance in earlier very small experiments.

In FY 2000 a conceptual design will be completed for a novel compact stellarator-tokamak experiment that combines the best features of the two leading magnetic fusion concepts. Critical computing codes will be modernized to take full advantage of the **President's Information Technology Initiative**. In addition, three new innovative concept exploration experiments will become fully operational.

In accordance with congressional direction and with the cooperation of our International Thermonuclear Experimental Reactor (ITER) partners, the Department will complete an orderly closeout of our ITER activities in FY 1999. The R&D activities to complete the U.S. Model Coil and to be involved in its test in Japan are proceeding through FY 1999 consistent with congressional direction. The Model Coil is part of the largest superconducting magnet ever built to operate with a changing magnetic field. It was recently completed and is now en route to Japan where the testing will be done.

The European Union, Japan, and the Russian Federation are proceeding with a 3-year extension of the ITER program to complete the design of a reduced cost and reduced objectives facility, and to decide in 2-3 years whether and where to construct ITER. We will be involved only on the periphery of the project consistent with traditional exchange of scientific information. If the other Parties decide to construct a burning plasma facility like ITER, the United States will then consider whether to propose to be involved.

With the closeout of the ITER activities, we are restructuring the fusion technology development activities to focus on our domestic needs in advancing the science of fusion. Emphasis will be placed upon R&D that will enable existing and near-term U.S. fusion facilities to achieve their ultimate performance capability. New methods of modeling and predicting the behavior of fusion materials will be investigated. R&D will continue on novel methods of enabling the new, innovative U.S. fusion concepts to achieve their full performance. This will include applied scientific research on issues such as the use of flowing liquid walls to handle heat and particle flux in magnetic or inertial systems and the study of advanced heating and fueling techniques. Some international R&D collaboration will continue at foreign facilities that have scientific research capabilities beyond those in the United States. Also, as part of the restructuring of this element of the fusion program, a Virtual Laboratory for Technology has been established to improve the governance of the various, diverse enabling R&D elements through improved advocacy, coordination, and communication.

In conclusion, the U.S. Fusion Energy Sciences program has made excellent scientific progress and has been responsive to the congressional request to restructure the program. Fusion and plasma science make a unique contribution to the nation's scientific infrastructure in the near-term and provide a vital energy option for the future. Europe and Japan are making large investments in this area. The challenge to the United States is to continue a strong scientific base program, including making effective use of existing facilities, and to sustain a meaningful participation in the world program.

COMPUTATIONAL AND TECHNOLOGY RESEARCH

FY 1999 Appropriation - $157.5 M; FY 2000 Request - $198.9 M

Some of the pioneering accomplishments of the Computational and Technology Research (CTR) program are: development of the technologies to enable remote, interactive access to supercomputers; research and development leading to the High Performance Parallel Interface (HiPPI) standard; and research leading to the development of the slow start algorithm for the Transmission Control Protocol (TCP), which enabled the Internet to scale to today's worldwide communications infrastructure. This long history of accomplishments in the CTR program continued in FY 1999 including: the 1998 Gordon Bell Prize for Best Performance of a Supercomputing Application, the 1998 IEEE Fernbach Award for outstanding contribution in the application of high performance computers using innovative approaches and four R&D 100 Awards to CTR researchers in areas ranging from parallel numerical libraries to near frictionless coatings.

The CTR program supports advanced computing research -- applied mathematics, high performance computing, networking, and operates supercomputer and associated facilities that are available to researchers 24 hours a day, 365 days a year. The combination of support for fundamental research, computational and networking tools development, and high-performance computing facilities provides scientists with the capabilities to analyze, model, simulate, and --

most importantly -- predict complex phenomena of importance to the Office of Science and the Department of Energy.

Experiments at Office of Science facilities may generate millions of gigabytes (petabytes) of data per year (which would fill the disk drives of millions of today's personal computers) presenting significant computational and communications challenges in analyzing and extracting information from the data. The wide-area, data-intensive collaborations of the Department are the focus of DOE's efforts in the **Next Generation Internet** (NGI) Initiative. CTR is responsible for DOE participation in the NGI program to create the foundation for more powerful and versatile networks of the Twenty-first century.

CTR also heads the Department's **Scientific Simulation Initiative** (SSI) as a competitive, peer-reviewed program with the other program offices in SC. CTR's role in the SSI includes management of the selection process for the two basic science application efforts initiated in FY 2000, management of the SSI Advanced Computing and Communications Facilities, and management of the Computer Science and Enabling Technology component.

In addition to these computing related activities CTR also manages **the Laboratory Technology Research** (LTR) program for the Office of Science. The mission of this program is to support high risk, energy related research that advances science and technology to enable applications that could significantly impact the Nation's energy economy. LTR fosters the production of research results motivated by a practical energy payoff through cost-shared collaborations between Office of Science laboratories and industry.

MULTI PROGRAM ENERGY LABORATORIES - FACILITIES SUPPORT

FY 1999 Appropriations - $21.3 M; FY 2000 Request $21.3 M

Fulfillment of the DOE's science and technology goals depends heavily on the existence and operating efficiency of the five multiprogram SC laboratories. The five multiprogram energy laboratories are: Argonne National Laboratory-East, Brookhaven National Laboratory, Lawrence Berkeley National Laboratory, Oak Ridge National Laboratory, and Pacific Northwest National Laboratory. These laboratories have over 1000 buildings with 14.7 million gross square feet an average age of 35 years. Their estimated replacement value is over $8.7 billion. All facilities at these laboratories are government-owned, contractor-operated (GOCO). Total operating funding for these laboratories including work-for-others is over $3 billion a year.

Portions of the infrastructure of these laboratories are old, deteriorating, and, in some cases, obsolete. Improvements are needed to comply fully with the environment, safety and health requirements in effect today as well as to meet everyday operational needs.

The Office of Science established the Multiprogram Energy Laboratories-Facilities Support (MEL-FS) program in 1981 to provide a systematic approach to its stewardship responsibility for the general purpose support infrastructure of these laboratories. The MEL-FS program helps to preserve the government's investment in infrastructure and to maintain infrastructure integrity in a reasonable and economic manner at these laboratories.

The program supports line item construction projects to refurbish and replace inadequate general purpose facilities and infrastructure. This budget request provides for continuation of six on-going projects and for two new projects. Projects are selected based on the Life Cycle Asset Management the Cost-Risk-Impact Scoring Matrix. The new starts are:

Fire Safety Improvements - Phase IV, (ANL-E) - This project will bring 30 major facilities into compliance with the Life Safety Code and the National Fire Alarm Code. It will significantly improve the fire detection, suppression, and reporting capabilities at the lab, thereby reducing the possibility and magnitude of personnel or property loss during a fire.

Electrical Systems Upgrade, (ORNL) - This project will upgrade the 30-50 year-old electrical system to include: replacing overhead feeders; installing advanced protective relaying capabilities at major substations; and replacing major switchgear and transformers. This project will increase system reliability and capacity, while reducing the possibility of personnel injury or lost productivity due to system failures.

The program also provides funding for Payments in Lieu of Taxes (PILT) as authorized by the Atomic Energy Act of 1954, as amended. These discretionary payments are made to state or local governments where the Department or its predecessor agencies have acquired property previously subject to state or local taxation.

ENERGY RESEARCH ANALYSES

FY 1999 Appropriation - $1.0 M; FY 2000 Request - $1.0 M

The mission of the Energy Research Analyses (ERA) program is to conduct technical assessments of the Department's civilian research and development programs and to provide direction to future research and development activities. Energy Research Analyses also conducts science policy analyses, and coordinates the development of the Office of Science Strategic Plan and the DOE Science Portfolio.

The FY 2000 budget request will provide funding for peer reviews of projects in the Office of Science, Fossil Energy, and Energy Efficiency to continue to improve the quality and relevance of DOE research and development. Other activities will include evaluation of critical planning and policy issues of DOE science and technology using expert groups at the National Academy of Sciences, the JASON group, etc., as appropriate.

SCIENCE PROGRAM DIRECTION

FY 1999 Appropriation - $49.8 M; FY 2000 Request - $52.3 M

Science Program Direction provides the Federal staffing resources and associated costs required to provide overall direction of activities carried out under the Office of Science. This program supports staff in the High Energy Physics, Nuclear Physics, Biological and Environmental Research, Basic Energy Sciences, Fusion Energy Sciences, Computational and Technology Research, Multiprogram Energy Laboratories-Facilities Support, and Energy Research Analyses programs, including management and technical support staff.

Science Program Direction also supports staff at the Chicago, Oakland, and Oak Ridge Operations Offices directly involved in program execution. The management and technical support staff includes scientific and technical personnel and program management support in the areas of budget and finance, general administration, grants and contracts, information resource management, policy review and coordination, infrastructure management and construction management.

At the direction of Congress in FY 1999, funds were also provided in Science Program Direction for Science Education. These funds will support the Undergraduate Laboratory Fellowship, National Science Bowl and the Albert Einstein Distinguished Educator Fellowship programs. These programs utilize the Department's scientific and technical resources to enhance the development of a diverse, well-educated and scientifically literate workforce.

SCIENCE EDUCATION

For FY 2000, DOE proposes new science education activities focusing on assets at our laboratories to build a partnership with universities and educational institutions. These proposed science education activities will allow university faculty and student teams, at the undergraduate level, to participate on long term research projects at DOE laboratories. In addition, pre-college science and math teachers will be provided with laboratory research experience to improve their knowledge and skills of scientific discovery and to enhance their ability to apply them in a classroom environment. Funds for these activities are included in the line program budgets.

There is a national need to maintain worldwide leadership in science and technology and to stay competitive in critical research areas such as high energy and nuclear physics, computational science, and renewable energy technologies. Our outstanding National Laboratories help to drive the progress of science and technology development in the United States. To replenish our stocks of scientists and engineers for the next century, we must invest in our nation's youth to encourage interest in science and scientific careers. A proven method to achieve this is by introducing students to the excitement of scientific research through exposure to the National Laboratories.

Historically, over two-thirds of undergraduates who have participated in DOE programs have gone on to graduate school in disciplines directly related to DOE missions.

According to the latest research, trends show a declining number of graduates in the natural sciences and engineering from the early eighties to 1996. This trend is especially true among women, even those who have displayed a natural aptitude for science and math on standardized test scores. By instituting a program that effectively promotes proficiency and inspires students, we can help to ensure our future in science to develop the technologies that help us meet our mission and contribute to economic growth.

The proposed science education activities will provide hands-on experience to both students and faculty. Working with laboratory researchers links this work to real world, mission driven challenges while improving communications and connections between Academe and the National Laboratories. Undergraduate students and college faculty will be able to participate in and contribute to long-term research projects at the National Laboratories, providing unique opportunities for hands on experience with state-of-the-art equipment. This experience allows the student to develop technical skills that build confidence and reinforce classroom learning. This, in turn, will support a productive relationship between the national laboratory and the participating college or university while strengthening the research at both institutions. This activity efficiently connects academia and industry with the excellent resources of the DOE laboratories and the enormous intellectual resources of the nation's universities. $5 million of the SC request will provide over 1000 student and 200 faculty with fellowships for the Faculty/Student Science Teams during academic year 2000-2001.

The second new activity involves the training of pre-college teachers as part of a national effort to strengthen K-12 student performance in science, mathematics, and technology. The Department of Energy has a vested interest and vital role to play if Federal efforts, to ensure science literacy for all Americans and to develop future generations of scientists, are to be successful. This activity will provide high school and pre-college teachers with 8-week appointments at DOE's Office of Science Laboratories. In these settings, teachers will work in teams with scientists and engineers and will participate in and contribute to the ongoing research of the Laboratories. Teachers will participate in designing experiments, creating mathematical models, and collecting and analyzing data. Experience has shown that allowing teachers to experience being treated as research colleagues provides a sense of renewal, and increases connection to their field and profession. Therefore, this activity includes additional follow-up such as remote mentoring and opportunities for teachers to attend and make presentations at regional and national meetings of scientific and teacher organizations. It also includes loans and grants of equipment and materials, assistance in translating their research experience into investigations, activities, and demonstrations applicable to their classroom settings, and sharing research experiences with their colleagues. $5 million of the SC request will reach over 200 teachers nationwide annually through this activity.

ENERGY SUPPLY R&D PROGRAMS

TECHNICAL INFORMATION MANAGEMENT

FY 1999 Appropriation - $8.6 million; FY 2000 - $9.1 million

The Technical Information Management (TIM) program provides timely, accurate technical information to DOE's researchers and the public by collecting, preserving, and disseminating scientific and technical information, the principal product resulting from DOE's multi-billion dollar research and development programs. The TIM program also provides worldwide energy scientific and technical information to DOE researchers, U.S. industry, academia, and the public through interagency and international information exchange agreements and coordinates technical information-related activities across DOE and its laboratories.

In FY 2000, TIM will build on the huge success of the Information Bridge (www.doe.gov/bridge) and use digital information technology to complete a virtual library of energy science and technology. Specifically, the Information Bridge, already with over 2 million pages of searchable full-text R&D information, will be expanded to include both the most current research findings as well as historic records. To complete the virtual library capability, collaborative agreements with U.S. science journal publishers will be forged to establish hyper-text linkages between TIM's electronic journal citations and the publishers' full-text on-line journal articles. This capability will potentially save the Department millions of dollars in duplicate paper journal subscriptions.

CLOSING

The significant increase in the FY 2000 budget request for the Office of Science recognizes the critical role that fundamental knowledge plays in achieving the DOE missions and for the general advance of the Nation's economy and the welfare of its citizens. The Scientific Simulation Initiative represents a major investment in producing the necessary scientific computation and information infrastructure for DOE science applications as part of a multi-agency initiative. This request will also provide the U.S. scientific community with increased research capability and new opportunities at the DOE scientific user facilities, including progress on SNS, a new forefront neutron source, and upgrades of existing facilities. On behalf of the Administration and the Department, I am pleased to present this budget for the Office of Science and welcome the challenge to deliver results.

This concludes my statement. I would be happy to answer your questions.

U.S. Department of Energy
FY 2000 Congressional Budget Request
(Dollars in Millions)
Office of Science

Program	*FY 1998 Appropriation*	*FY 1999 Appropriation*	*FY 2000 Request*
Basic Energy Sciences	$ 651.8	$ 799.5	$ 888.1
Biological and Environmental Research	395.7	436.7	411.2
Fusion Energy Sciences	224.2	222.6	222.6
Computational and Technology Research	146.8	157.5	198.9
High Energy Physics	668.6	695.5	697.1
Nuclear Physics	314.7	334.6	342.9
Multiprogram Energy Labs-Facilities Support	21.3	21.3	21.3
Energy Research Analyses	1.4	1.0	1.0
Science Program Direction	37.6	49.8	52.3
SBIR/STTR	80.7	-	-
Subtotal	2,542.8	2,718.5	2,835.4
General Reduction for Use of Prior Year Balances	(15.3)	(13.0)	-
Superconducting Super Collider	(35.0)	(7.6)	-
Total	2,492.5	2,697.9	2,835.4
Technical Information Management	10.1	8.6	9.1
General Reduction for Use of Prior Year Balances	(0.1)	(0.2)	-
Total	10.0	8.4	9.1

Mr. PACKARD. We are delighted to have the Assistant Secretary of the Office of Efficiency and Renewable Energy. Mr. Reicher has jurisdiction over all of the renewable programs in the Department of Energy. We are delighted to have you with us, and the time is yours.

ORAL STATEMENT OF DAN REICHER

Mr. REICHER. Thank you, Mr. Chairman and members of the subcommittee. I am pleased to be here to testify on the energy and water development portion of the budget for the Office of Energy Efficiency and Renewable Energy. As you know, the other portion of our budget is funded by the Interior Subcommittee.

Mr. Chairman, 20 years ago, renewable energy was generally produced at a very high cost and in a very inefficient manner. Advanced power delivery system components and high temperature superconductivity didn't even exist, and the alternative transportation fuel sector was very immature. We have come a long, long way, Mr. Chairman.

The cost of electric power from wind turbines in 1980 ranged from 30 to 40 cents a kilowatt hour, and it has dropped as a result of aggressive R&D to between 4 and 6 cents a kilowatt hour. At this price, wind power systems are entering the marketplace, expanding from early California sites to include states ranging from Vermont to Alaska and from Minnesota and Iowa to Texas. We are also working on the next generation of turbines, which should bring wind costs to as low as 2 and a half cents a kilowatt hour by 2002.

As another example, Mr. Chairman, the first commercially available photovoltaic panels in the early 1980s produced power at a cost of $1 per kilowatt hour. By fiscal year 2000, these PV systems will be delivering electricity for as low as 12 to 20 cents per kilowatt hour, and in the next decade it should drop to below a dime if we continue adequate support.

We now have large manufacturing plants in states as diverse as Virginia, Maryland, California, Michigan, Delaware and Massachusetts. The solar industry is very much a growing part of the U.S. economy. However, while both domestic PV production and U.S. product sales are up, we risk losing our world market leadership, having dropped from 44 percent in 1996 to 40 percent in 1997 to 35 percent in 1998. Our potential loss of this growing market is exacerbated by a Japanese PV budget which is three times what we spend in the United States.

Production of ethanol is also on track for widespread vehicle use at very competitive prices. As you know, Mr. Chairman, the use of ethanol is a very effective means to reduce our dependence on foreign oil. To compete with today's inexpensive gasoline, our biofuels program focuses on the development of facilities which make ethanol from agricultural and forest waste and from dedicated crops. Construction recently began in Louisiana of a first-of-a-kind production plant with 80 percent cost share that will produce ethanol from sugar cane waste. We are also supporting the development of plants in California and New York that will use rice straw and municipal solid waste to produce ethanol, again which can be used in automobiles.

A final example of our technical progress involves superconductivity. Through our innovative industry laboratory R&D program, superconductivity has rapidly moved from discovery to utility scale prototypes that carry 100 times the current of conventional copper cables, and this has occurred in only 10 years. I am pleased to note that the world's first superconducting power line will be installed in Detroit in the fall of the year 2000.

While we are making tremendous strides in these technologies, we still have much work to do. The competitive revolution in power generation has led to drastic decreases in the price of electricity. Still renewable energy is already making market inroads in many states: the world's largest wind installation being developed in Iowa; major new commitments to solar energy in many states ranging from Massachusetts to Illinois to Arizona; biomass power plants in states such as New York, Ohio, Minnesota, Vermont and Indiana; and tens of thousands of new geothermal heat pumps in homes, businesses, Federal installations, and schools in States as diverse as Indiana, New Jersey, Kentucky, South Dakota, Oklahoma and Texas.

We are also aggressively pursuing integration of fossil fuel with renewable energy technologies. Projects such as hybrid wind/natural gas and co-firing of biomass with coal demonstrate the opportunities that exist between renewables and fossil fuels.

Our fiscal year 2000 budget request would help us accelerate the market's success of renewables and advanced power systems. Our request is $325 million, up $53 million or about 19 percent from this year's enacted level. I would note that this year's request is a small fraction of what Congress appropriated for renewables in the early 1980s.

SOLAR AND RENEWABLES BUDGET OVERVIEW

Let me quickly give you some examples of major program activities in fiscal year 2000.

The photovoltaic program will initiate development of new high-efficiency, multi-junction solar cells to capture and convert one-third of the sun's energy to electricity; and that would be up from 8 to 15 percent conversion today.

The biopower program will accelerate development of advanced conversion systems such as co-firing biomass with coal.

The biofuels program will continue its waste-to-ethanol and corn ethanol projects and advance its core conversion technology research with universities and national labs.

The wind program will place added emphasis on field testing small wind turbine prototypes to verify performance for remote sites, cold weather and off-grid energy needs.

And, as I mentioned earlier, we are working on the next generation of large turbines for major on-grid power production; and we will begin testing those as a major step towards producing power at 2 to 3 cents a kilowatt hour.

The geothermal program will focus more resources on high-priority research and technology development for electric power applications. The program will accelerate work to produce an advanced drilling system capable of economically accessing the vast geothermal resources below 10,000 feet.

These initiatives will enable the program to achieve its goal of producing power at 3 cents a kilowatt hour.

And, importantly, Mr. Chairman, I want to say in fiscal year 2000 we propose to more than double our hydropower budget request to help us maintain and enhance our Nation's existing hydroelectric generation which today provides 10 percent of U.S. electricity. With more than 200 hydro facilities up for relicensing in the next decade, early indicators suggest that environmental concerns may cause regulators to reduce generation capacities or relicense facilities unless fish mortality and water quality concerns are met. We are developing and completing testing of advanced environmentally friendly hydropower turbine prototypes that will improve water quality and reduce fish kills so we can retain our current hydropower capacity.

In fiscal year 2000, our hydrogen request will continue a strong core R&D effort to meet the goals of reducing the cost of hydrogen production, increasing the energy density and efficiency of our storage systems and developing low-cost, reliable sensors to detect hydrogen leaks. Hydrogen has a phenomenal potential for clean power production and vehicle propulsion.

MANAGEMENT IMPROVEMENTS

Mr. Chairman, when I became Assistant Secretary about 17 months ago I realized that the office faced many management challenges, and I made a major commitment to fix them. The subcommittee also highlighted several issues. We have listened to you, to industry and our other partners, and we have delivered.

This subcommittee said we were relying too heavily on noncompetitive mechanisms to disburse funds. We listened, and we delivered a dramatic reduction in our use of noncompetitive funding mechanisms. The Office of Power Technologies, which represents the bulk of the funding from this subcommittee, has increased its level of competition to 93 percent, including congressionally directed activities. Close to 100 activities previously funded by sole source contracts within the energy and water account in fiscal year 1998 will now be competitively awarded.

In 1998, we competed the $1 billion management and operating contract for the National Renewable Energy Lab (NREL), the first time it was competed in 15 years.

This subcommittee also said that our office's uncosted balances were too high. Again, we listened, and we delivered. Across all of our offices, we have reduced uncosted balances by more than 58 percent since the beginning of fiscal year 1996; and, within solar and renewables, we have reduced them by more than 62 percent since fiscal year 1996. By the end of this fiscal year, we will have reduced these balances by more than $175 million versus the beginning of fiscal year 1996. I am very proud of this progress.

We realize that our work to improve is by no means complete, and so we have established a new management improvement team for working with the National Academy of Public Administration to improve our procurement. The National Academy of Sciences is reviewing our programs right now. And we are also trying to break down the stove pipes that have often separated our various offices, and I want to highlight one particular example, which is our bio-

energy initiative which brings together our work in biopower, biofuels and bioproducts.

So in conclusion, Mr. Chairman and members of the subcommittee, we have accomplished a great deal over the last two decades. We have set some aggressive, but we believe achievable, goals for the next few years. We have requested a realistic budget, and we have improved our management, and we hope that we can earn your support.

[The information follows:]



Department of Energy
Washington, DC 20585

Dan W. Reicher

Dan W. Reicher was nominated by President Clinton and confirmed by the U.S. Senate as Assistant Secretary of Energy for Energy Efficiency and Renewable Energy in 1997. Prior to this position he was Senior Policy Advisor to Secretary of Energy Federico Peña (1997), Chief of Staff of the Department of Energy (1996-1997), Acting Assistant Secretary of Energy for Policy (1995-96), Deputy Chief of Staff and Counselor to Energy Secretary Hazel R. O'Leary (1993-95) and Special Assistant to Secretary O'Leary (1993). Mr. Reicher was a member of the Clinton-Gore Transition Team (1992-93). From 1985 to 1992 he was a Senior Attorney with the Natural Resources Defense Council.

Mr. Reicher has more than 20 years of experience with environmental and energy policy and law. He was a staff member of President Carter's Commission on the Accident at Three Mile Island and worked in the Hazardous Waste Section of the U.S. Justice Department. He was an Assistant Attorney General in Massachusetts where he focused on environmental and energy matters and a law clerk to federal District Court Judge David Nelson in Boston. Mr. Reicher also served as a member of the National Academy of Sciences Board on Radioactive Waste Management and an adjunct professor of environmental law at the University of Maryland Law School.

At DOE, Mr. Reicher has been engaged in policy development and implementation in many areas, including energy efficiency, renewable energy, climate change, electric utility restructuring, clean air, environmental cleanup, nuclear waste management, contract reform, privatization, fossil energy, nuclear power, nuclear nonproliferation, and land conservation. In the international arena, he has been involved with the Department's extensive energy, environmental and national security work in Russia, India and with the International Atomic Energy Agency.

Mr. Reicher's work at the Natural Resources Defense Council focused primarily on the Department of Energy's environmental, energy and defense programs. He enforced federal environmental laws at the Department's facilities and worked to enact legislation to improve DOE's environmental performance and increase U.S. energy diversity.

Mr. Reicher is a graduate of Stanford Law School and Dartmouth College and also studied at Harvard's Kennedy School of Government. Mr. Reicher's articles have appeared in such publications as the New York Times, the Bulletin of the Atomic Scientists, and the Stanford Law Review. He co-edited a book entitled Controlling the Atom in the 21st Century (Westview Press) and wrote a chapter for the environmental law treatise Sustainable Environmental Law (West Publishing).

In 1985, Mr. Reicher was a member of the first expedition on record to kayak the Yangtze River in China and, in 1977, the first expedition to navigate the entire 1888-mile Rio Grande. He is married to Carole L. Parker, who works in the Office of Environmental Security, U.S. Department of Defense. Carole and Dan have a young daughter, Haley Katherine Reicher.

October 1998

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Testimony of Dan W. Reicher
Assistant Secretary for
Energy Efficiency and Renewable Energy
U.S. Department of Energy
Before the
Committee on Appropriations
Subcommittee on Energy and Water Development

March 11, 1999

Mr. Chairman and members of the Subcommittee, I am pleased to have the opportunity to appear before you today to discuss the Energy and Water Development portion of the FY 2000 budget request for the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE). I will address three areas related to Solar and Renewable Resource Technologies: 1) the tremendous technological progress that has been achieved to date; 2) what we will accomplish with the resources you provide; and 3) important management improvements we have instituted within EERE.

Technology Progress

Twenty years ago renewable energy was generally produced at a very high cost and in an inefficient manner. Advanced power delivery system components and high temperature superconducting materials did not even exist, and the alternative transportation fuel sector was very immature. We have come a long way.

For example, the cost of electric power from wind turbines in 1980 ranged from $0.30 - $0.40 per kilowatt-hour (kWh). Through aggressive R&D by EERE and its industry partners on wind turbine aerodynamics, materials development and computer-aided design, we have been able to reduce the costs to between $0.04 and $0.06 per kWh. At this price, wind systems are entering the marketplace, expanding from the early California windfarms to include States ranging from Vermont to Alaska and from Minnesota to Texas. Wind energy systems are also poised to expand into other Great Plains and Northeastern locations, such as upstate Oklahoma, Wisconsin, the Dakotas, Maine, and New York. We are also working on Next Generation Turbines to reduce the cost of electricity from wind even further -- to as low as 2 ½ cents per kWh by 2002. This cost will enable wind to compete in many regions of the U.S.

As another example, the first commercially-available photovoltaic (PV) systems in the early 1980s produced power at a cost of more than $1.00 per kWh. By FY 2000, PV systems will be delivering electricity for as low $0.12 - $0.20 per kWh -- depending upon the specific technology -- making clean, reliable PV systems competitive in many remote and on-grid sites here in the U.S. and around the globe. Improved materials manufacturing techniques and energy conversion improvements – most supported by DOE and its laboratories -- have made these cost reductions possible and have facilitated the resurgence of the U.S. PV industry as the world's leader in this $1.2 billion global industry, which grew 95 percent between 1995 and 1998. With large manufacturing plants in Virginia, Maryland, California, Michigan, Delaware and Massachusetts, the solar industry is a growing part of the U.S. economy. However, global competition is fierce. While both domestic PV production capacity and U.S. product sales are up, the U. S. risks losing its world market leadership, having dropped from 44 percent in 1996 to 40 percent in 1997 to 35 percent in 1998. Our potential loss of this growing market is exacerbated by a Japanese PV budget that is three times what we spend in the U.S. ($240 million in Japan in FY 1999 vs. $72 million in the U.S. in 1999).

Production of ethanol is also on track for widespread vehicle use at competitive prices. To compete with today's inexpensive gasoline, our biofuels program focuses on the development of

facilities that make ethanol from agricultural and forest wastes and dedicated crops. Construction recently began in Jennings, Louisiana, on a "first-of-a-kind" production plant with 80 percent industry cost-sharing that will produce ethanol from sugarcane waste. This 20-million gallon facility is scheduled to come on-line in the year 2000 with initial ethanol production costs of $1.00 per gallon, putting us well on-track for the program's 2010 production cost goal of $0.72 per gallon. We are also supporting the development of demonstration plants in California and New York that will use rice straw and municipal solid waste to produce ethanol. Additionally, we are studying ways to add facilities to existing corn-ethanol plants to produce ethanol from corn stalks and leaves. R&D on ethanol technology is very important to our future energy security. By 2020 net U.S. oil imports, which accounted for about 50 percent of domestic petroleum consumption in 1998, will grow to 65 - 70 percent of domestic petroleum consumption -- with an annual oil bill ranging from $130 billion to more than $180 billion in current dollars.

A final example of technological progress involves Superconductivity, a property of certain special materials allowing them to carry large electrical currents without resistance energy losses. While we have known about superconductivity for nearly a century, hurdles such as ultra-low temperature requirements stymied the development of commercial applications. Then Nobel prize-winning discoveries in the late 1980s opened the possibility for practical uses of these technologies to improve the efficiency and performance of the electricity sector. Through EERE's innovative industry/laboratory R&D program, High-Temperature Superconductivity (HTS) has rapidly moved from discovery to utility-scale prototypes that carry 100 times the current of conventional cable in only ten years. I am pleased to note that the world's first superconducting power line will be installed in Detroit in the fall of 2000. Installed more widely, superconducting power lines and equipment would increase capacity, efficiency and reliability during the crucial period ahead when competition will bring new (and unplanned) stresses on our national electrical system.

While we are making tremendous strides in these technologies, we still have much work to do. The competitive revolution in the power generation sector has led to drastic decreases in the price of power from new sources of generation. For example, natural gas-fired combustion turbine technology produces electricity for about $0.03 per kWh. Given the low domestic market prices of fossil fuels, market penetration of renewable energy technologies is occurring more quickly in remote locations domestically and also overseas where the cost of electricity is generally much higher than in the U.S. Still, renewable energy is already making market inroads in many states: the world's largest wind installation in Iowa; major new commitments to solar energy in at least 15 states ranging from Massachusetts to Illinois to Arizona; biomass power plants in states such as New York, Ohio, Minnesota, Vermont and Indiana; and tens of thousands of new geothermal heat pumps in homes, businesses, schools and Federal installations in states as diverse as Indiana, New Jersey, Kentucky, South Dakota, Oklahoma, and Texas.

We are also aggressively pursuing integration of fossil fuel with renewable energy technologies. Projects such as hybrid wind/natural gas and co-firing of biomass with coal demonstrate the opportunities between renewables and fossil fuels.

With this remarkable progress over the past two decades, we have established a firm foundation for major market success of renewables and advanced power delivery systems in the coming years.

FY 2000 Program Focus

Our FY 2000 budget request would help us accelerate the market success of renewables and advanced power delivery systems. The budget request has three central objectives. First, we will accelerate U.S. technological progress by funding, in cooperation with industry and other partners, a balanced and integrated portfolio of research and development on renewable energy and power delivery technologies capable of meeting the diverse needs of the competitive electricity marketplace in the 21st Century. Second, we will improve environmental quality through increased use of non-polluting renewable energy technologies and advanced electric power systems. Third, we will expedite the transfer of technology and manufacturing process improvements to U.S. industries which will enable them to increase the deployment of their energy systems in the United States and to better compete for expanding export markets in other countries. The programs will help us achieve two important goals for 2010: 1) Tripling the installed U.S. electricity generation capacity of geothermal, biomass, wind, and solar; and 2) developing ethanol from wastes and dedicated crops as a cost competitive (less than $0.75 per gallon) domestically-produced blended transportation fuel.

Some examples of major program activities in FY 2000 that will help us achieve these objectives include:

Photovoltaics: The photovoltaic program will initiate development of new high-efficiency, multi-junction solar cells to capture and convert 1/3 of the sun's energy to electricity (the concentrator cell will be 33 and 1/3 percent efficient). The program will also continue efforts to reduce manufacturing costs and increase durability of PV systems, extending their lifetimes to greater than 25 years by 2004.

Biopower/Biofuels: In FY 2000, the biopower program will accelerate development of advanced conversion systems such as co-firing with coal that offer economic, near-term reductions in carbon emissions. In addition, the program will also continue its three highly cost-shared, biomass power projects in Minnesota, Iowa, and New York that will confirm the economic feasibility of integrated biomass power projects and provide a vital stimulus to rural America.

The FY 2000 biofuels program will continue its waste-to-ethanol and corn ethanol projects, and advance its core conversion technology research with universities and the national laboratories through a highly competitive process. It will also co-fund the regional biomass and feedstock development programs essential for geographically-appropriate, genetically superior biomass material.

Wind: In FY 2000, the Wind program will place added emphasis on field testing small wind turbine prototypes to verify performance for remote site, cold weather, and off-grid energy needs.

The first Next Generation Turbine prototypes -- large turbines for major on-grid power production -- will also begin testing, a major step towards achieving the market-driven 2002 goal of 2½ cents per kWh in good winds.

Geothermal: The Geothermal program will focus more resources on high-priority research and technology development for electric power applications. In particular, the program will initiate a cost-shared enhanced geothermal system (EGS) at an existing geothermal field, putting the U.S. at the forefront of global competition to achieve the first full-scale EGS capable of sustained operation. Additionally, the program will accelerate work to produce an advanced drilling system capable of economically accessing the vast geothermal resources below 10,000 feet. These initiatives will enable the program to achieve its long-term strategic goals, including the technology-based cost target of $0.03 per kWh.

Hydropower: In FY 2000, we are more than doubling our hydropower budget request to help us maintain and enhance our Nation's existing hydroelectric generation which today provides 10 percent of U.S. electricity. With more than 200 hydropower facilities up for relicensing in the next decade, early indicators suggest that environmental concerns may cause regulators to reduce generation capacities for relicensed facilities unless fish mortality and water quality concerns are met. EERE is developing and completing testing of advanced environmentally-friendly hydropower turbine prototypes that will improve water quality and reduce fish kill so that we can retain our current hydropower capacity of 75,000 MW.

Hydrogen: In FY 2000, our request will continue a strong core research and development effort to meet the goals of reducing the cost of hydrogen production, increasing the energy density and efficiency of solid state storage systems, and developing low-cost, reliable sensors to detect hydrogen leaks for a number of applications. The program will also support the accelerated development of hydrogen vehicle fueling stations in a 50/50 cost-shared venture with industry, vehicle mounted storage systems, reversible fuel cells that can be integrated with renewable energy systems and small fuel cells for remote power applications.

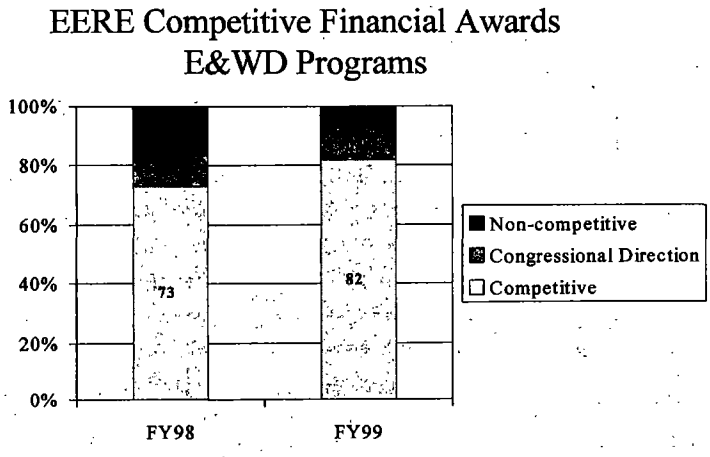
Superconductivity: In FY 2000 US leadership in this critical 21st Century technology will be visible through several ground breaking program successes. In addition to the Detroit cable project already mentioned, an advanced and environmentally friendly 10 megavolt ampere transformer will be installed in a Milwaukee substation - the world's first to supply power to a manufacturing facility. Also, testing will continue of the world's largest superconducting motor (1000 horsepower - installed FY 1999). Superconducting transformers and motors will be half the size of conventional alternatives and have only half the energy losses. Another expected breakthrough will be the continuous manufacture of an entirely new type of superconducting "tape" based on discoveries at Los Alamos and Oak Ridge National Laboratories. This new "tape," which can now only be made in short samples, offers unprecedented performance potential: two thin one centimeter-wide metal tapes coated with this new superconducting material will be able to carry the same electric load as a very large, complex copper cable.

Competitive Solicitation: In FY 2000 we propose to create an integrated Competitive Solicitation field validation program that combines the best elements of the earlier Renewable Indian Energy program and the Federal Buildings and Remote Power programs. Highly cost-shared, and technologically and regionally-diverse projects under this new solicitation will accelerate the development and use of the most promising renewable and hybrid renewable/fossil energy systems, leveraging as much as $30 million annually in new renewable energy projects.

Management Improvements

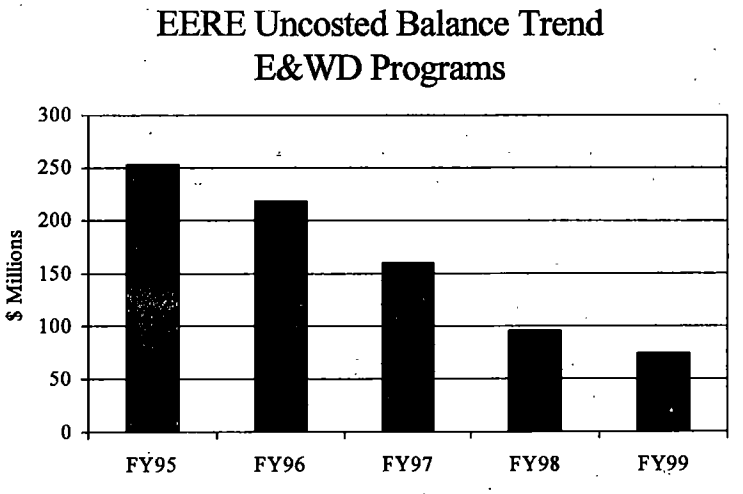
When I became Assistant Secretary seventeen months ago, I realized that EERE faced many management challenges and committed to fix them. This Subcommittee also highlighted several issues. We have listened to you -- and to industry and other partners -- and we have delivered.

Competition: This Committee said that EERE was relying too heavily on non-competitive mechanisms to disburse funds. We listened and we delivered a dramatic reduction in our use of non-competitive funding mechanisms. As you can see from the chart below, our use of broad-based solicitations, program management directives, and an increased emphasis on competition for laboratory subcontracts, has brought our level of competitive awards by the Office of Power Technologies (OPT) to 93 percent (including Congressionally-directed activities). This represents a reduction in OPT's discretionary use of sole source mechanisms by almost 60 percent in one year. Close to 100 activities previously funded by sole-source contracts within EERE's Energy and Water account in FY 1998 will be competitively awarded in FY 1999. This is a major success.



In 1998 we also competed the $1 billion management and operating contract for the National Renewable Energy Laboratory, the first time it has been competed in 15 years. The resulting contract with a partnership of three outstanding organizations -- the Midwest Research Institute, Battelle, and Bechtel -- strengthens the laboratory's management team and sharpens its mission focus.

Uncosted Balances: This Committee also said that EERE's uncosted balances were too high. Again, we listened and we delivered. Across all of EERE, we have reduced uncosted balances by more than 58 percent since the beginning of FY 1996. Within the Solar and Renewables R&D account we have made even greater progress, reducing uncosted balances by 62 percent since FY 1996. By the end of FY 1999, we will have reduced these balances by more than $175 million versus the beginning of FY 1996.



This Committee also highlighted the use of support service contractors. We listened and significantly reduced the proportion of funding directed to support service costs and established more streamlined procurement and business practices.

Management Practices: While we are proud of the progress we have made, we realize that our work to improve the management of EERE is by no means complete. For example, I have just established a new Management Improvement Team composed of senior managers from across the various EERE sectors as well as representatives from our National Laboratories, the Golden Field

Office, and various DOE Offices to improve the corporate management processes and procedures. We expect recommendations from this team will increase our ability to competitively award even more funding in FY 2000 on a competitive basis. Also, we are working with the National Academy of Public Administration (NAPA) to undertake an independent review of our financial management and procurement practices. This review should be completed by the end of October 1999.

Planning and Evaluation: We are also developing smarter strategies and carefully measuring progress in our core mission. We are developing a new office-wide strategic plan and using technology "roadmaps"-- jointly developed with industry -- to ensure we are in step with the needs and goals of the marketplace. We are making greater use of the Government Performance and Results Act and peer-reviewed measures of our technology progress. For example, we have commissioned the National Academy of Science to conduct an independent peer review of the Office of Power Technologies R&D programs. These tools and practices will help provide the data and analysis necessary to help make smart -- and sometimes difficult-- management choices such as our recent decision to end work on the solar power tower program in FY 2000. Finally, just as any business must do to stay competitive, we are working with the Department's Workforce 21 Initiative to ensure we have the right training, skills, and human resources available to fulfill our challenging missions.

Program Integration and Expanded Partnerships: One of our major management challenges is breaking through the "stovepipes" that often separate our various missions. This is important because the solutions to many of our renewable energy and energy efficiency challenges cross technology and market lines. For example, in the biomass area both the private sector industries (i.e., fuels, electric power, and chemical products) and our own power, industrial, and transportation programs have traditionally operated separately from each other. Leading initiatives designed to better integrate our work include those in Bioenergy, EnergySmart Schools, and Distributed Power.

As part of our efforts to integrate our biomass work, we are launching a crosscutting Bioenergy Initiative. Biomass represents a tremendous, untapped, domestic resource for our energy future, particularly as an alternative to imported oil. By investing in a bioenergy industry today, we can cultivate and harness renewable biomass resources to fuel our cars, power our homes and businesses, and supply our chemical needs in the 21st Century. The Department of Energy, along with other federal agencies and private partners, is launching a national partnership to develop an integrated industry to produce power, fuels, and chemicals from crops, trees, and wastes. By making a "ton of biomass" a viable market competitor to a barrel of imported oil, this initiative will help grow the U.S. economy, strengthen U.S. energy security, protect the environment, and revitalize rural America. This effort will integrate the work from existing DOE R&D in transportation biofuels, biomass power and programs with the forest products and agriculture industries. It is only through the integration of these efforts that biomass will be an effective competitor to imported fossil fuels.

The EnergySmart Schools initiative is an EERE-led partnership that brings together public and private sector resources to reduce the $6 billion in annual energy bills of our Nation's schools and redirect the savings to our children's education. EnergySmart Schools will help to reduce energy consumption and expand the use of clean energy technologies in new and existing schools, improve the learning environment, and increase awareness of energy-related issues. It is estimated that this initiative -- which will coordinate and build on the work of existing EERE programs such as Rebuild America, the State Energy Program, the Million Solar Roofs Initiative, Clean Cities, Energy Star, and the and potential projects under the proposed Solar Program Support/Competitive Solicitation program -- will help schools save up to $1.5 billion in energy costs and lower carbon emissions by 10 million metric tons by 2010 as they incorporate state-of-the-art energy efficiency and renewable energy technologies. Through the EnergySmart Schools partnership, we will provide technical assistance, demonstrate renewable and energy efficiency technologies, and offer guidance on financing and building design.

EERE is also pursuing a new initiative to encourage the development and use of distributed power technologies -- i.e., the generation of power at or near the point of use. Many technologies can be used in a distributed manner, including wind, photovoltaics, combined heat and power, concentrating solar power, fuel cells, gas microturbines, hydrogen production and storage, battery and flywheel energy storage, and hybrid renewable/fossil power systems. The benefits of the distributed approach to power generation include reduced consumer costs through increased system efficiencies, reduced environmental emissions, and increased reliability. Our approach to achieving the benefits is three-pronged: 1) R&D to facilitate introduction of distributed power applications, such as the development of modular renewable and fossil energy systems that can be scaled to need; 2) addressing crosscutting regulatory/institutional issues such as our work with the Institute of Electrical and Electronics Engineers (IEEE) to develop consensus-based interconnection standards; and 3) developing policy options for possible inclusion in electricity restructuring legislation.

Another challenge we are pursuing is to better leverage our resources and facilitate technology deployment by expanding partnerships with Federal, State, industry, and other entities. These partnerships involve other Offices within the Department of Energy including the Office of Fossil Energy (FE) and the Office of Science (OS) as well as other Federal agencies including the Department of Defense, NASA, the U.S. Department of Agriculture, the Department of the Interior, and the Environmental Protection Agency. For example, we work with FE as we implement our advanced geothermal drilling and biomass co-firing with coal programs, and OS is a partner for fundamental research on photovoltaic and superconducting materials and biomass feedstock genetics.

At the State and regional level, we have developed closer working relationships with State and tribal organizations including the Association of State Energy Research and Technology Transfer Institutions (ASERTI), the California Energy Commission (CEC), the New York State Energy Research and Development Agency (NYSERDA), and the Council of Energy Resource Tribes (CERT). For example, the Wind Energy program is coordinating R&D with the California

Energy Commission and an industry partner to develop one of EERE's two Next Generation Turbines.

Of course, in addition to our National Laboratories, our programs will continue to tap the innovation and expertise available at the many fine universities across the country. We will also continue to leverage resources and ensure market acceptance of the technologies we develop by pursuing cost-shared partnerships with the Nation's industries, utilities and other power providers, and other leaders in the energy field. For example, we are working with 18 universities across the U.S. to research innovative new photovoltaic conversion technologies and we have an extensive research partnership with the Electric Power Research Institute (EPRI) to accelerate development of superconducting wire, transmission cables, and motors.

OVERVIEW of the FY 2000 REQUEST for SOLAR AND RENEWABLE ENERGY TECHNOLOGIES

Our FY 2000 program level for Solar and Renewable Energy Technologies is $398.9 million -- an increase of $62.9 million over FY 1999. The bulk of the EERE Energy and Water Development Appropriation supports the work of the Office of Power Technologies ($325.2 million). This office works with electric service providers and related industries to advance clean, competitive and reliable power technologies. We develop renewable energy technologies that use solar, wind, hydropower, geothermal and biomass energy resources and conduct R&D that will enable a hydrogen energy infrastructure in the future. Our program also develops advanced technologies -- including high temperature superconducting materials, real-time power system controls, and energy storage -- that will improve the energy efficiency and cost-effectiveness of the nation's electric systems. Finally, the program facilitates the export of renewable energy power generation internationally.

Included in the Energy and Water Development Appropriation is $53.4 million for the Office of Transportation Technologies to support R&D on production of biomass-based transportation fuels. The requested funds also include $19.2 million for Program Direction, which provides the Federal staffing resources and associated funding to support the management and oversight of the Solar and Renewable programs.

Table 1 on the following page summarizes our total FY 2000 budget request, together with the appropriations for FY 1999 and FY 1997. In the following sections, I describe the details of the request. For each major line of the budget, I identify changes relative to FY 1999 appropriations and describe program specifics and reasons for the requested funding change.

Solar and Renewable Resource Technologies (in millions of dollars)				
	FY 1998 ($million)	FY 1999 ($million)	FY 2000 Request ($million)	Change (FY 1999-FY 2000) ($million)
Power Technologies	**245.2**	**272.3**	**325.2**	**+52.9**
Solar Building Technology Research	2.6	3.6	5.5	+1.9
Photovoltaic Energy Systems	64.7	72.2	93.3	+21.1
Concentrating Solar Power	16.3	17.0	18.9	+1.9
Biomass/Biofuels Energy Systems - Power Systems	27.8	31.5	39.0	+7.5
Wind Energy Systems	32.1	34.8	45.6	+10.8
Renewable Energy Production Incentive	3.0	4.0	1.5	-2.5
Solar Program Support[1]	0.0	0.0	10.0	+10.0
International Solar Energy Program[2]	1.4	6.4	6.0	-0.4
Geothermal Energy Systems	28.7	28.5	29.5	+1.0
Hydrogen Research	15.8	22.3	28.0	+5.7
Hydropower Development	0.7	3.3	7.0	+3.7
Renewable Indian Energy Resources[1]	3.9	4.8	0.0	-4.8
Electric Energy Systems and Storage	42.3	40.1	41.0	+0.9
Federal Buildings/ Remote Power Initiative[1]	4.9	4.0	0.0	-4.0
Transportation Technologies	**30.3**	**41.8**	**53.4**	**+11.6**
Biomass/Biofuels Energy Systems - Transportation	30.3	41.8	53.4	+11.6
National Renewable Energy Laboratory	3.2	3.9	1.1	-2.8
Program Direction	15.7	18.1	19.2	+1.1
Subtotal, Solar and Renewable Energy	**294.4**	**336.0**	**398.9**	**+62.9**
Use of Prior Year Balances	-24.4		-0.8	-0.8
Total, Solar and Renewable Energy	**269.9**	**336.0**	**398.1**	**+62.1**

[1] The FY 2000 Budget proposes to consolidate the Renewable Indian Energy Resources and the Federal Buildings and Remote Power programs through a competitive solicitation under Solar Program Support($10.0). This budget line would also include $2M for electricity restructuring.

[2] Excludes funding for international energy efficiency programs under Energy Conservation.

SOLAR BUILDING TECHNOLOGY RESEARCH

The request for Solar Building Technology Research is $5.50 million, an increase of $1.90 million from current levels. This funding will be used to make solar water heaters an economically attractive option for families across the U.S. by 2003. It will enable the Department to develop a new generation of solar water heaters that is 50 percent less expensive than today's technology (from $0.08/kWh to $0.04/kWh delivered energy cost). This would enable a family to buy a solar water heater for about $1,000 and see their investment returned in energy savings within four years. To accomplish this, the program is divided into three areas: Technology Development ($4.7 million), Field Validation ($0.5 million), and Quality Assurance ($0.3 million).

Within Technology Development (up $1.2 million), researchers will select two of the concepts under study that are most likely to enable the program to reach its cost goal. Development of these concepts will then become the focus of the program during FY 2000. It is likely that one or both of these systems will use polymers, including advanced plastics, as a replacement for the steel, glass, and copper that make up current solar water heaters. Since polymers are inexpensive and light weight, their use will reduce the cost of the solar collector and lower the cost of installation. Work will include testing to determine performance, ability to withstand freezing and overheating, and weather degradation. Materials research will be an important aspect of this work as several polymers formulations will be tested to see which are best suited to long term exposure to solar radiation.

In Field Validation (up $0.5 million) cooperative projects with utilities and builders will address some of the technical barriers that limit the use of solar water heaters. A Cooperative Research and Development Agreement with the Salt River Project (a utility serving the Phoenix region) will be completed that develops a roof integrated solar water heater that can provide hot water at a levelized cost of $0.06 to $0.07/kWh. This project, as well as projects with the Wisconsin Public Service and Lakeland Electric, is driven by restructuring of the electric industry as utilities seek to provide additional products and services to their customers. In addition, solar technical support will be provided to builders such as Pulte Homes, the second largest builder of U.S. homes, and CAVCO, one of the largest builders of manufactured homes. All efforts in this portion of the program are limited to R&D activities that include system evaluation, analysis of system performance, and assistance in solving problems such as materials degradation and corrosion that industry cannot address by itself.

Quality Assurance (up $0.2 million) funding will be used to address the reliability of solar water heaters, a primary customer concern. Performance and repair data from hundreds of systems that have operated for at least five years will be analyzed to identify the components and subsystems most in need of improvement. This data will be used to refine computer models that predict the reliability of solar water heating systems. This information will help the solar industry improve the reliability of its product and provide guidance to the researchers developing the new generation of solar water heaters.

PHOTOVOLTAIC ENERGY SYSTEMS

The request for Photovoltaic Energy Systems is $93.3 million, an increase of $21.1 million from FY 1999. The Photovoltaic Energy Systems program conducts a balanced portfolio of R&D activities that help U.S. industry to develop photovoltaic technology as a clean, competitive, reliable energy supply option, and to maintain technological leadership over strong international competition. The increase in FY 2000 will primarily be used to support basic research to dramatically reduce dollar per watt values for photovoltaics in the long term, and to support technology development and deployment to incrementally reduce costs in the near term. Based on a multi-year technology plan that has been developed in close partnership with industry, this balanced program focuses on three key activities that industry and other stakeholders have cited as the most critical to maintaining and advancing our lead in PV technology and products: Fundamental Research ($20.3 million), Advanced Materials and Devices ($27.0 million), and Collector Research and Systems Development ($46.0 million).

The Photovoltaic Energy Systems program is working hard to increase competition and reach out to a broader cross section of the industry. For example, the Million Solar Roofs Initiative is forming new partnerships all across the country with builders, solar equipment manufacturers, city planners, financial institutions and utilities. Furthermore, the FY 2000 increases for basic research will be used to issue competitive solicitations to a larger section of the research community seeking new ideas on non-conventional, breakthrough technologies.

Today, the U.S. stands as the world leader in photovoltaic technology, with our industry garnering 35 percent of total sales in 1998. This has not always been the case, however, nor is it guaranteed to continue. Leadership in photovoltaic technology was lost in the mid 1980's because of strong international support for PV development. As a result of our expanded support for advanced technology research and other DOE-industry partnership programs, the U.S. was able to recapture the lead in global market share for photovoltaic modules in 1993. However, in the past two years U.S. leadership has eroded, from 44 percent of total sales in 1996 to 40 percent in 1997 to 35 percent in 1998.

The U.S. photovoltaic industry faces intense competition from Japan and Europe, which are aggressively researching and marketing their PV technology. For example, Japan's FY 1999 budget for photovoltaics is 28.54 billion yen (approximately $240 million), which is more than three times our funding level. Half of Japan's budget is used to subsidize the purchase of residential PV systems. As a result, Japan's PV industry sales grew 40 percent in 1998 and are on pace to take over world leadership by the end of this year.

To maintain U.S. leadership -- and to penetrate new, larger markets such as energy service providers and building applications -- the cost of PV systems must be more competitive with other sources of electricity. Critical improvements in conversion efficiency, manufacturing, reliability and system life are essential. The increased funding request will enable the PV program, in cooperation with U.S. industry partners, to continue the research needed to resolve these technical problems.

Funding for Fundamental Research (up $9.3 million) will continue world-class research at national laboratories and universities on advanced concepts for improved technology in the post-2000 time frame. Activities will include continued research on several photovoltaic semiconductor materials to resolve issues that limit current technology. This work will advance the understanding of new and improved materials, cell structures, layer growth processes, semiconductor theory and material characterization methods.

Starting in FY 2000 we will begin a High Performance PV Initiative to support research to substantially increase the efficiency of two key technologies: large area, single crystal interconnected thin films, and multi junction concentrator cells made from elemental (III-V-based) materials such as antimony, arsenide, gallium, phosphorous, indium, or nitrogen. Fundamental research aimed at major innovations is required to essentially double the conversion efficiency of thin films from their current 8-10 percent to 15-20 percent, and to increase III-V-based multi junction cells from 30 percent to 40 percent under 500X solar concentration. Successful development of a 40 percent efficient four-junction laboratory cell will allow a 33 percent efficient concentrating module under a solar concentration of 500X, thereby capturing one third of the sun's energy. Both the enhanced thin film approach and the multi junction III-V approach will yield dramatically reduced dollar per watt values for terrestrial photovoltaics. Also new in FY 2000 will be a competitive solicitation on basic R&D for breakthrough, non-conventional PV technologies, such as liquid cells, polymers, biochemical and biomimetic processes, etc., aimed at dramatic cost reductions. Both of these new basic research activities will be core program efforts to meet the Program's long term goals of $0.06/kWh electricity.

Advanced Materials and Devices (no change) will continue collaborative research with industry to improve device efficiency and stability, particularly for large-area, thin-film deposition systems. The centerpiece of this activity is the Thin Film Partnership Program, a government/industry/university partnership program to accelerate development of cost-effective thin film technologies. Photovoltaic devices employing thin-film technology significantly reduce the amount of semiconductor material required for power generation. Also, because such devices are amenable to mass production, they offer significant potential for cost reduction -- which would make possible widespread use of such technologies as PV shingles. Module reliability research will continue to support testing of modules to improve operational lifetime in the field.

Collector Research and Systems Development increases (up $11.8 million) will be used to help reduce manufacturing costs of photovoltaics, develop building integrated products, accelerate electric utility use of photovoltaics, and expand work in support of the million solar roofs initiative. Key to maintaining U.S. competitiveness over the next five to ten years, manufacturing process research and development under the Photovoltaic Manufacturing Technology (PVMaT) partnership will continue cost-shared research with industry to reduce module manufacturing costs, improve module performance, and stimulate investment in new manufacturing production lines. As a result of this cost-shared R&D with industry, average manufacturing costs for DOE partners have declined by 50 percent since PVMaT began and are expected to decline by another 40 percent by 2004. In FY 2000, a PVMaT competitive solicitation to develop new in line

process diagnostics and state-of-the-art measurement and characterization equipment needed for module scale-up will be issued, resulting in 5-7 new industry cost-shared contracts. A new solicitation will be issued for highly leveraged utility projects designed to provide utilities with hands-on experience with PV systems, and validate technical and economic performance in specific high-value applications such as building integrated applications. A portion of the increase will also be used to fully fund Phase 3 building integrated contracts under the PV:BONUS program, which supports cost-shared efforts with industry and others to develop PV products that can be integrated into commercial and residential buildings.

In addition, a part of the increase in Collector Research and Systems Development (up $1.5 million) will be targeted at specific activities that support the million solar roofs initiative. An important goal of this initiative is to help develop a significant domestic market for U.S.-manufactured solar energy systems, to provide a firm base for U.S. industry expansion and market competitiveness. Without such a base, as is being actively pursued in other countries such as Germany and Japan, it is likely that PV systems will become an example of technology developed here but exploited abroad.

In FY 2000, the Million Solar Roofs Initiative will work with 25 State and Local Partnerships across the nation which have made preliminary commitments to install over 750,000 solar energy systems by 2010. These Partnerships work to eliminate barriers to the use of solar energy and create market demand. The members of the Partnerships often include utilities and energy services companies, builders and developers, financial institutions, solar equipment manufacturers and distributors, local government, state and Federal agencies and other solar energy interests. Work will be expanded that includes development of additional financing mechanisms, elimination of technical barriers like the safe interconnection of photovoltaics to the utility grid, technical training and establishment of net metering. Establishment of the national Million Solar Roofs registry to track system installations will also be fully implemented. Additionally, the Initiative will also work to ensure that solar energy systems meet the requirements and standards of state and local codes and standards. To ensure that the Initiative is responsive to the State and Local Partnerships, the DOE Regional Support Offices will coordinate Federal support and provide technical assistance. As the largest single user of energy in the U.S., the Federal government is committed to installing 20,000 solar energy systems on its own facilities by 2010. In FY 2000, the Initiative has an interim goal of 2,000 Federal solar energy installations.

CONCENTRATING SOLAR POWER PROGRAM

The FY 2000 funding request for the Concentrating Solar Power (CSP) Program (formerly the Solar Thermal Energy Systems program) is $18.85 million (up $1.85 million). The CSP Program leads the national effort to develop clean, competitive, and reliable power options using concentrated sunlight. Ranging in size from several kilowatts to multi-megawatt installations, CSP systems can satisfy substantial domestic and international energy needs, contributing up to 20,000 MW by the year 2020. Consequently, CSP systems are also expected to make a significant contribution to the U.S. effort to reduce carbon emissions in the early part of the 21st

Century. An advantage of concentrating solar power systems is the capability of being deployed as either a distributed power system or as a dispatchable power system (when hybridized), or both.

In response to the changes brought on by utility restructuring and the resulting emphasis on competition, the CSP program has revised its focus from developing specific technologies to providing technology options to U.S. industry that will enable them to compete in near-term renewable energy markets and further reduce the costs for long-term penetration of broader energy markets. This paradigm shift has led to the four new program technology paths described below.

Under the first path, *Distributed Power Systems*, ($6.7 million requested, up $1.4 million) the CSP Program will work with three industry partnerships to develop and demonstrate reliable dish/engine systems. Under the Utility Scale Joint Venture Project (USJVP), three 25 kW systems are undergoing intensive reliability monitoring in FY 1999 and FY 2000, with a near-term goal of reaching 1,000 hours between down times. In order to encourage competition, a second solicitation was issued for alternative designs under the Dish/Engine Critical Components (DECC) Project in FY 1998. Awards were made and operating hours are being accumulated on this system to prove reliability. Next-generation improvements are being incorporated in FY 1999, with a completely-modernized, full-scale 25 kW prototype system to be installed in FY 2000. A third project was launched in FY 1999 to field an advanced-technology 10 kW solar dish/engine system at a remote site in the Southwestern U.S. In FY 2000, the off-grid capability of the system will be developed and tested. These systems are equally suited for either stand-alone operation or for being hybridized with natural gas or diesel fuel.

The focus of the second path is to reduce the costs of *Dispatchable Power Systems* ($5.34 million, down $0.63 million). Based on the results of an industry-led trough technology roadmap, a number of component and system improvements were identified as being able to reduce the costs of near-term trough plants from the current 10-12¢/kWh to 6-8¢/kWh. To meet this need, the USA Trough Initiative was launched in FY 1999. FY 2000 work will focus on optimization of the collector design, improved system integration with conventional power plants (e.g., natural gas combined-cycle). This initiative will reopen a domestic market for trough systems and provide a leading position for U.S. industry in bidding on projects currently before the World Bank. Additional activities include a SolMaT effort to develop low-cost drives and concentrators.

Path three, *Advanced Components and Systems* ($5.96 million requested, up $0.97 million), addresses the longer-range R&D required for CSP systems to achieve energy costs in the 4 to 6¢/kWh range, thus allowing penetration of broader domestic and international markets. In FY 2000, the program will continue current project work focused on higher-temperature technologies, the development of durable reflective materials, and higher efficiency system designs through the improvement of both solar concentrators and receivers.

The fourth path, *Strategic Alliances & Market Awareness* ($0.85 million requested, up $0.11

million), covers technology transfer, communications, and technology roadmapping efforts to ensure that the CSP program is focused on the needs of industry and the realities of the marketplace. Analyses and studies conducted in FY 2000 by the world-class researchers at SunLab (a "virtual" laboratory comprised of the CSP researchers at Sandia National Laboratories and the National Renewable Energy Laboratory) are heavily relied upon by U.S. industry, Federal and State agencies, and other organizations involved in renewable energy development.

WIND ENERGY SYSTEMS

The FY 2000 funding request for the Wind Energy Systems program is $45.6 million, an increase of $10.8 million over the FY 1999 appropriation. The mission of the Wind Energy Systems program is to enable U.S. industry to complete the research, testing, and field verification needed to fully develop advanced wind energy technologies that lead the world in cost-effectiveness and reliability. Wind energy has been the fastest growing source of energy in the world for the last decade, with capacity additions worldwide totaling over 2000 MW in 1998 and industry sales of over $2 billion. Wind power stations in Europe and developing countries account for most of the recent capacity increases, using wind turbines supplied primarily by European companies. While wind power development in the United States is beginning to recover from several years of stagnation, prospects for sustaining this growth are still highly uncertain as electric power markets deregulate and place increased emphasis on low cost of energy production. The key to positioning wind as an important U.S. clean energy option for new competitive power markets, as well as export markets, is the development of innovative, cost-competitive technology that is being carried out under the Wind Energy Systems program. The program is currently partnering with industry for R&D targeted to reduce cost of energy from wind to 2 ½ ¢/kWh at sites with good winds.

In FY 2000, the Wind Energy Systems program will focus on Applied Research ($13.5 million), Turbine Research ($20.2 million), and Cooperative Research and Testing ($11.9 million).

Applied Research (up $2.8 million) addresses fundamental engineering and technology issues with a broad range of applications, and is carried out at National laboratories and numerous universities. The requested increase will support the Wind Partnerships for Advanced Component Technologies (WindPACT) project. Under WindPACT, promising research ideas and concepts generated in Applied Research will be further developed and tested by a joint team of industry and laboratory researchers on a component and subsystem basis. WindPACT will develop improved wind technology components such as self-protecting rotors, passive aerodynamic controls, and new generators that can readily be incorporated into new turbine designs beyond those now included in the Next Generation Turbine project. This competitive effort is expected to attract new players into the wind industry because partnerships between new entrants and existing wind companies will be encouraged and previous technical experience with wind will not be required.

Turbine Research (up $3.8 million) is a cost-shared cooperative program with industry and utilities that supports competitively-selected research, testing, and field verification needed for

advanced technology wind turbines. The requested increase for Turbine Research will support continuing partnerships with seven companies, and initiation of several new field verification projects that will be tailored to satisfy specific regional needs. Two companies are designing turbines under the Next Generation Turbine project, which is targeted to reduce energy costs from wind systems to 2 ½ ¢/kWh at 15 mph wind sites by 2002. In FY 2000, these companies will require increased funding as they enter into a period of peak design activity and hardware procurement for their engineering and manufacturing development prototype turbines. The Near Term Research and Testing project will be completed in FY 2000, yielding several technological advancements for a more cost effective 750 kW turbine, to help U.S. industry compete in current world markets. Testing of prototypes will commence under the Small Wind Turbine project, and several new field verification projects using small (up to 100kW) wind turbines will be in operation. The program will also take the lead in completing R&D and field verification for a wind turbine intended for use in extreme cold environments, such as Alaska and the Antarctic, as the third phase of a Small Business Innovation Research project begun by the National Aeronautics and Space Administration and the National Science Foundation.

Cooperative Research and Testing (up $4.2 million) focuses on near-term R&D and testing at the world-class National Wind Technology Center (NWTC) in Colorado, which features a user facility that allows U.S. industries to expand testing of new wind energy technologies. The requested funding increase will launch a new cooperative effort with industry -- Hybrid Systems for Village Power -- which will build upon the experience with ongoing wind hybrid power projects in Alaska and provide opportunities for field verification on new wind control systems and system integration options. In addition, a new Wind Monitoring Network will provide verifiable data on long-term performance of several large new wind projects. This information is needed for developing strategies to accelerate the use of wind energy under the new rules of the emerging competitive power markets. NWTC capabilities for providing accredited certification testing services will be expanded, and efforts will continue in establishing U.S. certification capability for wind turbines in cooperation with Underwriter's Laboratories (UL). UL is now offering certification services to the wind industry -- one wind turbine company has already contracted for UL certification -- and will begin to work with the NWTC staff to define certification procedures. NWTC staff are presently developing quality assurance, testing, and design evaluation procedures which will be used to test turbines for UL certification.

BIOPOWER/BIOFUELS

We are requesting $92.4 million for Biopower/Biofuels programs in FY 2000, an increase of 21 percent. This includes $6.0 million to support the Bioenergy Initiative described earlier in this testimony. The Initiative is an integrated effort spread among three sectors within the Office of Energy Efficiency and Renewable Energy in partnership with the private sector. The program supports biomass energy projects aimed at three principal markets: electric power; transportation fuels; and chemicals.

The following is a brief discussion of the Biopower and the Biofuels Programs:

BIOPOWER PROGRAM

The budget requests for the Biopower program with the Office of Power Technologies is $38.95 million in FY 2000 -- an increase of $7.5M over FY 1999. The Biopower Program mission is to integrate sustainable biomass feedstock production with efficient biomass power generation systems that can provide substantial energy, economic, and environmental benefits. The program focuses on collaborative partnerships between the Department and the private sector to conduct critical research, development, and cost-shared demonstration activities. Through the introduction of competition to the generation market, power producers who can also produce a variety of energy related co-products will capture an increasing volume of electricity sales. These applications will provide broader based, near term markets for advanced biopower systems. The program's goal is the establishment of 30,000 MW of renewable biomass capacity installed by 2020. The request includes $2.7 million for Thermoconversion and $32.15 million for Systems Development. Also included under collaborative co-funding with biofuels are $3.1 million for feedstock development and $1.0 million for the regional biomass energy program.

Thermoconversion
The increase in Thermoconversion (up $1.2 million) will support basic research in biomass combustion and gasification characteristics, especially related to cofiring biomass with coal (a major near-term, low-cost market opportunity) and as applied to integrated gasification power producing systems.

Systems Development
Within the Systems Development activity (up $5.8 million), $5.5 million is requested for the Vermont Gasifier Project, $17.3 million is requested for the DOE/USDA Biomass Power for Rural Development Initiative (an increase of $1.8 million), $5.4 million is requested for the Co-firing Biomass with Coal Initiative (an increase of $2.9 million), and $4 million is requested for Small Modular Systems Development.

The *Vermont Gasifier* project will demonstrate a pilot-scale state-of-the-art gasifier combined with an advanced turbine, producing approximately 8-12 MW of electricity from wood. In FY 2000, a hot-gas clean-up unit will be installed and the integrated combined cycle gasification systems will be operated for 1,000 hours at double the efficiency of direct-fired biomass units.

The *Biomass Power for Rural Development* initiative in FY 2000 would support three projects: 1) co-firing tests of a 35 MW retrofitted plant with switchgrass in Chariton Valley, Iowa project will begin and up to 3600 acres of switchgrass will be planted ($1.8 million); 2) cofiring tests of willow and coal will be conducted along with the completion of retrofit of two additional coal plants and up to 600 acres of willow will be planted as part of the New York Salix project ($1.5 million); and 3) construction of the 75 MW Minnesota Valley Alfalfa Producers integrated gasification combine cycle power plant ($14 million).

The *Co-firing Biomass with Coal* initiative, currently conducting test runs on the effectiveness of blends of coal and biomass, will expand in scope to additional sites to include biomass gasification. Sustained operations at selected sites will also be demonstrated. Modular systems development is funding feasibility studies, prototype demonstrations, and proceeding to full systems integration and development of smaller gasification units (5kW to 5MW).

TRANSPORTATION BIOFUELS

The Transportation Biofuels Energy Systems program within the Office of Transportation Technologies has a budget request of $53.4 million in FY 2000 - an increase of $11.7 million over FY 1999. The mission of this program is to research, develop, and demonstrate cost competitive technologies for the production of liquid transportation fuels, in collaboration and partnership with industry, other government organizations, and academic institutions. In support of this mission, the program pursues the development of low-cost biomass energy feedstocks and cost competitive conversion technologies for liquid fuels production from agricultural residues, forestry wastes, and energy crops. The development and deployment of biofuels technologies can displace 0.30 quads of primary energy by 2010 and 0.84 quads by 2020, while promoting rural economic development. Since biofuels produce almost no net carbon on a life cycle basis, they are a very promising supply side option for reducing carbon emissions in the transportation sector.

The requests of $53.4 million for the Transportation Biofuels Energy Systems Program includes $37.4 million for ethanol production, $1.0 million for biodiesel production, and $6.0 million for integrated bioenergy research and development. The request includes $5.5 million for feedstock development and $3.5 million for the regional biomass energy program (collaborative co-funding with the Biopower program).

Ethanol production (up $1.5 million) is a major focus of the Transportation Biofuels program, comprising 70 percent of the budget request. Currently, ethanol is being used as a blend with gasoline in 10 percent ethanol/ 90 percent gasoline mixtures, can be used in flexible fueled vehicles (up to 85 percent ethanol blends) and is being considered for use in fuel cells.

We have established three industrial partnerships for the construction of ethanol production facilities using waste biomass. These highly leveraged partnerships, with DOE providing around 20 percent of the costs will result in "first of a kind" commercial technology demonstration plants. We recently attended a ground breaking ceremony for the construction of the first partnership project-- a 20 million gallon waste to ethanol facility in Jennings, Louisiana. The other two partnerships are to build ethanol production facilities in California and New York. We are also working with the existing corn (starch based) ethanol industry to demonstrate biomass (cellulose) technology as add-on facilities using corn stalks and corn fiber to increase production and improve economic viability of the process. At least one feasibility study for an add-on facility will be completed in FY 1999.

The program will also continue advanced technology research and development at our National Laboratories will improve energy conversion and integrated process efficiencies and address key cost factors to reach the production cost goal of $0.72 per gallon by 2010.

The *Biodiesel* program (up $0.2 million) will continue research and development of efficient technologies for the production of biodiesel to lower the cost of a biomass-based alternative to diesel fuel. Opportunities for converting low-cost waste oils will be explored.

COLLABORATIVE FUNDING BY BIOPOWER AND BIOFUELS

The $8.6 million Biopower/Biofuels request for *Feedstock Development* (up $3.5 million) will expand the research and development to increase the number of crop species for regional diversity and the increase of the number of yearly harvesting in order to improve the economics utilization of feedstock for production. These feedstocks will provide a sustainable, reliable supply of biomass which can be used for the production of fuels, chemicals and power. The Biopower/Biofuels request for the Regional Biomass Energy Program of $4.5 million (up $1 million) will continue regionally focused activities with State and local governments to increase the development and use of biomass resources for multiple products.

RENEWABLE ENERGY PRODUCTION INCENTIVE PROGRAM

The request for the Renewable Energy Production Incentive Program is $1.5 million, a $2.5 million decrease from FY 2000 funding levels. Annual appropriations provide financial production incentives to stimulate the construction and operation of new, qualified renewable energy facilities owned by state entities, municipal utilities, and electric cooperatives that produce and sell electricity. We estimate that FY 2000 payments to qualified Tier I facilities -- which use solar, wind, geothermal or dedicated (closed-loop) biomass resources -- will require approximately $0.3 million to pay for electricity generated and sold. Remaining funds will be applied to qualified Tier II facilities, and include non-dedicated (open-loop) biomass resources (which would not be eligible for renewable energy tax credits if they were owned by private industry).

A number of very legitimate concerns regarding the proposed cut in REPI funding have been raised by the public power community. We are carefully revisiting this issue.

SOLAR PROGRAM SUPPORT

The FY 2000 request for Solar Program Support is $10 million, $8 million for a Competitive Solicitation which would combine current the current Renewable Indian Energy Resources and Federal Buildings/Remote Power programs to encourage innovative applications and deployment of renewable electric technologies and would provide $2 million for Electricity Restructuring.

The $8 million requested for a Competitive Solicitation (down $0.8 million from the predecessor programs) will speed early deployment of renewable technologies by seeking technology proposals on the best ways to use renewable technologies, either singly or in combination with other renewable technologies, or in hybrid configurations with fuel cells, natural gas or energy storage systems.

The two primary objectives of the Competitive Solicitation program are: 1) to prove the availability of clean, affordable, and reliable electric power supply options for the many remote and/or economically challenged regions of the Nation; and 2) to obtain essential data on operational performance, reliability, and benefits of renewable energy and hybrid renewable energy systems in various geographic locations and climatic conditions.

The information and experiences gained through this Competitive Solicitation program will also help overcome specific impediments to more widespread use of renewable electricity technologies. Currently, renewable energy projects are hampered by the uncertainties of electric utility restructuring, the current low price and perceived availability of natural gas, and improvements in gas turbine technology. The increasingly competitive restructured electric environment also favors technologies with low capital costs over technologies with higher capital costs, but lower life cycle costs. Rather than high project technical or financial risk, the major hurdle often facing renewable energy projects is identification of project structures in the new marketplace that would allow acquisition of long term power purchase contracts and project financing. Such new structures include renewable energy power marketers, hybrid projects with renewables and natural gas, investments in distributed renewable electricity generation, and customer choice.

This six-year, highly-leveraged program would combine two previous budget items -- the Renewable Indian Energy Resources and Federal Buildings/Remote Power programs -- into a single, integrated, technology-focused competitive field validation program. (Compared to the prior programs, funding is reduced by $0.8 million.) In keeping with the origins of this program, the Solicitation program would designate two targeted areas for competitive awards -- systems benefitting Native Americans and systems addressing the needs of Federal facilities -- in addition to providing for an "open" solicitation for other applications of these systems. Remote power needs will continue to be addressed as aspects of all three segments of this solicitation. Of the $8.0 million proposed for FY 2000, up to $3.0 million of the solicitation will be dedicated to projects benefitting Native Americans. Native American projects will require a minimum 20 percent cost-sharing, and the "open" portion of the solicitation will require at least 75 percent non-DOE funding. For a number of reasons, there are tremendous synergies between renewable energy technologies and the energy needs of Native Americans. Renewable resources such as solar and wind are often abundant on tribal lands. In addition, Native Americans often have substandard or, in some cases, no electricity service. Renewable energy technologies can often provide the most cost-effective option for providing electricity on tribal lands and can also be a source of employment for tribes installing such systems onsite.

The request for Electricity Restructuring for FY 2000 of $2 million represents an increase of $100,000 over FY 1999 appropriations. The purpose of the Department's electricity restructuring activities is to develop a comprehensive understanding of emerging electricity competition policies across the country and their impacts on renewable energy and energy efficiency products and services, and the impacts on various public benefit programs such as low-income assistance.

The program will provide technical assistance and analysis to State, Federal and tribal decision makers and others to assist them in their efforts to achieve their renewable energy, energy efficiency, and consumer protection goals as the industry is changed. This work is critical to renewable and energy efficiency technologies because the new electricity market and regulatory rules will have a major impact on future technology deployment.

Due to the introduction of competition the electricity sector is undergoing the most significant transformation that has occurred in over 60 years. Fourteen States have enacted retail competition legislation to permit customers to choose their electricity supplier and four others have issued comprehensive competition orders. Fourteen other States ended their 1998 legislative sessions with comprehensive retail competition bills pending.

The transition to competition is challenging for a number of reasons including the technical complexity of the electricity system, the intricate web of Federal, State, and local law and regulation, and regional differences. As a consequence, policy makers at all levels of government need analysis and technical assistance on a portfolio of market and policy mechanisms to achieve their restructuring goals. The demand for this assistance is very high. For example, as part of the recent broad-based solicitation, the Department received far more restructuring-related analysis and technical assistance proposals than our resources can support.

Although each State and region face unique electricity policy challenges, there are many common issues. Furthermore, many States lack the resources and expertise needed to address the complexities of electricity restructuring and to keep track of what other States are doing. Consequently, it is often more cost-effective and efficient for certain technical assistance and analysis to be provided at the federal level rather than duplicated on a State-by-State basis. In addition, although a plethora of studies and analyses funded by entities with economic interests in certain restructuring outcomes exist, user-friendly information from independent entities on key policy issues is often in short supply. The EERE electricity restructuring program works to fill this information gap.

The restructuring program is also important to the development of EERE's own research and development agenda. The success of our R&D agenda hinges, in part, on assuring that the technologies we help develop are compatible with the rapidly evolving electricity market structure. Thus, the restructuring program informs our R&D work. For example, the introduction of competition is likely to favor modular, distributed systems that are less capital intensive than central station plants. In response, many of our R&D programs are increasingly

focused on modular applications.

In FY 2000, the Department proposes to expand technical analyses on the impacts of electricity restructuring on renewable technologies and energy efficiency technologies. Analyses on market mechanisms such as labeling of electricity products for consumers, "green" certification, and energy services strategies will be completed. The program will provide tools and information for policy makers to develop legislative and regulatory policies that lead to competitive, reliable electricity markets with a range of energy options including renewable energy and efficiency technologies. To facilitate these efforts, the program will also encourage the States and others to form regional information exchange networks to share "lessons learned" about what does and doesn't work.

NATIONAL RENEWABLE ENERGY LABORATORY

The FY 2000 request of $1.1 million for the National Renewable Energy Laboratory (NREL), (down $2.8 million), is to provide for maintaining NREL facilities to assure appropriate scientific and technical support for Solar and Renewable Energy R&D activities. The request will fund infrastructure renovations and upgrades at the NREL sites, including minor modifications, road repair, safety fencing, roof repairs, and the installation of a 2,000 square foot multi-user prefabricated facility for solar radiation research. In addition, the request will fund acquisition of a variety of critical multi-program laboratory equipment needed to upgrade or replace old equipment, and also provide for the upgrading of the laboratory's data system infrastructure.

GEOTHERMAL ENERGY

The Geothermal Energy request for FY 2000 is $29.5 million, an increase of $1.0 million over FY 1999 levels. The Geothermal program in the Office of Geothermal Technologies works in partnership with U.S. industry to establish geothermal energy as a sustainable, environmentally sound, and economically competitive contributor to the U.S. and world energy supply. These joint efforts sponsor research and development that leads to advanced technologies to improve reliability, reduce environmental impacts, and lower costs of geothermal energy systems. The budget request supports the five goals of the Geothermal Energy Strategic Plan for 2010 which have been endorsed by industry: supplying the electrical power needs of 7 million U.S. homes; providing the heating, cooling, and hot water needs of 7 million U.S. homes; meeting the basic energy needs of 100 million people in developing countries; ensuring that the United States continues to lead in geothermal technology; and developing new technology to meet 10 percent of U.S. non-transportation energy needs. In contrast to last year, the budget request is allocated solely for Geothermal Electric R&D and Development ($29.5 million). No funds are requested for Geothermal Heat Pump Deployment in FY 2000. The $29.5 million request is allocated among: reservoir technology, $8.0 million; exploration, $7.0 million; drilling $7.5 million; and energy conversion, $7.0 million.

The Reservoir Technology program (+$2.5 million) will perform water injection tests at a commercial site at Dixie Valley, Nevada, develop a suite of chemical tracers for tracing the flow of injected water, and use field test data to improve reservoir models. These efforts will lead to proper fluid management practices which could enable a geothermal field to operate productively for over 100 years. The Enhanced Geothermal Systems initiative under the Reservoir Technology program will focus on extending the productivity and lifetime of geothermal reservoirs through rock fracturing, stimulation, and water injection.

The Exploration program (+$1.5 million) will collaborate with industry on 3D-seismic techniques to locate and characterize new geothermal fields. Individual geophysical methods will be integrated to develop "smart" systems which will select more reliable exploration targets. Greater effectiveness in locating geothermal resources will greatly reduce the number of non-productive wells.

The Drilling program (+$2.5 million) will complete the testing of improved PDC drill bits, unshielded high-temperature logging tools, and a high-temperature casing inspection tool. The Geothermal Advanced Drilling System will be initiated which will give economic access to the extremely large geothermal resources contained in rocks at great depth. One element of the Geothermal Advanced Drilling System is a high speed data link that will transmit a variety of real-time drilling data to the surface for decision making while drilling. About 50 percent of the cost of the high speed data link will be provided by major private sector partners. In addition, a consortium for high-temperature electronics suitable for applications in geothermal wells will be formed by the Gas Research Institute, Honeywell, Boeing, other industry leaders, and the Drilling program. Finally, the program will transfer to industry the technology to acoustically align downhole line shaft pumps which will save industry millions of dollars annually.

In the Energy Conversion program (+$1.0 million), the Kalina Cycle, a new plant design for more efficient and cost-effective electricity generation, will be tested in partnership with industry. The non-Federal cost share of this demonstration project is over 60 percent. The program will also field test gas monitors and anti-fouling coatings for heat exchanger tubes which will reduce geothermal power plant operating and maintenance costs. The new Modular Geothermal Power Plant initiative under the Energy Conversion program will support the design, construction, and testing of a small (300 to 500 kW) power module for distributed or off-grid sites. This initiative creates a supply option for developers wishing to install small-scale geothermal plants which can be used in remote, off-grid, and/or grid-connected locations, providing flexibility in adapting to the changing electric power industry. This is particularly important because geothermal is emerging as an attractive "green power" customer choice option as program R&D continues to cut power generation costs.

Competition is key to the cost-effective management of geothermal R&D activities. All three geothermal initiatives described above, as well as many other research and development activities, will be competed through solicitations.

HYDROGEN

The request for Hydrogen is $28 million, an increase of $5.7 million from FY 1999. Industry is investing substantially in both hydrogen production systems and the development of the Proton Exchange Membrane (PEM) fuel cells that require a hydrogen stream to operate. Buses powered by fuel cells with onboard hydrogen are being tested in metropolitan districts, and residential fuel cell systems are entering into pre-commercial testing. These ventures portend commercial activities for the distributed production, storage and utilization of hydrogen by 2001 to 2003.

The Hydrogen Program is authorized by the Hydrogen Future Act of 1996 to fund those projects which are evaluated on a competitive basis. In FY 1999, the Department funded 92 percent of the Hydrogen Program through four competitive solicitations. The FY 2000 request will support a balanced program to increase market penetration of renewable/hydrogen energy systems and hydrogen-powered vehicles, and long-term research and development in the production of hydrogen from renewable resources through a similar competitive process. The program focuses on three key activities: Core Research and Development ($14.1 million), Technology Validation ($11.4 million), and Analysis and Outreach ($2.5 million).

Core Research and Development (up $5.0 million) supports R&D on hydrogen production, storage and utilization. The increased funding will fully fund thermal conversion processes that produce hydrogen from natural gas with a 25 to 35 percent decrease in the cost of producing hydrogen over conventional processes. Long-term research programs will also be enhanced in awarding multiple cooperative agreements for photobiological and scaled-up photoelectrochemical processes. These key activities, in conjunction with the industrial development of the PEM fuel cell, will enhance the ability of the industry to consider low-cost hydrogen options for power, industry and transportation market sectors by 2004.

Storage R&D is focused on developing and demonstrating hydride and carbonaceous materials for the storage of hydrogen at low temperatures for power and transportation applications. The increased funding will permit the award of one project to characterize a family of new metal hydride materials and another award to assemble carbon absorbents into a laboratory system.

Utilization technology is focused on developing and demonstrating end-use power systems that are safe, and have near-zero or zero emissions with an overall generation efficiency greater than 45 percent. A newly developed solid state hydrogen leak detector prototype design will be fabricated and field tested. A low-cost 25 kWe fuel cell will be demonstrated.

Technology Validation (up $0.4 million) supports 50/50 cost-shared ventures with industry on hydrogen vehicle fueling stations, vehicle-mounted hydrogen storage systems, reversible fuel cells to operate with renewable systems, and small hydrogen fuel cell systems for remote power applications. The FY 2000 request supports the operation of a reversible fuel cell with 60% round-trip efficiency; the incorporation of high-pressure hydrogen storage on vehicles; construction of a quick-fill refueling station to service Las Vegas shuttle buses and government

vehicles; and the design and construction of small-scale fuel cells for remote applications.

Analysis and Outreach (up $0.3 million) conducts portfolio and technology analyses to determine what steps are required to transition to a hydrogen energy economy. Technology analyses will periodically review specific areas (i.e., thermoconversion, storage, etc.) to ensure that research is of high quality and of significance to the overall objectives of the program.

HYDROPOWER

For FY 2000, the Department is requesting $7.0 million for Hydropower Development, an increase of $3.8 million over FY 1999 funding. With this funding, the program will complete proof-of-concept testing of an innovative, non-shearing "fish-friendly" turbine design (competitively selected in earlier activities) and will provide for the completion of experiments to develop biological performance criteria for advanced turbine design. The program will also initiate the competitively selected engineering design of a "fish-friendly" turbine to increase dissolved oxygen.

Once complete, these new turbines can replace equipment at existing facilities where environmental concerns may cause a reduction in generation. Hydropower provides approximately 10 percent of the total U.S. electricity generation today; diminished power production from this clean baseload power resource would have serious environmental and economic impacts on our nation. This cost-shared program with industry would maximize power generation from hydropower facilities and help develop an important export market for U.S. companies.

ELECTRIC ENERGY SYSTEMS AND STORAGE

$41.0 million is requested for the Electric Energy Systems and Storage program in FY 2000, an increase of $0.9 million from FY 1999. The program is working with partners to develop advanced power systems that will make the delivery of electric power more efficient and cost effective, reduce power sector emissions, facilitate market penetration of renewables, and enhance U.S. industrial competitiveness. The program includes efforts on Transmission Reliability Research ($4.0 million), High Temperature Superconductivity ($31.0 million), Energy Storage ($6.0 million), and Climate Challenge (no funds requested).

The FY 2000 budget request for Transmission Reliability Research is $4.0 million, an increase of $1.0 million from FY 1999. Before electric restructuring, vertically integrated utilities sold electricity and reliability services from central station power generators over transmission lines that were constructed to serve specific load areas. This system was not designed to allow competitive sales of energy and services from any generator to any customer, and the resulting constraints to this type of operation must be resolved cost effectively to allow full market competition. Transmission Reliability provides Federal support to develop technologies and policy options that will maintain and improve the reliability of the Nation's electricity delivery system

during the transition to competitive power markets. The program is being implemented through a National Laboratory/electricity industry partnership, and is leveraging funds from other partners. Transmission Reliability has two key activities: Power System Reliability ($3.8 million) and Distributed Power ($0.2 million).

Power System Reliability (up $1.3 million) will develop advanced computational and information systems to monitor and control the power system in real time, and advanced power electronics to accomplish fast, high-power switching under real time system control. Reliability technologies and policy options are developed in the context of competitive markets, and research will account for changes in market forces as rules and restructuring legislation are developed and implemented. Real-time control of the power system can provide information to remove transmission bottlenecks and operate the system in a way that can turn "two-lane roads" into "superhighways," releasing capacity for competitive markets.

Distributed Power (down $0.3 million) funding will continue development of technologies, and removal of technical, regulatory, and institutional barriers to enable the integration of distributed generation and storage into the electric and natural gas systems. Distributed technologies include renewable resources, fuel cells, microturbines, battery and flywheel storage, and direct load control. Integration of these technologies offers environmental and economic benefits and extends competition to the retail customer level.

It is anticipated that the Transmission Reliability program will last approximately five years and will ensure that research and development for reliable systems and competitive markets is maintained until new market and/or regulatory structures are developed that provide the incentives for the private sector to assume this work. The program will be reassessed each year to determine the need for Federal involvement depending on the nature and implementation needs of new regulations, and the impact of market forces.

The FY 2000 budget request for High Temperature Superconductivity is $31 million, a decrease of $1.5 million. The funding is divided between the Superconductivity Partnership Initiative ($14.0 million), Second Generation Wire Initiative ($8.0 million) and Strategic Research ($9.0 million). The program is accomplishing two major technological goals: solving the difficult problem of manufacturing electrical wires from the family of brittle ceramic superconducting materials, while, in parallel creating designs of super-efficient electrical systems. The products will be resistance-free electrical wires that carry 100 times the current of conventional alternatives and the design of advanced systems that have only half the energy losses and are half the size of conventional alternatives of the same power rating.

The Superconductivity Partnership Initiative (down $0.5 million) will support six major projects to develop first-of-a-kind electrical systems that can provide quantum improvements to the efficiency and capacity of the national electrical grid. These include transmission cables, transformers, large motors, flywheel energy systems and magnetic separation systems that meet required performance goals. The revolutionary equipment emerging from the program in the

2005 - 2010 timeframe will have a major role in meeting the new demands of a competitive electricity industry for increased capacity and reliability. Superconducting cables will relieve congestion at critical parts of the grid as well as improve delivery efficiency. They will also allow load growth in urban areas to be accommodated by repowering existing ducts, without the need for acquiring new property. Superconducting transformers will accommodate increased demand for electricity without the need for construction of new substations and will protect against accidental "fault currents" that now cause serious damage and power outages. The program's past success has demonstrated that this extremely ambitious undertaking is possible within the funding requested due to careful planning and leveraging of resources. Leveraging includes the 50 percent cost share that the program has been able to attract, even though the projects are very high risk. Additional leveraging occurs through the project teams being a vertically integrated consortium of companies containing a future user (an electric power company), a manufacturer, and a superconducting component supplier. The funding reduction will result in research being completed in FY 2001 rather than in FY 2000, but is not expected to impact accomplishment of important goals.

The Second Generation Wire Initiative (no change) is crucial to producing superconducting wire that meets the program's performance goals. Four industrial consortia will be working with the national laboratories to scale up recent discoveries that are the basis for this initiative. Private sector participants' 50 percent cost-sharing leverages program funds.

The Strategic Research program element (down $1.0 million from FY 1999) is the incubator for discoveries and innovations that have characterized this successful program.. The activities supported include in-house national laboratory research and joint research carried out with private companies under 50% cost-shared agreements. The requested level of funding will adequately support multi-disciplinary research teams that have made major breakthroughs in the past, and will also support a number of cooperative research projects with industry. Important leveraging is obtained through integrating research funded by the DOE Office of Science and leveraged research at two NIST (National Institute of Science and Technology) laboratories where each program dollar is matched by two NIST dollars.

The $6.0 million request for the Energy Storage Systems program (up $1.5 million) will fund focused research on energy storage technologies which will reduce the high cost of power outages, improve power quality, and enhance technology choices in a competitive utility environment. Efficient energy storage is critical for service reliability and for the success of distributed power generation. In a restructured electricity industry with many independent power producers, energy storage will play an increasingly crucial role in combining multiple inputs of varying power quality and matching output to a changing load. Program emphasis will be placed on battery systems integration and on the development and evaluation of advanced storage technologies. All projects will be carried out in close cooperation with industry.

No funding is requested for the Climate Challenge program in FY 2000 (down $0.1 million).

INTERNATIONAL SOLAR ENERGY PROGRAM

The FY 2000 budget request for the International Solar Program is $6.0 million, a slight decrease of $350,000 from $6.350 million in FY 1999. The mission of the International Solar Energy Program is to encourage acceptance and use of renewable energy technologies by developed and developing countries in support of U.S. national interests and policies. With World Bank estimates indicating that developing countries alone will require five million megawatts of new electricity capacity over the next four decades (the world's total installed capacity today is three million megawatts), international markets will provide growing opportunities for U.S. sales of advanced renewable energy and energy efficient technologies and job creation. And it is these same technologies that also hold the greatest potential for mitigating global climate change.

The primary goal of the International Solar Energy Program is to support the expansion of U.S. renewable energy and energy efficiency technology exports to help meet the energy needs of developed and developing countries, reduce the rate of consumption of finite global resources, and address local and transnational environmental issues. The program has been refocused in response to Congressional direction. While the Program will continue to provide support for the U.S. Initiative on Joint Implementation, all activities will be refocused into three broad program areas: Emerging Global Environmental and Energy Issues (USIJI), facilitating Market and Trade Development, and advancing U.S. Energy and Environmental Security interests.

The Emerging Global Environmental and Energy Issues will be implemented specifically through and in conjunction with the U.S. Initiative on Joint Implementation (USIJI). USIJI is a DOE-led interagency program that supports the development of flexibility mechanisms under the U.N. Framework Convention on Climate Change (U.N. FCCC) such as Joint Implementation (JI), Clean Development Mechanism (CDM), and Emissions Trading. This element will also focus on encouraging meaningful participation by developing countries in the effort to reduce worldwide greenhouse gas emissions.

The Market and Trade Development element will accelerate reductions in U.S. technology production costs and advance deployment of technologies through overseas market expansion. Activities will focus on stimulating global economic development and regional economic stability, and accelerating domestic economic growth, market competitiveness, and employment. This element will be implemented in key regions through bilateral (e.g., Gore-Mbeki in South Africa) and multilateral (e.g., Asia Pacific Economic Cooperation, Hemispheric Initiatives and International Energy Agency) technology cooperation activities and information exchange and dissemination. Private sector technology development will be encouraged while seeking opportunities for leveraging U.S. funds and stimulating deployment in strategic and emerging markets through project-based activities.

The Energy and Environmental Security element is designed to advance U.S. strategic interests in bilateral and multilateral energy and environmental security activities and will provide specialized assistance in the utilization of appropriate technologies. This element will be implemented in

support of existing and emerging bilateral and multilateral treaties and agreements (e.g., U.S.-China Energy Efficiency and Renewable Energy Protocol). This element will also assist the Department in meeting U.S. obligations and commitments to provide disaster relief and assistance by facilitating private sector technology development and deployment in strategic and emerging markets.

SOLAR PROGRAM DIRECTION

The FY 2000 Congressional Request for Solar Program Direction is $19.2 million, an increase of $1.1 million. Program Direction provides the staffing resources and associated funding to support the management and oversight of the Solar and Renewable Energy Programs. It also provides funding for all support services, the Working Capital Fund, and crosscutting requirements.

There are two principal changes in Solar Program Direction this year. First, funding for electricity restructuring, included under this account in FY 1999, is provided for under Solar Program Support in FY 2000. Second, the request includes $1.85 million to address anticipated staffing adjustments resulting from Workforce 21 plans.

Workforce 21 is a Department-wide effort to address unintentional negative impacts resulting from aggressive downsizing in recent years. While the Department has been able to fill most essential positions through intra-agency transfers and a very few replacement hires (even as we met or exceeded our reduced workforce targets) some gaps in filling critical technical and professional positions still remain. The Program Direction request level will enable EERE to fill limited number of key technical and professional staff positions at DOE headquarters and in the field. Clerical and administrative positions will remain essentially level.

CONCLUSION

Thank you once again, Mr. Chairman, and members of the Subcommittee for the opportunity to discuss our FY 2000 budget request. I hope you agree that the management improvements we have instituted -- and continue to refine -- are enhancing the value received by American citizens for their investment. We believe that the technologies our programs are now developing will lead to a clean, cost-effective, and secure electric power and transportation fuel system for the United States. We fully understand that we must set and meet aggressive technology research and performance goals so that the new power generation, power delivery, and transportation fuel systems we are developing can compete in the marketplace. And while the task before us is certainly challenging, we are confident that our proven record of achievement -- combined with hard work, careful planning, and adequate financial and workforce resources -- will lead to even more success ahead, enabling the Nation to respond not only to the important energy and environmental challenges but also to the global market opportunities of the next century.

Mr. PACKARD. We apologize for rushing you through, and we appreciate your efficiency.

We have about four and a half minutes to vote. We have six votes in a row. We may not be back for half an hour to forty-five minutes. Please enjoy yourselves until we come back.

[Recess.]

BUDGET PRIORITIES FOR FY 2000

Mr. PACKARD. The rest of the members of the subcommittee will be returning shortly. We just completed our last vote, and we are told that we will have about an hour before the next vote, so maybe we can complete our work by then.

We certainly need to complete it by 1:00 because we have a full committee markup at 1:00. We are sorry for the delay, and we are grateful for your patience.

All three of you, I am sure, are aware that we are expecting a very tight budget this year. From all indications, we are going to be expected to live within the caps, and that is going to reduce our budget significantly from last year's dollar level, and it means that we are going to have to do a better job perhaps this year than ever before in developing our priorities. We may not have the funds to fund all that you would like and all that the administration would like or all that we would like to fund or at the levels that we would like to fund.

If that is the case, what programs, and this is a general question for all three of you, what programs or projects would you feel, and maybe it might be better to answer this for the record and have you give some thought rather than have you off the top of your head identify those low on your priority list and those high on your priority list.

Maybe you can simply comment, though, what areas you feel are crucial, that would be really hard hit if we had to reduce funding. Let's approach it from that aspect. Then, for the record, if you would maybe list those areas and projects, construction projects and activities, particularly those where you have called for increases over 5 percent, if you would provide a list of those and also those that you feel would—if necessary, could afford to be cut in your judgment.

Maybe we can start with you, Mr. Magwood. What are your top priorities in your budget presentation?

Mr. MAGWOOD. Well, since you have given us the opportunity to think about this, I think I will not list anything. But I would indicate that, in my opinion, the pantry is empty in our office, and I don't know that there is a place that I can recommend significant cuts. As a matter of fact, as I think you know, there are several parts of our budget that even with the request, do not have the level of funding that we think is necessary.

But I will give some thought to it and provide that information.

Mr. PACKARD. That is fine.

Dr. Krebs, do you have any comments?

Dr. KREBS. I am in the same position as Mr. Magwood. We have some fairly significant increases, but they are very important items, with respect to the Spallation Neutron Source construction and the new initiative in simulation. But in order to accommodate

those, we also took reductions that I think are not going to make everybody happy. And, as I said, they are defensible, but not comfortable. So I will take the advantage of response for the record.

Mr. PACKARD. And I appreciate that.

As you perhaps know, the Congressional Budget Office has estimated the administration's proposal, of which you are a part, is about $30 billion over the caps; and so we feel that if we are expected to live within the caps, we are not going to have the level of funding that you had in your budget request.

Mr. PACKARD. Mr. Reicher?

Mr. REICHER. Mr. Chairman, I also appreciate the opportunity to get back to you on this in writing. We would spread the cost generally, rather than taking specific cuts in program areas, the appropriate balance that we might take on the R&D side versus cuts in some of more of the demonstration projects. So we will get back to you on that.

[The information follows:]

BUDGET PRIORITIES

The Department's FY 2000 Budget Request for Discretionary Spending does not increase above the appropriated level for FY 1999. The information follows:

DOE Discretionary Funding
(dollars in thousands)

	FY 1999 Comparable	FY 2000 Request	Percent Increase
Total Discretional Funding	$17,856,392	$17,842,014	-0.08%

The Department is not requesting any increase at all for FY 2000. Within the overall flat budget, we have enhanced certain program levels, and reduced others in order to arrive at a proper balance within a flat budget. Thus, we believe that the Department has already taken every possible reduction, wherever such a reduction would not result in severely damaging our ability to perform our mission.

I would like to provide for the record a table that shows both new programs and ongoing programs that have increased by more than 5% over the FY 99 appropriation after comparability adjustments have been made.

Department of Energy
Funding Increases Exceeding 5% from the Previous Year
(dollars in thousands)

Appropriations Account / Program / Activity	FY 1999 Comparable Appropriation	FY 2000 Budget Request
Energy Supply		
Solar and Renewable Resources Technologies		
Solar building technology research	3,600	5,500
Photovoltaic energy systems	72,200	93,309
Concentrating solar power	17,000	18,850
Biomass Power systems	31,450	38,950
Biomass Transportation	41,750	53,441
Wind energy systems	34,771	45,600
Solar program support	—	10,000
Hydrogen research	22,250	28,000
Hydropower	3,250	7,000
Electric Energy Systems & Storage Transmission reliability	3,000	4,000
Electric Energy Systems & Storage Energy storage systems	4,500	6,000
Program Direction	18,100	19,171
Nuclear Energy R & D		
Test reactor area landlord - Operation and maintenance	4,000	6,070
99-E-200 Test reactor area electrical utility upgrade, INEL	341	1,430
Nuclear energy plant optimization	—	5,000
Nuclear energy research initiative	19,000	25,000
Uranium programs		
Operations & maintenance	35,420	41,000
Isotope Support		
99-E-201 Isotope production facility, LANL	6,000	8,000
Program Direction -Nuclear Energy	21,242	24,960
Oak Ridge Landlord	11,000	11,812
Technical Information Management - program direction	7,000	7,500
Non-defense Environmental Management		
Waste Management		
93-E-900 Long-term storage of TMI-2 fuel, INEL	—	2,500
Uranium Enrichment Decontamination and Decommissioning Fund		
U E Decontamination and Decommissioning Fund	190,200	210,198
Science		
High Energy Physics		
Research and technology	214,891	227,190
00-G-307 SLAC Office building	—	2,000
98-G-304 Neutrinos at the main injector, Fermilab	14,300	22,000
Nuclear Physics		
Operation and maintenance	317,935	342,940
Basic Energy Sciences		
99-E-334 Spallation neutron source, ORNL	101,400	196,100
Computational and technology research	157,471	198,875
Multiprogram Energy Labs		
MEL-001 Multiprogram energy laboratory infrastructure	14,924	18,351
Program direction - Science	49,800	52,360

Department of Energy
Funding Increases Exceeding 5% from the Previous Year
(dollars in thousands)

Appropriations Account / Program / Activity	FY 1999 Comparable Appropriation	FY 2000 Budget Request
Departmental Administration		
General Management -personnel compensation & benefits	105,859	112,053
Policy analysis and system studies	350	1,000
Environmental policy studies	2,000	2,432
Information management	8,000	13,000
Weapons Activities		
Stockpile Stewardship		
Operation and maintenance	1,453,302	1,635,355
00-D-103 Terascale simulation facility, LLNL	----	8,000
00-D-105 Strategic computing complex, LANL	----	26,000
00-D-107 Joint computational engineering laboratory, SNL	----	1,800
99-D-106 Model validation & system certification center, SNL	1,600	6,500
99-D-108 Renovate existing roadways, NTS	2,000	7,005
97-D-102 Dual-axis radiographic hydrotest facility, LANL	36,000	61,000
Technology partnerships & education - Education	19,000	29,800
Stockpile Management		
99-D-127 Stockpile management restructuring initiative, KC	13,700	17,000
99-D-128 Stockpile management restructuring initiative, Pantex	1,108	3,429
99-D-132 SMRI nuclear material S&S upgrade project, LANL	9,700	11,300
98-D-125 Tritium extraction facility, SR	6,000	33,000
98-D-126 Accelerator production of tritium, VL	20,000	31,000
95-D-102 Chemistry & metallurgy research upgrades, LANL	5,000	18,000
88-D-123 Security enhancements, Pantex	----	3,500
Defense Environmental Restoration & Waste Management		
Site/Project Completion		
99-D-402 Tank farm support services, F&H area, SR	2,745	3,100
99-D-404 Health physics instrumentation laboratory, INEL	950	7,200
98-D-453 Plutonium stabilization & handling system for PFP, RL	10,699	16,860
97-D-470 Regulatory monitoring and bioassay lab, SR	7,000	12,220
Post 2006 completion		
Operation & maintenance - Environmental management	2,242,653	2,898,997
Operation & maintenance - Health studies (EH)	12,000	20,000
00-D-401 SNF treatment and storage facility Title I & II, SR	----	7,000
Defense Environmental Management Privatization		
Privatization initiatives, various locations	228,357	253,000

Department of Energy
Funding Increases Exceeding 5% from the Previous Year
(dollars in thousands)

Appropriations Account / Program / Activity	FY 1999 Comparable Appropriation	FY 2000 Budget Request
Other Defense Activities		
Non-Proliferation and National Security		
00-D-192 Non-Proliferation & international security center, LANL	---	6,000
Arms control	256,900	296,000
Nuclear safeguards and security	55,200	59,100
HEU transparency implementation	13,580	15,750
International nuclear safety	30,000	34,000
Program direction - Non-proliferation & National Security	80,450	90,450
Counterintelligence	15,641	31,200
Fissile Materials Control and Disposition		
Operation and maintenance	116,372	129,766
00-D-142, Immobilization & associated processing facility, VL	---	21,765
99-D-141 Pit disassembly and conversion facility, VL	20,000	28,751
Program direction - Fissile Materials	4,588	7,343
Office of Hearings and Appeals	2,400	3,000
Naval Reactors		
90-N-102 Expended core facility dry cell project, ID	5,800	12,000
Southeastern Power Administration		
Program direction	4,370	4,727
Southwestern Power Administration		
Operation and maintenance	2,722	3,625
Program direction	16,402	17,631
Western Area Power Administration		
Construction and rehabilitation	20,802	26,802
Falcon and Amistad Operating and Maintenance Fund	1,010	1,309
Nuclear Waste Disposal		
Repository program	112,000	186,397
Program direction	53,000	71,603

EMPLOYMENT LEVEL

Mr. PACKARD. One area that you certainly will want to look at, I suspect, will be FTEs. Your employment levels, they obviously carry a significant portion of your budget, as most agencies do, and the Department has called for a lowering of FTEs, and yet the budget as it is presented calls for an increase in funding for FTEs. That would be an area that I would hope that you would look at as well. Any comment?

Mr. REICHER. Just briefly. Overall, the Department has come down substantially in FTEs over the last few years. What Secretary Richardson has put forward is an initiative to, in key areas, build back some key Federal staff because we found that as we have lost large numbers of people, particularly in key technical areas; and in some cases where budgets have gone up, we have not had the people we need to supervise the work.

My office is down somewhere between 25 and 30 percent in FTEs, and our budget has gone up somewhat. We are hoping to get support for some funding to allow some key hiring back in some special technical positions where we really need help.

Dr. KREBS. I would like to make a comment as well.

There are increases in my program direction budget proposed, but they reflect two things: not that we are expecting to have significant increases in FTEs, but, in fact, over the last few years we have come down from about 320 people at our headquarters staff to about 270. We have an issue where in prior years we were working off prior year balances in our program direction, and we can no longer do that and maintain our business.

And we also, as a result of the Scientific Simulation Initiative, do not have on board the expertise in the particular areas that we need to develop in order to manage and move forward with this program. The increases that are proposed in our program direction are very carefully thought out and do not represent significant growth at all, and we have come down significantly in the last 5 years.

[The information follows:]

PROGRAM DIRECTION INCREASES

The Office of Science increase in Program Direction funding for FY 2000 is mostly attributable to funding for several full-time-equivalents (FTEs) above the FY 1999 level. Increased funding for FTEs includes five FTEs for the Scientific Simulation Initiative, and two FTEs for the Spallation Neutron Source Project Office at the Oak Ridge Operations Office.

Mr. MAGWOOD. May I just make a very, very brief comment? The Office of Nuclear Energy has downsized from about 260 employees in 1993 down to less than 100 today, and there are some areas where I believe we currently don't have adequate technical coverage to manage some of the programs that you are well funding. So I believe we not only need to hold the line but we need to come up in a few areas. So I hope you take a careful look at our program direction request.

Mr. PACKARD. Thank you very much.

Mr. Visclosky.

ENVIRONMENTAL SAFETY CONCERNS AT ARGONNE NATIONAL LAB

Mr. VISCLOSKY. Dr. Krebs, if I could ask about the management of the various lab facilities and the external regulation of them by the DOE and if I could focus in on the issue of environmental safety, you have a lab at Argonne?

Dr. KREBS. Yes.

Mr. VISCLOSKY. And you have an environmental safety staff at Argonne, right?

Dr. KREBS. Yes.

Mr. VISCLOSKY. And the Department of Energy has a Chicago field office?

Dr. KREBS. Correct.

Mr. VISCLOSKY. And they have supervisory function as far as Argonne?

Dr. KREBS. They oversee the implementation of contracts. They have responsibilities as well if you are leading in this direction to assist with oversight, departmental oversight of the environmental health and safety activities at the lab.

Mr. VISCLOSKY. So you would have people in the Chicago office doing environmental safety for Argonne?

Dr. KREBS. Oversight. Not actual implementation. They have different roles at the lab. The lab has people who actually assist the scientists in maintaining control of their waste management activities. They actually implement waste management activities, for example. They do not—whereas the Chicago office would exercise oversight to assure that they are paying attention to the agreed-upon rules.

Mr. VISCLOSKY. Okay. Then you would manage the environmental safety office and function out of DOE in Washington?

Dr. KREBS. Correct.

Mr. VISCLOSKY. Would they oversee the Chicago office or Argonne directly?

Dr. KREBS. There are—it is not my part of the Department, you know, and what they do is they establish policy for the general set of environmental health and safety activities for all of the sites in the Department and then there is a staff that does exercise what we call independent oversight.

Mr. VISCLOSKY. So they would bypass the Chicago office and deal directly with Argonne?

Dr. KREBS. Correct.

Mr. VISCLOSKY. And the University of Chicago is also involved, right?

Dr. KREBS. Correct.

Mr. VISCLOSKY. Would they have a staff dealing with environmental safety as well for Argonne?

Dr. KREBS. They do a certain kind of oversight. I do not believe that they maintain a separate environment health and safety staff with a separate environment health and safety expertise.

Mr. VISCLOSKY. I realize that it is a technical question, and if you can provide an answer for the record with the University of Chicago and their relationship with Argonne as far as environmental safety.

[The information follows:]

IMPLEMENTATION AND OVERSIGHT OF ENVIRONMENT, SAFETY AND HEALTH AT ARGONNE NATIONAL LABORATORY

There is no redundancy or overlap in implementation and oversight of Environment, Safety and Health (ES&H) at the Argonne National Laboratory–East (ANL–E).

The DOE Role: The Argonne Group (ARG) of the Chicago Operations Office (CH) provides day-to-day operational oversight of activities at ANL–E. ARG, therefore, is the CH line manager for ES&H oversight at ANL–E. There are several DOE Headquarters offices (e.g., SC, EM) that fund work at ANL–E. These program offices facilitate resolution of ES&H issues that require HQ involvement and maintain operational awareness of ES&H activities at ANL–E, but do not perform day-to-day oversight of the laboratory. The Office of Environment, Safety and Health (EH) provides independent oversight of ES&H activities at ANL–E and carries out the Department's function under the Price-Anderson Amendments Act of 1988 for enforcement of potential nuclear and radiological safety violations. EH does not maintain day-to-day surveillance of ANL–E.

The Contractor Role: ANL provides day-to-day implementation of ES&H activities at ANL–E. The University of Chicago operates ANL–E under contract with DOE. The University's Board of Trustees has established a Board of Governors (BOG) at ANL. The BOG has a Safety and Environment Committee that reviews the Laboratory activities in worker and public safety of nuclear operations and the protection of the environment, but does not provide day-to-day implementation or oversight of activities at ANL–E.

Mr. VISCLOSKY. Are you satisfied that there is no overlap or looseness here that we could tighten up for you?

Dr. KREBS. There is always a struggle, I think, to assure ourselves that the activities at these laboratories are safe for workers and for the public and for the environment.

The Department made a commitment, in fact, Secretary O'Leary made a commitment to work to reduce unnecessary requirements in oversight with respect to a lot of different activity at headquarters and in the field so we could reduce unnecessary expenditures. We have made a great deal of progress on that, and I think it requires eternal vigilance.

Mr. VISCLOSKY. And I don't mean to be argumentative, but I think that it requires more than vigilance. We had Secretary Pena and now we have Secretary Richardson and that is two secretaries removed from when the commitment was made. You have four different offices exercising some role as far as environmental management here at just one lab.

Dr. KREBS. I think the important thing that hasn't changed from one secretary to another is the commitment to the approach to environment, health, and safety, namely integrated Safety management. And it was developed under Secretary O'Leary and committed to by Secretary Peña and by Secretary Richardson, and my own sense is—and I have basically really supported the notion of Integrated Safety management, and it is within that framework if we have the correctly tailored approach that we can assure environmental health and safety at our laboratories and also maintain the quality of science.

Mr. VISCLOSKY. I think we all agree that we want to have an environmentally safe agency and laboratories. The question is, how can we provide that in the most efficient fashion possible? And I think it is also an example that is systemic of other overlapping and duplicative management functions. We have the labs saying it is the Department's fault and the Department comes in and says, well——

Dr. KREBS. I don't think that you would necessarily have the Department saying that it is the laboratories fault. And it is hard for me to make an authoritative statement here, to be perfectly honest, because in general what I am paying attention to is the execution of my programs. I work very hard in my stewardship role with respect to the laboratories to put in place systems that will meet the tests that are established for them by the EH organization inside the Department of Energy as well as what is going on at the field offices.

Mr. VISCLOSKY. Thank you.

Thank you, Mr. Chairman.

Mr. PACKARD. Mr. Knollenberg called me, and he asked me if he could go quickly because he has something else, and I am going to ask Mr. Frelinghuysen, who normally would be next, if he would yield to him for questions.

Mr. FRELINGHUYSEN. I yield.

NUCLEAR ENERGY PROJECTIONS

Mr. KNOLLENBERG. Thank you very much, Mr. Chairman and Mr. Frelinghuysen.

Welcome, Mr. Magwood, Dr. Krebs and Mr. Reicher.

To begin with—and this might be a question for you, Mr. Magwood, it relates to the nuclear industry. We have about 105 nuclear plants that are operating. Is that right?

Mr. MAGWOOD. One hundred and four.

Mr. KNOLLENBERG. We are reducing by the minute. We better get a clock.

The March 8 National Journal's daily energy briefing stated that DOE projects our global nuclear capacity to fall by 50 percent in the next two decades. Is that an accurate description perhaps of DOE's plan?

Mr. MAGWOOD. I would not say that it is DOE's plan. There are projections which have been made by somebody in the Energy Information Administration that would indicate that there could be some decline in nuclear capacity over time, particularly in the United States. I think the current events, particularly the success of NRC's efforts in renewing licenses for nuclear power plants, may lead to some recalculation of those projections.

Mr. KNOLLENBERG. You have produced a chart that indicates the problem that could occur if relicensing isn't granted, and even if it is granted on a 75 percent basis what would happen, and it trails off to some very, very startling low figures. So without a change in nuclear policy in terms of relicensing, we could be in for a reduction in the amount of power generated by nuclear facilities; is that a fair statement?

Mr. MAGWOOD. If some of the early projections proved out, there would be a very significant decline in nuclear capacity. As I mentioned, I think that NRC has done a very good job, and we work closely with them in thinking about these issues, and they have done a very good job in proceeding with the renewal of licenses.

Just as an example, Baltimore Gas and Electric had been projecting that it would take about 4 years to get a new license for its Calvert Cliffs plant, and I believe it will be completed in less than half that time. So there is actually a success story there.

Mr. KNOLLENBERG. I think we as a nation are going down the wrong path by not optimizing our existing nuclear plants and, in fact, should be working toward building more facilities if the marketplace so desires. And I especially encourage this direction, that is to say the marketplace direction, if they must exist under any kind of severe CO_2 reductions which is part of the Kyoto treaty which is embraced by the Administration. And so, to meet the Kyoto reduction targets without a change in policy, we are not going to get there without nuclear energy. You know as well as I do that over 50 percent of the electrical energy is produced by coal, some 14 percent by natural gas, thereabouts, 18 percent by nuclear, and it was 20 I think at one time, and 10 percent by hydro.

Dr. Krebs I know is very enthusiastic about fusion, but I don't know if that is going to get there as fast as we want. That is not going to be the silver bullet, is it?

So here is what I am going to come down to. It appears with these things in mind, Mr. Reicher, you are going to have a lot of ground to make up. The Energy Information Administration states that to comply with the Kyoto proposal the U.S. must reduce coal-produced electricity by 77 percent. And, furthermore, Mr. Magwood may be pleased to know that the EIA will also increase the amount of electricity produced by nuclear energy, but I am not convinced that the Clinton administration has changed their policy on nuclear energy as a way to get us there, and then there is the matter of hydroelectric and what is going to happen to that over the next two decades.

So what we are pointing up here is a scenario if we emphasize in terms of R&D, and you and I have talked about this a number of times, greater emphasis on solar and wind when they produce literally 2/10ths of 1 percent of the country's electricity, and with the expectation that we have to meet those target deadlines in 2008, assuming Kyoto becomes a reality.

I guess I just wonder how we get there from here with that in mind. In a free and open marketplace, the ideas—I didn't mention biomass, by the way, which includes wood, does it not? That is about 2.72 percent, but we have to look at this from the standpoint of return on investment. There are good investments and bad investments, but how are we going to get there, I don't know. I see it as a very, very difficult situation.

Before I come to you on this question, Mr. Magwood, how much would it cost to build a new nuclear plant, and how much of a megawatt facility would that be?

Mr. MAGWOOD. I think the best estimates that we have, as indicated earlier that the Japanese have built plants with the type of technology that we are thinking about, a large nuclear power plant of about 1,300 to 1,400 megawatts probably would cost on the order of $2.2 billion, which by the way we think is still too high. We are thinking more work needs to be done in that area.

WIND FARM CONSTRUCTION COSTS

Mr. KNOLLENBERG. Let me ask Mr. Reicher, how much would it cost to build a new wind farm, using the same megawatt capacity as a nuclear power plant which Mr. Magwood just described?

Mr. REICHER. A wind farm can vary in size from a couple of megawatts to hundreds of megawatts. What I can tell you that you can today produce electricity from a wind turbine at about 4 to 6 cents a kilowatt hour.

Mr. KNOLLENBERG. But you can't give me the information on what it would cost?

Mr. REICHER. The turbines vary in size so greatly from a very tiny turbine that you could power a house with to one that you could power a very large community with.

Mr. KNOLLENBERG. I have been told that it would cost over $3 billion.

Mr. REICHER. What size would that be? How many megawatts?

Mr. KNOLLENBERG. I don't know.

Mr. REICHER. I can get you the per megawatt cost, and I am sure one of my colleagues here has that.

But what is important to note is that we can produce wind energy, wind-generated electricity at quite a competitive rate today, and that is why we are seeing major growth in that industry.

Mr. KNOLLENBERG. How long would that facility last?

Mr. REICHER. It is $1 billion for a thousand megawatts. So that is a lower figure than we have heard.

Mr. KNOLLENBERG. Where did that figure come from?

Mr. REICHER. From one of my colleagues in the wind office.

Mr. KNOLLENBERG. For the record, can we have the gentleman's name?

Mr. REICHER. Dan Adamson, and he is the Deputy Assistant Secretary for the Office of Power Technologies.

Mr. KNOLLENBERG. How long would such a facility last once you got it built?

Mr. REICHER. These turbines operate for many, many years and with regular upkeep——

Mr. KNOLLENBERG. Because we don't know how long they would last because we don't have experience.

Mr. REICHER. We have experience from 1980, and many of the turbines are doing quite well. Some are in the 20 to 30 year range.

Mr. KNOLLENBERG. Some work better in gusty wind conditions and some don't?

Mr. REICHER. Yes.

Mr. KNOLLENBERG. The efficiency of the plant would be better in gusty wind situations?

Mr. REICHER. Higher sustained winds, but one of the things that they are working on the in the R&D is to make them more efficient in a whole range of winds.

Mr. KNOLLENBERG. Well, my time has expired here. I do have some other questions relative to this whole matter.

What I am saying, Mr. Chairman, and I do appreciate your courtesy here, is that we really should look at all of these options and we should concentrate, I think, on which options work today. Cleaning up coal would be one thing. More nuclear would be another. If CO_2 is something that we should reduce, let's get there as economically as we can, but let us not put too much emphasis on products that have not already proved themselves.

I will submit additional questions regarding these issues.

Mr. PACKARD. You can submit questions for the record.

Mr. PACKARD. I would like to remind the members that we would like to hold to the 5-minute rule on the questions if we can.

Mr. Edwards?

Mr. EDWARDS. Mr. Magwood, today's technology—I don't know what the barometer is, if it is oil, natural gas, coal. If you use oil prices as a barometer, what price for a barrel of oil—would a new nuclear power plant, given today's technology, be competitive in a deregulated electricity market?

Mr. MAGWOOD. I can't give you a precise answer to that at this point, but for new nuclear power plants we don't believe that the current prices of oil or natural gas or coal, for that matter, would tend to make a utility choose a nuclear power plant on an economic basis at this stage.

Clearly, more work needs to be done to reduce the construction time of nuclear power plants, to reduce the initial capital investment. Because if you look at the actual operation costs for existing nuclear power plants, they are extremely competitive; and utilities are now, as you have probably seen in the press, buying used nuclear plants and buying the most efficient capacity on the grid right now. Some nuclear plants produce power at around 1 cent per kilowatt hour, which is very good. But to build a new plant, would be a big investment; and unless the industry is successful in dramatically reducing the construction time and construction costs of plants, I don't believe that they will be competitive.

Mr. EDWARDS. Is there any ballpark figure that you can guess?

Mr. MAGWOOD. I would like to try to get you that information for the record.

Mr. EDWARDS. Good.

[The information follows:]

NUCLEAR POWER PLANT COSTS

Although nuclear is competitive with oil today and is expected to remain so, its real market competitors for new capacity are natural gas and coal. The competitive position of nuclear may improve if fossil generating capacity is required to internalize all its costs as nuclear is required to do; cost of nuclear generation includes costs of waste disposal and decommissioning. Nuclear also does not produce any harmful air emissions. Compliance with the Clean Air Act is likely to add to the cost of producing electricity from fossil fuels but will not affect nuclear generation costs.

Perhaps a more meaningful measure for assessing cost competitiveness of new Advanced Light Water Reactors (ALWR) would be to compare the costs for nuclear energy with coal and natural gas rather than oil alone, because oil is used for only 2 percent of the electricity produced in the United States. If one looks at the generation costs excluding capital costs (operating and maintenance plus fuel costs) for each of these fuel sources, we find that nuclear (1.91 cents per kilowatt-hour [kwh] in 1996) is comparable to coal (1.83 cents per kwh). Natural gas costs an average of 3.38 cents per kwh and oil is 4.14 cents per kwh. Including capital costs makes nuclear energy more expensive than coal or gas electric generation. A new 1350 MWe advanced nuclear power plant will cost $2.2 billion to $2.5 billion to build. A comparable new gas-fired advanced combined cycle plant would cost about one-fourth as much. Most new electrical generation plants being built today in the U.S. are gas-fired. For nuclear to become competitive with natural gas and coal, prices for these fuels would have to increase by 28% and 71% respectively. In other words, with all other things remaining unchanged new nuclear power plants become competitive if the price of gas increases above $3.43 per thousand per thousand cubic feet (compared to $2.69 today) or if the price of coal increases above $44.74 per short ton (compared to the current price of $26.16).

Nuclear can also become competitive if its capital costs can be reduced. Reduction in capital costs can be achieved through the application of advanced technologies through all phases of design, licensing, fabrication, construction and operation. The

activities proposed in our Nuclear Energy Research Initiative and Nuclear Energy Plant Optimization programs would make the option of nuclear energy more competitive in the future.

References: 1. Energy Information Administration, Annual Energy Outlook 99; 2. Energy Information Administration, Annual Energy Review 1997; and 3. Nuclear Energy Institute, Fact Sheet on U.S. Nuclear Power Plant Performance, http://www.nei.org/library/infobl.htm.

COMMITMENT TO NUCLEAR RESEARCH

Mr. EDWARDS. That is not an argument to not proceed with nuclear research. I think when you put in the cost of the Persian Gulf War and whatever the next war will be in the Middle East, the real price of a barrel of oil is much more expensive than it is on the open market.

Dr. Krebs, where are we today in terms of our commitment to basic research that doesn't have a short-term consumer or political payoff compared to 20 years ago?

Dr. KREBS. I can get you the numbers that show the commitment to 10 or 20 years ago. I don't have those in my head.

[The information follows:]

BASIC RESEARCH

[B/A in millions—as spent]

Fiscal year	Total Department of Energy	Total Office of Science
1978 Actual	441.3	441.3
1979 Actual	464.9	464.0
1980 Actual	522.5	519.9
1981 Actual	597.0	587.5
1982 Actual	775.5	766.7
1983 Actual	762.5	729.3
1984 Actual	830.8	791.0
1985 Actual	938.4	890.6
1986 Actual	961.0	899.2
1987 Actual	1,059.3	987.5
1988 Actual	1,171.2	1,093.3
1989 Actual	1,382.7	1,293.9
1990 Actual	1,502.5	1,401.5
1991 Actual	1,684.5	1,570.6
1992 Actual	1,712.6	1,645.2
1993 Actual	1,732.7	1,596.1
1994 Actual	1,619.5	1,551.7
1995 Actual	1,622.3	1,556.7
1996 Actual	1,918.3	1,803.7
1997 Actual	2,045.2	1,946.4
1998 Actual	2,097.5	2,005.2
1999 Estimate	2,228.1	2,138.8
2000 Request	2,283.5	2,195.7

Mr. EDWARDS. Generally, are we going down or are we maintaining a commitment to basic research?

Dr. KREBS. Within the Office of Science in the Department of Energy, if you look back 15 years or so, we have steadily increased the investment in basic science. There is an issue, however, because part of what we are good at in the Office of Science is building big machines and so we have built some big machines in High Energy and Nuclear Physics and also for accelerators for materials and biological research.

And then the challenge is always to balance the operation of those facilities with the research that is carried out at those facilities. When you are in a situation, a job like mine or a job like yours, you will hear different people come to you and say, we need to operate our facilities at the right level, and we haven't kept up, or we need—we are not operating research at the right level, and we need to keep up. And so overall in this last 15 years, there has been at the bottom line some growth.

But what has also become clear in the last 15 years is exactly the extent to which basic science makes a difference to our economy. And both the Congress and the Administration have made a commitment in the last few years to see increases in these programs, and certainly over the last 2 years the President has made major increases in the Office of Science, 8 percent last year, 5 percent this year.

SCIENCE EDUCATION PROGRAM

Mr. EDWARDS. Good. Can I ask for a brief answer since I want to respect the time? Does your science education program do anything to encourage women and minorities to go into science and engineering? Are we in just as poor shape as when I was in the Texas legislature when 3 percent of engineering school students were women and minorities? Is that Department of Education or does the Federal Government not have any programs in that area?

Dr. KREBS. The Federal Government has programs, but let me—I don't have all of the numbers in my head about all of the different disciplines. I can talk about women in physics because that is me.

When I was in graduate school, it was 3 percent of the total were women. And now overall it is 9 percent, and if you look under 35 or so it is about 15 percent. So there has been improvement as the young people are coming along.

To some extent what we have done in our education programs is to develop a broad solicitation process, make sure that women and minority institutions are well aware of the opportunities that we provide at our laboratories; and we have in fact, over the last few years, increased the number of women—provided increased opportunities for women and minorities for research experiences at our laboratories.

[The information follows:]

SCIENCE EDUCATION PROGRAM

Our core program the Office of Science—Energy Research Undergraduate Laboratory Fellowship Program (ERULF), which started in the summer of 1998 provided research appointments for over 500 undergraduate students at eleven DOE-Science Laboratories. The demographic profile of the students who participated is as follows: 40 percent female, 12 percent African American, 8 percent Hispanic and 1 percent Native American. These results exceed the population base of these students who are enrolled in science and engineering at U.S. universities and colleges. The Office of Science—ERULF is a national program available and accessible to any student of good standing enrolled in a U.S. Higher Education Institution. The Office of Science, Science Education staff has made a concerted effort to communicate and distribute information regarding the ERULF program to all science and engineering faculty located at Historic Black Colleges and Universities, Hispanic Serving Institutions, Native American and Tribal Colleges and female faculty across the country including women colleges.

Mr. EDWARDS. Thank you both for your answers, and I thank you for the work you do.

Mr. PACKARD. Mr. Frelinghuysen.

TOKAMAK DECONTAMINATION AND DECOMMISSIONING

Mr. FRELINGHUYSEN. Thank you, Mr. Chairman. It was a pleasure to yield to Mr. Knollenberg. My personal energy source this morning is Starbucks and Fig Newtons, so I will try to control myself.

My questions are to Dr. Krebs, relative to fusion. Dr. Krebs, last week I think you are aware I discussed with Secretary Richardson the rationale behind including the decontamination and decommissioning funds for the Tokamak in the program account for fusion energy sciences. I think I have a better understanding of why these funds were put in this account. However, in an effort to clarify the Department's position, I wanted to ask you if the main reason for putting these funds in the program accounts centers around the fact that D&D of the Tokamak does not include the demolition of the existing building?

Dr. KREBS. That is correct.

Mr. FRELINGHUYSEN. If these D&D funds were included in the EM budget, how would the current decontamination and decommissioning plan change?

Dr. KREBS. The general policy, and you know you can always develop exceptions, but the general policy for accepting D&D in the Environmental Management program is that they take charge of the facility and they do a complete from the ground up disassembly and decontamination of the facility and there is not much left for reuse. So that would mean that some of the equipment that currently is available on the TFTR which we would like to reuse for other facilities would not be available. It might mean that the NSTX that is in the current building that the TFTR is also in could not use some of the TFTR support systems. That would cause a problem if complete decontamination from the current policy perspective of the environmental management program was implemented.

Mr. FRELINGHUYSEN. So some of the Tokamak's components will or will not be used in other fusion machines and experiments?

Dr. KREBS. The intention—since the D&D for TFTR is in the Office of Fusion Energy, we intend to decontaminate the facility in such a way that it would permit reuse of certain components and would permit reuse of the space at a later date.

Mr. FRELINGHUYSEN. As you are aware, D&D of the Tokamak is a top priority of mine and also of my State. You have reviewed the plan?

Dr. KREBS. Not in detail, sir.

Mr. FRELINGHUYSEN. What about the whole issue about whether it can be accomplished in a 3-year time frame? In your testimony you make reference on page 27 to the fact that it is a 3 year effort.

Dr. KREBS. That is correct. And we have a commitment within the administration to accommodate that cost profile.

Mr. FRELINGHUYSEN. What would be the projected savings by undertaking this initiative in that——

Dr. KREBS. I don't have that in my head. I will provide it for the record.

[The information follows:]

TFTR COST SAVINGS

By completing the Tokamak Fusion Test Reactor Decontamination and Decommissioning in 3 years instead of 5 years, the Department will save $13.2M.

Mr. FRELINGHUYSEN. Also, as I discussed with the Secretary, has the inclusion of these D&D funds squeezed other elements of the fusion energy science program?

Dr. KREBS. As you will recall, essentially the fusion energy budget is essentially flat between 1999 and 2000. The Committee gave direction in the 1999 budget to terminate the activities associated with the international Tokamak activity. We will have completed that, and in some respects you can view that funding as now being redirected within the program for the cleanup.

Mr. FRELINGHUYSEN. You could use additional funds, obviously.

Dr. KREBS. Right.

Mr. FRELINGHUYSEN. How would you use them if you could get them?

Dr. KREBS. The fusion community and other outside organizations such as TCAS has recommended that the fusion program be funded at least at $250 million without regard to the TFTR D&D, and so there certainly is good research that could be supported with additional funds.

Mr. FRELINGHUYSEN. Changing——

Mr. PACKARD. Would the gentleman yield on fusion?

Mr. FRELINGHUYSEN. Yes.

Mr. PACKARD. Dr. Krebs, I have had a keen interest in fusion work for a great many years, and Princeton has been cooperative with much of our fusion work in San Diego so it has been of keen interest. We have noted that it has been a flat budget and again projected to be so this year.

When the decommissioning is done at the Tokamak, is it intended then that those funds would be diverted back to research or is that going to be dropped from your budget request?

Dr. KREBS. That is my hope, sir. I think it is also fair to say, another way, to say what has happened in fusion in the year 2000 is that it was fairly widely held knowledge that was published in trade press that the target going into the fiscal year 2000 budget construction was $190 million, and in a sense we were able to build that back to a flat budget. And my goal would be to maintain at least that, if not more, in the outyears.

Mr. PACKARD. And as we close out ITER that is also planned or hoped to go back into the research program?

Dr. KREBS. In the long run.

Mr. PACKARD. Thank you for yielding.

SPALLATION NEUTRON SOURCE

Mr. FRELINGHUYSEN. Thank you. It is great to share with the Chairman what Mr. Knollenberg doesn't feel quite is true, that this is a potential silver bullet.

One last question. Can you tell me the status of the Spallation Neutron Source being constructed in Oak Ridge and has the Department spent the funds provided by our committee?

Dr. KREBS. The Spallation Neutron Source is—as I indicated earlier, we had a review, which is our standard review on a biannual basis of a big construction project, and this was the first review that occurred after the initial funding was available from the committee, and they found, and it was not a surprise to us, that the management of the project was not quite at the stage that they would—they feel is optimal. We made managerial changes, and I believe that this will get the project on track.

It is the case that right at this moment we are spending at about 60 percent of the rate that was originally projected. We are undertaking a review with the new technical project manager and the new project director, I need to be careful about the terminology here, but the new project director is on site doing the review.

He will have a title 1 baseline done by July, as was requested by our review. We will not spend at the expected rate in the next few months, but it is the case and we will know better when we have the report from the new project director just what the rate will be, but we expect to see significant obligation of funds in the last part of this year and through 2000. I am not prepared to say that there is a lot to take there.

Mr. FRELINGHUYSEN. Thank you, Mr. Chairman.

Mr. PACKARD. The gentleman from South Carolina, Mr. Clyburn.

Mr. CLYBURN. Thank you, Mr. Chairman.

FELLOWSHIP PROGRAM

Let me begin by asking Mr. Magwood a question if I may. I would like to ask you about the fellowship program that you have. I want you to know that I support the program very much and know that it is a pretty low-budget activity and I want to know what the future holds for it?

Mr. MAGWOOD. I consider this to be one of the more important parts of the university program for which we did ask for a modest increase this year from $11 million in fiscal year 1999 to $11.3 million. The fellowship program is a little bit lower than the previous year, but there were just a lot of priorities we had to deal with in that budget this year.

I consider the fellowship and scholarship program to be one of the most important parts for two reasons:

One, we have standing commitments with a large number of students who are attending nuclear engineering programs, graduate and undergraduate. There are some students in historically black colleges and universities who receive some funding from us, and I think it is critical that we maintain that support while those students are progressing.

The reduction that we show this year reflects the fact that some of those students have graduated and moved on, and we simply did not add more students because of the budgetary pressure. But I think that is some of the most important money that we spend in the whole budget, and I would like to increase as much as we can.

Mr. CLYBURN. Thank you very much. I do support that, and I know that you have met with my staff, and I want you to know that I support it.

Dr. Krebs, I don't profess to be able to understand all that you testified to here today.

Dr. KREBS. I don't either.

Mr. CLYBURN. Anytime I hear somebody has found a way to counteract gravity, I am ready to leave the room, but I want you to know that I understand the great contribution that all of your work means to western civilization. We wouldn't be where we are without your work, and I want you to know that I admire the work, but I want to say to you that I am particularly interested in your being very, very careful with these indirect costs. It is a problem for me. I know that my fellow colleagues, we sometimes sweat bullets when we see the headlines in newspapers about indirect costs. Although I do support what you do, I ask you that you be very, very careful with the indirect costs.

EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH (EPSCOR)

Now, let me talk about something that I am particularly interested in and that is your program to stimulate competitive research. I am very interested in that. I think in South Carolina we have been very much involved in a lot of your work. My alma mater, South Carolina State University, is involved in it. Can you tell me what the future is for that program?

Dr. KREBS. We have sustained that at a fairly steady level over these last 3 to 5 years at around $7 million.

Certainly within the Administration and within the Office of Science we think that the EPSCOR program, as we call it, is really a very good way to build research capability and a research experience into universities that are in a sense pre-competitive. What we want to do is the students who attend schools throughout the Nation need to have an environment in which they can be exposed to faculty pursuing research because that is what would lead them on to a career in research.

To the extent that we can assist the States and these institutions in attracting high-quality research faculty and at the same time make that research experience available to their students which otherwise might not have happened, that really for me is the purpose of the EPSCOR program.

We work with our colleagues in NASA and NSF, and NSF has a significantly larger program, to make the appropriate investments in areas of research that are relevant to the Department of Energy.

Mr. CLYBURN. So I can gather from your answer that you do envision that this program has a significant future?

Dr. KREBS. You bet.

RENEWABLE ENERGY PRODUCTION INCENTIVE PROGRAM

Mr. CLYBURN. Mr. Reicher, as you know, the Renewable Energy Production Incentive program was created to encourage public power to invest in renewables, and you may also be aware that public power has a very large presence in my home State of South

Carolina, and I notice in your written testimony that you plan to revisit, I think is the word you use, the 62.5 percent reduction in the program in the year 2000. What do you mean by revisit?

Mr. REICHER. Mr. Clyburn, there has been a great deal of concern expressed by people from the public power community to the proposed cut in the Renewable Energy Production Incentive line this year, and we are going back to see what we can do about that to support—potentially support greater funding for it.

Mr. CLYBURN. Increase the funding?

Mr. REICHER. Yes.

Mr. CLYBURN. So revisit is to try to increase. There have been some revisits around here that——

Mr. REICHER. That is a fair question. With an eye towards supporting in fiscal year 2000 an increase over what we have asked for.

We are also supporting a little further down the road a rewriting of the overall approach to REPI, to make it much more useful to public power, to make it much more predictable so they know what money will come in the door to encourage the use of renewables in the United States. I think if we do both, do what we can in terms of this current proposal and improve the underlying program going down the road, I think we will be in much better shape.

Mr. CLYBURN. Thank you. I was hoping that would be your definition of revisit.

Thank you, Mr. Chairman.

Mr. PACKARD. Mr. Forbes.

Mr. FORBES. Thank you, Mr. Chairman, and thank you all for being here today.

HIGH FLUX BEAM REACTOR AT BROOKHAVEN NATIONAL LAB

Dr. Krebs, I particularly appreciate your leadership and your help as head of the Office of Science in relation to the many problems that Brookhaven National Laboratory has endured. And, as you know, I have been especially critical of the environmental transgressions. But, having said that, I think that Brookhaven remains one of the Nation's preeminent research facilities. I am a thousand percent behind the laboratory and its wonderful multiscience disciplinary activities there, and I thank you for your leadership on this question.

As you know, I have been especially concerned about the nuclear reactor at Brookhaven National Laboratory, the so-called High Flux Beam Reactor, and that reactor having been shut down almost 2 years ago, and it was expected to go back on-line or a decision was to be rendered, I guess, as of January, 1999, about the High Flux Beam Reactor going back on-line. I stated my opposition to the restart.

Having said that, I was wondering if you can share with us a little bit of the insight, the record of decision on why the future of the High Flux Beam Reactor had been delayed so long? I guess now it is projected that a decision will be made at the end of the year, December, 1999.

And I would ask you also how does the delay affect the cost and the complexity of any attempt to restart? Would that be the decision of the Secretary later this year?

And also let me ask, originally, as we noted, the decision was supposed to be in January of 1999 and now it has been put off to later this year, and I was wondering also what alternatives the Department might be considering if, in fact, because of this delay and the decision having been postponed, and I know there are people associated with the High Flux Beam Reactor working there, and I would like some of your insights in regard to those specific areas.

Dr. KREBS. I will try to make this brief and provide you with any additional information for the record.

The delay has basically occurred as we have put the development of the Environmental Impact Statement through the reviews inside the Department, and some natural delays occurred as a result of that.

But, more recently, Secretary Richardson determined that he would extend the public review period that would be required and, as a result, we are delaying putting out the final Environmental Impact Statement until I think October/November of this year, which would then—that is the driver to delay the final record of decision until at the earliest December of 1999.

In terms of the cost—what this does is in any scenario once a decision—if a decision were to restart was made, it would take about 16 months to restart the reactor. The original schedule was that the reactor would be back on-line in 3 and a half years. If the record of decision is to restart in December, then it would be in the middle of 2001 before it would be back on-line. The longer you delay restarting, it does induce issues associated with training of staff and that sort of thing. These machines need to be exercised, and so there are some concerns the longer we delay.

The alternatives, I think you are referring to what other things have happened, what has the neutron research community been doing in the meantime?

Mr. FORBES. Right, because of the delay.

Dr. KREBS. Some of them are using other facilities, other reactors at Oak Ridge Laboratory, overseas in France. They are also using some of our spallation sources at Los Alamos, and some are rethinking about the way of doing their research as the facility has—you know, has continued to be off-line.

There is still a fairly strong feeling among some members of the community that this is a unique facility and should still operate. We don't have many reactor ports for neutron science in this country, and so they would like to see it, and they are waiting for it to come back.

Mr. FORBES. I think DOE's own Basic Energy Science Advisory Committee had advised that restarting would not be practical or feasible from a technical and economic standpoint unless it operated at increased power, at 60 megawatts. I think they said in their report, "It should restart at 30 megawatts and move immediately to 60 megawatts in a timely manner. All of the actions required for this move should be completed before start-up. If the start-up were to be at 30 megawatts with no clear plan to move to megawatts, it should not be done."

And, as you know, the community, and I would share this view, that moving from 30 to 60 megawatts is something that is opposed

by many of the people on Long Island. I know that the scientific community would like that to happen.

Even if the Administration decided to restart the High Flux Beam Reactor, how realistic is it to think that you could run the HFBR at 60 megawatts as recommended when the HFBR did not run at 60 megawatts for some 17 years? And I guess what would be necessary to make sure that that were happening if the Secretary were to decide to restart?

Dr. KREBS. I will have to get back to you for the record on some of the specifics there. My understanding is that there are no technical issues with restarting up to 60 megawatts. And the desire of the Basic Energy Science Advisory Committee was to move to 60 megawatts because the intensity of the beam would be that much stronger and would allow them to do a different set of experiments which were highly desirable.

So the details of what it would take to get to the point of being able to go to a 60 megawatt start-up is something that I am going to have to provide you for the record.

[The information follows:]

RECORD OF DECISION DELAYED FOR THE HIGH FLUX BEAM REACTOR

During the Environmental Impact Statement (EIS) scoping process a year ago, the community requested that the Department expand analysis of the reactor's potential environmental impacts. To ensure that a comprehensive review is conducted, the Department has taken additional time for analysis and evaluation. The scheduled activities have been delayed to address issues of importance to the environment of Long Island, and the health and safety of workers and the public. The Draft EIS is now scheduled for public comment in April 1999, and the Final EIS is expected to be published in November 1999. The change in schedule for the Draft EIS and Final EIS will delay the Record of Decision, which is scheduled to be issued no earlier than December 1999.

SECRETARY'S DECISION TO RESTART HFBR

HFBR was upgraded in 1982 with new heat exchangers to support an increase in operating power from 40 megawatts (MW) to 60 MW. The reactor operated satisfactorily at 60 MW until 1989 when questions were raised about certain postulated accidents. Analysis done since then has resolved these questions. DOE would follow normal practice for restarting a reactor after a long shutdown, including operator training, an Operational Readiness Review and setting safety set-points, and updating administrative paperwork for 60 MW operation. No decision to restart at any power level has been made.

RELATIVISTIC HEAVY ION COLLIDER

Mr. FORBES. Is the RHIC, relativistic heavy ion collider, still on schedule to begin operations in August of this year, and has the Department of Energy fully funded its operations at BNL?

Dr. KREBS. The RHIC is on schedule to start. I trip over the word "fully." I think there will always be disagreements between what is fully and what is adequate under constrained circumstances, but I think we are providing a fairly significant increase for RHIC operations. It is going to be $106 million some in fiscal year 2000 with $12 million for research. We think that this meets, I believe, the recommendations of the advisory committee.

IMPACT OF BATES LABORATORY DECISION

Mr. FORBES. Just quickly, I know there had been reversal decisions as applied to Bates Laboratory at MIT. I am just wondering if the nuclear physics budget is impacted, because now there is an additional demand on that budget after the Department reversed itself on Bates?

Dr. KREBS. The actual details of the budget amendment are not completed within the Administration, but it is not expected that it would affect nuclear physics except through an increase. We will take care of Bates by an increase to the nuclear physics budget.

Mr. FORBES. Nor the RHIC project itself?

Dr. KREBS. That is correct.

Mr. PACKARD. I will yield to my colleague.

SOLAR AND RENEWABLE INVESTMENT ACCOUNTABILITY

Mr. VISCLOSKY. We have talked in the past about renewables and accountability, if you would. Would you want to address that issue as to how we on the committee can judge whether or not the investment is paying off if sharp decisions are being made to terminate some programs if they in fact are not going to lead anywhere?

Mr. REICHER. Thank you, Mr. Visclosky.

Let me say the following, just to put a couple of numbers on the table. Renewables today are about 2.2 percent of U.S. electricity, that is geothermal, biomass, solar, wind, those kinds of sources, about 2 percent.

What we are very proud of are the cost curves. Back 20 years ago people talked about where we needed to get over 20 years in terms of bringing the prices of these various renewables down, and what I would like to submit for the record are these very impressive cost trends for wind, for geothermal, for wind, for biomass and photovoltaics; and we made a huge amount of technological progress; and we have seen some growth in the use of these renewables.

[The information follows:]

4-Mar-99

Table 1: Electricity Consumption From Renewable Sources

	(Quadrillion Btu) 1997	Percent of Total electricity	Percent of Total U.S. Energy
Geothermal	0.43	1.26%	0.46%
Municipal Solid Waste	0.23	0.67%	0.24%
Biomass	0.04	0.12%	0.04%
Solar	0.01	0.03%	0.01%
Wind	0.04	0.12%	0.04%
Total Non-hydro	*0.75*	*2.19%*	***0.80%***
Total Electricity	34.25	100.00%	36%
Conventional Hydroelectric	3.6	10.5%	4%
Total U.S. Energy Consumption	94.04		100%

Table 2: Selected Non-electricity Renewable and Cogeneration Consumption

	(Quadrillion Btu) 1997	Percent of Total U.S. Energy
Cogeneration	1.12	1.19%
Residential Wood	0.60	0.64%
Non-marketed Renewable - 1	0.03	0.03%
Industrial Biomass	1.84	1.96%
Total	3.59	***3.82%***

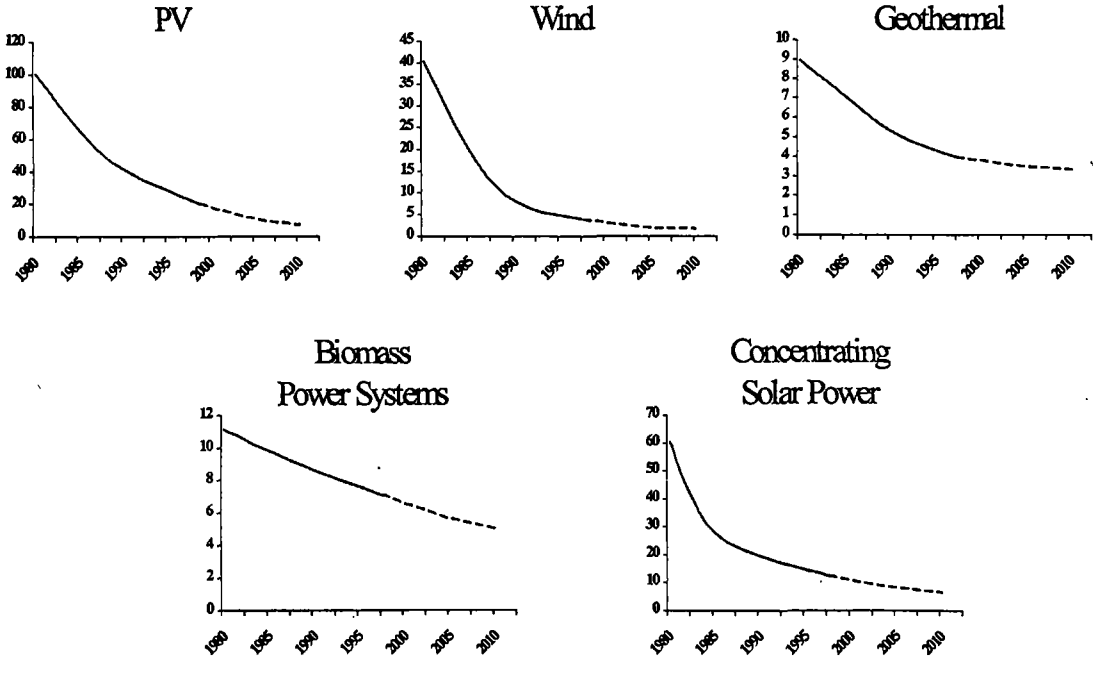
1. Includes solar hot water heating, geothermal heat pumps, and commercial solar thermal.
Source: AEO99, Table A18, A2, A8

Combination of Table 1 and Table 2: ***Electricity, non-electricity renewables, and Cogeneration*** '(as a percent of total U.S. Energy)

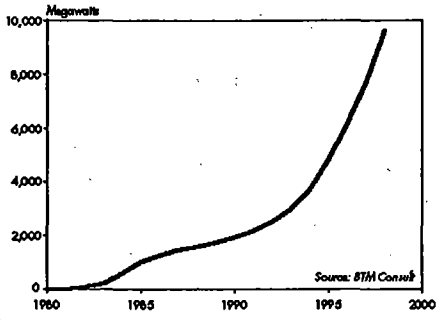
4.61%

Cost Trends of Renewable Energy

(¢/kWh)



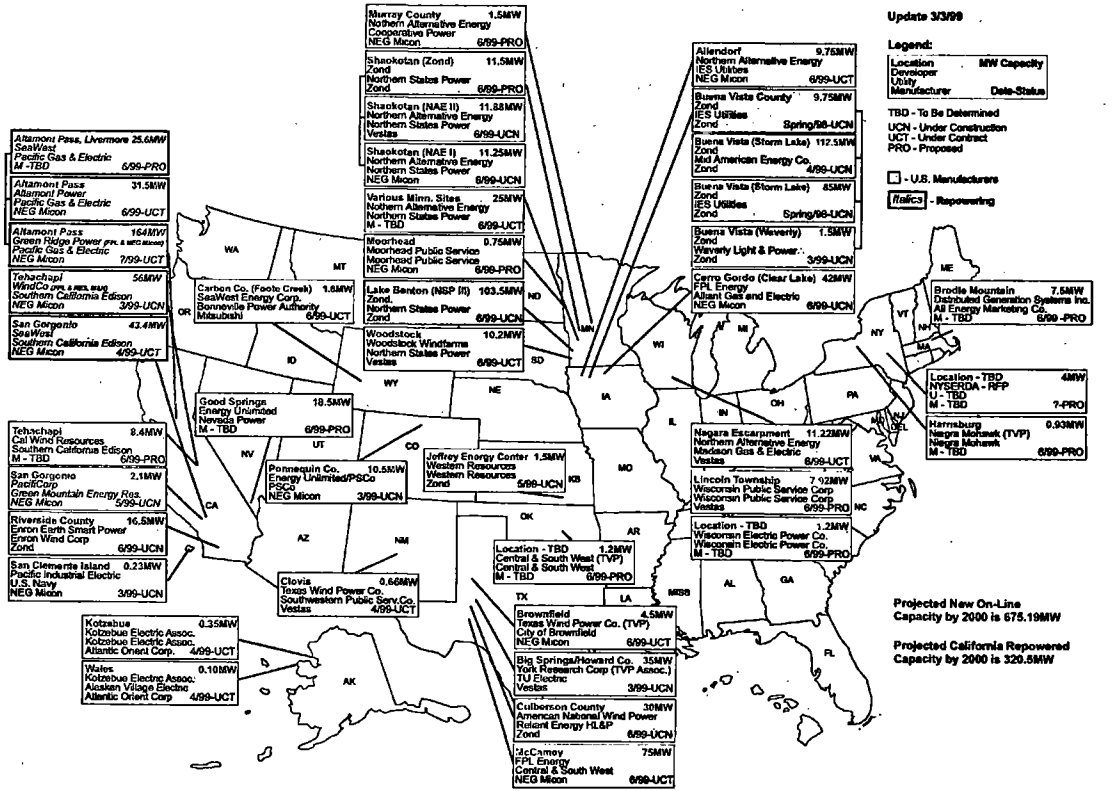
World Wind Energy Generating Capacity, 1980-98

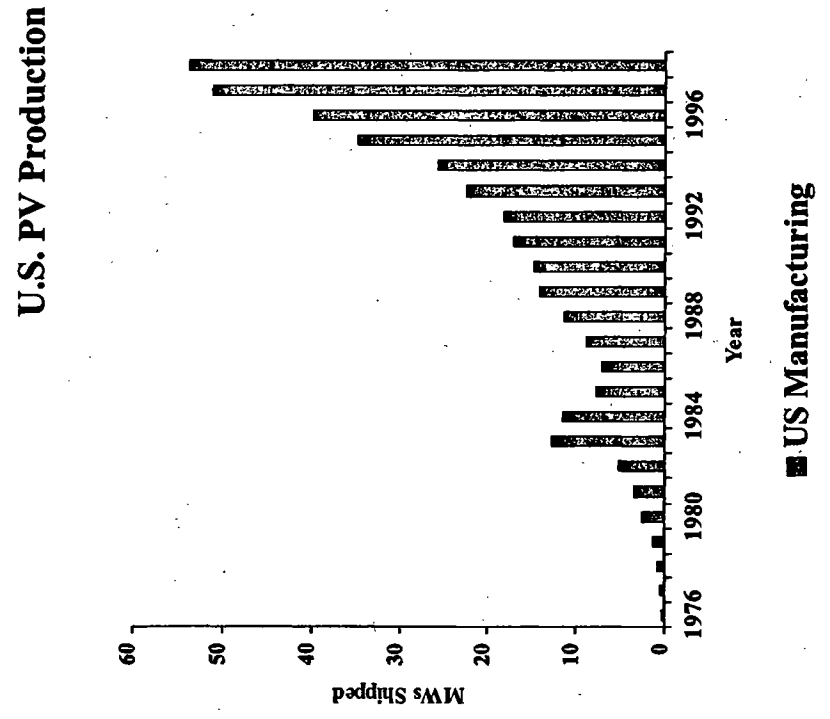


TABLE

World Wind Energy Generating Capacity, 1980-98

United States Wind Power Projects for 1999




U.S. PV Production
MWs Shipped
60
50
40
30
20
10
0
1976
1980
1984
1988
1992
1996
Year
US Manufacturing

SOLAR AND RENEWABLE INVESTMENT ACCOUNTABILITY

Mr. REICHER. The thing that I really want to stress and I have done some thinking about this since we met is that energy technologies take time and take investment, often Federal, to become a major contributor to our overall energy picture. I want to give you some perspective.

Let's talk about hydro. We really got going with hydro in 1920 with the Federal Power Commission and the Federal Power Act. It took us about 70 years, 1920 to about 1990, to get to 74,000 megawatts or 10 percent of U.S. electricity today. We spent in as-spent dollars, not inflation adjusted. We spent on the order of $20 billion through the Power Marketing Administration territory and many billions more through TVA or well in excess of $20 billion to get us to 10 percent.

The nuclear area we started in 1950, the Shipping Port Reactor in Pennsylvania, it took us 45 years to get to the 110,000 megawatts or 18 percent of U.S. electricity that we have got today, and in excess of $20 billion, and those are inflation adjusted dollars, 1997 and 1998 dollars, in excess of $20 billion to get there.

Let me just pick one technology that you have heard me talk about which is wind. We had virtually no wind capacity in this country, 10 megawatts in 1980. And we are now at 2,000 megawatts in the United States, about, and we are about to hit 10,000 megawatts worldwide. Just in 1 year, between 1997 and 1998, we saw 2,000 megawatts added worldwide. The Europeans are on a trajectory to build 40,000 megawatts of new power. The average coal plant is 200 or 300 megawatts. So when you look at 40,000 megawatts of new power that the Europeans are intending to put on-line, you understand that we are only 20 years into what in the case of hydro was a 70-year cycle, in the case of nuclear has been a 45-year cycle.

Thus, the need for some continued Federal support. We are at 4 to 6 cents a kilowatt hour. With some Federal support we think that we can bring this down to 2 to 3 cents a kilowatt hour in the next 2 to 3 years. With that we will see the increasing growth take off even more in this country and indeed around the world.

We think that it is very good for our economy. There are new wind plants, not just the turbine but wind manufacturing facilities, being built in this country. There are new jobs being created. It is a good response, a good way to reduce traditional air pollution and global warming gases.

When all is said and done, we need to support coal, to improve the combustion of coal. We need to improve our work with natural gas. We need to continue to support nuclear. But what we have in wind and some of the other renewables are technologies that are taking off as we speak, where the real growth is from now going forward and not the last 20 years, which have been devoted to bringing them down to a price where the other technologies had to get in their growth curves over much longer periods of time.

So that is my answer and that is why I think the requests we have made to support these technologies make a great deal of sense, because the next decade and two decades is when we are going to see real penetration by these technologies.

Mr. VISCLOSKY. I tend to land in Mr. Knollenberg's camp, although I have set aside all of my fusion questions because he has now left and there are only three of us here.

I guess the problem in my mind and that all of us on the committee have to resolve is that I do appreciate what you have said and I do appreciate you coming back with the information as far as getting your costs down. Part of this, and it has been a positive development, contrary to what most of us would have anticipated in the early 1970s, the cost of energy has continued to decline and so the target that renewables have had to hit and other forms of energy have had to hit has been a moving target in a positive direction, what is good today may be bad tomorrow.

On the other hand, we are short on cash and, from my own personal assumption, we are about $1.80 billion short on the subcommittee. The chairman may have a different perspective on that, but we have a very tight budget.

Under renewables there are some significant increases as far as the request. Mr. Magwood has a request for a new program, and we turned you down last year on the optimization.

You have facilities here that potentially today are producing energy at 1 cent, others that we would like to get down to 1 cent. Is that $5 billion better spent there or somewhere else? I do appreciate the point that you raise and I do have an open mind, but I think we have an obligation to strike a balance between the mature, efficient sources that we have today as well as continuing to make progress to get the prices down on renewables and to hold your feet to the fire. And if some of these are not going to pan out, we have to put some additional resources in the ones that are most promising. If you would want to make a final comment.

Mr. REICHER. Well, I wanted to say, you talk about the cost of energy. What we see are many things that go into this calculation of the cost of energy, and what I think we are going to see over time is fossil fuels tend to go in cycles. They go down and up in price. I think with the increasing environmental imperatives that we are seeing, the regulation of air emissions and other kinds of environmental constraints, we are going to see increases in the price of fossil fuels. And it is in the renewables that we see the opportunity to put in place very clean power sources that are not depending upon the vagaries of fuel prices.

I want to urge you to take a careful look at the fact that these are technologies that are increasing their role in the marketplace today and are at a point in time much earlier in their development as was hydros and renewables several decades ago. We are there with a fairly modest investment. We can push these to a point where they will be very good for the economy and the environment and make a major, major contribution going into the next century.

Mr. PACKARD. Mr. Frelinghuysen?

Mr. FRELINGHUYSEN. Just a few comments. I thought that the institution TVA would never be mentioned in this committee again. I sort of wrote a note to the chairman here, if any rescissions are considered or any offsets to supplementals, and I guess the chair has been good enough to offer up a few, willingly or unwillingly. I hope that he takes a look at the amount that we continue as a subsidy for the TVA last year. If any of your lobbyists are here, I

don't forgive myself for saying this and for our refinancing a third of a portion of their bonding capacity.

Mr. Reicher, I don't want to pick up where Mr. Knollenberg left off, but I can't help doing a little bit of that. You referred in your remarks to environmentally friendly hydroelectric power. I assume when you are talking about environmentally friendly, you are talking more about to fish than to taxpayers and the history of subsidization?

Mr. REICHER. Yes, to their impacts on fish and water quality generally.

Mr. FRELINGHUYSEN. From time to time this committee takes a close look at these costs of subsidy, and certainly in some cases there may be some validity, and since we are joined by the good gentleman from Ohio, I will stay away from his area, but in the hydro area there has been a long history of subsidization.

Relative to Japan, I know that sometimes people highlight Japan and you mentioned in your remarks Japan has three times the budget that we do I guess in the renewable area?

Mr. REICHER. In the area of photovoltaics.

Mr. FRELINGHUYSEN. Generally speaking, I don't think that Japan has any oil, does it?

Mr. REICHER. That is correct.

Mr. FRELINGHUYSEN. I think we need to be aware that, while Japan may have some brainpower assets, they don't have a lot of natural resources, other than perhaps photovoltaic and perhaps wind.

Mr. REICHER. We are importing an increasing amount of our oil as well. We are now in excess of 50 percent and headed onto 60 and perhaps 70 percent over the next decade; and that is one of the primary reasons, from a national security standpoint, that support for technologies that can rely on——

Mr. FRELINGHUYSEN. I understand that we have a greater reliance, and certainly the prices have come down remarkably, but I think it is fairly well known that when wars are fought to protect that oil supply, these that you hold out as perhaps—those that we ought to emulate don't do a lot to contribute towards those military efforts. I like you and you are excited about the work that you do and I am not against solar and ethanol, but I do think that we need to take a look at how productive these investments are.

Thank you very much, Mr. Chairman.

Mr. PACKARD. Mr. Forbes, please.

Mr. FORBES. Thank you, Mr. Chairman.

NATIONAL SYNCHROTRON LIGHT SOURCE

Dr. Krebs, the National Synchrotron Light Source at BNL is perhaps the most heavily used light source in the country. It is a valuable resource for industry as well as academia, and I understand that the Energy Department is collaborating with the National Institutes of Health and that the overall budget for the synchrotron light source has been increased by 15 percent. But I also understand that is not operating money, that is really construction money. I was wondering your reaction. At BNL there seems to be great difficulty in meeting the needs of the user community who are anxious to take advantage of the synchrotron light source.

What is DOE's share of the operating budget for the national synchrotron light source?

Dr. KREBS. I think we provide the whole operating budget of the synchrotron light source. Indeed, we value the synchrotron—NSLS—very highly. It was recommended for increases in Basic Energy Science Advisory Committee review; and I believe that in 1998 we provided them with additional funding, not the full level that BESAC recommended but something like two-thirds of the increase; and I will provide you with the detail for the record.

[The information follows:]

NATIONAL SYNCHROTRON LIGHT SOURCE

The Department of Energy provides the total operating budget for the NSLS. As a result of recommendations from the Basic Energy Sciences Advisory Committee (BESAC) based on 1997 report "Synchrotron Radiation Sources and Science" [Professor Robert Birgeneau (MIT), Chair; Professor Z.-X. Shen (Stanford), Vice Chair], BES provided a $2 million increase in funding for operations to NSLS in FY 1998. This rapid action showed our commitment to addressing the problems identified by BESAC. We provided an approximate cost-of-living increase in FY 2000. Through the Birgeneau/Shen study, we identified and addressed the most serious problems with our light sources. Furthermore, the study identified the growing numbers of users in macromolecular crystallography. Partially as a result of that report, NIH entered into serious discussions with DOE about how they might better serve their community of users. In FY 1999, NIH is planning to add funds for beamline upgrades at NSLS and has agreed to put an additional $4 million to upgrade the NSLS x-ray storage ring itself.

Dr. KREBS. But in fact they also recommended that increases be provided for other of our synchrotron light sources as well, and upgrades. And the value of the NIH funding is that they will allow us to do upgrades for the biological community where there is an intense demand for this kind of facility, structural biology.

Mr. FORBES. I have one other brief question, and then I will submit the balance of my questions for the record, Mr. Chairman.

HIGH FLUX BEAM REACTOR

For the High Flux Beam Reactor, the monies which have been requested or set aside for the High Flux Beam Reactor, is there any hope that some of that money, since the High Flux Beam Reactor is closed, some of the dollars that are allocated for that and of course cannot be spent currently on operation, some of those dollars could be used to enhance or expedite to whatever small degree that might be the cleanup at the laboratory?

Dr. KREBS. Currently, the funding for—there is $23 million worth of funding that is being expended on HFBR-related activities at the laboratory today.

Mr. FORBES. That $20 million is being used for a closed down facility?

Dr. KREBS. For the maintenance and surveillance, for modifications and repairs that are necessary, whether we restart or shut it down. And so those funds are fully utilized in 1999, and approximately the same amount of funding would also be required in year 2000 independent of a decision to restart or shut down.

Mr. FORBES. What was the expenditure on the High Flux Beam Reactor before it was shut down?

Dr. KREBS. It was more than $20 million. In fact, what we have done as a result of the constraints that were placed on the neutron

science community, we used—some of those dollars to do upgrades at the Los Alamos Neutron Science Center, a small spallation source. We also used it for some of the upgrades we are undertaking at the High Flux Isotope Reactor at Oak Ridge as well.

Mr. FORBES. So some of the $20 million is being used at other facilities?

Dr. KREBS. There is not more than $5 million, maybe $6 million. I would need to get you the exact funding. But, basically, we used it to accommodate—to try and prepare to accommodate the needs of the neutron science community at other facilities.

[The information follows:]

HIGH FLUX BEAM REACTOR FUNDING BEFORE SHUTDOWN

In FY 1996, the last year of full operation, HFBR was funded at a level of $26.3 million. In FY 1997, the funding was $34.4 million for HFBR remediation activities. In FY 1998, the funding was $22.6 millions. In FY 1999, the funding is expected to be $22.6 million and the FY 2000 request is also $22.6 million. As a result of the unavailability of HFBR, we have performed upgrades at the Los Alamos Neutron Science Center, a small spallation source, and the High Flux Isotope Reactor at Oak Ridge. These upgrades have been identified in our budget requests.

Mr. FORBES. Is that the kind of funding that needs to come to the committee for reprogramming?

Dr. KREBS. I don't believe that it is within the framework of our authorities.

Mr. FORBES. Thank you, Dr. Krebs.

Thank you, Mr. Chairman.

Mr. PACKARD. Mr. Latham.

BIOMASS

Mr. LATHAM. Thank you, Mr. Chairman; and I will be very brief.

When the Secretary was here, I mentioned about Iowa State working on a biorenewables consortium at the Ames lab; and they will be looking at agricultural commodities for energy sources; and there are some other farm States that also attempted to use the crop residue for energy, as an energy source.

It appears that obviously the cost of going back and retrieving it is expensive. I just wondered, while biomass really appears to be promising, is there any data available as far as cost effectiveness or are there—of harvesting the crop residue or are there any particular crops that you have data on to show to be of much more value or usable? Maybe not as residue but as initial crop?

Mr. REICHER. Mr. Latham, we are looking at dedicated energy crops, switch grass, for example, and looking at all sorts of residue from agriculture, waste from corn and the sugar cane industry.

Mr. LATHAM. That would be post-processing waste? What waste?

Mr. REICHER. This might be waste left in the field, waste that comes out of a processing in a factory. There is a whole host of waste sources.

Within the last couple of weeks we have put out a solicitation to the corn industry, basically to corn ethanol. Today we make ethanol from corn out of the corn kernel itself. We have technology that can use the rest of the corn plant, the stalk, the leaves, that sort of thing; and we have some of the corn ethanol companies that are very interested in taking this technology and bolting it onto existing corn ethanol plants and be able to make use of the rest of

the plant which would greatly improve corn ethanol economics and use what, in many cases, would be a waste. So that is an example where we can make a lot of progress.

We are also making good progress on using municipal solid waste to make ethanol, and that would be a major breakthrough. We spend large amounts of money paying to get rid of solid waste today, and a plant in New York State is going to demonstrate that we could make a lot of progress.

Mr. LATHAM. You don't think that I would get any resistance from my corn farmers at all?

Mr. REICHER. If we can grow the whole ethanol business, making it out of the corn plant and solid waste, we can do lots of good for the ethanol industry and reduce our reliance on imported oil. The cheaper you can make it, the more it can compete in the market.

Mr. LATHAM. The potential market is big enough for everyone if it is developed?

Mr. REICHER. The potential market is potentially endless.

Mr. LATHAM. More corn.

There is a provision to allow fuel use credits to be allocated for biodiesel in last year's omnibus appropriation bill, and I am curious to know if the Department is considering to look at this soybean-based product further and its relationship to cleaning up diesel engine emissions in any other areas? Where are we?

Mr. REICHER. We are very interested in the biodiesel area. It has some very good potential for using crops from farm country. We are in the midst of a rulemaking now on biodiesel, and we will have an interim rule out in the next couple of months that governs the credits one can get for biodiesel, and then we will have a final rule out sometime I believe in the fall of this year. So this is going to be a way of really pushing biodiesel but, at the same time, making sure that we get the energy benefits from it and that we do the right accounting of it, so we are very bullish about it.

Mr. LATHAM. Thank you, Mr. Chairman.

CHAIRMAN PACKARD'S CONCERNS

Mr. PACKARD. We now have a vote on, and for the subcommittee we have a full committee markup in the full committee room.

Unless there are some urgent questions I would like to wrap up with some comments and questions of my own before we have to leave for the vote.

I listened to the questions that Mr. Visclosky had of you, Mr. Reicher, in regard to the priorities of the Energy Department and where our monies and our emphasis go. I couldn't help but notice that we funded the renewable budget to the tune of about $399 million last year—no, $336 million, and that includes the $60 million in the omnibus bill, and you are asking for a 35 percent increase from that. That is of concern, of course, with the funds that we have.

In addition, I noticed also that 20 percent of our electricity is coming from nuclear energy and 3,000ths of a percent—0.003—percent is coming from photovoltaics and yet you are asking for a $54 million budget for photovoltaics and that—and only $19 million for nuclear energy. It almost sounds like our priorities are in the wrong place in terms of actual output of energy. I guess my ques-

tion is, how do you justify that? And I would like it in two sentences.

Mr. REICHER. We spent in excess of $20 billion on nuclear R&D over 45 years to get where we are today. In the case of—I will give you the best example that I have at my fingertips. In the case of wind, we have spent about $650 million, a tiny percentage of that, to get us where we are today. And with respect to wind, photovoltaic, geothermal, we are on the beginning of an amazing growth curve as we bring these prices down; and that is why I think it is so important that we continue to fund these.

I just wanted to say one thing, Mr. Chairman. You cited the 45 percent increase. We obviously look at the final enacted level in the omnibus, and when you look at it there it is a 19 percent increase.

I also just wanted to be sure that we could enter the previous documents that I referred to into the record.

Mr. PACKARD. Of course. Thank you.

Two or three comments that I want to make.

One, on nuclear plants, it is going to be very difficult for us to see additional nuclear generating plants built in the near future and maybe even in the long-term future. I don't expect that we will see any major new hydro plants built in our lifetime. So I sense that we are moving or will be in the long term moving away from hydro, which has been a very efficient and very I think environmentally good direction to go, and nuclear which we are moving away from those which obviously means we are moving in the long term toward fossil fuel; and that, of course, is of great concern to me.

I sense that we need a greater emphasis on building new nuclear plants. I know that has almost been heresy in the past, but I think we are reaching the point where your Department and this committee more and more are going to have put the message out that nuclear energy is still a very good direction for us to go in this country.

I would hope that I would live long enough to see a new nuclear power plant built in this country. Five years ago I would have said that I wouldn't, but I think the attitude is changing and minds are changing. Those of us who have some say agree about the direction that we should go. I am concerned that we are moving away from what we have historically tried to move towards supporting, nuclear powers.

Secondly, I would like to encourage, not just the three of you, but the entire Energy Department to seek ways to get things done, to improve things and allow agencies move forward rather than looking for ways to prevent them from doing their work.

Many of our government agencies—and this is a soapbox of mine. Many of our agencies, particularly our regulatory agencies, look for ways to fine, to penalize, to prevent, to imprison, to entrap, to try to find ways to hurt business and the private sector and even sometimes the public sector.

I would like to see a mind change in our departments, particularly our regulatory departments, where it is not to find ways to penalize or entrap people in noncompliance but try to find ways to help people comply with the rules. No one is asking them to break the rules, but particularly in our environmental agencies, I have

found where it appears that their goal is to entrap people into strict obedience and then to fine, to penalize, to hurt.

I would like government to be in the business of trying to help people comply with the rules and the regulations and help find ways for them to do so, not to put them into lawsuits and terrible positions.

That is an attitudinal change. It needs to start at the top of our agencies, but it is desperately needed at the field level of our agencies, and I would hope that it could start here. I don't think that you are the offenders like I see in other agencies, and I have made this pitch before to them.

But I want you to know that is where I feel government people should be working, to help people follow the rules and get the work done. We are in the business of helping people perform services for our citizens. You are in the business of helping people and agencies and organizations and businesses to provide services to our people. That is a great service. We ought to be in the business of helping them to do so and not prevent them from doing so.

Lastly, one last question of Dr. Krebs. How do we determine the projects and science programs that our labs do?

Dr. KREBS. Within the Office of Science, let me speak to that, which is a strong amount of what they are asked to do, the big facilities we build are subject to the scrutiny and recommendation of the external scientific community. And the—so we do not proceed with big facilities without external peer review; and with respect to the small projects, we also do external peer review. We do not place research at these laboratories without external peer review.

[The information follows:]

LABORATORY SCIENCE MISSIONS

The mission of each of the major laboratories is reviewed each year by the Program Secretarial Officers, as part of the Institution and Planning process. Currently, the Laboratory Operations Board is preparing a Laboratory Profile Report that describes the labs' mission.

Mr. PACKARD. The reason that I am asking the question is maybe to get a message across more than to get an answer to the question.

I am a little concerned about our labs, although the work that they do is fine, that they develop projects and science that perpetuate themselves. I think the reverse ought to take place. I think we ought to determine what kind of science and projects need to be done for the good of our country and for the good of our citizens, and then determine which labs are more suitable to do it. I am concerned that our labs are in the business, often, of finding programs to self-perpetuate themselves and may not be the best science or the best projects that need to be done.

I would like you to give some thought as to how that can be restructured so we determine what our labs ought to be doing, rather than the labs coming up with their own projects, thus self-perpetuating themselves.

Lastly, I am very concerned about the lobbying efforts going on in the Department of Energy, where we pay our people out of taxpayer money within the Department to lobby Washington. That needs to stop.

I think the Department, if they need to do lobbying, they need to put that new authority in the budget and hire a professional lobbyist to do your job. I hope the day will come when we will see no paid staff or paid people in your departments that do lobbying, and can that is what they are supposed to do in Washington or anywhere else. We would like to see that phased out. If you need lobbying, you can request authority in your budget to hire professional lobbyists, just like any other city or county or agency would do. I don't believe that the taxpayers ought to be paying for the lobbyists of this Department.

And I will now close the hearing.

INCREASES IN PROGRAMS, CONSTRUCTION PROJECTS AND ACTIVITIES

Mr. Packard. Since enactment and collection of these revenue proposals is doubtful, can the Department identify lower priority programs within the Department which can be terminated or reduced to produce a budget that complies with the budget caps? Please provide a list of all new programs, construction projects and activities with increases that exceed 5% of the amount provided last year.

Dr. Telson. I would like to assert that the Department's FY 2000 Budget Request for Discretionary Spending does not increase above the appropriated level for FY 1999. The information follows:

DOE Discretionary Funding
(dollars in thousands)

	FY 1999 Comparable	FY 2000 Request	Percent Increase
Total discretional Funding	$17,856,392	$17,842,014	-0.08%

The Department is not requesting any increase at all for FY 2000. Within the overall flat budget, we have enhanced certain program levels, and reduced others in order to arrive at a proper balance within a flat budget. Thus, we believe that the Department has already taken every possible reduction, wherever such a reduction would not result in severely damaging our ability to perform our mission.

I would like to provide for the record a table that shows both new programs and ongoing programs that have increased by more than 5% over the FY 99 appropriation after comparability adjustments have been made. The funding levels in the following table were determined to be appropriate after many long discussions with program officials within the Department, and only after we took offsetting reductions in other programs. We have also attempted to eliminate double counting. Thus, the list below arranges the programs by the line items as they were submitted to Congress. It does not list programs of a cross-cutting nature such as the Strategic Simulation Initiative or the Climate Change Technology Initiative. The information follows:

Department of Energy
Funding Increases Exceeding 5% from the Previous Year
(dollars in thousands)

Appropriations Account / Program / Activity	FY 1999 Comparable Appropriation	FY 2000 Budget Request
Energy Supply		
Solar and Renewable Resources Technologies		
Solar building technology research	3,600	5,500
Photovoltaic energy systems	72,200	93,309
Concentrating solar power	17,000	18,850
Biomass Power systems	31,450	38,950
Biomass Transportation	41,750	53,441
Wind energy systems	34,771	45,600
Solar program support	----	10,000
Hydrogen research	22,250	28,000
Hydropower	3,250	7,000
Electric Energy Systems & Storage Transmission reliability	3,000	4,000
Electric Energy Systems & Storage Energy storage systems	4,500	6,000
Program Direction	18,100	19,171
Nuclear Energy R & D		
Test reactor area landlord - Operation and maintenance	4,000	6,070
99-E-200 Test reactor area electrical utility upgrade, INEL	341	1,430
Nuclear energy plant optimization	----	5,000
Nuclear energy research initiative	19,000	25,000
Uranium programs		
Operations & maintenance	35,420	41,000
Isotope Support		
99-E-201 Isotope production facility, LANL	6,000	8,000
Program Direction -Nuclear Energy	21,242	24,960
Oak Ridge Landlord	11,000	11,812
Technical Information Management - program direction	7,000	7,500
Non-defense Environmental Management		
Waste Management		
93-E-900 Long-term storage of TMI-2 fuel, INEL	----	2,500
Uranium Enrichment Decontamination and Decommissioning Fund		
U E Decontamination and Decommissioning Fund	190,200	210,198
Science		
High Energy Physics		
Research and technology	214,891	227,190
00-G-307 SLAC Office building	----	2,000
98-G-304 Neutrinos at the main injector, Fermilab	14,300	22,000
Nuclear Physics		
Operation and maintenance	317,935	342,940
Basic Energy Sciences		
99-E-334 Spallation neutron source, ORNL	101,400	196,100
Computational and technology research	157,471	198,875
Multiprogram Energy Labs		
MEL-001 Multiprogram energy laboratory infrastructure	14,924	18,351
Program direction - Science	49,800	52,360

Department of Energy
Funding Increases Exceeding 5% from the Previous Year
(dollars in thousands)

Appropriations Account / Program / Activity	FY 1999 Comparable Appropriation	FY 2000 Budget Request
Departmental Administration		
General Management -personnel compensation & benefits	105,859	112,053
Policy analysis and system studies	350	1,000
Environmental policy studies	2,000	2,432
Information management	8,000	13,000
Weapons Activities		
Stockpile Stewardship		
Operation and maintenance	1,453,302	1,635,355
00-D-103 Terascale simulation facility, LLNL	----	8,000
00-D-105 Strategic computing complex, LANL	----	26,000
00-D-107 Joint computational engineering laboratory, SNL	----	1,800
99-D-106 Model validation & system certification center, SNL	1,600	6,500
99-D-108 Renovate existing roadways, NTS	2,000	7,005
97-D-102 Dual-axis radiographic hydrotest facility, LANL	36,000	61,000
Technology partnerships & education - Education	19,000	29,800
Stockpile Management		
99-D-127 Stockpile management restructuring initiative, KC	13,700	17,000
99-D-128 Stockpile management restructuring initiative, Pantex	1,108	3,429
99-D-132 SMRI nuclear material S&S upgrade project, LANL	9,700	11,300
98-D-125 Tritium extraction facility, SR	6,000	33,000
98-D-126 Accelerator production of tritium, VL	20,000	31,000
95-D-102 Chemistry & metallurgy research upgrades, LANL	5,000	18,000
88-D-123 Security enhancements, Pantex	----	3,500
Defense Environmental Restoration & Waste Management		
Site/Project Completion		
99-D-402 Tank farm support services, F&H area, SR	2,745	3,100
99-D-404 Health physics instrumentation laboratory, INEL	950	7,200
98-D-453 Plutonium stabilization & handling system for PFP, RL	10,699	16,860
97-D-470 Regulatory monitoring and bioassay lab, SR	7,000	12,220
Post 2006 completion		
Operation & maintenance - Environmental management	2,242,653	2,898,997
Operation & maintenance - Health studies (EH)	12,000	20,000
00-D-401 SNF treatment and storage facility Title I & II, SR	----	7,000
Defense Environmental Management Privatization		
Privatization initiatives, various locations	228,357	253,000

Department of Energy
Funding Increases Exceeding 5% from the Previous Year
(dollars in thousands)

Appropriations Account / Program / Activity	FY 1999 Comparable Appropriation	FY 2000 Budget Request
Other Defense Activities		
Non-Proliferation and National Security		
00-D-192 Non-Proliferation & international security center, LANL	----	6,000
Arms control	256,900	296,000
Nuclear safeguards and security	55,200	59,100
HEU transparency implementation	13,580	15,750
International nuclear safety	30,000	34,000
Program direction - Non-proliferation & National Security	80,450	90,450
Counterintelligence	15,641	31,200
Fissile Materials Control and Disposition		
Operation and maintenance	116,372	129,766
00-D-142, Immobilization & associated processing facility, VL	----	21,765
99-D-141 Pit disassembly and conversion facility, VL	20,000	28,751
Program direction - Fissile Materials	4,588	7,343
Office of Hearings and Appeals	2,400	3,000
Naval Reactors		
90-N-102 Expended core facility dry cell project, ID	5,800	12,000
Southeastern Power Administration		
Program direction	4,370	4,727
Southwestern Power Administration		
Operation and maintenance	2,722	3,625
Program direction	16,402	17,631
Western Area Power Administration		
Construction and rehabilitation	20,802	26,802
Falcon and Amistad Operating and Maintenance Fund	1,010	1,309
Nuclear Waste Disposal		
Repository program	112,000	186,397
Program direction	53,000	71,603

DEPARTMENTAL STAFFING

Mr. Packard. On page five of the budget justification, the Department reports that it will reduce the number of FTEs funded in this account by 298, an 18% reduction. The budget lines from which Federal salaries and expenses are funded reflect increases for staff. Why is the Department requesting more funding for fewer staff? Please provide a table reconciling the discrepancy between the staff reductions and budget increases to illustrate the Department's need for a sizeable budget increase to pay for fewer FTEs.

Dr. Telson. The staffing table referred to from the Department's Fiscal Year 2000 Budget Request, contains an error in the FY 1999 column. The FTEs for the Office of Environment, Safety and Health are shown in the Energy Supply account, when in fact they are budgeted in Other Defense Activities. This accounts for most of the difference between FY 1999 and FY 2000. The tables for Program Direction elsewhere in the Energy Supply volume, when summed, provide a different picture. While most of the discrepancy has disappeared there is, nevertheless, still a question as to why Salary and Benefits are increasing slightly while FTE levels are decreasing by seven percent. The information follows:

Energy Supply Program Direction Summary
(dollars in thousands)

	FY 1998	FY 1999	FY 2000	Difference	Percentage Change
Salary & Benefits	$117,910	$114,956	$117,768	$2,812	2%
Full-Time Equivalents	1,472	1,442	1,340	(102)	-7%

This discrepancy can be explained by two factors, the Federal payraise and the Workforce 21 timing decisions. Within the Department, there is an ongoing review of FTE needs, referred to as Workforce 21. Several program offices expect their FTE levels to be adjusted in FY 2000 to help address skill mix problems, and have requested enough funding under Salary and Benefits to pay for the expected increase. Note that this is explicitly stated in the Department's Fiscal Year 2000 Budget Request, Volume I in the request for Solar and Renewables on page 195, and in the request for Nuclear Energy on page 336.

CLIMATE CHANGE TECHNOLOGY INITIATIVE (CCTI)

Mr Packard. Please provide a crosswalk of CCTI programs including the programs and funding levels for fiscal year 1999. Please provide comparable spending for these activities in fiscal year 1999 and current estimates for additional spending in the fiscal years following 2000. How many years does the Administration plan to request funds for this program? Please provide out-year funding requirements for the CCTI including all years for which the Administration anticipates funding this program.

Dr. Telson. I have a table I would like to insert for the record on the Climate Change Technology Initiative. The CCTI was initially announced in the FY 1999 budget in terms of a five-year plan of increase to existing programs, along with some new activities. The original CCTI plan was to provide a total of $2.7 billion in additional spending over five years and five agencies, relative to the FY 1998 appropriation baseline.

For reasons of clarity and conciseness we now report CCTI in terms off the total spending in its constituent programs, without creating artificial distinctions between different categories of money. A large portion of what we report as CCTI represents a continuation of program that have been funded for many years, for reasons other than climate change. Those activities have economic competitiveness, energy efficiency, pollution prevention, and energy security benefits, and as such we would expect them to generally continue for the foreseeable future. The actual funding levels that will be requested in fiscal years after FY 2000 will depend on the annual Administration budget process, and have not been determined at this time. The information follows:

Climate Change Technology Initiative
(dollars in millions)

	FY 1998	FY 1999	FY 2000
Energy & Water Development Appropriations			
Energy Efficiency and Renewable Energy			
Solar & Renewable Energy	294.3	336.0	398.9
Use of Prior Year Balances	-24.4	0	0
Total Solar & Renewable Energy	$269.9	$336.0	$398.9
Nuclear Energy - Plant Optimization	$0.0	$0.0	$5.0
Science			
Biological & Environmental Research	0.0	8.0	20.0
Basic Energy Sciences	0.0	5.5	13.0
Total Science	$0.0	$13.5	$33.0
Total Energy & Water Development Appropriations	$269.9	$349.5	$436.9
Interior Appropriations			
Energy Efficiency and Renewable Energy			
Energy Conservation R&D	450.2	525.7	646.5
Fossil Energy	0.0	23.9	36.8
Energy Information Administration	0.0	2.5	3.0
Total Interior Appropriations	$450.2	$552.1	$686.3
Total Climate Change Technology Initiative	$720.1	$901.6	$1,123.2

HOW FUNDS ARE SPENT

Mr. Packard. The Under Secretary has stated that he will work to improve the way grants and contracts are awarded to ensure that awards are made using sound scientific review and economic judgement. What are the problems today? What steps have been taken to make this effort successful?

Mr. Farrell. During a review conducted by the Department, it was determined that merit review procedures were not being consistently applied and that they were primarily used in a competitive environment by certain program offices. Since merit reviews are also beneficial in a noncompetitive environment to provide an assessment of the technical or scientific value of a single proposal, it was considered necessary to establish additional controls to require all discretionary financial assistance awards be subjected to an objective merit review. New policies were implemented to provide additional controls for the conduct of merit reviews.

Since the new policy has been in effect, procurement officials have been providing hands-on assistance to individual programs in developing improved merit-based selection procedures. For example, the Office of Energy Efficiency and Renewable Energy and the Office of Procurement and Assistance Management developed a competitive, broad-based solicitation for information dissemination and outreach activities. The response to this solicitation has been very positive, with more than 400 applications received at the first closing date. These applications have been subjected to an objective merit review and the successful ones will receive awards in the near future.

The Office of Nuclear Energy, Science and Technology (NE) in initiating the Nuclear Energy Research Initiative (NERI) program this fiscal year has adopted a fundamental change in their management approach to nuclear energy research and development programs. All of NE's previous nuclear energy research programs were directed research with the Department defining the research and approach to be used. Unlike research of the past, the NERI program will conduct investigator-initiated scientific and engineering research that is competitively selected for award based on a comprehensive peer review for scientific and technical merit, and a Federal relevance review for compliance with the NERI program and DOE policy objectives. Additionally, the program will receive guidance from the Office of Nuclear Energy's Nuclear Energy Research Advisory Committee (NERAC). We believe this approach will result in the selection and funding of innovative and new research that will result in breakthrough technologies that effectively address the barriers to the future use of nuclear power - proliferation resistance, economics, and waste management – in a manner that is scientifically and economically sound.

HOW FUNDS ARE SPENT

Mr. Packard. For each program activity, please provide how funds were spent in fiscal years 1997 and 1998 and estimates for fiscal years 1999 and 2000. Please provide the following three categories for each program: recipients of program dollars (national laboratories, universities or the private sector), how funds are spent (grants, contracts, other), and the basis for providing grants and contracts (competitive or non-competitive). For any program with applied research or development activities, provide the amount for applied research or development activities.

Dr. Krebs. The policy of the Office of Science (SC) is to award its grants and contracts on a competitive basis, to the maximum extent possible. SC continues to use its competitive Financial Assistance Program Rule (10 CFR Part 605) to solicit grant applications, and its well established Merit (Peer) Review System to conduct scientific peer reviews and select meritorious research grant applications for funding. Non-competitive awards are only made under unusual circumstances when competition is not practical, such as when a recipient has a unique or exclusive capability to perform the work, or when Congress has named the recipient in legislation. Details of the funding by recipient type and by type of agreement follows.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - TOTAL PROGRAM
(B/A in thousands)

Basic Energy Sciences	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
M&O Laboratories	$488,107	$511,412	$636,387	$727,371
Universities	136,120	124,898	120,190	127,248
Other				
Non-Profit	5,118	4,288	4,270	3,425
Industrial	458	898	17,199	16,751
Other Federal Agencies	2,105	2,985	1,928	1,748
All Other a/	10,813	7,335	19,550	11,541
Total Other	18,494	15,506	42,947	33,465
Subtotal BES	642,721	651,816	799,524	888,084
Adjustment	-9,731 b/	-4,852 b/	-4,002 b/	---
Total BES	$632,990	$646,964	$795,522	$888,084

a/ Includes funding for state and local government, Federal Telecommunications System support for ESnet operations, Fermi and Lawrence awards, etc.

b/ Share of general reduction for use of prior year balances in FY 1997, FY 1998, and FY 1999 and emergency flood supplemental rescission assigned to this program in FY 1997.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - TOTAL PROGRAM
(B/A in thousands)

Computational and Technology Research	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
M&O Laboratories	$122,137	$128,404	$117,041	$147,467
Universities	19,965	13,255	20,980	25,938
Other				
Non-Profit	2,309	2,736	2,481	2,578
Industrial	1,240	90	4,053	4,865
Other Federal Agencies	574	408	25	0
All Other a/	3,643	1,886	12,891	18,027
Total Other	7,766	5,120	19,450	25,470
Subtotal CTR	149,868	146,779	157,471	198,875
Adjustment	-2,580 b/	-1,714 b/	-1,573 b/	----
Total CTR	$147,288	$145,065	$155,898	$198,875

a/ Includes funding for state and local government, Federal Telecommunications System support for ESnet operations, Fermi and Lawrence awards, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - APPLIED a/
(B/A in thousands)

Computational and Technology Research / Laboratory Technology Research	Actual FY 1997	Actual FY 1998	Estimate FY 1999	Estimate FY 2000
M&O Laboratories	$17,168	$14,775	$9,253	$13,916
Universities	6,195	396	2,968	0
Other				
Non-Profit	20	20	20	0
Industrial	79	0	423	379
Other Federal Agencies	0	0	0	0
All Other b/	204	188	3,478	5
Total Other	303	208	3,921	384
Subtotal CTR	23,666	15,379	16,142	14,300
Adjustment	-183 c/	-180 c/	-173 c/	----
Total CTR - Applied	$23,483	$15,199	$15,969	$14,300

a/ The applied amounts are included in the Computational and Technology Research Total Program table.

b/ Includes funding for state and local government, Federal Telecommunications System support for ESnet operations, Fermi and Lawrence awards, etc.

c/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - TOTAL PROGRAM
(B/A in thousands)

Technical Information Management	Actual FY 1997	Actual FY 1998	Estimate FY 1999	Estimate FY 2000
M&O Laboratories	$0	$0	$0	$0
Universities	0	0	0	0
Other				
Non-Profit	0	0	0	0
Industrial	0	0	0	0
Other Federal Agencies	0	0	0	0
All Other a/	12,000	10,100	8,600	9,100
Total Other	12,000	10,100	0	0
Subtotal TIM	$12,000	$10,100	$8,600	$9,100
Adjustment	-263 b/	-68 b/	-191 b/	---
Total TIM	$11,737	$10,032	$8,409	$9,100

a/ Includes funding for state and local government, Federal Telecommunications System support for ESnet operations, Fermi and Lawrence awards, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and FY 1997 emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - TOTAL PROGRAM
(B/A in thousands)

Fusion Energy Sciences	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
M&O Laboratories	$110,797	$102,091	$100,462	$105,878
Universities	61,527	68,171	65,025	58,825
Other				
Non-Profit	201	422	832	195
Industrial	39,730	42,777	51,135	50,935
Other Federal Agencies	542	737	922	1,097
All Other a/	14,022	9,992	4,260	5,684
Total Other	54,495	53,928	57,149	57,911
Subtotal FES	226,819	224,190	222,636	222,614
Adjustment b/	-2,133	-791	-1,136	0
Total FES	$224,686	$223,399	$221,500	$222,614

a/ Includes funding for state and local government, Federal Telecommunications System support for ESnet operations, Fermi and Lawrence awards, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - TOTAL PROGRAM
(B/A in thousands)

High Energy Physics	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
M&O Laboratories	$543,043	$553,506	$541,287	$538,930
Universities	112,329	110,207	112,892	126,708
Other				
Non-Profit	940	880	867	921
Industrial	624	388	29,740	26,068
Other Federal Agencies	1,063	1,630	1,283	921
All Other a/	171	1,979	9,457	3,542
Total Other	2,798	4,877	41,347	31,452
Subtotal HEP	658,170	668,590	695,526	697,090
Adjustment b/	-1,051	-1,851	-1,610	0
Total HEP	$657,119	$666,739	$693,916	$697,090

a/ Includes funding for state and local government, Federal Telecommunications System support for ESnet operations, Fermi and Lawrence awards, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - TOTAL PROGRAM
(B/A in thousands)

Nuclear Physics	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
M&O Laboratories	$243,706	$247,172	$259,436	$277,655
Universities	65,494	65,998	65,644	56,287
Other				
Non-Profit	231	35	44	0
Industrial	0	0	7,387	8,031
Other Federal Agencies	239	388	320	140
All Other a/	330	1,145	1,724	827
Total Other	800	1,568	9,475	8,998
Subtotal NP	$310,000	$314,738	$334,555	$342,940
Adjustment	-49 b/	-971 c/	-776 c/	0
Total NP	$309,951	$313,767	$333,779	$342,940

a/ Includes funding for state and local government, Federal Telecommunications System support for ESnet operations, Fermi and Lawrence awards, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, emergency flood supplemental rescission assigned to this program.

c/ Share of general reduction of use of prior year balances for FY 1997, FY 1998, and FY 1999 assigned to this program.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - TOTAL PROGRAM
(B/A in thousands)

Biological and Environmental Research	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
M&O Laboratories	$254,245	$240,248	$244,327	$256,090
Universities	81,150	95,282	93,478	85,866
Other				
Non-Profit	22,712	36,985	47,420	23,298
Industrial	3,183	3,008	13,281	11,372
Other Federal Agencies	9,293	10,602	7,412	10,249
All Other a/	9,590	9,551	30,770	24,295
Total Other	44,778	60,146	98,883	69,214
Subtotal BER	380,173	395,676	436,688	411,170
Adjustment	-6,702 b/	-4,580 b/	-3,798 b/	---
Total BER	$373,471	$391,096	$432,890	$411,170

a/ Includes funding for state and local government, Federal Telecommunications System support for ESnet operations, Fermi and Lawrence awards, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - APPLIED a/
(B/A in thousands)

Biological and Environmental Research Medical Applications	Actual FY 1997	Actual FY 1998	Estimate FY 1999	Estimate FY 2000
M&O Laboratories	$18,064	$17,296	$14,557	$15,554
Universities	26,614	33,537	34,030	14,244
Other				
Non-Profit	3,620	2,522	16,564	8,497
Industrial	21	0	1,889	1,090
Other Federal Agencies	957	610	0	0
All Other b/	646	2,876	3,904	2,522
Total Other	5,244	6,008	22,357	12,109
Subtotal BER	49,922	56,841	70,944	41,907
Adjustment	-631 c/	-647 c/	-592 c/	---
Total BER - Applied	$49,291	$56,194	$70,352	$41,907

a/ The applied amounts are included in the Biological and Environmental Research Total Program table.

b/ Includes funding for state and local government, Federal Telecommunications System support for ESnet operations, Fermi and Lawrence awards, etc.

c/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - TOTAL PROGRAM
(B/A in thousands)

Energy Research Analyses	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
M&O Laboratories	$767	$765	$750	$650
Universities	100	5	0	0
Other				
Non-Profit	277	176	131	0
Industrial	235	0	24	27
Other Federal Agencies	225	244	0	0
All Other a/	351	244	95	323
Total Other	1,088	664	250	350
Subtotal ERA	$1,955	$1,434	$1,000	$1,000
Adjustment	-415 b/	-144 b/	-92 b/	----
Total TIM	$1,540	$1,290	$908	$1,000

a/ Includes funding for state and local government, Federal Telecommunications System support for ESnet operations, Fermi and Lawrence awards, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and FY 1997 emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY RECIPIENT TYPE - TOTAL PROGRAM
(B/A in thousands)

Multiprogram Energy Laboratories - Facilities Support	Actual FY 1997	Actual FY 1998	Estimate FY 1999	Estimate FY 2000
M&O Laboratories	$20,628	$21,247	$21,260 a/	$21,260 a/
Universities	0	0	0	0
Other				
Non-Profit	0	0	0	0
Industrial	0	0	0	0
Other Federal Agencies	0	0	0	0
All Other	0	0	0	0
Total Other	0	0	0	0
Subtotal MELFS	$20,628	$21,247	$21,260	$21,260
Adjustment	-1,399 b/	-336 b/	-13 b/	----
Total MELFS	$19,229	$20,911	$21,247	$21,260

a/ Includes $1,160,000 for Payments in Lieu of Taxes (PILT) provided to communities surrounding Brookhaven National Laboratory and Argonne National Laboratory through the Chicago Operations Office.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and FY 1997 emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - TOTAL PROGRAM
(B/A in thousands)

Basic Energy Sciences	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
Grants	$132,892	$120,261	$120,320	$126,834
Contracts	491,767	515,572	640,487	731,571
Other a/	18,062	15,983	38,717	29,679
Subtotal BES	642,721	651,816	799,524	888,084
Adjustment	-9,731 b/	-4,852 b/	-4,002 b/	----
Total BES	$632,990	$646,964	$795,522	$888,084

a/ Includes funding for state and local agreements, interagency agreements, cooperative agreements, purchase orders, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and FY 1997 emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - TOTAL PROGRAM
(B/A in thousands)

Computational and Technology Research	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
Grants	$22,496	$15,020	$22,494	$16,994
Contracts	123,021	128,594	117,141	147,750
Other a/	4,351	3,165	17,836	34,131
Subtotal CTR	149,868	146,779	157,471	198,875
Adjustment	-2,580 b/	-1,714 b/	-1,573 b/	-----
Total CTR	$147,288	$145,065	$155,898	$198,875

a/ Includes funding for state and local agreements, interagency agreements, cooperative agreements, purchase orders, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - APPLIED a/
(B/A in thousands)

Computational and Technology Research Laboratory Technology Research	Actual FY 1997	 FY 1998	Estimate FY 1999	 FY 2000
Grants	$6,215	$416	$2,988	$0
Contracts	17,276	14,775	9,303	13,956
Other b/	175	188	3,851	344
Subtotal CTR	23,666	15,379	16,142	14,300
Adjustment	-183 c/	-180 c/	-173 c/	-----
Total CTR - Applied	$23,483	$15,199	$15,969	$14,300

a/ The applied amounts are included in total for Computational and Technology Research Total Program table.

b/ Includes funding for state and local agreements, interagency agreements, cooperative agreements, purchase orders, etc.

c/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - TOTAL PROGRAM
(B/A in thousands)

Technical Information Management	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
Grants	$0	$0	$0	$0
Contracts	0	0	0	0
Other a/	12,000	10,100	8,600	9,100
Subtotal TIM	12,000	10,100	8,600	9,100
Adjustment	-263 b/	-68 b/	-191 b/	----
Total TIM	$11,737	$10,032	$8,409	$9,100

a/ Includes funding for state and local agreements, interagency agreements, cooperative agreements, purchase orders, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and FY 1997 emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - TOTAL PROGRAM
(B/A in thousands)

Fusion Energy Sciences	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
Grants	$31,974	$38,839	$45,384	$44,955
Contracts	171,041	165,667	153,571	161,218
Other a/	23,804	19,684	23,681	16,441
Subtotal FES	226,819	224,190	222,636	222,614
Adjustment b/	-2,133	-791	-1,136	0
Total FES	$224,686	$223,399	$221,500	$222,614

a/ Includes funding for state and local agreements, interagency agreements, cooperative agreements, purchase orders, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and FY 1997 emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - TOTAL PROGRAM
(B/A in thousands)

High Energy Physics	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
Grants	$104,962	$103,754	$106,816	$120,847
Contracts	543,268	553,527	541,287	538,930
Other a/	9,940	11,309	47,423	37,313
Subtotal HEP	658,170	668,590	695,526	697,090
Adjustment b/	-1,051	-1,851	-1,610	0
Total HEP	$657,119	$666,739	$693,916	$697,090

a/ Includes funding for state and local agreements, interagency agreements, cooperative agreements, purchase orders, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and FY 1997 emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - TOTAL PROGRAM
(B/A in thousands)

Nuclear Physics	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
Grants	$45,770	$45,528	$47,418	$47,734
Contracts	243,706	247,172	259,436	277,655
Other	20,524	22,038	27,701	17,551
Subtotal NP	310,000	314,738	334,555	342,940
Adjustment	-49 b/	-971 c/	-776 c/	-----
Total NP	$309,951	$313,767	$333,779	$342,940

a/ Includes funding for state and local agreements, interagency agreements, cooperative agreements, purchase orders, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, emergency flood supplemental rescission assigned to this program.

c/ Share of Science general reduction of use of prior year balances assigned to this program. The total general reduction is applied at the appropriation level.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - TOTAL PROGRAM
(B/A in thousands)

Biological and Environmental Research	Actual FY 1997	Actual FY 1998	Estimate FY 1999	Estimate FY 2000
Grants	$80,030	$98,241	$113,490	$88,250
Contracts	260,424	247,417	283,088	288,698
Other	39,719	50,018	40,110	34,222
Subtotal BER	380,173	395,676	436,688	411,170
Adjustment	-6,702 b/	-4,580 b/	-3,798 b/	-----
Total BER	$373,471	$391,096	$432,890	$411,170

a/ Includes funding for state and local agreements, interagency agreements, cooperative agreements, purchase orders, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - APPLIED a/
(B/A in thousands)

Biological and Environmental Research Medical Applications	Actual FY 1997	Actual FY 1998	Estimate FY 1999	Estimate FY 2000
Grants	$26,968	$31,458	$45,608	$18,741
Contracts	18,100	20,536	20,756	19,166
Other b/	4,854	4,847	4,580	4,000
Subtotal BER	49,922	56,841	70,944	41,907
Adjustment	-631 c/	-647 c/	-592 c/	-----
Total BER- Applied	$49,291	$56,194	$70,352	$41,907

a/ The applied amounts are included in total for Biological and Environmental Research Total Program table.

b/ Includes funding for state and local agreements, interagency agreements, cooperative agreements, purchase orders, etc.

c/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - TOTAL PROGRAM
(B/A in thousands)

Energy Research Analyses	Actual		Estimate	
	FY 1997	FY 1998	FY 1999	FY 2000
Grants	$377	$181	$131	$0
Contracts	1,002	765	750	650
Other a/	576	488	119	350
Subtotal ERA	1,955	1,434	1,000	1,000
Adjustment	-415 b/	-144 b/	-92 b/	----
Total ERA	$1,540	$1,290	$908	$1,000

a/ Includes funding for state and local agreements, interagency agreements, cooperative agreements, purchase orders, etc.

b/ Share of general reduction for use of prior year balances for FY 1997, FY 1998, and FY 1999 and FY 1997 emergency flood supplemental rescission assigned to this program.

OFFICE OF SCIENCE
FUNDING BY TYPE OF AGREEMENT - TOTAL PROGRAM
(B/A in thousands)

Multiprogram Energy Laboratories - Facilities Support	Actual FY 1997	Actual FY 1998	Estimate FY 1999	Estimate FY 2000
Grants	$0	$0	$0	$0
Contracts	20,628	21,247	20,100	20,100
Other a/	0	0	1,160 a/	1,160
Subtotal MELFS	20,628	21,247	21,260	21,260
Adjustment	-1,399 b/	-336 b/	-13 b/	-----
Total MELFS	$19,229	$20,911	$21,247	$21,260

a/ Payments in Lieu of Taxes (PILT) provided to communities surrounding Brookhaven National Laboratory and Argonne National Laboratory through the Chicago Operations Office.

b/ Share of general reduction for use of prior year balances in FY 1997, FY 1998, and FY 1999 and FY 1997 emergency flood supplemental rescission assigned to this program.

HOW FUNDS ARE SPENT

Mr. Packard. For each program activity, please provide how funds were spent in fiscal years 1997 and 1998 and estimates for fiscal years 1999 and 2000. Please provide the following three categories for each program: recipients of program dollars (national laboratories, universities or the private sector), how funds are spent (grants, contracts, other), and the basis for providing grants and contracts (competitive or non-competitive). For any program with applied research or development activities, provide the amount for applied research or development activities. Also, for cost-share activities, indicate what amount of cost-sharing is below 25%, what amount is below 50% and what amount is more than 75%.

Mr. Magwood. See attached tables for how funds were spent in fiscal year 1997 and fiscal year 1998, and estimates for fiscal year 1999 and fiscal year 2000. Also included is a table of applied research and development activities by program for fiscal year 1997-fiscal year 2000 and cost-share activities.

Office of Nuclear Energy, Science and Technology
FY 1997 Operating Funds
($ in 000's)

	Recipients of Program Funds			How Funds are Spent			Basis for Grants and Contract	
	National Labs	Universities	Private Sector	Grants	Contracts	Other	Competitive	Non-Competitive
Light Water Reactors	4,950	75	31,675	75	18,906	17,719	14,739	4,242
Radioisotope Power Systems	14,217	286	25,530	286	39,747		26,605	13,428
University Nuclear Science and Reactor Support	1,895	2,232	22	2,232	1,907		1,907	2,232
TRA Landlord			2,000		2,000		2,000	
ATR Fusion Irradiations			757		757		757	
Nuclear Technology R&D	19,275				19,275			19,275
Facilities	102,590		6,827		109,217	200	38,745	70,472
Program Direction			629		629		629	
Isotope Program	15,437		614		16,001	50	614	15,387
Uranium Programs	971		43,344		44,315		41,894	2,421

Office of Nuclear Energy, Science and Technology
FY 1998 Operating Funds
($ in 000's)

	Recipients of Program Funds			How Funds are Spent			Basis for Grants and Contract	
	National Labs	Universities	Private Sector	Grants	Contracts	Other	Competitive	Non-Competitive
Radioisotope Power Systems (AF-70)	25,609	1,047	12,800		39,446	10	17,420	22,036
University Nuclear Science and Reactor Support (AF-40)	2,446	3,944	602	3,890	3,047	55	5,581	1,411
TRA Landlord (AF-86)	2,882		32		2,914		32	2,882
Nuclear Technology R&D (AF-50)	11,825		175		12,000		175	11,825
Facilities (AF-95)	75,435	24	357		75,796	20	337	75,479
Program Direction (KK)			925		925		925	
Isotope Program (ST)	17,157		2,316		33,734		3.144	30,590
Uranium Programs (CD)	2,173		27,274		29,447		29,477	

Notes:

- Excludes funding for programs transferred to the Office of Nonproliferation and Nation Security.
- Uranium Programs excludes $19.2 million reprogrammed to the UE Decontamination and Decommissioning Fund and the Fast Flux Test Facility.

Office of Nuclear Energy, Science and Technology
FY 1999 Operating Funds
($ in 000's)

	Recipients of Program Funds			How Funds are Spent			Basis for Grants and Contract	
	National Labs	Universities	Private Sector	Grants	Contracts	Other	Competitive	Non-Competitive
Radioisotope Power Systems (AF-70)	24,032	1,047	11,921		36,990	10	11,720	25,280
University Reactor Fuel Assistance and Support (AF-40)	2,670	7,035	1,295	7,035	3,965		8,970	2,030
TRA Landlord (AF-86)	4,000				4,000			4,000
Nuclear Energy Research Initiative (AF-35)	See Notes							
Termination Costs (AF-95)	82,000		3,000		85,000		3,000	82,000
FFTF (AF-79) 27,000		3,000		30,000			3,000 27,000	
Program Direction (KK)	127		3,573		3,700		3,573	127
Isotope Program (ST)	21,500				21,500			21,500
Uranium Programs(CD)	300		35,120		35,420		35,420	

Notes:

- Excludes funding for programs transferred to the Office of Nonproliferation and Nation Security.
- The NERI program has not awarded any grants to date. Consequently, we are not able to provide the various breakdowns requested at this time. Awards will be competitively selected based on the results of the peer review of the more than 300 scientific and engineering research proposals received from universities, national laboratories, and industry, and a relevance review that will evaluate the proposals with respect to programmatic and policy factors. Following the peer and relevance reviews, and proposal selection, awards will be initiated beginning in May 1999.

Office of Nuclear Energy, Science and Technology
FY 2000 Operating Funds
($ in 000's)

	Recipients of Program Funds			How Funds are Spent			Basis for Grants and Contract	
	National Labs	Universities	Private Sector	Grants	Contracts	Other	Competitive	Non-Competitive
Radioisotope Power Systems (AF-70)	28,300	1,050	7,650		36,990	10	7,190	29,810
University Reactor Fuel Assistance and Support (AF-40)	3,005	6,925	1,415	6,925	4,420		9,251	2,094
TRA Landlord (AF-86)	6,070				6,070			6,070
Nuclear Energy Plant Optimization	See Note							
Nuclear Energy Research Initiative (AF-35)	See Note							
Termination Costs (AF-95)	62,000		3,000		65,000		3,000	62,000
FFTF (AF-79)	27,000		3,000		30,000		3,000	27,000
Program Direction (KK)	200		5,650		5,850		5,650	200
Isotope Program (ST)	21,000				21,000			21,000
Uranium Programs (CD)	1,230		39,770		41,000		41,000	

Notes:

- Excludes funding for programs transferred to the Office of Nonproliferation and Nation Security.
- The NERI program has not awarded any grants to date. Consequently, we are not able to provide the various breakdowns requested at this time. Awards will be competitively selected based on the results of the peer review of the more than 300 scientific and engineering research proposals received from universities, national laboratories, and industry, and a relevance review that will evaluate the proposals with respect to programmatic and policy factors. Following the peer and relevance reviews, and proposal selection, awards will be initiated beginning in May 1999.
- The NEPO program is a new initiative for FY 2000. The program is designed to develop advanced technologies that can enhance the long-term reliability, safety and efficiency of current nuclear power plants, at least 50/50 cost-shared with industry, guided by a joint EPRI/DOE strategic plan, and coordinated with the Nuclear Regulatory Commission. Research performed under this program would be prioritized by the Nuclear Energy Research Advisory Committee (NERAC) subcommittee on operating nuclear power plants and would be competitively bid to select contractors. Contractors would include the national laboratories, universities, and industry, and although no federal research dollars would be allocated internationally, the program would benefit from substantial international collaboration and coordination.

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Office of Nuclear Energy, Science and Technology
FY 1997-2000

Applied Research and Development Activities

	FY 1997	FY 1998	FY 1999	FY 2000
Light Water Reactors	36,993	0	0	0
Radioisotope Power Systems	3,750	4,800	6,000	5,300
Nuclear Technology R&D	19,475	0	20,000	0
Uranium Programs	2,206	976	0	2,563
Nuclear Energy Research Initiative	0	0	19,000	25,000
Nuclear Energy Plant Optimization	0	0	0	5,000
Isotope Support	0	0	0	2,000

Activities Cost-Shared (at least 50%) with Industry

	FY 1997	FY 1998	FY 1999	FY 2000
Light Water Reactors	36,993	0	0	0
Nuclear Energy Plant Optimization	0	0	0	5,000
DOE/Industry Matching Grants	1,380	800	1,000	800

HOW FUNDS ARE SPENT

Mr. Packard. For each program activity, please provide how funds were spent in fiscal years 1997 and 1998 and estimates for fiscal years 1999 and 2000. Please provide the following three categories for each program: recipients of program dollars (national laboratories, universities or the private sector), how funds are spent (grants, contracts, other), the basis for providing grants and contracts (competitive or non-competitive). For any program with applied research or development activities, provide the amount for applied research or development activities. Also, for cost-share activities, indicate what amount of cost sharing is below 25%, what amount is below 50%, and what amount is more than 75%.

Mr. Reicher. The table below indicates the recipients of program dollars, how funds were spent and whether funding was provided for competitive or non-competitive contracts or grants for the Solar and Renewable Energy Programs for FY 1997-2000.

Solar Buildings Research					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.8	Contract (M&O)	0.8	100%/0%
	Universities	0.4	Subcontract (through Lab)	0.4	50%/50%
	Private Sector	1.1	Grant/Cooperative Agreement	0.5	40%/60%
			Subcontract (through Lab)	0.6	80%/20%
	Total	2.3	Total	2.3	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
2.3	0.7	0.2	0.0	0.2

Solar Buildings Research					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.9	Contract (M&O)	0.9	100%/0%
	Universities	0.4	Subcontract (through Lab)	0.4	56%/44%
	Private Sector	1.1	Grant/Cooperative Agreement	0.5	93%/7%
			Subcontract (through Lab)	0.6	42%/58%
	HQ Reductions	0.2	HQ Reductions	0.2	
	Total	2.6	Total	2.6	

Applied Research and Development Activities	($M)	Industry Cost Share $M			
		Below 25%	25 - 50%	51% - 75%	More than 75%
	2.4	0.7	0.2	0.4	0.0

Solar Buildings Research					
FY 1999	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	2.2	Contract (M&O)	2.2	100%/0%
	Universities	0.2	Subcontract (through Lab)	0.2	100%/0%
	Private Sector	1.2	Grant/Cooperative Agreement	0.2	70%/30%
			Subcontract (through Lab)	1.0	75%/25%
	Total	3.6	Total	3.6	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
3.6	1.0	0.2	0.0	0.0

Solar Buildings Research					
FY 2000 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	2.3	Contract (M&O)	2.3	100%/0%
	Universities	0.5	Subcontract (through Lab)	0.5	95%/5%
	Private Sector	2.7	Grant/Cooperative Agreement	0.2	100%/0%
			Subcontract (through Lab)	2.5	95%/5%
	Total	5.5	Total	5.5	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
5.5	2.0	0.2	0.5	0.0

Photovoltaic Energy Systems					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	26.4	Contract (M&O)	26.4	100%/0%
	Universities	7.3	Subcontract (through Lab)	7.3	60%/40%
	Private Sector	25.5	Grant/Cooperative Agreement	4.2	10%/90%
			Subcontract (through Lab)	21.3	95%/5%
	Total	59.2	Total	59.2	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
49.3	1.2	7.3	3.5	7.9

Photovoltaic Energy Systems					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	26.4	Contract (M&O)	26.4	100%/0%
	Universities	7.8	Subcontract (through Lab)	7.8	60%/40%
	Private Sector	30.5	Grant/Cooperative Agreement	4.7	30%/70%
			Subcontract (through Lab)	25.8	95%/5%
	Total	64.7	Total	64.7	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
53.7	23.0	5.6	5.7	6.3

Photovoltaic Energy Systems					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	27.9	Contract (M&O)	27.9	100%/0%
	Universities	9.6	Subcontract (through Lab)	9.6	65%/35%
	Private Sector	34.7	Grant/Cooperative Agreement	6.1	85%/15%
			Subcontract (through Lab)	28.6	95%/5%
	Total	72.2	Total	72.2	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
61.2	2.5	5.8	8.9	11.9

Photovoltaic Energy Systems					
FY 2000 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	32.0	Contract (M&O)	32.0	100%/0%
	Universities	14.0	Subcontract (through Lab)	14.0	80%/20%
	Private Sector	47.3	Grant/Cooperative Agreement	12.0	90%/10%
			Subcontract (through Lab)	35.3	100%/0%
	Total	93.3	Total	93.3	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
73.0	4.0	8.0	13.0	15.0

Concentrating Solar Power					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	8.3	Contract (M&O)	8.3	100%/0%
	Universities	0.1	Subcontract (through Lab)	0.1	0%/100%
	Private Sector	13.5	Grant/Cooperative Agreement	3.2	0%/100%
			Subcontract (through Lab)	10.3	80%/20%
	Total	21.9	Total	21.9	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
20.6	0.6	5.8	0.0	0.0

Concentrating Solar Power Program					
FY 1998	Recipients ($000)		How Spent ($000)		% Competitive/ % Non-comp
	National Laboratories	8.0	Contract (M&O)	8.0	100%/0%
	Universities	0.1	Subcontract (through Lab)	0.1	0%/100%
	Private Sector	8.2	Grant/Cooperative Agreement	3.2	0%/100%
			Subcontract (through Lab)	5.0	77%/33%
	Total	16.3	Total	16.3	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
16.3	0.5	0.5	0.0	0.0

Concentrating Solar Power Program					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	5.8	Contract (M&O)	5.8	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	0%/100%
	Private Sector	11.2	Grant/Cooperative Agreement	3.0	0%/100%
			Subcontract (through Lab)	8.2	98%/2%
	Total	17.0	Total	17.0	

Applied Research and Development Activities	($M)	Industry Cost Share $M			
		Below 25%	25 - 50%	51 - 75%	More than 75%
	17.0	0.1	2.6	0.0	0.0

Concentrating Solar Power Systems					
FY 2000 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	7.0	Contract (M&O)	7.0	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	0%/100%
	Private Sector	11.8	Grant/Cooperative Agreement	0.0	0%/100%
			Subcontract (through Lab)	11.8	95%/5%
	Total	18.8	Total	18.8	

Applied Research and Development Activities ($M)	Industry Cost Share $			
	Below 25%	25 - 50%	51 - 75%	More than 75%
18.8	0.1	3.7	0.0	0.0

Biomass/Biofuels Energy Systems - Power Systems					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	4.8	Contract (M&O)	4.8	100%/0%
	Universities	1.0	Subcontract (through Lab)	1.0	50%/50%
	Private Sector	17.4	Grant/Cooperative Agreement	16.9	100%/0%
			Subcontract (through Lab)	0.5	0%/100%
	Total	23.2	Total	23.2	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
23.2	0.0	2.1	4.7	0.0

Biomass/Biofuels Energy Systems - ATS/Biomass for Cogeneration (no funding appropriated after FY 1997)					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.6	Contract (M&O)	0.6	100%/0%
	Universities	0.1	Subcontract (through Lab)	0.1	50%/50%
	Private Sector	3.2	Grant/Cooperative Agreement	3.2	100%/0%
	Total	3.9	Total	3.9	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
3.9	0.0	1.0	0.0	0.0

Biomass/Biofuels Energy Systems - Power Systems

FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	5.0	Contract (M&O)	5.0	100%/0
	Universities	2.3	Subcontract	2.3	0%/100%
	Private Sector	20.5	Grant/Cooperative Agreement	9.8	32%/68%
			Subcontract/contract	10.4	75%/25%
			Other	0.3	50%/50%
	Total	27.8	Total	27.8	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
27.8	0.0	5.6	0.0	0.0

Biomass/Biofuels Energy Systems - Power Systems					
FY 1999	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	5.5	Contract (M&O)	5.5	100%/0
	Universities	3.2	Subcontract	3.2	0%/100%
	Private Sector	22.7	Grant/Cooperative Agreement	12.6	67%/33%
			Subcontract/contract	7.1	80%/20%
			Other	3.0	50%/50%
	Total	31.4	Total	31.4	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
31.4	0.3	15.4	5.4	0.0

Biomass/Biofuels Energy Systems - Power Systems					
FY 2000 (est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	5.5	Contract (M&O)	5.5	100%/0%
	Universities	3.9	Subcontract	3.7	0%/100%
	Private Sector	29.5	Grant/Cooperative Agreement	19.3	75%/25%
			Subcontract/contract	8.4	75%/25%
			Other	2.0	50%/50%
	Total	38.9	Total	38.9	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
38.9	1.1	6.7	3.2	63.4

Biomass/Biofuels Energy Systems -Transportation					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	12.8	Contract (M&O)	12.8	100%/0%
	Universities	2.5	Subcontract (through Lab)	2.5	0%/100%
	Private Sector	10.6	Grant/Cooperative Agreement	9.2	8%/92%
			Subcontract (through Lab)	1.4	20%/80%
	Other Gov Agencies	1.3	Interagency Agreements	1.3	0/100%
	Total	27.2	Total	27.2	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
24.7	5.0	0.0	0.0	0.0

Biomass/Biofuels Energy Systems - Transportation					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	12.4	Contract (M&O)	12.4	100%/0%
	Universities	2.9	Subcontract (through Lab)	2.9	20%/80%
	Private Sector	13.9	Grant/Cooperative Agreement	10.8	10%/90%
			Subcontract (through Lab)	3.1	20%/80%
	Other Gov Agencies	1.1	Interagency Agreements	1.1	0%/100%
	Total	30.3	Total	30.3	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
26.2	0.0	8.7	0.0	0.0

Biomass/Biofuels Energy Systems - Transportation					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	12.5	Contract (M&O)	12.5	100%/0%
	Universities	3.0	Subcontract (through Lab)	3.0	20%/80%
	Private Sector	25.0	Grant/Cooperative Agreement	16.6	25%/75%
			Subcontract (through Lab)	8.4	50%/50%
	Other Gov Agencies	1.2	Interagency Agreement	1.2	0%/100%
	Total	41.7	Total	41.7	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
23.7	0.0	11.8	0.0	0.0

Biomass/Biofuels Energy Systems - Transportation					
FY 2000 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	13.5	Contract (M&O)	13.5	100%/0%
	Universities	6.0	Subcontract (through Lab)	6.0	30%/70%
	Private Sector	32.4	Grant/Cooperative Agreement	23.4	40%/60%
			Subcontract (through Lab)	9.0	50%/50%
	Other Gov Agencies	1.5	Interagency Agreements (Through Lab)	1.5	0%/100%
	Total	53.4	Total	53.4	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
39.5	0.0	0.0	22.0	0.0

Renewable Energy Production Incentive Program

The Renewable Energy Production Incentive (REPI) provides direct incentive payments, subject to the availability of annual appropriations, to owners of qualified renewable energy facilities for their electric production. These owners are states, subdivisions of states, or non-profit electric cooperatives. Cost sharing is not applicable for this program.

Wind Energy Systems					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	13.2	Contract (M&O)	13.2	100%/0%
	Universities	1.0	Subcontract (through Lab)	1.0	55%/45%
	Private Sector	12.2	Grant/Cooperative Agreement	1.8	0%/100%
			Subcontract (through Lab)	8.6	20%/80%
			Other (e.g. Purchase Order)	1.8	10%/90%
	General Reductions	2.2	General Reductions	2.2	
	Total	28.6	Total	28.6	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25%-50%	51%-75%	More than 75%
20.7	0.5	0.7	0.0	7.3

Wind Energy Systems					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	17.1	Contract (M&O)	17.1	100%/0%
	Universities	1.0	Subcontract (through Lab)	1.0	35%/65%
	Private Sector	9.6	Grant/Cooperative Agreement	2.0	0/100%
			Subcontract (through Lab)	5.3	51%/49%
			Other (e.g. PO)	2.3	10%/90%
	General Reductions	4.4	General Reductions	4.4	
	Total	32.1	Total	32.1	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25%-50%	51%-75%	More than 75%
24.1	0.2	3.1	0.0	0.5

Wind Energy Systems					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	16.2	Contract (M&O)	16.0	100%/0%
	Universities	1.1	Subcontract (through Lab)	1.1	90%/10%
	Private Sector	17.5	Grant/Cooperative Agreement	4.3	100%/0%
			Subcontract (through Lab)	12.7	90%/10%
			Other (e.g. Purchase Order)	0.5	10%/90%
	Total	34.8	Total	34.8	

Applied Research and Development Activities		Industry Cost Share $M			
	($M)	Below 25%	25%- 50%	51%-75%	More than 75%
	27.1	0.5	3.6	0.0	0.5

Wind Energy Systems					
FY 2000 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	18.0	Contract (M&O)	18.0	100%/0%
	Universities	1.0	Subcontract (through Lab)	1.0	90%/10%
	Private Sector	26.6	Grant/Cooperative Agreement	6.0	100%/0%
			Subcontract (through Lab)	19.0	90%/10%
			Other (e.g. Purchase Order)	1.6	50%/50%
	Total	45.6	Total	45.6	

Applied Research and Development Activities	($M)	Industry Cost Share $M			
		Below 25%	25%-50%	51%-75%	More than 75%
	37.7	1.2	4.7	0.0	0.4

Solar International					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.0	Contract (M&O)	0.0	
	Universities	0.0	Subcontract (through Lab)	0.0	
	Private Sector	0.7	Grant/Cooperative Agreement	0.7	70%/30%
			Subcontract (through Lab)	0.0	
	Total	0.7	Total	0.7	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
0.0	0.0	0.0	0.0	0.0

Solar International					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.5	Contract (M&O)	0.5	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	
	Private Sector	0.9	Grant/Cooperative Agreement	0.9	90%/10%
			Subcontract (through Lab)	0.0	
	Total	1.4	Total	1.4	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
0.0	0.0	0.0	0.0	0.0

Solar International					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.1	Contract (M&O)	0.1	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	
	Private Sector	3.6	Grant/Cooperative Agreement	3.6	30%/70%
			Subcontract (through Lab)	0.0	
	Total	3.7*	Total	3.7	

* The additional $2.6 million provided in the FY 1999 Omnibus Appropriations Act will be distributed based on competitive procurement awards.

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
0.0	0.6	0.0	0.0	0.0

Solar International					
FY 2000 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	2.5	Contract (M&O)	2.5	90%/10%
	Universities	0.3	Subcontract (through Lab)	0.3	90%/100%
	Private Sector	3.2	Grant/Cooperative Agreement	3.2	100%/0%
			Subcontract (through Lab)	0.0	
	Total	6.0	Total	6.0	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
0.0	0.3	0.0	0.0	0.0

Geothermal Energy Program					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	14.2	Contract (M&O)	14.2	100%/0%
	Universities	4.1	Subcontract(through Labs) and Grants	4.1	89%/11%
	Private Sector	10.7	Grant/Cooperative Agreement	7.3	95%/5%
			Subcontract (through Lab)	3.4	3%/97%
	General Reduction	0.6	General Reduction	0.6	
	Total	29.6	Total	29.6	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
17.7	0.0	2.9	7.0	7.5

Geothermal Energy Program					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	14.8	Contract (M&O)	14.8	100%/0%
	Universities	4.6	Subcontract(through Labs) and Grants	4.6	89%/11%
	Private Sector	8.9	Grant/Cooperative Agreement	6.1	95%/5%
			Subcontract (through Lab)	2.8	3%/97%
	General Reduction	0.4			
	Total	28.7	Total	28.7	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
17.2	0.0	3.9	9.4	0.0

Geothermal Energy Program					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	11.0	Contract (M&O)	11.0	100%/0%
	Universities	3.3	Subcontract(throug h Labs) and Grants	3.3	85%/15%
	Private Sector	14.2	Grant/Cooperative Agreement	13.0	96%/4%
			Subcontract (through Lab)	1.2	28%/72%
	Total	28.5	Total	28.5	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
17.5	0.0	2.5	10.8	0.0

Geothermal Energy Program					
FY 2000 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	11.5	Contract (M&O)	11.5	100%/0%
	Universities	3.3	Subcontract(through Lab) and Grants	3.3	85%/15%
	Private Sector	14.7	Grant/Cooperative Agreement	13.5	96%/4%
			Subcontract (through Lab)	1.2	30%/70%
	Total	29.5	Total	29.5	

Applied Research and Development Activities ($m)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
24.5	0.0	3.0	7.0	0.0

Hydrogen Program					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	6.5	Contract (M&O)	6.5	100%/0%
	Universities	2.0	Subcontract (through Lab)	0.03	0%/100%
			Grant/Cooperative Agreement	1.9	60%/40%
	Private Sector	6.3	Grant/Cooperative Agreement	6.1	75%/25%
			Subcontract (through Lab)	0.2	25%/75%
	Total	14.8	Total	14.8	

Applied Research and Development Activities		Industry Cost Share $M			
	($M)	Below 25%	25 - 50%	51 - 75%	More than 75%
	14.5	5.1	1.9	0.0	0.0

Hydrogen Program					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	5.4	Contract (M&O)	5.4	100%/0%
	Universities	1.6	Subcontract (through Lab)	0.3	25%/75%
			Grant/Cooperative Agreement	1.3	70%/30%
	Private Sector	8.8	Grant/Cooperative Agreement	7.6	75%/25%
			Subcontract (through Lab)	1.2	25%/75%
	Total	15.8	Total	15.8	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
15.8	2.2	3.5	0.0	0.0

Hydrogen Program					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	8.7	Contract (M&O)	8.7	100%/0%
	Universities	2.0	Subcontract (through Lab)	0.0	0%/100%
			Grant/Cooperative Agreement	2.0	90%/10%
	Private Sector	11.5	Grant/Cooperative Agreement	11.2	90%/10%
			Subcontract (through Lab)	0.3	50%/50%
	Total	22.2	Total	22.2	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
20.0	4.1	6.5	0.0	0.0

Hydrogen Program					
FY 2000 (est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	9.5	Contract (M&O)	9.5	100%/0%
	Universities	3.0	Subcontract (through Lab)	0.0	0%/100%
			Grant/Cooperative Agreement	3.0	90%/10%
	Private Sector	15.5	Grant/Cooperative Agreement	15.0	90%/10%
			Subcontract (through Lab)	0.5	50%/50%
	Total	28.0	Total	28.0	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
28.0	3.4	8.8	0.0	0.0

Hydropower					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.8	Contract (M&O)	0.8	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	
	Private Sector	0.1	DOE procurements	0.1	0%/100%
			Subcontract (through Lab)	0.0	
	Total	0.9	Total	0.9	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
0.9	0.0	0.0	0.0	0.0

Hydropower					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.6	Contract (M&O)	0.6	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	
	Private Sector	0.0	Grant/Cooperative Agreement	0.0	
			Subcontract (through Lab)	0.0	
	General Reduction	0.1	General Reduction	0.1	
	Total	0.7	Total	0.7	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
0.6	0.0	0.0	0.0	0.0

Hydropower					
FY 1999 (Est)	Recipients ($M)		How Spent ($m)		% Competitive/ % Non-comp
	National Laboratories	1.2	Contract (M&O)	1.2	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	
	Private Sector	1.6	DOE Contracts	1.6	0%/100%
	Other Federal Agencies	0.5	Interagency Agreement	0.5	0%/100%
	Total	3.3	Total	3.3	

Applied Research and Development Activities		Industry Cost Share $M			
	($M)	Below 25%	25 - 50%	51 - 75%	More than 75%
	3.3	0.4	0.0	0.0	0.0

Hydropower					
FY 2000 (est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	1.2	Contract (M&O)	1.2	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	
	Private Sector	5.8	DOE contracts	5.8	60%/40%
			Subcontract (through Lab)		
	Total	7.0	Total	7.0	

Applied Research and Development Activities		Industry Cost Share $M			
	($M)	Below 25%	25 - 50%	51 - 75%	More than 75%
	7.0	0.7	0.0	0.0	0.0

Renewable Indian Energy Resources (Hydropower - Alaska)					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.04	Contract (M&O)	0.04	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	
	Private Sector	3.77	Grant/Cooperative Agreement	3.77	0%/100% (earmarked)
			Subcontract (through Lab)	0.0	
	General Reduction	0.19	General Reduction	0.19	
	Total	4.0	Total	4.0	

Applied Research and Development Activities ($000)	Industry Cost Share $000			
	Below 25%	25 - 50%	51 - 75%	More than 75%
0.0	0.0	0.0	6.2	13.5

Renewable Indian Energy Resources (Hydropower - Alaska)					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.08	Contract (M&O)	0.08	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	
	Private Sector	3.25	Grant/Cooperative Agreement	3.25	0%/100% (earmarked)
			Subcontract (through Lab)	0.0	
	General Reduction	0.61	General Reduction	0.61	
	Total	3.94	Total	3.94	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
0.0	0.0	0.0	0.0	4.6

Renewable Indian Energy Resources (Hydropower - Alaska)					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.02	Contract (M&O)	0.02	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	
	Private Sector	4.76	Grant/Cooperative Agreement	4.76	0%/100% (earmarked)
			Subcontract (through Lab)	0.0	
	Total	4.78	Total	4.78	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
0.0	0.0	0.0	1.2	0.0

Renewable Indian Energy Resources (Hydropower - Alaska)					
FY 2000 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories		Contract (M&O)		
	Universities		Subcontract (through Lab)		
	Private Sector		Grant/Cooperative Agreement		
			Subcontract (through Lab)		
	Total	0.0			

Applied Research and Development Activities ($000)	Industry Cost Share $000			
	Below 25%	25 - 50%	51 - 75%	More than 75%
0.0	0.0	0.0	0.0	0.0

Electric Energy Systems and Storage - Transmission Reliability Program (no funds appropriated in FY 1997 or FY 1998)					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	1.9	Contract (M&O)	1.9	100%0%
	Universities	0.5	Grant (through Inter Agency Agreement with NSF)	0.5	100%0%
	Private Sector	0.6	Grant/Cooperative Agreement	0.0	
			Subcontract (through Lab)	0.6	5%95%
	Total	3.0	Total	3.0	

Applied Research and Development Activities ($M)	Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
3.0	0.0	0.0	0.0	2.4

Electric Energy Systems and Storage - Transmission Reliability Program					
FY 2000 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	2.6	Contract (M&O)	2.6	100%/0%
	Universities	0.6	Grant (through Inter Agency Agreement with NSF)	0.6	100%/0%
	Private Sector	0.8	Grant/Cooperative Agreement	0.0	
			Subcontract (through Lab)	0.8	100%/0%
	Total	4.0	Total	4.0	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
4.0	0.0	0.0	0.0	3.6

Electric Energy Systems and Storage - High Temperature Superconducting R&D					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	11.5	Contract (M&O)	11.5	100%/0%
	Universities	0.5	Subcontract (through Lab)	058	0%/100%
	Private Sector	6.6	Grant/Cooperative Agreement	6.6	100%/0%
			Subcontract (through Lab)	0.2	96%/4%
	General Reduction	0.9	General Reduction	0.9	
	Total	19.5	Total	19.5	

Applied Research and Development Activities		Industry Cost Share $M			
	($M)	Below 25%	25 - 50%	51 - 75%	More than 75%
	9.5	0.0	11.5	0.0	0.0

Electric Energy Systems and Storage - High Temperature Superconducting R&D					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	17.4	Contract (M&O)	17.4	100%/0%
	Universities	2.9	Subcontract (through Lab)	2.9	34%/66%
	Private Sector	10.4	Grant/Cooperative Agreement	9.8	100%/0%
			Subcontract (through Lab)	0.2	0%/100%
	General Reduction	1.7			
	Total	32.5	Total	32.5	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
14.5	0.0	16.5	0.0	0.0

Electric Energy Systems and Storage - High Temperature Superconducting R&D					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	19.0	Contract (M&O)	19.0	100%/0%
	Universities	2.8	Subcontract (through Lab)	2.8	36%/64%
	Private Sector	10.7	Grant/Cooperative Agreement	10.6	100%/0%
			Subcontract (through Lab)	0.1	0%/100%
	Total	32.5	Total	32.5	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
14.5	0.0	17.5	0.0	0.0

Electric Energy Systems and Storage - High Temperature Superconducting R&D					
FY 2000 (est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	18.52	Contract (M&O)	18.52	1005/0%
	Universities	2.28	Subcontract (through Lab)	2.28	44%/56%
	Private Sector	10.2	Grant/Cooperative Agreement	10.1	100%/0%
			Subcontract (through Lab)	0.1	0%/100%
	Total	31.0	Total	31.0	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51 - 75%	More than 75%
14.0	0.0	17.0	0.0	0.0

Electric Energy Systems and Storage -Energy Storage					
FY 1997	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	1.1	Contract (M&O)	1.1	100%/0%
	Universities	0.0	Subcontract (through Lab)	0.0	0%/100%
	Private Sector	2.7	Grant/Cooperative Agreement	0.0	
			Subcontract (through Lab)	2.7	48%/52%
	General Reduction	0.1	General Reduction	0.1	
	Total	3.9	Total	3.9	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
31.9	0.0	1.2	0.0	0.0

Electric Energy Systems and Storage - Energy Storage					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	1.3	Contract (M&O)	1.3	100/0%
	Universities	0.1	Subcontract (through Lab)	0.1	0/100%
	Private Sector	2.3	Grant/Cooperative Agreement	0.0	
			Subcontract (through Lab)	2.3	47/53%
	General Reduction	0.1	General Reduction	0.1	
	Total	3.8	Total	3.8	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
3.7	0.0	1.6	0.0	0.0

Electric Energy Systems and Storage - Energy Storage					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	1.5	Contract (M&O)	1.5	100%/0%
	Universities	0.3	Subcontract (through Lab)	0.3	100%/0%
	Private Sector	2.7	Grant/Cooperative Agreement	0.0	
			Subcontract (through Lab)	2.7	81%/19%
	Total	4.5	Total	4.5	

Applied Research and Development Activities ($M)	Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
4.3	0.0	1.4	0.0	0.0

Electric Energy Systems and Storage - Energy Storage					
FY 2000 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	1.7	Contract (M&O) (Sandia)	1.7	100%/0%
	Universities	0.3	Subcontract (through Lab)	0.3	100%/0%
	Private Sector	4.0	Grant/Cooperative Agreement	0.0	
			Subcontract (through Lab)	4.0	82%/18%
	Total	6.0	Total	6.0	

Applied Research and Development Activities		Industry Cost Share $M			
	($M)	Below 25%	25 - 50%	51% - 75%	More than 75%
	5.7	0.0	1.8	0.0	0.0

Federal Buildings/Remote Power - No funding was appropriated prior to FY 1998					
FY 1998	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	1.0	Contract (M&O)	1.0	100%/0%
	Universities		Subcontract (through Lab)		
	Private Sector	3.8	Grant/Cooperative Agreement/Inter Agency Agreement	3.4	100%/0%
			Subcontract (through Lab)	0.4	100%/0%
	Total	4.8	Total	4.8	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
4.8* *$2.5M of this funding is for the Federal Energy Management Program which encourages cost share but is not a requirement.	0.1	4.6		

Federal Buildings/Remote Power					
FY 1999 (Est)	Recipients ($M)		How Spent ($M)		% Competitive/ % Non-comp
	National Laboratories	0.3	Contract (M&O)	0.3	100%/0%
	Universities		Subcontract (through Lab)		
	Private Sector	3.7	Grant/Cooperative Agreement	3.7	100%/0%
			Subcontract (through Lab)		
	Total	4.0	Total	4.0	

Applied Research and Development Activities ($M)	Industry Cost Share $M			
	Below 25%	25 - 50%	51% - 75%	More than 75%
4.0* *$2M of this funding is for the Federal Energy Management Program which encourages cost share but is not a requirement.	0.0	2.0	0.0	0.0

Federal Buildings/Remote Power - No funding requested in FY 2000			
FY 2000 (Est)	Recipients ($M)	How Spent ($M)	% Competitive/ % Non-comp

FUNDING FOR NON-GOVERNMENTAL ORGANIZATIONS

Mr. Packard. For the record, please provide a list of non-governmental organizations that directly received funding from the Department in fiscal years 1995 through 1999. This list should include trade associations and professional, environmental or other organizations. Please include funding provided directly by the Department and funding provided by M&O contractors. Summary information should be provided where appropriate. At a minimum, for each organization provide the following:

- Name of organization;
- Total funds provided to the organization in the four-year period;
- Description of work performed by organization;
- Whether the funds were provided as a grant or contract;
- Whether the funds were awarded on a competitive basis, and if not, the rationale for a non-competitive award;

Dr. Krebs. I would be pleased to provide the requested information for the record for Office of Science programs. (The information follows:)

OFFICE OF ENERGY RESEARCH
FUNDING FOR NON-GOVERNMENTAL INSTITUTIONS
(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Alliance of Genetic Support Group	G	C	0	5	0	0	0	5

Justification for Non-Competitive Award:
N/A

Description of Work:
Ethical, Legal and Social Implications of the Human Genome Project: Education of Interdisciplinary Professionals

Publications:
Report of conference, "Ethical, Legal and Social Implications of the Human Genome Project: Education of Interdisciplinary Professionals"

American Assoc. for the Advancement of Science	G	C	127	149	0	37	0	313

Justification for Non-Competitive Award:
N/A

Description of Work:
Science & Literacy for Health: Human Genome Project

Publications:
Science education materials for low literacy adults

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
American Assoc. for the Advancement of Science	G	C	0	33	0	0	0	33

Justification for Non-Competitive Award:
N/A

Description of Work:
Congressional Seminar Series on the Human Genome Project

Publications:
None

American Assoc. for the Advancement of Science.	G	C	0	0	6	0	0	6

Justification for Non-Competitive Award:
N/A

Description of Work:
The Human Genome Project: What's the Public Got To Do With It? A symposium at the 1997 AAAS Annual Meeting and Science Innovation Exposition

Publications:
Report of conference, "The Human Genome Project: What's the Public Got To Do With It?"

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
American Bar Association	G	C	0	0	18	0	0	18

Justification for Non-Competitive Award:
N/A

Description of Work:
Genetics in the Courtroom

Publications:
Report of conference, "Genetics in the Courtroom"

American Chemical Society	G	C	115	271	263	266	0	915

Justification for Non-Competitive Award:
N/A

Description of Work:
Undergraduate Summer Schools in Nuclear and Radiochemistry

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
American Chemical Society	G	C	0	0	0	8	0	8

Justification for Non-Competitive Award:
N/A

Description of Work:
Support for a Symposium in Dallas 1998 - Organic Radiochemistry

Publications:
None

American Geological Institute	G	C	40	42	0	0	0	82

Justification for Non-Competitive Award:
N/A

Description of Work:
Russian-U.S. Geoscience Student Exchange Program: Implementation and Administration

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
American Geophysical Union	G	C	15	0	0	0	0	15

Justification for Non-Competitive Award:
N/A

Description of Work:
Support of the XXI General Assembly of the International Union of Geodesy and Geophysics

Publications:
Report of conference, "XXI General Assembly of the International Union of Geodesy and Geophysics"

American Judicature Society	G	C	0	0	0	0	12	12

Justification for Non-Competitive Award:
N/A

Description of Work:
American Judicature Society 1999 Mid-Year Meeting

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
American Mathematical Society	G	C	10	0	0	0	0	10

Justification for Non-Competitive Award:
N/A

Description of Work:
1995 Society for Industrial and Applied Math (SIAM) Summer Seminar in Applied Mathematics of Numerical Analysis

Publications:
Conference Proceedings

American Medical Women's Association	G	C	0	5	0	0	0	5

Justification for Non-Competitive Award:
N/A

Description of Work:
Journal of the American Medical Women's Association Special Issue on Genetics and Women's Health

Publications:
Journal of the American Medical Women's Association Special Issue on Genetics and Women's Health

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
American Physical Society	G	C	0	0	0	0	40	40

Justification for Non-Competitive Award:
N/A

Description of Work:
Role for Physics Students in the APS Centennial Meeting

Publications:
None

American Society for Microbiology	G	C	12	0	0	0	0	12

Justification for Non-Competitive Award:
N/A

Description of Work:
Basic Research for the Future: Opportunities in Microbiology for the Coming Decade

Publications:
Report of conference, "Basic Research for the Future: Opportunities in Microbiology for the Coming Decade"

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
American Society for Microbiology	G	C	0	25	0	0	0	25

Justification for Non-Competitive Award:
N/A

Description of Work:
Colloquium entitled, "The Microbial World: Foundation of the Biosphere"

Publications:
Report of conference, "The Microbial World: Foundation of the Biosphere"

American Society for Microbiology	G	C	0	0	0	0	30	30

Justification for Non-Competitive Award:
N/A

Description of Work:
Microbial Genome Sequencing: Current Status & Future Needs - A Colloquium to be Convened March 19-21, 1999 in New Orleans

Publications:

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
American Society for Microbiology	G	C	0	0	250	250	250	750

Justification for Non-Competitive Award:
N/A

Description of Work:
Microbial Literacy Collaborative: Intimate Strangers: Unseen Life on Earth

Publications:
Education materials development not yet completed

American Society for Microbiology	G	C	0	0	20	0	0	20

Justification for Non-Competitive Award:
N/A

Description of Work:
Climate Variability and Human Health: An Interdisciplinary Perspective

Publications:
Report of conference, "Climate Variability and Human Health: An Interdisciplinary Perspective"

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
American Society for Microbiology	G	C	0	0	0	0	12	12

Justification for Non-Competitive Award:
N/A

Description of Work:
Travel Grant Program for the IXth International Congresses of Mycology and Bacteriology

Publications:

American Society for Microbiology	G	C	0	0	8	0	0	8

Justification for Non-Competitive Award:
N/A

Description of Work:
Fifth E. coli and Small Genomes Meeting - 1997

Publications:
Report of conference, "Fifth E. coli and Small Genomes Meeting - 1997"

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
American Society for Microbiology	G	C	0	0	0	0	15	15

Justification for Non-Competitive Award:
N/A

Description of Work:
DNA Repair and Mutagenesis to be held November 1-7, 1999

Publications:

American Society of Human Genetics	G	C	35	35	35	35	35	175

Justification for Non-Competitive Award:
N/A

Description of Work:
Congressional Fellowship in Human Genetics
Publications:
None. Educational Fellowship.

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
ARC of the United States	G	C	0	100	100	0	0	200

Justification for Non-Competitive Award:
N/A

Description of Work:
The Human Genome Project and Mental Retardation: An Educational Program

Publications:
"The Human Genome Project and Mental Retardation: An Educational Program"

Baltimore Urban League, Inc.	G	NC	0	152	76	0	0	228

Justification for Non-Competitive Award:
The activity is necessary for the satisfactory completion of, or is a continuation or renewal of, the minority energy technical assistance program presently being funded by DOE or another Federal agency, and for which competition for support would have a significant adverse effect on continuity or completion of the activity.

Description of Work:
Minority Energy Technical Assistance Program

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Biotechnology Industry Org..	G	C	0	50	0	0	0	50

Justification for Non-Competitive Award:
N/A

Description of Work:
Environmental Biotech '96 - Support for the First National Meeting

Publications:
Report of conference, "Environmental Biotech '96"

Consortium for Ocean Research and Education	G	C	50	50	0	0	0	100

Justification for Non-Competitive Award:
N/A

Description of Work:
National Ocean Science Partnerships: Improving Scientific Technological and Educational Linkages Between Academic Institutions, Marine Industry, and Federal Agencies

Publications:
"Oceans 2000: Bridging the Millennia, Partnerships for Stakeholders in the Oceans"

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Council of Scientific Soc. Pres.	G	C	0	0	15	0	0	15

Justification for Non-Competitive Award:
N/A

Description of Work:

Conference on Creating a Strategy for Science-Based National Policy: Addressing Conflicting Scientific Views on the Health Risk of Low-Level Ionizing Radiation

Publications:
Report of conference, "Creating a Strategy for Science-Based National Policy: Addressing Conflicting Scientific Views on the Health Risk of Low-Level Ionizing Radiation"

Federation of American Society for Experimental Biology (FASEB)	G	C	8	0	0	0	0	8

Justification for Non-Competitive Award:
N/A

Description of Work:
FASEB Research Conferences: Recombination

Publications:
Reports of conference, "FASEB Research Conference: Recombination"

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Federation of American Society for Experimental Biology (FASEB)	G	C	0	0	6	0	0	6

Justification for Non-Competitive Award:
N/A

Description of Work:
1997 FASEB Conference on Microbial Polysaccharides of Medical, Agricultural, and Industrial Importance

Publications:
Report of conference, "1997 FASEB Conference on Microbial Polysaccharides of Medical, Agricultural, and Industrial Importance"

Fed. of Amer. Soc. For Exp. Biology	G	C	0	5	0	0	0	5

Justification for Non-Competitive Award:
N/A

Description of Work:
FASEB Summer Research Conference: Signal Transduction in Plants

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Fed. of Amer. Soc. For Exp. Biology	G	C	0	5	0	0	0	5

Justification for Non-Competitive Award:
N/A

Description of Work:
FASEB Summer Research Conference on Plant Development Genetics

Publications:
None

Global Environment & Technology Foundation	G	NC	0	0	9	0	0	9

Justification for Non-Competitive Award:
The workshop is being conducted by the applicant using its own resources or those donated or provided by third parties; however, DOE support of this workshop will enhance the public benefits to be derived and DOE knows of no other entity which is conducting or is planning to conduct such an activity.

Description of Work:
Workshop Funds - Small Business and Innovation Research

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Institute for Electrical and Electronic Engineers (IEEE)	G	C	36	9	36	0	33	114

Justification for Non-Competitive Award:
N/A

Description of Work:
IEEE Particle Accelerator Conferences and International Conferences on High-Energy Accelerators

Publications:
"1995 Particle Accelerator and International Conference on High-Energy Accelerators"
"1997 Particle Accelerator and International Conference on High-Energy Accelerators"
"1998 Particle Accelerator and International Conference on High-Energy Accelerators"
Accelerator physics and technology papers by scientists and engineers

Institute of Electrical and Electronic Engineers (IEEE) Computer Society	G	C	9	12	15	0	0	36

Justification for Non-Competitive Award:
N/A

Description of Work:
Teacher Enhancement of Supercomputing (95, 96 & 97)

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Intl. Fed. of Inst. for Advanced Study	G	C	0	0	20	0	0	20

Justification for Non-Competitive Award:
N/A

Description of Work:
Symposium: Human Genome Research: Implications for Health in Latin America

Publications:
Report of conference, "Human Genome Research: Implications for Health in Latin America"

Life Sciences Res. Foundation	G	C	324	324	324	324	0	1,296

Justification for Non-Competitive Award:
N/A

Description of Work:
Developing Research Capabilities in Energy Biosciences

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Medical Research Council	G	C	0	10	0	0	0	10

Justification for Non-Competitive Award:
N/A

Description of Work:
12th Symposium on Microdosimetry

Publications:
Report of conference, "12th Symposium on Microdosimetry"

National Academy of Public Administration	C	NC	0	0	49	0	0	49

Justification for Non-Competitive Award:
Given their unique status and specialized expertise, the National Academy of Public Administration was the only practical source to develop a pilot process to bring closure to old whistleblower cases prior to April 1992.

Description of Work:
Whistle Blower Report on Pilot Program of Cases Prior to 1992

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
National Foundation for Brain Research..	G	C	25	0	0	0	0	25

Justification for Non-Competitive Award:
N/A

Description of Work:
Symposium on The Power and Potential of Brain Imaging

Publications:
Report of conference, "Symposium on The Power and Potential of Brain Imaging"

Pennsylvania Biotech Assoc..	G	C	40	0	54	28	0	122

Justification for Non-Competitive Award:
N/A

Description of Work:
Your World/Our World, Exploring the Human Genome, Teacher's Resource Materials

Publications:
Educational materials for high school biology students entitled, "Your World/Our World, Exploring the Human Genome, Teacher's Resource Materials"

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Radiation Research Society	G	C	10	0	0	0	0	10

Justification for Non-Competitive Award:
N/A

Description of Work:
Travel support to the 10th International Congress of Radiation Research

Publications:
Report of conference, "10th International Congress of Radiation Research"

Radiation Research Society	G	C	0	0	0	5	0	5

Justification for Non-Competitive Award:
N/A

Description of Work:
Curie Edition of Radiation Research Journal

Publications:
Curie Edition of Radiation Research Journal

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Radiation Research Society	G	C	0	0	0	0	25	25

Justification for Non-Competitive Award:
N/A

Description of Work:
11th International Congress on International Research

Publications:
Report of conference, "11th International Congress on International Research"

Santa Fe Institute	G	C	40	0	0	75	0	115

Justification for Non-Competitive Award:
N/A

Description of Work:
Complex Systems Summer School

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Society for Industrial and Applied Math (SIAM)	G	C	19	0	0	0	0	19

Justification for Non-Competitive Award:
N/A

Description of Work:
SIAM Conference on the Geosciences and on Parallel Processing

Publications:
Conference Proceedings

Society for Industrial and Applied Math (SIAM)	G	C	10	0	0	0	0	10

Justification for Non-Competitive Award:
N/A

Description of Work:
Travel Support for SIAM 95

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Society for Industrial and Applied Math (SIAM)	G	C	0	0	0	8	0	8

Justification for Non-Competitive Award:
N/A

Description of Work:
SIAM Workshop on Uncertainty in Modeling and Simulation

Publications:
None

Society for Industrial and Applied Math (SIAM)	G	C	0	20	0	0	0	20

Justification for Non-Competitive Award:
N/A

Description of Work:
1995 SIAM Conference on Inverse Problems in the Geosciences and Geometric Design

Publications:
Conference Proceedings

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Society for Industrial and Applied Math (SIAM).	G	C	0	15	0	0	0	15

Justification for Non-Competitive Award:
N/A

Description of Work:
SIAM Conferences on Computational Differentiation and Numerical Combustion

Publications:
Conference Proceedings

Society for Industrial and Applied Math (SIAM)	G	C	0	0	0	0	30	30

Justification for Non-Competitive Award:
N/A

Description of Work:
1999 SIAM Conference on Parallel Processing, Geosciences, and Optimization

Publications:
None

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Society for Industrial and Applied Math (SIAM)	G	C	0	10	0	0	0	10

Justification for Non-Competitive Award:
N/A

Description of Work:
SIAM Conference on Sparse Matrices

Publications:
Conference Proceedings

Society for Industrial and Applied Math. (SIAM)	G	C	0	0	25	0	0	25

Justification for Non-Competitive Award:
N/A

Description of Work:
1997 Society for Industrial and Applied Math (SIAM) Conferences on Parallel Processing for Scientific Computing and Geosciences

Publications:
Conference Proceedings on Parallel Processing for Scientific Computing and Conference Proceedings on Mathematics and Geosciences

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Society for Industrial and Applied Math. (SIAM)	G	C	0	0	5	10	0	15

Justification for Non-Competitive Award:
N/A

Description of Work:
SIAM Workshop: Focus on Diversity

Publications:
None

Society for Industrial and Applied Math. (SIAM)	G	C	0	0	20	0	0	20

Justification for Non-Competitive Award:
N/A

Description of Work:
1997 SIAM Conferences on Applied Linear Algebra and on Geometric Design

Publications:
Conference Proceedings on Applied Linear Algebra and Conference Proceedings on Geometric Design

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Society of Nuclear Medicine	G	C	0	10	0	0	0	10

Justification for Non-Competitive Award:
N/A

Description of Work:
Preparation & Dissemination of a Publication of the Society of Nuclear Medicine Proceedings of the 1996 Isotope Availability Symposium

Publications:
Society of Nuclear Medicine Proceedings of the 1996 Isotope Availability Symposium

Society for Occupational and Environmental Health	G	C	0	0	20	0	0	20

Justification for Non-Competitive Award:
N/A

Description of Work:
Global Climate Change: Implications for Occupational and Environmental Health

Publications:
Report of conference, "Global Climate Change: Implications for Occupational and Environmental Health"

(B/A in thousands)

	Grant or Contract	Competitive (C) or Non-Competitive (NC)	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total FY 1995-FY 1999
Zeta Phi Beta Sorority MEF	G	C	0	0	0	0	10	10

Justification for Non-Competitive Award:
N/A

Description of Work:
Information and Dialogue Conference on the Human Genome Project for the Minority Communities in the State of Louisiana

Publications:
None

FUNDING FOR NON-GOVERNMENTAL ORGANIZATIONS

Mr. Packard. For the record, please provide a list of non-governmental organizations that directly received funding from the Department in fiscal years 1995 through 1999. This list should include trade associations and professional, environmental or other organizations. Please include funding provided directly by the Department and funding provided by M&O contractors. Summary information should be provided where appropriate. At a minimum, for each organization provide the following:

- Name of Organization;
- Total funds provided to the organization in the five-year period;
- Description of work performed by organization;
- Whether the funds were provided as a grant or contract;
- Whether the funds were awarded on a competitive basis, and if not, the rationale for a non-competitive award;

Mr. Magwood. The requested list is shown in a table which I would like to insert in the record. This list does not include journal subscriptions, professional membership costs, conference fees or training courses.

Organization	Fiscal Year	Total Funding	Description of Work	Grant or Contract	Competitive or Non-Competitive
National Academy of Sciences	95-99	$1,846,000	Conducted a study of electrometallurgical techniques as potential technologies for DOE spent fuel treatment. Monitor the scientific and technical progress of the Argonne National Laboratory program on electrometallurgical technology treatment for DOE spent nuclear fuel.	Grant	Non-competitive (Studies are extensions of earlier evaluations conducted by the National Research Council)
Society of Nuclear Medicine	99	$2,350	Exhibit Booth at Nuclear Medicine's 46th meeting	Contract	Non-competitive (Registration)
American Chemical Society	95-96	$229,000	University students summer school program for FY 95-96	Grant	Non-competitive (Summer school sponsored by American Chemical Society)
Chicago Museum of Science and Industry	95-96	$120,000	Atoms for Electricity Exhibit in the museum	Grant	Non-competitive (Annual maintenance charge for existing exhibit)
American Society for Engineering Education	99	$19,576	Preparation of Survey on employment opportunities in Nuclear and Radiological Engineering	Contract	Non-Competitive (vendor possesses unique qualities conducive to task)

Organization	Fiscal Year	Total Funding	Description of Work	Grant or Contract	Competitive or Non-Competitive
American Nuclear Society	99	$8,157	Exhibit booth at Winter Meeting, and co-sponsorship of summer meeting	Contract	Non-Competitive (Rental Fees)
American Assoc. for Advancement of Science	98	$ 3,600	Conference Facilities	Contract	Non-Competitive (Rental Fees)
World Energy Congress	98	$ 6,000	Display booth at Houston World Energy Congress	Contract	Non-Competitive (Rental Fees)
Non-Destructive Testing Management Associates	98	$ 1,145	Exhibit Booth at Annual Conference	Contract	Non-Competitive (Rental Fees)

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Mr. Reicher. The table below provides the requested information for all non-governmental organizations including trade associations and professional, environmental or other organizations that received funding from the Solar and Renewable Energy Research and Development programs between FY 1995 and FY 1999.

Solar Buildings Research			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
TBD - Solicitation to obtain polymer expert consultants in costing, materials formulation, structural analysis, and thermal analysis)	225	C	C
TBD - Solicitation to obtain concepts for a low cost, polymer solar water heater	300	C	C
TBD - Solicitation to fund the second phase of the "new concept" contracts awarded in FY 1998.	175	C	C
Support for American Solar Energy Society Conferences in FY 1999 and FY 2000.	40	G	C

TBD - Consultant to NREL for project planning and analysis of low cost solar water heater - *	22	C	N
*TBD (Consultant to NREL for project planning) - assistance is needed to plan a multi-year project to reduce the cost of solar water heaters. This is specialized expertise needed in timely fashion for a short period of time for a small amount of money. It is not practical to obtain a quality consultant through the competitive process for such a task. There will be no follow-on activities.			
Solar Rating & Certification Corp (SRCC) - solar system and component testing, rating, and certification for industry. Develop U.S. standards and make compatible with international standards.	905	G	C**
** In 1997 the SRCC competitively selected the Florida Solar Energy Center as its operating agent. In FY 1999, the DOE increased the SRCC budget from $160K to $200K to enable them to continue work on adapting U.S. standards to international standards and begin work on establishing standards for reliability. The $40K increase was determined to be noncompetitive. A merit review will take place. The SRCC will solicit for a new operating agent in FY 2000. Solar Rating & Certification Corp (SRCC) - the SRCC is an independent, non-profit organization which certifies and rates the performance of solar energy equipment. As such, the SRCC is directly responsible for implementing the technical procedures currently under development by the Solar Buildings program for the rating and certification of solar equipment for the solar industry.			
University of Wisconsin - develop TRNSYS computer model for use by solar industry. Support Solar Rating and Certification Corporation development of standards.	743	G	N - see rationale for noncompetitive award below
University of Wisconsin developed and maintains the TRNSYS computer model of solar energy systems. TRNSYS is the pre-eminent solar system modeling tool for researchers and systems analysts. As the developers of the tool, the University is in the best position to maintain and upgrade it. Wisconsin's solar laboratory is world renowned for solar expertise.			
TBD - Solicitation to obtain computer modeling analysis of solar water heating systems.	50	C	C
Florida Solar Energy Center - support Solar Rating and Certification Corporation in development of OG-300, the standard for solar heating systems.	435	C	N - see rationale for noncompetitive award below

Florida Solar Energy Center established experts in the certification and testing of solar domestic hot water systems. FSEC has maintained a first class capability in this area dating back to the 1970's. FSEC's strategic location in a state that has one of the strongest solar manufacturing capabilities in the U.S., makes it ideally suited for this mission. FSEC, however, stopped receiving non-competitive awards in FY1997.			
Colorado State University - support Solar Rating and Certification Corporation in testing systems that verified accuracy of OG-300, the standard for solar heating systems.	325	G	N - see rationale for noncompetitive award below
Colorado State University - Over the last 20 years CSU has established perhaps the nation's best capability for testing solar energy systems for residential solar heating and cooling applications. The location is particularly well suited for such testing. The university and its staff are recognized experts in this area. CSU, however, stopped receiving non-competitive awards in FY1997.			
Solar Energy Industries Association - develop educational materials, publish Solar Journal, sponsor annual conference, support USH2O solar water heating initiative in cooperation with utility group, work with homebuilders, attend builder conferences. No FY 1999 funding was provided for this effort.	1,363	G	N – see rationale for noncompetitive award below
Solar Energy Industries Association - represents the solar domestic hot water manufacturers and installation industry. It provides valuable insights into the needs of its membership to the program, and is in a unique position to translate the results of program activities to its members.			
University of Minnesota - development of a new efficient heat exchanger for solar water heaters. (through FY 1998).	150	G	N - see rationale for noncompetitive award below
University of Minnesota - Professor Jane Davidson continued her work begun at Colorado State University on the development of improved certification methods. By virtue of her previous involvement in this area and her proven skills, she is extremely well-qualified to perform this work. Minnesota, however, stopped receiving non-competitive awards in FY1998.			
Thermal Conversion Technology manufactures and sells solar energy systems. Reduced cost of solar water heater through manufacturing improvements (e.g. better welding practices).	94	C	C

Sun Trapper manufactures and sells solar energy systems. Reduced cost of solar water heater through manufacturing improvements (e.g. improved storage tank).	132	C	C
Science Applications International - technology analyses.	205	C	C
PERI - technical analyses of solar water heating systems to determine energy and environmental impacts, and system performance.	140	C	C
American Institute of Architects - integration of solar water heaters into buildings.	100	C	N - see rationale for noncompetitive award below
American Institute of Architects (AIA) - AIA is the leading professional organization for architects and is the best vehicle for communicating new building energy concepts to the architectural community. They are particularly influential in advancing these concepts in the non-residential buildings market.			
Arizona State University - support of Solar Rating and Certification Corporation in development solar standards.	110	C	N - see rationale for noncompetitive award below
Arizona State University (ASU) - Professor Byard Wood serves as Technical Director of the Solar Ratings and Certification Corporation (SRCC) and is an acknowledged expert in systems certification issues. His strong leadership and knowledge of state, national, and international certification institutions provides the SRCC with a most effective resource for increasing acceptance of its certification procedures. ASU stopped receiving non-competitive awards after Professor Wood left the university.			
Solar Design Associates - analyses of photovoltaic integrated in buildings.	90	C	N
Solar Design Associates - Mr Steven Strong is considered the nation's foremost expert in building-integrated photovoltaic (BIPV) systems. He was the architect for the country's first BIPV home and continues to be a leader in this technology. In addition, he brings insights on international developments based on his broad ranging experience in this area.			
Industrial Solar Technology - modification of solar trough for solar cooling application.	114	C	C

Solar Enterprises International - development of a compound parabolic concentrator for solar cooling application.	100	C	C
Ohio State University - design and test of a hybrid (solar and gas) absorption chiller.	138	C	C
University of Puerto Rico - modify a single effect absorption system to be driven by solar energy.	193	C	C
University of Minnesota - development of a polymer heat exchanger.	179	C	C
Davis Energy Group - development of a thermosiphon solar water heater with unpressurized storage.	75	C	C
Florida Solar Energy Ctr - development of a roof integrated solar water heater.	50	C	C
Access Technology - development of a polymer trickle-down solar water heater.	60	C	C
University of Wisconsin - investigate the potential of integral storage collectors to work in climates that experience freezing.	60	C	C
Meso-American Development - development of a solar coffee drying system.	100	C	C
National Association of Home Builders - Research Center - conduct workshops for homebuilders, architects, roofers and plumbers.	75	C	N - see rationale for noncompetitive award below
National Association of Homebuilders Research Center (NAHB) - the NAHB provides unique access to homebuilders across the nation. It also has extensive experience in the introduction of new technology into homes.			
Focus Marketing - conduct workshops for home buyers to determine attitudes toward solar energy.	65	C	C

Photovoltaic Energy Systems			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
University of Washington — Improve the stability and efficiency of dye-sensitized photoelectrochemical solar cells.	61	C	C
University of Utah — identify a-Si:H metastabilities. Amorphous hydro generatedsilicon (a-Si:H) solar cells display degraded power output with long-term illumination. The mechanism of this phenomenon is a topic of internal research.	24	C	C
University of Illinois at Urbana-Champaign — Determine the source of sample to sample variability on copper-indium-gallium-diselenide (CIGS) based solar cell performance.	251	C	C
University of South Florida — Advance the understanding of the formation and performance of thin-film compound semiconductor solar cells.	301	C	C
Hampton University — Strengthen the research and education capabilities of HBCUs in photovoltaics.	49	C	C
Southern University — Strengthen the research and education capabilities of HBCUs in photovoltaics.	62	C	C
Central State University — Strengthen the research and education capabilities of HBCUs in photovoltaics.	45	C	C
Texas Southern University — Strengthen the research and education capabilities of HBCUs in photovoltaics.	45	C	C

Mississippi Valley State University — Strengthen the research and education capabilities of HBCUs in photovoltaics.	87	C	C
Clark Atlanta University — Strengthen the research and education capabilities of HBCUs in photovoltaics.	160	C	C
Wilberforce University — Strengthen the research and education capabilities of HBCUs in photovoltaics.	141	C	C
North Carolina State University — Explore the use of Se as a dopant in InGaP for multijuncion solar cells.	319	C	C
Johns Hopkins University.— Develop new materials to improve the efficiency of photoelectrochemical solar cells.	314	C	C
Arizona State University — Acquire critical PV research and test equipment.	13	C	C
AstroPower, Inc. — Develop inexpensive substrate for growth of inexpensive GaAs solar cells.	50	C	C
California Institute of Technology — Develop crystalline Ge films on glass for substrates for thin-film GaAs solar cells.	160	C	C
California Institute of Technology — Acquire critical PV research and test equipment.	24	C	C
Clemson University — Acquire critical PV research and test equipment.	94	C	C
Colorado School of Mines — Acquire critical PV research and test equipment.	83	C	C
Georgia Tech Research Corporation — Acquire critical PV research and test equipment.	61	C	C
North Carolina State University — Acquire critical PV research and test equipment.	100	C	C

Pennsylvania State University — Acquire critical PV research and test equipment for electronic measurement for characterizing the electronic and material properties of solar cells.	50	C	C
Research Triangle Institute — Attain 90% of the efficiency for crystalline materials on low cost polycrystalline materials.	520	C	C
State University Of New York at Buffalo — Acquire critical PV research and test equipment.	33	C	C
Syracuse University — Acquire critical PV research and test equipment for electronic measurement for characterizing the electronic and material properties of solar cells.	17	C	C
University of California at Los Angeles — Develop large area crack-free GaAs films.	332	C	C
University of Delaware – Acquire critical PV research and test equipment.	100	C	C
University of Florida — Acquire critical PV research and test equipment	91	C	C
University of Oregon — Acquire critical PV research and test equipment.	46	C	C
University of South Florida — Acquire critical PV research and test equipment.	148	C	C
University of Toledo — Acquire critical PV research and test equipment	49	C	C
University of Utah — Acquire critical PV research and test equipment.	49	C	C
Washington State University — Acquire critical PV research and test equipment.	49	C	C
Bar Ilan University — Research on dye-sensitized solar cells.	38	C	C
Washington State University — Research on future generation PV approaches.	76	C	C

University California Berkeley — Research on future generation PV approaches.	69	C	C
University of Illinois — Research on future generation PV approaches.	76	C	C
Northwestern University — Research on future generation PV approaches.	76	C	C
University of Rochester — Research on future generation PV approaches.	71	C	C
University of California San Diego — Research on future generation PV approaches.	66	C	C
North Carolina State University — Research on future generation PV approaches.	60	C	C
Penn State University — Research on future generation PV approaches.	67	C	C
West Virginia State University — Research on future generation PV approaches.	67	C	C
Vanderbilt University — Research on future generation PV approaches. Research into solar-to-electric conversion processes that mimic biological mechanisms such s photosynthesis. These are so-called "biomimemic" processes.	62	C	C
Cornell University — Research on future generation PV approaches	62	C	C
University of Minnesota — Research on future generation PV approaches.	43	C	C
SUNY Buffalo — Research on future generation PV approaches.	58	C	C
Reed/University of Oregon — Research on future generation PV approaches.	42	C	C
Penn State University — Research on future generation PV approaches.	87	C	C

University of California Santa Barbara — Research on future generation PV approaches.	54	C	C
Arizona State University — Research on future generation PV approaches.	20	C	C
Crystalline Silicon			
Duke University -- Investigation of Gettering Mechanisms in Crystalline Silicon.	725	C	C
Georgia Institute of Technology -- High Efficiency Solar cell fabrication on Commercial Silicon Substrates.	600	C	C
North Carolina State University -- Characterization and Ti Gettering of PV Substrates.	545	C	C
Cornell University -- Low-Cost Glass and Glass-Ceramic substrates for Thin Film Silicon.	240	C	C
Texas Tech. University -- Theoretical Analysis of Hydrogen-Vacancy-Impurity Formation and Dissociation.	210	C	N - Unique expertise
University of California at Berkeley -- Impurity Precipitation, Dissolution, Gettering, and Passivation in PV Silicon.	740	C	C
Lehigh University -- Hydrogen-Defect Interactions Relevant to Si Solar-Cell Fabrication Studied by Vibrational Spectroscopy.	30	C	N - Unique expertise
Pennsylvania State University -- Hydrogen-Defect Interactions in Photovoltaic Silicon.	10	C	N - Unique expertise
University of South Florida -- Optimization of Gettering Processes for PV Silicon..	495	C	C
Georgia Institute of Technology -- Crystalline silicon solar cell processes (DOE-designated university center of excellence in PV).	2,727	C	N - unique expertise and organization

Thin Film PV Partnership			
University of Delaware/Institute of Energy Conversion -- Processing and modeling issues for thin-film solar cells (DOE-designated university center of excellence in PV).	5,653	C	N - unique expertise and organization
Colorado School of Mines -- Microstructure of amorphous Silicon Based Solar Cell Materials.	356	C	C
Colorado School of Mines -- Process Development of Electrochemically deposited CdTe-based Solar Cells.	1,253	C	C
Colorado State University -- Device Physics of Thin-Film Polycrystalline Cells and Modules.	591	C	C
University of Central Florida -- Florida Solar Energy Center, CdTe Module Testing and Study of Transient and Irreversible Effects in CdTe Cells.	40	C	N - unique climate exposure
University of Central Florida -- Florida Solar Energy Center, $CuIn_{1-x}Ga_xSe$ Thin Film Solar Cells. Research and development of copper-indium-gallium-diselenide thin-film solar cells, which have alrady displayed impressive results in commercial-size PV modules.	147	C	C
Harvard University -- Optimization of Transparent and Reflecting Electrodes for Solar Cells.	725	C	C
Iowa State University -- Improved Amorphous Silicon and Alloy Materials Prepared by ECR Plasma Techniques.	1,267	C	C
National Institute for Standards and Technology (with U. Colorado, Boulder) -- Characterization of Small Particle Formation in the Preparation of a-Si Solar Cells and STM Measurement of Field Profiles.	620	C	N - unique capabilities

Pennsylvania State University -- Stable a-Si:H Based Multijunction Solar Cells with Guidance from Real Time Optics.	997	C	C
Syracuse University -- Electroabsorption and transport Measurements and Modeling Research in a-Si:H Solar Cells.	518	C	C
University of California -- Los Angeles, Photocharge Transport and Recombination Measurements in a-Si:H Films and Solar Cells.	144	C	C
University of Florida -- Gainesville, Future CIS Manufacturing Technology Development.	1,121	C	C
University of Illinois -- Properties of Wide-Gap Chalcopyrite Semiconductors for Photovoltaics.	55	C	C
University of North Carolina -- Search for Factors Determining the Photodegradation in High-Efficiency a-Si:H-based Solar Cells.	550	C	C
University of Oregon, Eugene -- Identifying Electronic Properties Relevant to Improving Stability and Performance of a-Si:H-based Solar Cells.	617	C	C
University of South Florida -- Advanced Processing Technology for CdTe and High Band Gap CIS Solar Cells.	1,345	C	C
University of Toledo -- High Efficiency Thin-Film CdTe- and a-Si:H-based Solar Cells.	897	C	C
University of Toledo -- Optimization of Laser Scribing for Thin-Film PV Modules.	255	C	C
Washington State University -- Alternative Window Schemes for $CuInSe_2$-Based Solar Cells.	431	C	C
University of Utah -- Characterization of Amorphous Silicon Thin Films and PV Devices.	155	C	C

Weizmann Institute of Science -- Identifying and Overcoming Degradation Mechanisms in CdTe Solar Cells.	164	C	C
Pennsylvania State University -- CIS and CdTe Based Tandem Solar Cell Studies Using AMPS.	50	C	C
Purdue University -- Numerical Modeling as a Tool for Analyzing and Interpreting Thin-Film Solar Cell Measurements.	37	C	C
BP Solar -- Apollo thin film process development.	641	C	C
DayStar Technologies -- Thin film based "Micro-Concentrator" photovoltaic technology.	153	C	C
Energy Conversion Devices -- Stable, high-efficiency triple junction a-Si alloy solar cells.	1,406	C	C
Energy Photovoltaics -- Thin film CIGS photovoltaic technology. Research into the large-scale inexpensive processing of copper-indium-gallium-diselenide photovoltaic modules.	4,489	C	C
Global Solar Energy -- Process development of large area, thin film CIGS flexible PV modules.	1,083	C	C
International Solar Electric Technology -- Application of CIS to non-vacuum based PV module fabrication.	2,540	C	C
ITN Energy Systems -- Atmospheric Pressure CVD of CdTe for Thin Film PV Devices.	438	C	C
Materials Research Group -- In-situ sensors for process control for CIGS Devices.	210	C	C
MV Systems -- Hot wire CVD prepared a-Si and polycrystalline Si film solar cells.	578	C	C

Siemens Solar Industries -- CIS Based Thin Film PV Technology.	4,685	C	C
Solar Cells, Inc. -- Technology support for initiation of high-throughput processing of thin film CdTe.	5,264	C	C
Solarex -- Research on a-Si cells and modules.	3,199	C	C
United Solar Systems Corp -- Thin film a-Si alloy research - thin-film amorphous silicon cells.	3,763	C	C
AstroPower -- Light-trapped,interconnected Si-Film modules.	3,519	C	C
PV Manufacturing Technology (PVMaT)			
AstroPower, Inc. - Silicon-Film Solar Cells by a Flexible Manufacturing System.	6,797	C	C
Utility Power Group, Inc. - Development of a Fully-Integrated PV System for Residential Applications.	1,644	C	C
Ascension Technology, Inc. - Cost Reduction and Manufacture of the SunSineTM325AC Module.	912	C	C
Spire Corporation - Post-Lamination Manufacturing Process Automation for Photovoltaic Modules.	1,427	C	C
Solarex - Improvements in Polycrystalline Silicon PV Module Manufacturing Technology.	3,926	C	C
Solar Cells, Inc. - Specific PVMaT R&D in CdTe Product Manufacturing.	3,336	C	C
Evergreen Solar - Continuous, Automated Manufacturing of String Ribbon Silicon PV Modules.	2,272	C	C
Omnion Power Engineering Corp. - Manufacturing and System Integration Improvements for One- and Two-Kilowatt Residential PV Inverters.	1,308	C	C

Energy Conversion Devices - Efficiency and Throughput Advances in Continuous Roll-to-Roll a-Si Alloy Manufacturing Technology.	1,275	C	C
ASE Americas - Cost Reductions in High Volume EFG PV Module Manufacturing Line.	2,734	C	C
Global Solar - Manufacturing Cost and Throughput Improvements for copper-indium-galium-diselenide (CIGS) based Thin Film PV Modules.	1,078	C	C
PowerLight Corporation - PowerGuard Advanced Manufacturing. This is a power conditioning equipment for use with PV modules.	628	C	C
Crystal Systems - Production of Solar Grade Silicon by Refining of Liquid Metallurgical Grade Silicon.	646	C	C
Siemens Solar Industies - Specific R&D Problems in Product Manufacturing.	3,782	C	C
Solar Design Associates - The Development of Standardized Low-Cost AC PV Modules.	717	C	C
Iowa Thin Film Technologies - PVMaT Monolithic a-Si Modules on Continuous Polymer Substrates.	2,638	C	C
Solar Electric Specialties - Design, Fabrication and Certification of Advanced Modular PV Power Systems.	240	C	C
Trace Engineering - Modular 2 - 5 kW DC to AC Power Inverter Module for PV Applications.	193	C	C
Advanced Energy Systems, Inc. - Next Generation Three Phase Inverter.	940	C	C
Photovoltaics International - Manufacturing of the PVI PowerGrid.	3,462	C	C
PV:BONUS			

PV:BONUS consists of multiple Cooperative Agreement awards to support the development of cost-effective photovoltaic (PV) and /or PV hybrid products, strategic partnering, and infrastructure development in order to provide a sustainable market for PV in the building sector. The listed awardees are the prime contractor for teams typically consisting of manufacturers, guilders and/or utilities.			
FIRST, Inc.-- PV/Building Integration.	467	CA	C
Delmarva Power and Light -- PV/Building Integration.	470	CA	C
Energy Conversion Devices--PV/Building Integration.	3,364	CA	C
Solar Design Associates--PV/Building Integration	1,035	CA	C
Adavanced Photovoltaic Systems -- PV/Building Integration.	330	CA	C
PV:BONUS-Two			
Solarex--PV/Building integration.	743	CA	C
AstroPower--PV/roof.	50	CA	C
PowerLight--PV/roof.	515	CA	C
Evergreen Solar --Module design.	50	CA	C
United Solar Systems Corporation--PV/roof.	613	CA	C
Solar Design Associates--PV/Thermal system.	925	CA	C
Sage Electronics--Electrochromic windows.	380	CA	C
Energy Conversion Devices--PV/thermal roof.	50	CA	C
United Solar Technologies--PV/Thermal system.	50	CA	C
Delmarva Power and Light --AC "Minigrid".	50	CA	C
Springborn--Fire retardant encapsulant.	50	CA	C
Global Solar Energy--PV laminates.	54	CA	C
Ascension Technology--Codes for wind/seismic forces.	87	CA	C
Omnion--PV/storage UPS.	17	CA	C
TerraSun--Transparent PV.	40	CA	C
Advanced Energy Systems--PV inverter.	307	CA	C
Kiss + Cathcart--PV building integration.	32	CA	C

PV COMPACT			
Georgia Institute of Technology--PV/Natatorium (competitive swimming facility).	1,750	CA	N - Unique facility
World Bank--Asian projects.	31	G	N - Unique organization
Southern California Edison--Distributed application, defer 4KV Line.	2,000	CA	N - Unique facility
Utility Photovoltaic Group--Distributed application.	20,391	CA	N - Unique facility
USAPV--Utility applications in New Jersey.	304	CA	N - Unique facility
Sacramento Municipal Utility District--Grid connected applications.	1,300	CA	N - Unique organization
PV4U/Interstate Renewable Energy Council -- Market barriers and State working groups.	2,000	G	N -- unique organization
Pace University Law School -- Renewable energy technology analysis to facilitate negotiations in various states regarding acceleration of PV in the energy service organizations.	400	G	N -- unique capabilities
Education and Outreach/Miscellaneous			
American Solar Energy Society -- Solar Home Tour for public information on homes that installed renewable energy.	30	G	N - Unique organization
WalMart- PV roof installation.	100	CA	N - Unique facility
AIAS--PV education for architectural students.	93	G	N - Unique organization
California Energy Commission--PV education and outreach.	60	G	N - Unique organization
US/Export Council for Renewable Energy--Foreign applications of renewables.	25	G	N - Unique organization

Solar Energy Industries Association (SEIA)-FY95--Education, training, publications for the PV industry. SEIA conducted technology transfer and outreach to PV industry such as codes, standards and safety standards, and traiing to installers. Outreach also facilitated through PV industry product directory and other publications describing merits of solar energy.	582	G	N - Unique organization
SEIA-FY96--Education, training, publications.	588	G	N - Unique organization
SEREF-FY96--Outreach, tech transfer.	57	G	N - Unique organization
CRM--Brochure on benefits of using solar energy.	20	G	N - Unique expertise
SEIA-FY97--Educations, training, publications.	785	G	N - Unique organization
SEREF-FY97--Outreach, tech transfer. The Solar Energy Research and Education Foundation (SEREF) was funded to develop educational materials for schools and the general public.	213	G	N - Unique organization
SEIA - FY98 --Analysis, educations, training, publications.	312	G	N - Unique organization
Albuquerque Public Schools – Education support and training materials on PV.	75	C	N - unique capabilities
Morse Associates – Organize workshop on PV and provide technical analysis for EIA.	68	C	N - unique capabilities
PV Energy Systems -- Conducted survey of US PV Industry for EIA report.	10	C	N - unique capabilities
New Resources Group -- Support of Sunrayce '95, '97, and '99. Provided organizational and logistical planning and implementation of college and university student competitions.	1,699	C	N - unique expertise and experience
Photovoltaic System Performance and Engineering			
PVUSA - Utility applications (competitive since FY 1998).	3,200	G	C
NEOS Corporation - Development of PV system test methods.	49	C	N - unique capabilities

Power Mark Corporation - PV certification and accreditation management support.	135	C	N - unique organization
Solar Energy Industries Association - Management and administration of IEC TC-82 (international standards).	145	C	N- unique organization
University of Colorado at Denver - Solar cell degradation monitor.	117	C	N - unique expertise
EG&G Management Systems - Technical Support for PV Program.	391	C	N - unique capabilities
Spectra Research Institute - Technical Support for PV Program.	789	C	N - unique capabilities
New Mexico State University - PV system evaluation and testing data collection and balance of systems reliability (Congressional line item).	3,757	C	N - unique capabilities; Appropriation language
University of Central Florida - PV Research and Services. PV system evaluation and testing data collection and balance of systems reliability (Congressional line item).	2,851	C	N – unique capabilities; Appropriation language
Bureau of Land Management – BLM Systems. PV systems for National Forest and Parks.	200	C	N – unique capabilities
National Park Service – NPS Systems. PV systems for National Forest and Parks.	250	C	N – unique capabilities
Tonto National Forest – USFS Systems. PV systems for National Forest and Parks.	100	C	N – unique capabilities
Texas Southern University – PV Demonstration Facility on campus.	30	C	N – unique capabilities
Steve Chalmers – IEEE/UL Coordination.	8	C	N – unique capabilities
ASE Americas – PV System and Inverter.	10	C	N – unique capabilities
Photovoltaic Services Network – PV System Maintenance & Monitoring.	5	C	N – unique capabilities
Endecon Engineering – Acceptance Testing for PV modules and systems.	168	C	N – unique capabilities
Arizona Public Service – Hybrid PV systems development.	50	C	N – unique capabilities
GT Solar Technologies – Engineering Study.	10	C	N – unique capabilities
Balance of Sytems Components Development			

Ascension Technology, Inc. – Benson Evaluation.	25	C	N – unique capabilities
Douglas C. Dawson – PV Interconnection (Consultant).	25	C	N – unique capabilities
Omnion Power Engineering – Reliability Improvement of Fielded PV Power.	416	C	N – unique capabilities
Trace Engineering – Reliability Improvement of Fielded PV Power.	425	C	N – unique capabilities
Control Systems Associates – Collaborative PEBB Research.	75	C	N – unique capabilities
(Out to Bid) – PV Inverter Development.	140	C	C
Utility Power Group – Inverter Development.	90	C	N – unique capabilities
Domestic PV Markets and Applications Development			
American Solar Energy Society - DOE sponsored conferences.	295	C	N – unique organization
Interstate Renewable Energy Council - Unsolicited proposals.	105	C	N– unique organization
NESEA - DOE sponsored conference.	5	C	N– unique organization
University of Illinois - Unsolicited proposals/PV farm products display	28	C	N - unique organization
Modern Wood Design	50	C	C
Grand Visuals	19	C	C
Wortman Engineering -- Iissues in existing and proposed building codes and standards for EE and RE technologies.	34	C	C
Solar Design Associates -- represent the U.S. on IEA PVPS Task 7, "Photovoltaics in the Built Environment."	49	C	N - unique expertise
Solar Design Associates --Brochure for "whole-building" design to reduce a building's energy use.	25	C	N - unique expertise
Interstate Renewable Energy Council – State, regional and community workshops.	60	C	N - Unique expertise and organization
Renewable Energy Development Institute – Pilot PV financing mechnism with CA private mortgage financers	35	C	N - Unique relationship with finance community

Greater Flagstaff Economic Development Council – Identify community value of renewable energy economic development target cluster.	15	C	N - Unique Community Service organization
Institute for Sustainable Power – form consensus among domestic training organizations of core competencies for PV installers, O&M certification.	10	C	N - Unique expertise
Learning Village Project - Organize MSRI partnership and develop local implementation plan	25	C	N - Unique community willingness
Washington State University - Organize MSRI partnership and develop local implementation plan.	25	C	N - Unique community willingness
Hawaii Electric Light Company - Organize MSRI partnership and develop local implementation plan.	25	C	N - Unique community willingness
Pacific Energy Group – Market, utility and policy analysis.	372	C	N - Unique expertise and leveraged co-funding
State University of New York – PV Capacity/utility load match.	180	C	N - Unique capabilities
International Market and Applications Development (No FY 1999 funding was used for these PV activities)			
Solar Electric Light Fund Solar Home System Project. Development of standardized systems for remote homes.	280	C	N - unique experience
University of Delaware--Center for Energy and Environmental Policy--Rural Electrification Analyses.	147	C	N - unique expertise and experience
Princeton Economic Research Institute--Preparation of a report for DOE's Energy Efficiency and Renewable Energy Protocol with China.	59	C	N - unique capabilities
Center for Renewable Energy Development--Assistance for business development US and China companies.	134	C	N - DOE/China bilateral protocol
Chinese Ministry of Agriculture--rural electrification project.	150	C	N -DOE/China bilateral protocol

World Bank, Asia Alternate Energy Unit — Development of alternative energy in developing nations in Asia.	370	C	N - World Bank funding agreement
Clark Atlanta University — Determine effects of atmospheric variability on PV performance.	20	C	C
NRECA International, Ltd. — Institutional development in Brazil.	23	C	N - unique capability
Meridian (Dyncorp) — International assistance for CORECT	150	C	N - unique expertise in Mexico
Enersol — Educate people in Central America on renewable energy.	80	C	N - USAID cost share agreement
NRECA — Technical support for PV activities in Mexico.	250	C	N - Unique in-country capabilities
Spire Corporation — Provide a PV assembly plant.	694	C	N - unique project opportunity
University of Virgin Islands — Establish center for renewable energy technology.	50	C	N - unique capability
KPMG — Assess PV market potential in Mexico.	44	C	N - Int'l business capabilities
Arizona Public Service — Implement mini-grid hybrid system in Mexico.	50	C	N - Mexico Experience
Ecoturismo y NT — Support Mexican renewable energy projects in the Quintana Roo.	95	C	N - Unique experience in region
Photocomm, Inc. — Support Mexico renewable energy program.	10	C	C
Tata Energy and Resources Institute — Evaluate impact of PV systems in the Sundarbans.	69	C	C
Remote Power International	14	C	N - Unique experience in Sundarbans
Applied Power Corporation — Provide village PV power systems into remote India.	200	C	C

Enersol Associates – Infrastructure Dev. In Central America/Mexico.	80	C	N - unique capabilities
National Rural Electric Coop – Latin America Renewable Energy Support.	255	C	N - unique capabilities
Ecoturismo Y Nt – Technical Support.	50	C	N - unique capabilities
Peat Marwick – Market Assessment for REO and Mexico Project.	57	C	N - unique capabilities

Concentrating Solar Power			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
SEIA -- Soltech Conferences, Publications, Solar Enterprise Zone Support.	1,081	C	N
PERI -- Technical Analysis, Program Support.	460	C	C
American Solar Energy Society - Solar Conferences.	60	G	N
California Energy Commission -- Technical Analysis.	30	C	N

Regarding the rationale for non-competitive awards, the award of non-competitive financial assistance is based on a determination using the criteria established in Financial Assistance Rules (10CFR 600). Each Applicant proposed activities that supported the program objectives and were determined to meet the following two criteria: (1) the activity to be funded is necessary to the satisfactory completion of, or is a continuation or renewal of, an activity presently being funded by DOE or another Federal agency, and for which competition for support would have a significant adverse effect on continuity or completion of the activity; and (2) the applicant has exclusive domestic capability to perform the activity successfully, based upon unique equipment, proprietary data, technical expertise, or other such unique qualifications.

Biomass/Biofuels Energy Systems - Power Systems			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
Department of Environment (Peoples' Republic of China) - Perform biomass resource assessment for rural power applications.	222	C	N - In order to perform this type of work in China, it is necessary to partner with a govt. agency; this is the agency with purview.
Solar Energy Industries Assoc. - Organize Soltech95 conference, Prepare reports on opportunities for mid-size biomass power generation, prepare a bioenergy industries directory.	108	C	N - Unique Organization
National Audubon Society - participate in National Biofuels Roundtable and evaluate wildlife impacts of LOI studies.	35	C	N - NAS is the primary national organization concerned with bird populations that may be affected by dedicated cropping schemes
People's Republic of China: Support for U.S./China Protocol Annex implementation (Resource database, Biogas workshop, Co-firing assessment) part of international cross-cut activities at NREL.	120	C	N - In order to perform this type of work in China, it is necessary to partner with a govt. agency; this is the agency with purview.

United BioEnergy Commercialization Association (UBECA) - provide information about biopower to the industry and stakeholders.	100	C	N - UBECA is the primary industry association concerned with biopower and as such is in a unique position to disseminate information and interface with the industry.

Biomass/Biofuels Energy Systems - Transportation			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
National Corn Growers Association Research on advanced fermentation organisms.	85	G	N - Association supports ongoing research in area.
New Uses Council Bi-monthly publication focusing on new agricultural (non-food) and industrial by-products from agricultural materials.	30	G	N - Council has a long record organizing agricultural organizations and farmers to investigate the potential of developing new markets for existing commodity crops, including biomass applications.
National Bioenergy Industries Association Publication of articles on biomass to energy. Each regional biomass energy program submits articles for magazine, *Biologue*.	75	G	N - Association uniquely qualified to reach target audience, through *Biologue* magazine.

American Coalition for Ethanol Screening study on utilizing feedstock grown on CRP lands in a biomass-to-ethanol production facility - Preliminary Business Plan.	115	C	N - Unique ties to the existing corn to ethanol industry, farmers in the upper Great Plains, and ethanol engineering companies that provides ACE with the capabilities to develop a preliminary business plan for a biomass-to- ethanol facility in the region and identify a potential owner/ operator for the facility.
National Audubon Society Study of the opportunities & barriers to the implementation & sustainability of bioenergy systems.	66	C	N - Capabilities and knowledge of biomass energy placed it in a unique position to accomplish study.
MSS Consultants Biomass and ethanol utilization studies.	162	C	N - Unique capabilities
Biomass Energy Foundation A 1995 Survey of Biomass Gasification Technology.	10	C	N - Foundation had unique capabilities to conduct survey in a short period of time.

Coloradans for Clean Air Identify issues and barriers to the development of biomass energy in the Western U.S. - 3 workshops/meetings.	165	C	N - Unique capabilities to bring together the western forestry efforts and determine the size of the potential resource and the issues surrounding it, based on involvement in the Front Range Forest Health Partnerships and the Quincy Library Group, plus years of experience with diverse governmental agencies, environmental groups, etc.
New Uses Council Preparation of briefing book on new industrial uses for agricultural commodities, workshop/meeting & report.	44	C	N - Council has a long record bringing together agricultural organizations and farmers to identify new uses and new crops.
The Common Purpose Institute Biomass co-firing with coal at Lakeland, Florida, utilities.	20	C	C
National Biodiesel Board Health effects Tier II testing of biodiesel fuel.	89	C	N - NBB project manager for larger EPA project, testing competitively awarded by NBB to Lovelace laboratories, total $1.2 million project.
Governors' Ethanol Coalition Information dissemination/outreach to member States.	45	G	N - Unique capability

Clean Fuels Foundation Information brochure/web page.	50	G	N - Unique capability
Clean Fuels Development Coalition California ethanol conference.	25	G	N - Conference co-sponsor
Environmental and Energy Science Institute - Cellulosic and corn based ethanol information and outreach.	108	CA	C

Wind Energy Systems			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
Electric Power Research Institute (EPRI) Administrator for Turbine Verification Program. This is a cost shared, collaborative EPRI/Department of Energy program for field verification of new wind turbine technologies.	9,430	G	N - Program is a collaborative cost-shared effort with EPRI and host utilities in which host utilities and turbine vendors are selected competitively.
American Wind Energy Association (AWEA) - Technical Information and applications support to U.S. wind industry.	120	C	C in 1999.
Development of wind industry consensus standards.	3,136	C	N - AWEA is primary association for wind energy in U.S., and uniquely qualified or has exclusive capabilities in some required technical areas.
Participation in national and regional forums regarding the use of wind energy.	75	Purchase Order	N - AWEA has exclusive capabilities.

Kern Wind Energy Association (KWEA) to conduct public education related to development and use of wind energy in Kern County and other areas of Southern California	35	G	N - KWEA uniquely qualified to provide educational information in Tehachapi area.
Kotzebue Electric Association (KEA) Design, procure and install 1.0 MW to 2.0 MW wind installation to test cold weather operations and reduce remote utility's dependence upon diesel generators for electricity production.	3,760	G	N - Congressional direction.
National Association of Regulatory Utility Commissioners (NARUC) to participate in National Wind Coordinating Council collaborative meetings and reporting to NARUC members.	200	G	N - NARUC uniquely qualified to provide utility commission representation to NWCC.
National Conference of State Legislatures (NCSL) to participate in NWCC collaborative meetings and report to NCSL members.	350	Purchase Orders and Grant	N - NCSL uniquely qualified to participate in NWCC.and to report to state legislatures through the nation.
National Association of State Energy Offices (NASEO) to participate in NWCC collaborative meetings and report to NASEO members.	70	Purchase Order	N - NASEO uniquely qualified to participate in NWCC and to report to state energy offices across the nation..
National Association of State Utility Consumer Advocates (NASUCA) to participate in NWCC collaborative meetings and report to NASUCA members.	60	Purchase Order	N - NASUCA uniquely qualified to participate in NWCC.

Union of Concerned Scientists (UCS) to participate in NWCC collaborative meetings and report to UCS members.	110	Purchase Order	N - UCS uniquely qualified to participate in NWCC and to represent the environmental community.
Utility Wind Interest Group, Inc (UWIG) Administrative support to facilitate interaction among members, stakeholders on technical topics and other wind related interests. Contract management of Utility Wind Resource Assessment Program.	400 566	C C	U*WRAP participants were competitively selected. N - UWIG is user group for utility use of wind energy.

Note: The Wind Program anticipates competitive awards to several non-governmental organizations as part of the FY 1999 Broad Based Solicitation now being evaluated.

Renewable Energy Production Incentive			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
The Renewable Energy Production Incentive provides incentive payments to states, subdivision of states, and non-profit electric cooperatives. Non-profit electric cooperatives are non-governmental organizations. The Kotzebue Electric Association, Alaska and the Pacific Northwest Generation Cooperative, Oregon are non-profit electric cooperatives. Fiscal year 1999 is the first year the Kotzebue Electric Association will receive an incentive payment for electric production from its wind energy generation system. Since we are awaiting receipt of the official inflation factor, that is applied to the rate, we cannot provide the exact amount of the payment. The Pacific Northwest Generation Cooperative received incentive payments of $15,325; $182,727; and $99,926 in fiscal years 1996, 1997, and 1998, respectively. We are awaiting the official inflation factor, that is applied to the rate, to determine the exact payment for fiscal year 1999.			

Solar Program Support - Electricity Restructuring			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
Energetics, Inc. - Technical analyses of state restructuring issues; weekly distribution of state restructuring information; organization of regional workshop on restructuring issues for state regulators and legislators.	100	C	C
Regulatory Assistance Project - Technical outreach, on request basis, to state regulators and state regulatory organizations, on electricity restructuring issues including default service, efficiency programs, and renewable technologies.	75	G	N - Unique organization and unique expertise.
Solar Program Support - Competitive Solicitation - There have been no funds appropriated.			

Solar International - U.S. Initiative for Joint Implementation			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
Camber Corp.–To provide specialized support in developing and supporting international workshops.	494	C	N - Unique organization; 8(a) qualifications
International Utility Efficiency Partnerships (IUEP/EEI)–To assist Public/private partnerships to facilitate the investment in specific itnernational JI energy proejcts which support current multinational JI agreements, introduce large scale electric generation infrastructure development projects into the USIJI pilot process, and support sustainable development.	2,060	G	N - Unique organization and unique expertise. Congressional direction to provide grant.
Virginia Accelerators Corporation–To perform design and siting analysis for an electron scrubbing demonstration project.	1,250	C	N - Unique organization and unique expertise. Congressional direction to provide contract.
The Nature Conservancy–To advance projects that reduce, avoid or sequester GHG emissions in developing and transitional countries for submission under the USIJI program and 2) to accelerate the development and adoption by key countries of GHG mitigation plans and meaningful participation under the UNFCCC.	152	C	C

Center for Clean Air–To provide the Department of Energy (DOE) with technical expertise and assistance in developing the institutional capacity needed to provide International Technical Support and Assistance for Joint Implementation and other Supporting Mechanisms and Measures for Greenhouse Gas Emissions Mitigation project	835	G/C	N - Unique expertise C ($200)
International Institute for Energy Conservation–To advance projects that reduce, avoid or sequester GHG emissions in developing and transitional countries for submission under the USIJI program and to accelerate the development and adoption by key countries of GHG mitigation plans and meaningful participation under the UNFCCC.	222	G/C	C ($200)
Envir-Management Research, Inc.–To provide technical support in developing, coordinating, and implementing workshops and preparing training materials to be presented at the workshops and assist in the compilation and editing of the reports.	90	C	C
International Fund for Renewable Energy–To provide technical assistance to various multinational funding organizations (e.g., Asian Development Bank and inter-American Development Bank) to raise awareness about Joint Implementation (JI) projects and facilitate financing.	479	G	N - Unique expertise

Export Council for Renewable Energy–To link renewable energy projects developed or under the Renewable Energy in Latin America program to potential utility investors to encourage the preparation of applications to the USIJI Secretariat. To develop protocols for use in developing renewable energy joint implementation projects which would indicate the greenhouse gas emission benefits and provide indicators for the other impacts from sustainable development. After the cooperative agreement was awarded, ECRE closed its doors. Presently, planning is underway to determine a reallocation of these funds to the other cooperators to perform activities consistent with the goals and objectives of this cooperative agreement.	85 240	G C	N - Unique expertise Competitive
National Rural Electric Cooperative Association–To assist member organizations to qualify projects as Joint Implementation projects.	50	G	N - unique expertise
Pacific Energy Systems–To develop a Joint Implementation proposal for a landfill methane project in Argentina.	33	G	C
Paul Rizzo Associates–To develop a Joint Implementation proposal for a micro-hydro project in Bulgaria.	32	G	C
Ameritech Engineering–To develop a Joint Implementation proposal for a cold in-place recycled asphalt project in Chile.	27	G	C
Arkenol Holdings–To develop a Joint Implementation proposal for a biomass based transportation fuel project in Guyana.	27	G	C
Smart Plug–To develop a Joint Implementation proposal for a motor vehicle emission and efficiency project in Pakistan.	23	G	C

Ecoenergy International Corporation–To develop a Joint Implementation proposal for an energy efficiency and bagasse cogeneration project in the Philippines.	32	G	C
Acrion Technologies–To develop a Joint Implementation proposal for a landfill methane project in Romania.	27	G	C
Appropriate Technology International–To develop a Joint Implementation proposal for a livestock methane project in Tanzania.	27	G	C

Geothermal Energy			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
Geothermal Heat Pump Consortium; Manage competitive funding of cost-shared geothermal heat pump projects with utilities and related companies.	18,680	CA	N - Unique utility organization established to cost share with DOE
Geothermal Resources Council; Provide technical publications, short courses, and seminars for technology transfer of DOE geothermal research.	913	G	N - Unique US geothermal professional society
Geothermal Energy Association; Compilation of proprietary US geothermal company data on foreign and domestic electrical capacity and generation; Review of DOE research in light of company needs.	1,700	G	N - Unique access to proprietary geothermal company information
Geothermal Education Office; Preparation and distribution of geothermal educational materials for grades K to 12.	614	G	N - unique expertise in geothermal education

National Rural Electric Cooperative Association; Resource and market assessment for geothermal development in rural South America.	140	C	N - unique access to information and experience in South American renewable energy development

Hydrogen			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
National Hydrogen Association Develop codes and standards for hydrogen technologies that meet the ISO 9000 standard.	937	1995 - 1997 Contract through NREL 1997 - 1998 Cooperative Agreement	N - Five key members of the association that had industrial experience with hydrogen agreed to provide data and safety personnel to the task at no cost to the government.
Air Products and Chemicals A. Develop an advanced ceramic ion transport membrane to convert stranded assets of natural gas to hydrogen. B. Develop a low temperature reforming process to convert natural gas to hydrogen without any carbon dioxide emissions.	A. 1,150 B. 1,850	A: CA B: CA	A. C - Joint effort with Fossil Energy B. N - Company developed a proprietary process to selectively absorb carbon dioxide in the reformer and produce a cost effective sequestration process.

SRT Group Develop a reversible fuel cell to produce cost-effective energy storage.	947	CA	N - Company has over 15 patents on the technology to produce a fuel cell system with over 70% efficiency.
Energy Conversion Devices - Develop metal hydrid alloys for high density storage.	691	CA	C
A.D. Little - Develop metal hydride and molten salt stationary storage systems for hydrogen.	520	CA	C
Praxair - Conduct research on glass microspheres for hydrogen storage.	47	CA	N - Unique expertise. Company licensed the technology for glass microspheres from the national lab.
Tecogen - Research and development on metal hydride slurries for hydrogen transport.	1,029	CA	C
International Fuel Cells - Design pure hydrogen Phos-Acid Fuel Cells.	506	CA	C
Clean Air Now - Relocate renewable hydrogen production system to Sunline transit.	355	CA	C
Electrolyzer Corporation - Develop advanced electrolysis for hydrogen refueling.	843	CA	C
Teledyne Brown - Research and development in remote village power systems using Proton Exchange Membrane Fuel Cells.	484	CA	C
General Atomics - Research and development on supercritial water oxidation of waste to produce hydrogen.	150	CA	C
MC Power - Molten carbonate fuel cells integrated with biomass.	139	CA	C

Bruderly - Hydrogen fuel cell development with industry-market study.	150	CA	C
Thiokol - Develop conformable hydrogen storage tanks.	350	CA	C
NRG - Conduct research and development on blends of 70% natural gas, 30% hydrogen for transportation vehicles.	738	CA	C
Proton -Develop Proton Exchange Membrane electrolyzer.	366	CA	C
Energy Partners - Develop fuel cells for remote power systems.	501	CA	C
Desert Research Institute - Integrate wind with electrolyzer to demonstrate integrated systems.	225	CA	C
Princeton University - Conduct technical and market analysis on integrated hydrogen systems to identify key research and development needs.	480	CA	N - Recommended by the Hydrogen Technical Advisory Panel to perform analyses on several hydrogen energy scenarios based on published reports.
University of California - Research and development on microalgae for hydrogen production.	380	CA	N - Joint workshop with National Science Foundation recommended the Program fund this world renowned expert on genetic engineering to validate algal production of hydrogen.
MIT - Research and development on plasma reformers for hydrogen production.	320	CA	N - Collaboration between the Office of Nuclear Engineering at EERE.

University of Hawaii - Research and development on biological hydrogen production and supercritical water oxidation of wet biomass, metal hydrides for storage and photoelectrochemistry.	3,000	CA	N - Original funding was Congressionally directed. The university developed an expertise in storage and production technologies and has had outstanding peer review results, thus collaboration has been continued.
Florida Solar Energy Center - Research and development on high temperature membranes for electrochemical production of hydrogen autothermal reforming of natural gas with no CO2 emissions.	1,000	CA	N - Original funding was Congressionally directed. The university developed an expertise in renewable hydrogen production and has had outstanding peer review results, thus collaboration has been continued..
University of Oklahoma - Research and development on photoconversion.	250	CA	N - Congressionally directed funding.
Northeastern University - Research and development on carbon nanofibers for hydrogen storage.	250	CA	N - Recommended by HTAP due to the very high levels of storage capable on their carbon adsorbents published in the open literature.
Montana Trade Port Authority - Study on fuel cell manufacturing.	$240	CA	N - Congressionally directed funding.

Hydropower			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
No non-governmental organizations funded.			

Renewable Indian Energy Resources			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
No non-governmental organizations funded.			

Electric Energy Systems and Storage - Transmission Reliability			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
Edison Technology Solutions - Distributed Resources planning and integration, power and reliability monitoring studies.	580	C	N - Unique experience and facility
Cornell University - Distributed control and test planning, reliability monitoring studies.	91	G	C
University of Illinois at Urbana-Champaign - Distributed control and test planning, reliability monitoring studies.	91	G	C
Washington State University - Distributed control and test planning, reliability monitoring studies.	91	G	C

University of California-Berkeley - Distributed control and test planning, reliability monitoring studies.	91	G	C
University of Wisconsin-Madison - Distributed control and test planning, reliability monitoring studies.	91	G	C

Electric Energy Systems and Storage - High Temperature Superconducting R&D			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
National Conference of State Legislatures Produce report on Superconductivity: Implications for State Energy Programs.	21	C	N - Unique organization directed to issues of state energy
Materials Research Society Editorial and publications assistance support for International Superconductivity Technology Center (ISTEC) workshops and MRS workshops.	43	G	N - unique conferences
Applied Superconductivity Conference Editorial and publications assistance for two professional Conferences.	16	G	N - unique conferences
Crynogenic Engineering and International Cryogenic Materials Conference (CEC-ICMC) - Editorial and publications assistance support for 1999 CEC-ICMC Conference.	5	G	N - unique conference
Council on Superconductivity for American Competitiveness Development and publication of educational materials and displays.	36	G	N - Unique organization only U.S.-based industry association
International Workshop on Vortex Matter Support expenses.	1	G	N - unique workshop

Spectroscopies of Novel HTS Conference Support for speaker travel for scientific conference.	5	G	N - unique conference
6th International Conference on Materials and Mechanisms of Superconductivity Conference support organized by Texas Center for Superconductivity at the University of Houston.	15	G	N - unique conference

Electric Energy Systems and Storage - Energy Storage Systems			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
Energy Storage Association; Development, Production, and Dissemination of Brochures on Energy Storage.	260	C	N - Based on requirement for broad and objective performance of the project, such that no single supplier or technology was favored. The wide range of ESA membership ensures an unbiased perspective and it is the only organization that meets this requirement.

Federal Buildings/Remote Power			
Name of Organization and Description of Work Performed	Total Funds Provided FY 1995-FY 1999 ($000)	Grant/ Contract/ Cooperative Agreement (C) (G) (CA)	Competitive or Noncompetitive (include rational for noncompetitive) (C) or (N)
No non-governmental organizations funded.			

INTERNATIONAL SPENDING

Mr. Packard. The Department has justified many of its spending programs on the basis of the benefit to domestic manufacturers. The Department also has a significant number of partnerships with foreign companies. Please provide a list of these agreements including the amount of the Federal commitment.

Dr. Krebs. The Office of Science does not have any partnerships with foreign companies.

INTERNATIONAL SPENDING

Mr. Packard. The Department has justified many of its spending programs on the basis of the benefit to domestic manufacturers. The Department also has a significant number of partnerships with foreign companies. Please provide a list of these agreements including the amount of the Federal commitment.

Mr. Magwood. The United States, despite the limited scope of our nuclear research and development activities over the last decade, remains a key participant in the international discussion over the future application of nuclear technology -- a position that has benefitted our foreign policy, economy, and scientific infrastructure for many years. The Office of Nuclear Energy, Science and Technology (NE) continues to be a party to international agreements that stem primarily from its earlier programs in reactor development. These agreements have been recast into general agreements that provide an umbrella for cooperation on nuclear technology development. None of these agreements involve foreign companies; rather, they are with foreign governmental research organizations. The agreements are:

AGREEMENT BETWEEN THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA AND THE POWER REACTOR AND NUCLEAR FUEL DEVELOPMENT CORPORATION [Japan] IN THE FIELD OF NUCLEAR TECHNOLOGIES

MEMORANDUM OF UNDERSTANDING BETWEEN THE UNITED STATES RESEARCH AND DEVELOPMENT ORGANIZATIONS AND THE JAPANESE RESEARCH AND DEVELOPMENT ORGANIZATIONS FOR COOPERATION IN NUCLEAR TECHNOLOGIES RESEARCH AND DEVELOPMENT

AGREEMENT BETWEEN THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA AND THE JAPAN ATOMIC ENERGY RESEARCH INSTITUTE IN THE FIELD OF NUCLEAR RESEARCH AND DEVELOPMENT

GENERAL AGREEMENT BETWEEN THE UNITED STATES DEPARTMENT OF ENERGY AND THE NUCLEAR POWER ENGINEERING CORPORATION OF JAPAN FOR COOPERATION IN THE FIELD OF RESEARCH AND DEVELOPMENT OF LIGHT WATER REACTOR-ASSOCIATED TECHNOLOGIES

The purpose of these agreements includes enabling the United States to leverage its research and development spending through cooperation with other countries and providing opportunities for foreign research institutions to invest in the Department's nuclear infrastructure by undertaking projects at such facilities as the Advanced Test Reactor.

In addition to the agreements noted, NE is represented on the U.S.-South Korea Joint Standing Committee on Nuclear Energy Cooperation and participates in a similar organization with Taiwan. Some of our laboratories are carrying out "work for others" projects with Korean or Taiwan counterparts under the auspices of these organizations. Both of these efforts are headed by the State Department.

NE will be represented on the Department's Joint Coordinating Committee with China on the Peaceful Uses of Nuclear Technology when the first meeting of that Committee occurs later this year. We have also begun discussions with the French Atomic Energy Commission to establish a nuclear research and development agreement with them in the near future.

There are no current Federal funding commitments associated with any of NE's agreements. The Nuclear Energy Research Initiative (NERI) will likely result in collaborative arrangements between foreign and U.S. scientific and research institutions; however, no NERI funds will be provided to the foreign organizations.

INTERNATIONAL SPENDING

Mr. Packard. The Department has justified many of its spending programs on the basis of the benefit to domestic manufacturers. The Department also has a significant number of partnerships with foreign companies. Please provide a list of these agreements including the amount of the Federal commitment.

Mr. Reicher. The Photovoltaic Energy Systems and Solar Building Technologies Research Programs funded by Energy and Water Development Appropriations Subcommittee do not have partnerships with foreign companies. There are, however, contracts with registered U.S. companies who are subsidiaries of foreign companies or who have ties to foreign firms. For a variety of reasons, each of these foreign firms, after having purchased a U.S. manufacturing company, decided to keep and expand the production facility at their existing U.S. locations. These decisions have resulted in the retention and expansion of U.S. technology, leadership, employment and the continued expansion of export sales in the highly-competitive worldwide market. In virtually every instance, foreign affiliated organizations under contract with these programs have U.S. operations where the work is performed. In most cases as well, the organizations are cost sharing and have existing or planned manufacturing facilities in the U.S. For example, the Office of Power Technologies has a contract in the Photovoltaic program with Siemens Solar (German affiliation) under the PVMaT (manufacturing technology research) development; to develop photovoltaic copper indium diselenide cells. Under United States law, competitive solicitations must be open to all U.S. registered companies.

The Biomass Power Systems Program has no direct partnerships with foreign companies. One awardee under the Biomass Power for Rural Development program (MnVAP) has a foreign partner (gasifier supplier Carbona), however, domestic partners were sought prior to the selection of Carbona. The Department continues to support domestic gasifier development, but no domestic gasifier vendors were available at that time. The project will also be using a Siemens/Westinghouse gas turbine; however, this selection was made after an evaluation that compared domestic and foreign manufacturers on the basis of turbine size, availability, gas cleanliness requirements and environmental performance.

The Hydrogen Program collaborates with foreign laboratories conducting longer-term research especially in the areas of storage and hydrogen production from renewable energy sources. The Program participates through the International Energy Agency's Implementing Agreement for Production, Storage and Utilization of Hydrogen. The Program has committed to fund $1,500,000 at U.S. universities and National labs in support of our IEA commitment.

The Program has also collaborated with Stewart Energy, a Canadian company in a cost-shared program to develop a low-cost electrolyzer system for the production of hydrogen for dedicated fleets in the U.S. The Program has committed $1,900,0000 for this 50/50 cost-shared project. This project was reviewed under the guidelines of the Energy Policy Act and approved since Stewart agrees to comply fully with the U.S. competitiveness clause.

TERMINATIONS

Mr. Packard. Each year, this Committee has to find room for new proposals by re-examining existing programs. Please provide a list of program terminations listing each activity and the funding provided in the current fiscal year. What activities does the Department anticipate eliminating in fiscal year 2000?

Dr. Krebs. Within our core research programs, there is normal turnover in activities as a result of peer review of proposed new work and of ongoing activities. I would be pleased to provide the requested information for the record for Office of Science programs. (The information follows:)

OFFICE OF SCIENCE
TERMINATIONS
(B/A in thousands)

	FY 1999 Estimate	FY 2000 Request	FY 2000 Estimated Terminations
Basic Energy Sciences	0	0	0

No major programmatic activities within the Basic Energy Sciences program will be terminated in FY 2000; however, virtually all core research activities will be held to the FY 1999 spending levels with no cost-of-living increase, and some activities will be reduced (geosciences and engineering). Within the core research programs, there will be the normal (approximately 10%) turnover in activities as a result of peer review of proposed new work and of ongoing activities.

Computational and Technology Research			
Advanced Energy Projects	2,495	0	-2,495
Scientific Applications Pilot Projects	7,328	3,785	-3,543
ANL Advanced Computing Research Facility	4,000	1,700	-2,300

The CTR program will terminate the Advanced Energy Projects (AEP) subprogram in FY 2000. FY 1999 funding for the AEP subprogram is $2,495,000. The Scientific Applications Pilot Projects will be terminated in an orderly fashion in FY 2000. FY 1999 funding for this activity is $7,328,000. The Scientific Applications Pilot Projects represent the evolution of the Grand Challenge projects that were initiated as part of DOE's component of the Federal High Performance Computing and Communications Program, which started in FY 1991. These pilot projects, which enabled the Department to test the usefulness of current advanced computing research, will not be continued beyond FY 2000. Support for the Advanced Computing Research

Facilities (ACRFs) will be reduced including termination of the Argonne National Laboratory ACRF in mid-FY 2000. Funding for the total ACRF activity in FY 1999 is $17,411,000. FY 1999 funding for the ANL ACRF is $4,000,000.

(B/A in thousands)

	FY 1999 Estimate	FY 2000 Request	FY 2000 Estimated Terminations
Fusion Energy Sciences			
International Thermonuclear Experimental Reactor	12,200	0	-12,200
University of California, Davis (Plasma Start-Up in Vacuum Equilibrium Magnetic Field Structure)	225	0	-225

In FY 1999 Congress provided guidance to close out U.S. participation in the International Thermonuclear Experimental Reactor (ITER). $12,200,000 was provided for ITER close-out activities in FY 1999. No funds are provided for those programs in FY 2000. This will end 1) U.S. involvement in the design of an experimental fusion reactor, 2) U.S. role in fabrication of superconducting magnet and divertor components for fusion experiments, 3) U.S. industrial consortium role in engineering design of fusion experiments, 4) development of robotic systems for remotely-operable welding of vacuum vessels, 5) development of remotely-operable inspection and viewing systems for fusion experiments, and 6) radiation hardening of plasma diagnostic system components.

In addition, each year we review programs up for renewal and compare them to new proposals in deciding through a peer review process which programs to initiate or continue. There are no specific programs planned for future termination in a specific year, although it is likely that each year some programs will be terminated through the review process. In FY 1999, in addition to the ITER activities, the Plasma Start-Up in Vacuum Equilibrium Magnetic Field Structure program, at the University of California, Davis, was closed out.

High Energy Physics	0	0	0

No major programmatic activities within the High Energy Physics program will be terminated in FY 2000; however, virtually all core research activities at the laboratories will be held to the FY 1999 spending levels with no cost-of-living increase, and some activities will be reduced. Within the core research programs, there will be the normal turnover in activities as a result of peer review of proposed new work and of ongoing activities.

(B/A in thousands)

Nuclear Physics	FY 1999 Estimate	FY 2000 Request	FY 2000 Estimated Terminations
Bates Facility Operations	15,400	4,000 a/	-11,400
Nuclear Physics BNL/AGS Operations	8,570	0 b/	-8,570

In FY 2000 President's Budget Request for the Nuclear Physics program, operations of the MIT/Bates Facility for research with electron beams and operations of the BNL/Alternating Gradient Synchrotron (AGS) for medium energy and heavy ion research will be terminated.

a/ Funds are provided for completion of data analysis and the initiation of Decommissioning and Decontamination (D&D) activities. The Administration is currently considering a FY 2000 budget amendment to continue Bates facility operations.

b/ AGS becomes the injector for the RHIC facility and FY 1999 funding for AGS Operations becomes part of RHIC Operations FY 2000.

Biological and Environmental Research			
General cellular biology research	3,833	0	-3,833
General biological research	7,975	0	-7,975

The general budget categories of cellular biology and biological research have traditionally supported a wide variety of general research, including studies on DNA repair, studies on gene expression, studies on health risks of energy-related materials, and animal carcinogenesis studies. These more general studies have been phased out and replaced by more focused research activities that better address Departmental mission needs. These new research activities include the new low dose radiation research that was specifically identified in the Department's fiscal year 1999 appropriation, the use of model organisms to help us understand the human DNA sequence that is rapidly being determined, and the development and use of new technologies to determine the physical structures of proteins that are important to DOE needs, including energy use and production and environmental cleanup.

It should be noted that in basic research programs there is a regular turnover of individual investigators within BER activities as a result of peer review and merit evaluations.

TERMINATIONS

Mr. Packard. Does the Department anticipate eliminating any activities after fiscal year 2000? If so, please provide the activity and the Department's estimate of when the activity will be eliminated.

Dr. Krebs. No major programmatic activities are currently planned for termination beyond FY 2000.

TERMINATIONS

Mr. Packard. Each year this committee has to find room for new proposals by re-examining existing programs. Please provide a list of program terminations listing each activity and the funding provided in the current fiscal year. What activities does the Department anticipate eliminating in fiscal year 2000? Does the Department anticipate eliminating any activities after fiscal year 2000? If so, please provide the activity and the Department's estimate of when the activity will be eliminated.

Mr. Magwood: With completion of the modifications to the Annular Core Research Reactor and associated hot cell facilities in fiscal year 1999 with $5.2 million in appropriated funding, the Department will seek no further appropriation in fiscal year 2000 or beyond for the purpose of establishing an emergency capability for production of molybdenum-99. Rather, the Department will continue to pursue privatization, as indicated in our report, *Privatization of Molybdenum-99 Production at Sandia National Laboratories*, delivered to Congress on February 19, 1999. Additionally, with privatization of Pacific Northwest National Laboratory's yttrium-90 production activities ($350,000 in fiscal year 1999), no further appropriation will be sought for production of yttrium-90. The fiscal year 2000 budget request for the Isotope Production and Distribution Program reflects the end of these activities.

Under the Termination Costs line, one activity, the sodium processing project (funded at $5.6 million in fiscal year 1999) will be completed in fiscal year 2000. This program will require $3.4 million in the last year.

The Department will complete the electrometallurgical treatment demonstration project in fiscal year 1999. It is funded at $40 million in fiscal year 1999. Completion of this project will provide the basis for whether the Department should move forward with full scale treatment of the remaining inventory of sodium-bonded fuel using this treatment technology. At present, this is the only technology that has been identified that could be used without a significant additional research and development and/or capital investment. Regardless, implementation of the decision will require additional funding beyond the fiscal year 2000 budget request, to either proceed with a multi-year campaign to treat the sodium bonded fuel or to begin deactivation of the Fuel Conditioning Facility at Argonne National Laboratory-West.

TERMINATIONS

Mr. Packard. Each year, this Committee has to find room for new proposals by re-examining existing programs. Please provide a list of program terminations listing each activity and the funding provided in the current fiscal year. What activities does the Department anticipate eliminating in fiscal year 2000? If so, please provide the activity and the Department's estimate of when the activity will be eliminated?

Mr. Reicher. The following activities will be terminated in FY 1999 or are anticipated eliminations in FY 2000 These terminations/eliminations do not include efforts which have concluded full RD&D as expected.

Solar Buildings Research - During FY1997, four contracts were initiated through a competitive solicitation to determine the practicality of using solar energy to drive absorption cooling systems. These contracts were with Ohio State University, University of Puerto Rico at Mayaguez, Industrial Solar Technology, and Solar Enterprises. They will be completed during FY 1999, with no follow-on effort. It was determined that although it is technically possible to use solar energy with absorption cooling systems, the current cost of doing so is too high and the market too small to warrant further R&D at this time. The program instead is focusing its resources on developing a low cost solar water heater. Similarly, a contract that looked at the practicality of using solar energy for crop drying by Mesoamerican Development will also be completed without follow-on activities because of the decision to focus resources on the low cost water heater R&D. No programs are planned for termination in FY 2000.

Concentrating Solar Power - The Solar Two Project is scheduled to terminate in FY 2000 (FY 1999 funding: $4.0M; FY 2000 funding request: $1.2M). Power production at Solar Two is scheduled to end in April 1999, with heliostat alignment data still to be collected at the site by SunLab staff through the end of the fiscal year. The requested FY 2000 resources will be utilized by DOE's SunLab staff to perform the final evaluation of testing data and to document the results. This should complete DOE's involvement in the project. The major goals of the Solar Two Project were to demonstrate molten-salt power tower technology design performance and to resolve problems which might affect future commercial plants. DOE anticipates that it will achieve all of the critical near- and mid-term objectives of the project. In spite of the success of Solar Two, changes in the marketplace, largely due to utility restructuring, have caused delays in future applications of this technology. Accordingly, no follow-on projects are proposed at this time.

Geothermal Energy Systems - The Geothermal Heat Pump Deployment activity will conclude in FY 1999. There are no funds requested for this effort in FY 2000.

REQUESTS FOR PROPOSALS

Mr. Packard. Are there any known instances of funds being used to initiate or prepare RFP's for programs that have not been funded by Congress?

Mr. Farrell. The question pertains to the Department's implementation of Section 305 of the Energy and Water Development Appropriations Act, 1999. We are not aware of any instance in which an RFP has been issued contrary to the restrictions of Section 305. The Department has issued formal Department-wide policy direction implementing Section 305. This policy directive was disseminated through the Department's formal distribution process to all contracting offices and affected program offices. Consistent with the legislation, this policy prohibits Departmental Program and Project Managers and Budget Officials from initiating and certifying procurement requests for goods and services that are in support of a program for which funding has been specifically denied. In addition, the policy directive prohibits contracting officers from preparing or issuing RFPs for which funds have not been properly certified by a designated authority.

MANAGEMENT OF GRANTS

Mr. Packard. What steps have been taken to better track, collect and evaluate the work done by grantees? Have these steps improved the management of the grants program? What further steps can be taken to streamline this process? For the record, please provide your best estimate of the number of pending grant deliverables for each program.

Mr. Farrell. Direction has been given to all Department of Energy field activities regarding actions which must be taken during the pre-award, administration, and closeout phases of the award cycle to ensure that technical and financial reports are received in accordance with the requirements of the award. The guidance will: (1) ensure that grant solicitations are reviewed to eliminate non-essential or non-utilitarian reporting requirements; (2) require consideration of recipient's past failures to comply with reporting requirements or other performance problems in determining responsibility for future awards or require the inclusion of special payment provisions when denial of award based on past performance is not appropriate; (3) provide notice in new and renewal awards to ensure that recipients are aware of reporting requirements and the potential consequences of failure to comply; (4) ensure that internal roles and responsibilities for monitoring reporting requirements are understood; (5) require immediate follow-up to the nonreceipt of a report including advising the recipient of those actions which may be taken as a consequence; (6) provide a menu of consequences to include conversion of payment method, withholding of payments, disallowance of costs, termination, and withholding of future awards including the possibility of Government-wide debarment; and, (7) define appropriate methods to pursue close-out of the financial assistance instrument.

In the summer of 1998, the Department's Contracting Activities were directed to review their over-aged financial assistance instruments to determine if the delay in close out was the result of the award recipient's noncompliance with reporting requirements. Noncompliant recipients were advised that if they failed to take action to comply within 30 days they would be referred to the Director of the Office of Procurement and Assistance Management for consideration of debarment. To date, two recipients have been referred for consideration of debarment.

In order to further streamline and improve our scientific technical information reporting, the Department has issued a new DOE Order and Guide on Scientific and Technical Information Management, which include a preference for electronic deliverables rather than multiple paper copies of reports. The Department's financial assistance database does not accumulate information on pending grant deliverables, therefore estimates cannot be provided.

ANTI-LOBBYING PROHIBITION

Mr. Packard. Are there any known instances of funds being used to lobby Congress? How can the Department be sure that organizations that receive Federal funds are not using those funds to lobby? What steps has DOE taken to ensure that Federal funds are not used for lobbying?

Mr. Farrell. Yes, there is one known instance of a DOE grantee having engaged in lobbying with Federal funds. The Defense Contract Audit Agency performed a special audit which identified unallowable activities; the dissemination of correspondence related to grassroots lobbying activities and letters to legislators. The Department has taken action to recover these funds and other expenses questioned in the audit.

Identification of unallowable lobbying activities is normally uncovered during incurred-cost audits performed by the Office of the Inspector General or the Defense Contract Audit Agency. When unallowable costs of any nature are detected, audit reports provide findings to Contracting Officers who take appropriate actions to recover the inappropriate expenditures. In addition, in response to anti-lobbying restrictions included in the FY 1998 and FY 1999 Energy and Water Development Appropriations Acts, the Department has issued formal policy direction to all contracting activities to incorporate a new clause in all awards using FY 1998 and FY 1999 funds. It is important to note, however, that the substance of the statutorily imposed restrictions are already encompassed in the lobbying and political activity cost prohibitions currently contained in Government-wide and Departmental regulations pertaining to contracts and financial assistance.

Additional steps have also been taken to ensure that both contractor and federal personnel are aware of the lobbying prohibitions. The Department has been very proactive in educating both awardees and Federal employees and has developed a brochure which identifies the various statutory and regulatory lobbying prohibitions. The lobbying brochure has been disseminated to field activities and is provided to all new contractors and financial assistance recipients at the time new awards are made. It is also available on the Department's procurement and financial assistance Internet web-sites. Further, last year the Department issued a notice to all employees to increase the awareness of these lobbying restrictions. We are currently in the process of updating and reissuing that notice.

We have also recently taken three additional actions to emphasize lobbying cost prohibitions. First, the Procurement Executive has initiated a compliance review to ensure that all lobbying restrictions are included in existing and future contract and financial assistance awards. Contracting activities have been requested to review award documents and ensure that appropriate contractual language is included, and where it is not, to unilaterally amend the award. Second, the Office of the Inspector General has been requested to place special attention on the review of unallowable lobbying activities as part of their responsibility to audit contractor incurred costs.

Lastly, the Procurement Executive is requesting all Heads of Contracting Activities to communicate directly with each laboratory director/general manager to ensure they are cognizant of statutory requirements. A sample letter has been provided to the Heads of Contracting Activities for their use to communicate the Department's commitment to ensure that appropriated funds are not used to reimburse lobbying activities.

USE OF ADVISORY BOARDS

Mr. Packard. Please provide a list of groups used for advisory purposes by the Department. Please provide funding profiles for these groups for fiscal year 1998 and estimates for fiscal years 1999 and 2000. This list should include but not be limited to: the Secretary of Energy's Advisory Board (and detail for any subgroups thereof), the Laboratory Operations Board, and the Research and Development Council. Please include any cost details for these groups and any related subgroups thereof. Also, include any related overhead costs including travel expenses. Also, please provide all sources for these funds.

Mr. Farrell. The Department uses advisory committees as a vehicle for allowing public participation in agency decision-making in critical, high risk areas such as: environmental restoration; waste management; research and development; and national defense.

The actual expenditures for fiscal year 1998 and the estimated budgets for fiscal year 1999, are taken from the *Twenty-Seventh Annual Report of the President on Federal Advisory Committees, Fiscal Year 1998.* Fiscal year 2000 data reflects fiscal year 1999 projected costs adjusted upward for inflation. These costs include the Secretary of Energy Advisory Board.

The Laboratory Operations Board is a subcommittee of the Secretary of Energy Advisory Board. Cost data for that and other subcommittees of the Secretary of Energy Advisory Board are included in their overall cost for the Board. The Research and Development Council is not an advisory committee. Its membership consist of Program Secretarial Officers with significant research and development programs that correspond to the Department's business lines: Energy Resources, Environmental Quality, National Security and Science and Technology.

Attached are the funding profiles for the Department's 20 advisory committees. Sources for these funds are from regular appropriated funds for these programs. (The information follows:)

ADVISORY COMMITTEES
FUNDING PROFILES

	FEDERAL ADVISORY COMMITTEES	ACTUAL EXPENDITURES	PROJECTED COSTS	PROJECTED COSTS
		(Whole Dollars)		
		FY 1998	FY 1999	FY 2000 *
1.	**Advisory Committee on Appliance Energy Efficiency Standards**			
	Overhead Cost	$92,500	$92,500	$94,350
	Travel Expenses	$5,204	$10,000	$10,200
	Committee TOTAL	$97,704	$102,500	$104,550
2.	**American Statistical Association Committee on Energy Statistics**			
	Overhead Cost	$32,133	$29,500	$30,090
	Travel Expenses	$20,149	$20,000	$20,400
	Committee TOTAL	$52,282	$49,500	$50,490
3.	**Basic Energy Sciences Advisory Committee**			
	Overhead Cost	$84,343	$104,000	$106,080
	Travel Expenses	$70,116	$86,500	$88,230
	Committee TOTAL	$154,459	$190,500	$194,310
4.	**Beryllium Rule Advisory Committee 1/**			
	Overhead Cost	$47,000		
	Travel Expenses	$21,300		
	Committee TOTAL	$68,300	$0	$0
5.	**Biological and Environmental Research Advisory Committee 2/**			
	Overhead Cost	$118,970	$48,200	$49,164
	Travel Expenses	$94,069	$55,600	$56,712
	Committee TOTAL	$213,039	$103,800	$105,876
6.	**Environmental Management Advisory Board**			
	Overhead Cost	$717,000	$760,000	$775,200
	Travel Expenses	$153,996	$176,100	$179,622
	Committee TOTAL	$870,996	$936,100	$954,822
7.	**Environmental Management Site-Specific Advisory Board (EM SSAB)**			
a.	EM SSAB Fernald Site			
	Overhead Cost	$220,000	$226,530	$231,061
	Travel Expenses	$57,000	$66,000	$67,320
	Site Total	$277,000	$292,530	$298,381

ADVISORY COMMITTEES
FUNDING PROFILES

	FEDERAL ADVISORY COMMITTEES	ACTUAL EXPENDITURES (Whole Dollars) FY 1998	PROJECTED COSTS (Whole Dollars) FY 1999	PROJECTED COSTS (Whole Dollars) FY 2000 *
b.	EM SSAB Hanford Site			
	Overhead Cost	$617,400	$668,000	$681,360
	Travel Expenses	$137,000	$144,500	$147,390
	Site Total	$754,400	$812,500	$828,750
c.	EM SSAB Idaho Nat Env. Lab Site			
	Overhead Cost	$413,741	$352,200	$359,244
	Travel Expenses	$92,573	$45,150	$46,053
	Site Total	$506,314	$397,350	$405,297
d.	EM SSAB Los Alamos Nat. Lab Site			
	Overhead Cost	$167,523	$216,700	$221,034
	Travel Expenses	$8,386	$8,000	$8,160
	Site Total	$175,909	$224,700	$229,194
e.	EM SSAB Monticello Site			
	Overhead Cost	$1,999	$1,575	$1,607
	Travel Expenses	$5,582	$1,800	$1,836
	Site Total	$7,581	$3,375	$3,443
f.	EM SSAB Nevada Site			
	Overhead Cost	$245,589	$286,388	$292,116
	Travel Expenses	$18,698	$20,500	$20,910
	Site Total	$264,287	$306,888	$313,026
g.	EM SSAB Oak Ridge Site			
	Overhead Cost	$294,000	$473,596	$483,068
	Travel Expenses	$35,200	$75,000	$76,500
	Site Total	$329,200	$548,596	$559,568
h.	EM SSAB Paducah Site			
	Overhead Cost	$44,500	$82,000	$83,640
	Travel Expenses	$4,500	$8,000	$8,160
	Site Total	$49,000	$90,000	$91,800
i.	EM SSAB Pantex Site			
	Overhead Cost	$129,070	$192,972	$196,831
	Travel Expenses	$9,607	$10,300	$10,506
	Site Total	$138,677	$203,272	$207,337
j.	EM SSAB Rocky Flats Site			
	Overhead Cost	$289,108	$382,850	$390,507
	Travel Expenses	$21,782	$29,751	$30,346
	Site Total	$310,890	$412,601	$420,853

ADVISORY COMMITTEES
FUNDING PROFILES

FEDERAL ADVISORY COMMITTEES	ACTUAL EXPENDITURES (Whole Dollars) FY 1998	PROJECTED COSTS (Whole Dollars) FY 1999	PROJECTED COSTS (Whole Dollars) FY 2000 *
k. EM SSAB Sandia National Lab Site			
Overhead Cost	$168,100	$195,958	$199,877
Travel Expenses	$14,750	$14,500	$14,790
Site Total	$182,850	$210,458	$214,667
l. EM SSAB Savannah River Site			
Overhead Cost	$389,373	$501,499	$511,529
Travel Expenses	$54,137	$63,500	$64,770
Site Total	$443,510	$564,999	$576,299
EM SSAB Overhead Cost	$2,980,403	$3,580,268	$3,651,873
EM SSAB Travel Expenses	$459,215	$487,001	$496,741
EM SSAB Committee TOTAL	$3,439,618	$4,067,269	$4,148,614
8. **Fusion Energy Sciences Advisory Committee**			
Overhead Cost	$33,000	$33,000	$33,660
Travel Expenses	$62,000	$62,000	$63,240
Committee TOTAL	$95,000	$95,000	$96,900
9. **High Energy Physics Advisory Panel**			
Overhead Cost	$43,100	$44,100	$44,982
Travel Expenses	$62,100	$63,100	$64,362
Committee TOTAL	$105,200	$107,200	$109,344
10. **Hydrogen Technical Advisory Panel**			
Overhead Cost	$69,550	$50,000	$51,000
Travel Expenses	$60,250	$48,000	$48,960
Committee TOTAL	$129,800	$98,000	$99,960
11. **Metal Casting Industrial Advisory Board 3/**			
Overhead Cost	$0	$0	$0
Travel Expenses	$0	$0	$0
Committee TOTAL	$0	$0	$0
12. **National Coal Council**			
Overhead Cost	$32,000	$35,000	$35,700
Travel Expenses	$13,265	$15,000	$15,300
Committee TOTAL	$45,265	$50,000	$51,000

ADVISORY COMMITTEES
FUNDING PROFILES

	FEDERAL ADVISORY COMMITTEES	ACTUAL EXPENDITURES	PROJECTED COSTS (Whole Dollars)	PROJECTED COSTS
		FY 1998	FY 1999	FY 2000 *
13.	**National Electric and Magnetic Fields Advisory Committee 4/**			
	Overhead Cost	$44,461	$14,700	$0
	Travel Expenses	$24,978	$14,900	$0
	Committee TOTAL	$69,439	$29,600	$0
14.	**Nuclear Energy Research Advisory Committee 5/**	$0	$600,000	$300,000
15.	**National Petroleum Council**			
	Overhead Cost	$45,920	$75,000	$76,500
	Travel Expenses	$30,400	$50,000	$51,000
	Committee TOTAL	$76,320	$125,000	$127,500
16.	**President's Council on Sustainable Development 6/**			
	Overhead Cost	$759,956	$747,893	$762,851
	Travel Expenses	$108,879	$87,200	$88,944
	Committee TOTAL	$868,835	$835,093	$851,795
17.	**Secretary of Energy Advisory Board (SEAB)**			
a.	Openness Advisory Board			
b.	Laboratory Operations Board			
c.	Task Force on Electric System Reliability			
d.	Tennessee Valley Electric System Advisory Committee			
e.	Task Force on Education			
f.	Task Force on Fusion Energy			
	SEAB Overhead Cost	$598,477	$648,400	$661,368
	SEAB Travel Expenses	$111,993	$135,000	$137,700
	SEAB Committee TOTAL	$710,470	$783,400	$799,068
18.	**State Energy Advisory Board**			
	Overhead Cost	$128,000	$130,000	$132,600
	Travel Expenses	$44,000	$65,000	$66,300
	Committee TOTAL	$172,000	$195,000	$198,900
19.	**Technical Advisory Committee on Verification Fissile Materials and Nuclear Warhead Controls 7/**	$0	$0	$0

ADVISORY COMMITTEES
FUNDING PROFILES

	FEDERAL ADVISORY COMMITTEES	ACTUAL EXPENDITURES	PROJECTED COSTS	PROJECTED COSTS
		(Whole Dollars)		
		FY 1998	FY 1999	FY 2000 *
20.	Technical Panel on Magnetic Fusion 8/	$0	$0	$0
	TOTAL	$7,168,727	$8,367,962	$8,193,129

* FY 2000 Budget Request column reflects FY 1999 projected costs adjusted upward for inflation for all advisory committees.

1/ Advisory Committee Terminated, June 1998

2/ Formerly the Health and Environmental Research Advisory Committee

3/ Advisory Committee Terminated, December 1997

4/ Advisory Committee Terminated, December 1998

5/ Advisory Committee Established, October 1, 1998, Program Projections for FY 99 are $600,000 and FY 2000 are $300,000

6/ Managed at the Department of Energy through an Interagency Agreement with the Executive Office of the President, Council on Environmental Quality

7/ Inactive, Statutory Advisory Committee

8/ Inactive, Statutory Advisory Committee

UNREALISTIC FUNDING INCREASES

Mr. Packard. Despite last year's action by the Committee and Congress to modestly increased funding for most solar and renewable programs, critics continue to demand massive spending increases for these programs. Last year, $384 million was appropriated for solar and Renewable programs research and development. This amount is in addition to hundreds of millions of Federal support for tax credits, Dept. of Commerce trade promotion, fish restoration, and green power promotion activities.

Last year, the President signed the Energy & Water bill which provided $276,000,000 to the Office of Energy Efficiency and Renewable Energy (EE) for solar and renewable programs. In the Omnibus bill, $60,000,000, a $123,000,000 increase (a 45% increase) over the original amount in last year's Energy and Water Development Appropriations bill.

Nuclear energy represents just under 20% of the Nation's electricity. Last year, this subcommittee provided $19 million for nuclear energy research. Photovoltaic energy represents .003% of electricity and last year the Subcommittee provided $54,000,000 for photovoltaic research and development. Do you consider $54,000,000 a significant amount of funding?

Mr. Reicher. The photovoltaic research and development funded under previous appropriations and the program planned for FY2000 is appropriate for PV given the current state of photovoltaic technology, the potential for dramatic technology improvements, and the energy and environmental challenges we face today and in the 21st century. PV's small current contribution to domestic generation is not a good indicator of its future potential, or a useful gauge for determining the appropriate amount of funding for PV research. The domestic electricity market PV is entering is dramatically different from the markets in 1950 and 1960 when nuclear power first became commercial. Although electricity demand is picking up again, it is not predicted to increase at the double digit rates that fueled the massive boom in U.S. power plant construction from 1960 to the late 1970s. Since the late 1970s and into the 1980s PV and other renewable energy technologies have been struggling to compete in a domestic utility market that had more capacity than it needed. In the 1990s utility restructuring is creating new rules, new opportunities, and new challenges that make the commercialization path nuclear power was able to follow obsolete. PV will be deployed in smaller increments, and we expect much of it will be located on customer property as distributed generation. Looking beyond the grid, the PV industry is doing well in off-grid applications and remote power where there are no other cost effective alternatives, and has a high commercial potential once research and development brings costs down even more. Projections from Shell and others predict a global takeoff in solar energy in the 2030 to 2050 time frame. By then we will have devoted the same 50 years of research and commercial development to PV as nuclear power has enjoyed, and PV will be a mature technology making a significant contribution to domestic and international energy supplies. In the meantime, the industry and DOE are making the most of near-term, high-value applications to expand the industry and continue to develop and deploy new technology.

PV for terrestrial applications was not available as a commercial product until the late 1970s. Research on PV for terrestrial applications only began in earnest in 1974. After 25 years

of research and development, PV is gradually contributing to domestic utility generation.

In comparison, U.S. research on civilian applications of nuclear power began in the late 1940s, laboratory demonstrations were deployed in the 1950s, and the first commercial U.S. nuclear reactor did not come on-line until 1960, under a cooperative agreement between the Atomic Energy Commission and Duquesne Light, in Shippingport, Pennsylvania. The great boom in nuclear plant construction did not occur until the early 1970s, 25 to 30 years after research on civilian nuclear applications began. It has taken 50 years for nuclear power to reach its present level of maturity, supplying about 20% of U.S. generation. To get to this point the Federal government invested billions in civilian nuclear energy research and development. Billions more were invested in military applications of nuclear power, particularly nuclear power for the Navy, which produced significant spin-off benefits. Military research and procurement of nuclear power systems contributed significantly to better reactor designs, creating standard operating procedures and experience, and training personnel who went on to work in private industry for both utilities and equipment manufacturers. The national investment in nuclear energy research worked – it created a new industry and a new technology that has diversified our energy supply. It can also work for PV.

FUNDING INCREASES

Mr. Packard. Last year, five days after the President signed the Energy and Water Development Appropriations Act for 1999, the OMB insisted upon inserting a supplemental appropriation for fiscal year 1999 in the amount of $60,000,000 in an unrelated bill. In contrast to the usual submission of budget justification materials, the Committee was not provided with a justification for the $60,000,000 requested nor a plan for how the funds would be divided between the twenty-three solar and renewable energy programs. What was the basis for the supplemental request? How was the $60,000,000 figure calculated? Please provide a comprehensive chronology of the Department's involvement in preparing this supplemental request. Also, please provide a table displaying the distribution of these funds across the various solar and renewable programs.

Mr. Reicher. The basis for the supplemental request was to address the very significant reductions included in the markup of the FY 1999 Solar and Renewable Energy Programs by the Senate Energy and Water Development Appropriations Subcommittee. The markup at $250 million would have significantly reduced these programs from the FY 1998 appropriation of $270 million and adversely impacted on-going R&D programs. Therefore, there was an effort to support an initiative that would restore these reductions and also support other important Solar and Renewable Energy Programs that had not been included in the markup. The $60 million was the result of a comprehensive analysis of the highest priority Solar and Renewable activities that had not been included in the markup and would result in the most immediate benefits to the mission requirements of the programs. Additionally, the $60 million was formulated to help mitigate the impact of substantial funding reductions attributed to the use of prior year balances which were included in the House and Senate Energy and Water Development FY 1999 appropriations markups.

The chronology of the Department's involvement in preparing this supplemental request included: analyzing the content of the FY 1999 appropriations mark and developing appropriate R&D options for consideration by DOE and OMB senior management to be added to the mark. Subsequently, the Department assisted in defending these recommendations and providing technical information on the results of these deliberations with the Congress. The DOE plan for the use of the funds included in the Omnibus Bill was provided to both the House and Senate Energy and Water Development Appropriations Subcommittees for review and approval. As requested we have enclosed a funding table which displays the distribution of these funds across the various solar and renewable programs. The table includes a proposed reallocation from that presented to the Committee earlier in order to permit the accomplishment of high priority work on Distributed Power and Critical Infrastructure activities. The work on Distributed Power will address the issues of removing regulatory, institutional, and technical barriers to distributed power generation which are critical to the future of renewable technologies. The Critical Infrastructure work supports efforts to insure the reliability and security of the Nation's electric power system.

Solar and Renewable Energy - FY 1999 Appropriation

YB = Annual Funds YF = 2 Year Funds

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BUDGET STRUCTURE		FY 1999 Annual Appropriation 8990224 Appropriation YB Fund Type, P.L. 105-245			FY 1999 2-Year $60M Appropriation 899/00224 Appropriation YF Fund Type P.L. 105-277					Total FY 1999
		FY 1999 Conference Mark	Allocation of $42M Reduction	Total YB Funds	Offset for $42M Reduction	Additional $18M YF Funds	Change	Revised Additional $18M YF Funds	Total YF Funds	(YB and YF Funds)
		1	2	3 (1-2)	4	5	6	7 (5+6)	8 (4+7)	9 (3+8)
Solar and Renewable Energy										
Solar Building Technology Research	EB 21	2,900,000	435,000	2,465,000	435,000	700,000	0	700,000	1,135,000	3,600,000
Photovoltaic Energy Systems	EB 22	66,800,000	12,850,000	53,950,000	12,850,000	5,400,000	(211,000)	5,189,000	18,039,000	71,989,000
Solar Thermal Energy Systems	EB 23	17,000,000	3,271,000	13,729,000	3,271,000	0	0	0	3,271,000	17,000,000
Biomass/Biofuels Energy Systems - EB24/EB52		72,750,000	7,087,000	65,663,000	7,087,000	450,000	(250,000)	200,000	7,287,000	72,950,000
Power Systems	EB 24	31,000,000	1,927,000	29,073,000	1,927,000	450,000	(250,000)	200,000	2,127,000	31,200,000
Transportation	EB 52	41,750,000	5,160,000	36,590,000	5,160,000	0	0	0	5,160,000	41,750,000
Wind Energy Systems	EB 25	33,200,000	3,883,000	29,317,000	3,883,000	1,671,000	(271,000)	1,300,000	5,183,000	34,500,000
Renewable Energy Production Incentive Program	EB 29	4,000,000	417,000	3,583,000	417,000	0	0	0	417,000	4,000,000
International Solar Energy Program	EB 27	3,750,000	65,000	3,685,000	65,000	2,600,000	0	2,600,000	2,665,000	6,350,000
National Renewable Energy Laboratory	EB 36	2,000,000	283,000	1,717,000	283,000	1,900,000	0	1,900,000	2,183,000	3,900,000
Geothermal Technology Development	EB 40	28,500,000	3,061,000	25,439,000	3,061,000	0	0	0	3,061,000	28,500,000
Hydrogen Research	EB 42	21,000,000	2,576,000	18,424,000	2,576,000	1,250,000	0	1,250,000	3,826,000	22,250,000
Hydropower	EB 44	2,000,000	154,000	1,846,000	154,000	1,250,000	0	1,250,000	1,404,000	3,250,000
Renewable Indian Energy Resources	EN	3,500,000	110,000	3,390,000	110,000	1,279,000	0	1,279,000	1,389,000	4,779,000
Electric Energy Systems and Storage - EB50		39,500,000	5,057,000	34,443,000	5,057,000	600,000	732,000	1,332,000	6,389,000	40,832,000
Transmission Reliability	EB 50 05	2,500,000	0	2,500,000	0	600,000	732,000	1,232,000	1,232,000	3,732,000
High Temperature Superconducting	EB 50 01	32,500,000	4,278,000	28,222,000	4,278,000	0	0	0	4,278,000	32,500,000
Energy Storage Systems	EB 50 02	4,500,000	779,000	3,721,000	779,000	0	0	0	779,000	4,500,000
Climate Challenge	EB 50 04	0	0	0	0	100,000	0	100,000	100,000	100,000
Federal Building/Remote Power Initiative	EB 53	4,000,000	18,000	3,982,000	18,000	0	0	0	18,000	4,000,000
Program Direction	EB 51	17,100,000	2,733,000	14,367,000	2,733,000	1,000,000	0	1,000,000	3,733,000	18,100,000
Total Solar and Renewable Energy		318,000,000	42,000,000	276,000,000	42,000,000	16,000,000	0	16,000,000	60,000,000	336,000,000

FUNDING INCREASES

Mr. Packard. On pages 22, 23, 24, and 31 of the budget justification, the Department provided tables displaying fiscal year 1999 budget level and the fiscal year 2000 request. Please provide the same tables with the following additional columns: Fiscal Year 1999 not including the amount added in the Omnibus bill (showing application of reductions to program), Fiscal Year 2000 Request less Fiscal Year 1999 not including the amount in the Omnibus bill (showing application of reductions to programs) and a percentage change between the two aforementioned columns.

Mr. Reicher. As requested, we have enclosed the three tables from the FY 2000 Budget with the additional information, specifically, the application of reductions in FY 1999 and a comparison to the FY 2000 Request.

The $60 million provided in the FY 1999 Omnibus Consolidated Appropriation Act included a total of $42 million to be applied against the $318 million in the original appropriation under P.L. 105-245. This reduced the initial appropriation of $318 million to $276 million. In actual application, any Solar and Renewable Energy Program that had funding reduced to make up the $42 million "reduction" subsequently got back an equal amount of Omnibus funding so that there was a zero impact - - in effect, it was analogous to an exchange of initial appropriated funds for the later Omnibus funds. The allocation was based only on a review of FY 1998 carryover balances in each program and the revised total for the initial appropriation should not be interpreted as the desired, recommended, or optimal FY 1999 funding level for the Solar and Renewable Energy Programs.

Office of Energy Efficiency and Renewable Energy
FY 2000 Congressional Budget Request

(in thousands of dollars)

	FY 1998	FY 1999	FY1999 Orginal Appropriation Excluding Omnibus Act	FY 2000	$ Change FY 1999 Original Approp. vs. FY 2000	% Change FY 1999 Original Approp. vs. FY 2000
	1	2	3	4	5 (4-3)	6 (5/3)
Solar and Renewable Energy Technologies	294,351	336,000	276,000	398,921	122,921	45%
Buildings Technology, State, and Community Sector Programs	232,702	262,221	262,221	335,881	73,660	28%
Federal Energy Management Program	19,800	23,818	23,818	31,868	8,050	34%
Industrial Technologies	133,911	165,859	165,859	171,000	5,141	3%
Transportation Technolgies	189,972	202,071	202,071	252,100	50,029	25%
Policy and Management	28,925	37,732	37,732	46,666	8,934	24%
Total Program Funding	899,661	1,027,701	967,701	1,236,436	268,735	28%
PODRAS and Prior Year Balances	(45,403)	(64,000)	(64,000)	(821)	63,179	-99%
Total Budget Authority	854,258	963,701	903,701	1,235,615	331,914	37%

Funding Profile

(dollars in thousands)

	FY 1998 Current Appro-priation	FY 1999 Original Appro-priation	FY 1999 Adjust-ments	FY 1999 Current Appro-priation	FY1999 Orginal Appropriation Excluding Omnibus Act	FY 2000 Request	$ Change FY 1999 Original Approp. vs. FY 2000	% Change FY 1999 Original Approp. vs. FY 2000
	1	2	3	4	5	6	7 (6-5)	8 (7/5)
Solar and Renewable Resources Technologies								
Solar Building Technology Research	2,625	2,900	700	3,600	2,465	5,500	3,035	123%
Photovoltaic Energy Systems	64,691	66,800	5,400	72,200	53,950	93,309	39,359	73%
Concentrating Solar Power	16,317	17,000	0	17,000	13,729	18,850	5,121	37%
Biopower/Biofuels Energy Systems	58,116	72,750	450	73,200	65,663	92,391	26,728	41%
Wind Energy Systems	32,128	33,200	1,571	34,771	29,317	45,600	16,283	56%
Renewable Energy Production Incentive Progra	2,954	4,000	0	4,000	3,583	1,500	(2,083)	-58%
Solar Program Support	0	0	0	0	0	10,000	10,000	100%
International Solar Energy Program	1,375	3,750	2,600	6,350	3,685	6,000	2,315	63%
National Renewable Energy Laboratory	3,200	2,000	1,900	3,900	1,717	1,100	(617)	-36%
Geothermal	28,694	28,500	0	28,500	25,439	29,500	4,061	16%
Hydrogen Research	15,806	21,000	1,250	22,250	18,424	28,000	9,576	52%
Hydropower	729	2,000	1,250	3,250	1,846	7,000	5,154	279%
Renewable Indian Energy Resources	3,939	3,500	1,279	4,779	3,390	0	(3,390)	-100%
Electric Energy Systems and Storage	43,262	39,500	600	40,100	34,443	41,000	6,557	19%
Program Direction	15,651	17,100	1,000	18,100	14,367	19,171	4,804	33%
Federal Building/Remote Power Initiative	4,864	4,000	0	4,000	3,982	0	(3,982)	-100%
Subtotal, Solar and Renewable Resources Technologies	294,351	318,000	18,000	336,000	276,000	398,921	122,921	45%
Use of Prior Year Balances	(24,447)	(42,000)a	42,000 b	0	0	(821)c	(821)	-100%
Total, Solar and Renewable Resources Technologies	269,904	276,000	60,000	336,000	276,000	398,100	122,100	44%

a. Share of EWD reduction for use of prior-year balances assigned to this program.

b. Reflects spread of $60,000,000 provided in the Omnibus Consolidated Appropriation Act.

c. Reflects an appropriation transfer from the Geothermal Resources Development Fund.

Program Funding Detail

(dollars in thousands)

	FY 1998 Current Appropriation	FY 1999 Current Appropriation	FY1999 Orginal Appropriation Excluding Omnibus Act	FY 2000 Request	Funding Change	$ Change FY 1999 Original Approp. vs. FY 2000	% Change FY 1999 Original Approp. vs. FY 2000
	1	2	3	4	5	6 (4-3)	7 (6/3)
Solar and Renewable Resources Technologies							
Solar Building Technology Research							
Space Conditioning and Water Heating	2,625	3,600	2,465	5,500	3,035	3,035	123%
Photovoltaic Energy Systems							
Fundamental Research	11,000	11,000	10,000	20,309	10,309	10,309	103%
Advanced Materials and Devices	24,000	27,000	21,800	27,000	5,200	5,200	24%
Collector Research & Systems Development	29,691	34,200	22,150	46,000	23,850	23,850	108%
Total, Photovoltaic Energy Systems	64,691	72,200	53,950	93,309	39,359	39,359	73%
Concentrating Solar Power							
Distributed Power system Development	3,550	5,300	4,283	6,700	2,417	2,417	56%
Dispatchable Power System Development	6,850	5,970	4,825	5,340	515	515	11%
Advanced Component and System Research	5,117	4,990	4,030	5,960	1,930	1,930	48%
Strategic Alliances & Market Awareness	800	740	591	850	259	259	44%
Total, Concentrating Solar Power	16,317	17,000	13,729	18,850	5,121	5,121	37%
Biomass/Biofuels Energy Systems							
Power Systems							
Thermochemical Conversion	1,500	1,550	1,200	2,700	1,500	1,500	125%
System Development	21,017	26,350	24,323	32,150	7,827	7,827	32%
ATS/Biomass for Cogeneration	2,564	0	0	0	0	0	0%
Feedstock Development	1,723	2,300	2,300	3,100	800	800	35%
Regional Biomass Energy Program	985	1,250	1,250	1,000	(250)	(250)	-20%
Total, Power Systems	27,789	31,450	29,073	38,950	9,877	9,877	34%
Transportation							
Ethanol Production	25,027	35,950	28,740	37,441	8,701	8,701	30%
Biodiesel Production	800	750	750	1,000	250	250	33%
Feedstock Production	2,500	2,800	4,600	5,500	900	900	20%
Regional Biomass Energy Program	2,000	2,250	2,500	3,500	1,000	1,000	40%
Integrated Bioenergy Research and Development	0	0	0	6,000	6,000	6,000	100%
Total, Transportation	30,327	41,750	36,590	53,441	16,851	16,851	46%
Total, Biomass/Biofuels Energy Systems	58,116	73,200	65,663	92,391	26,728	26,728	41%

Program Funding Detail

(dollars in thousands)

	FY 1998 Current Appropriation	FY 1999 Current Appropriation	FY1999 Orginal Appropriation Excluding Omnibus Act	FY 2000 Request	Funding Change	$ Change FY 1999 Original Approp. vs. FY 2000	% Change FY 1999 Original Approp. vs. FY 2000
	1	2	3	4	5	6 (4-3)	7 (6/3)
Wind Energy Systems							
Applied Research	11,101	10,700	9,730	13,500	3,770	3,770	39%
Turbine Research	13,000	16,400	13,699	20,200	6,501	6,501	47%
Cooperative Research & Testing	8,027	7,671	5,888	11,900	6,012	6,012	102%
Total, Wind Energy Systems	32,128	34,771	29,317	45,600	16,283	16,283	56%
Renewable Energy Production Incentive Program	2,954	4,000	3,583	1,500	(2,083)	(2,083)	-58%
Solar Program Support							
Electricity Restructuring	0	0	0	2,000	2,000	2,000	100%
Competitive Solicitation	0	0	0	8,000	8,000	8,000	100%
Total, Solar Program Support	0	0	0	10,000	10,000	10,000	100%
International Solar Energy Program	1,375	6,350	3,685	6,000	2,315	2,315	63%
National Renewable Energy Laboratory							
Facility Maintenance	1,000	3,900	1,717	1,100	(617)	(617)	-36%
Construction	2,200	0	0	0	0	0	0%
Total, National Renewable Energy Laboratory	3,200	3,900	1,717	1,100	(617)	(617)	-36%
Geothermal							
Geothermal Electric R&D and Deployment	22,294	22,000	20,004	29,500	9,496	9,496	47%
Geothermal Heat Pump Deployment	6,400	6,500	5,435	0	(5,435)	(5,435)	-100%
Total, Geothermal	28,694	28,500	25,439	29,500	4,061	4,061	16%
Hydrogen Research	15,806	22,250	18,424	28,000	9,576	9,576	52%
Hydropower	729	3,250	1,846	7,000	5,154	5,154	279%
Renewable Indian Energy Resources	3,939	4,779	3,390	0	(3,390)	(3,390)	-100%
Electric Energy Systems and Storage							
Transmission Reliability							
Power System Reliability	0	2,500	2,500	3,800	1,300	1,300	52%
Distrbuted Power	0	500	0	200	200	200	100%
Total, Transmission Reliability	0	3,000	2,500	4,000	1,500	1,500	60%
High Temperature Superconductivity R&D							
Superconductivity Partnership Initiative	14,000	14,500	10,222	14,000	3,778	3,778	37%
Second Generation Wire Initiative	8,000	8,000	8,000	8,000	0	0	0%
Strategic Research	9,579	10,000	10,000	9,000	(1,000)	(1,000)	-10%

Program Funding Detail

(dollars in thousands)

	FY 1998 Current Appropriation	FY 1999 Current Appropriation	FY1999 Orginal Appropriation Excluding Omnibus Act	FY 2000 Request	Funding Change	$ Change FY 1999 Original Approp. vs. FY 2000	% Change FY 1999 Original Approp. vs. FY 2000
	1	2	3	4	5	6 (4-3)	7 (6/3)
Total, High Temperature Superconductivity R&D	31,579	32,500	28,222	31,000	2,778	2,778	10%
Energy Storage Systems							
Storage Systems Integration	1,950	2,200	1,920	3,000	1,080	1,080	56%
Key Components for Storage Systems	1,350	1,400	1,001	2,100	1,099	1,099	110%
Analysis and Utility Competition	539	900	800	900	100	100	13%
Total, Energy Storage Systems	3,839	4,500	3,721	6,000	2,279	2,279	61%
Climate Challenge	0	100	0	0	0	0	0%
Electric & Magnetic Fields R&D	7,844	0	0	0	0	0	0%
Total, Electric Energy Systems and Storage	43,262	40,100	34,443	41,000	6,557	6,557	19%
Program Direction							
Golden Field Office	1,509	1,700	1,700	2,645	945	945	56%
Idaho Operations Office	88	90	90	95	5	5	6%
Headquarters.	14,054	16,310	12,577	16,431	3,854	3,854	31%
Total, Program Direction	15,651	18,100	14,367	19,171	4,804	4,804	33%
Federal Building/Remote Power Initiative	4,864	4,000	3,982	0	(3,982)	(3,982)	-100%
Total, Solar and Renewable Resources Technologies	294,351	336,000	276,000	398,921	122,921	122,921	45%
Use of prior year balances	(24,447)	0	0	(821)	(821)	(821)	-100%
Total, Solar and Renewable Resources Technologies	269,904	336,000	276,000	398,100	122,100	122,100	44%

FUNDING INCREASES

Mr. Packard. On page 33 of the budget justification, the Department lists the sites that receive funding from this appropriation. The following pages provide site descriptions and narratives describing the activities done at many of the sites listed on page 33. Please provide site descriptions and narratives for all of the sites listed in the table that begins on page 33.

Mr. Reicher. The Site Descriptions included information on the Solar and Renewable Energy Programs at the National Laboratories and the DOE Operations and Field Offices since the majority (97.8 percent) of the program is conducted at these field elements. Information on the six Regional Support Offices which were not included in the Site Descriptions is enclosed.

Additional Site Descriptions
Solar and Renewable Resources Technologies

Atlanta Regional Support Office

Atlanta Regional Support Office, located in Atlanta, Georgia, performs ongoing program support, deployment, and technical outreach functions for the Solar and Renewable programs. Principal activities consisting of: the Photovoltaic Energy Systems Million Solar Roofs Initiative which includes community partnership competitive grants; and Biofuels and Biopower activities that involve the conduct of resource assessments, cost-shared biomass power projects and information dissemination workshops. These efforts are vital in educating business leaders, and city and state government officials about available technologies and helping them develop a better understanding of the infrastructure needed to gain public acceptance.

Boston Regional Support Office

Boston Regional Support Office, located in Boston, Massachusetts, supports Solar and Renewable programs by performing technical outreach and technology deployment functions. Activities include: assessing biomass power resources available in the region and developing end-use strategies for conversion of biomass into electric energy, and efforts to educate city and state governments and business leaders on methods available that will enable them to employ Biofuels, Biopower, and Photovoltaic Energy Systems. Endeavors like the Vermont Methane Energy Production Project are vital in helping develop a better understanding of the technologies available and how to put in place the infrastructure needed for new technologies to gain public acceptance.

Chicago Regional Support Office

Chicago Regional Support Office, located in Chicago, Illinois, supports Solar and Renewable programs by performing technical outreach and technology deployment functions. Activities include efforts to educate state and local governments, and business leaders on methods to utilize Biofuels, Biopower, and Photovoltaic Energy Systems. Technical support activities also include, work with major businesses, utilities, and government officials on strategies to incorporate the most recent advances in Electric Energy Systems and Storage, and Power Systems Integration and Reliability into current power generation and distribution systems. As the utility market is restructured, these focused technology deployment and outreach efforts have the potential for significant impact on power generation and distribution systems. These efforts are also key to developing a better understanding of the technologies available, and to gaining acceptance by and state and local governments and the public.

Denver Regional Support Office

Denver Regional Support Office, located in Denver, Colorado, supports Solar and Renewable programs by performing technical outreach and technology deployment functions. Activities include: assessing biomass power resources available in the region; geothermal heat pump technical assistance and research and development activities; work with the National Association of Regulatory Utility Commissioners in developing rules and regulations that facilitate the use renewable energy; and ongoing efforts to educate state and local governments, and business leaders on methods to utilize Biofuels, Biopower, and Photovoltaic Energy Systems technologies. Technical support activities also include, work with major businesses, utilities, and government officials on strategies to incorporate advances in Geothermal power generation equipment and systems. These efforts are developing a better understanding of the technologies available, and infrastructure needed to gain acceptance by the public and state and local governments.

Philadelphia Regional Support Office

Philadelphia Regional Support Office, located in Philadelphia, Pennsylvania, performs on going program support, deployment, and technical outreach functions for the Solar and Renewable programs. Activities include efforts to educate business leaders, and city and state governments on methods to utilize Photovoltaic Energy Systems. These efforts are helping develop a better understanding of the technologies.

Seattle Regional Support Office

Seattle Regional Support Office, locate in Seattle, Washington, performs on going program support, deployment, and technical outreach functions for the Solar and Renewable programs. Activities include efforts to educate business leaders, and city and state governments on methods to deploy Biofuels, Biopower, and Photovoltaic Energy Systems. These efforts are vital to developing a better understanding of the technologies and infrastructure needed to gain public acceptance.

Nevada Operations Office

The Nevada Operations Office, located in Las Vegas Nevada performs on going program support, deployment, and technical outreach functions for the Solar and Renewable programs. Activities include conduct of studies to; determine the magnitude and migration of methane gas generation at a closed landfill site and methods of extracting the methane gas for energy production; and hydrogen technologies research and development involving hydride storage and development of a hydrogen refueling station. Other activities include ongoing endeavors to educate business leaders, and city and state governments on methods to deploy Biofuels, Biopower, and Photovoltaic Energy Systems. These efforts help develop an understanding of the technologies available and infrastructure that must be developed and put in place for a given technology to gain public acceptance.

COMPETITIVE VS NON-COMPETITIVE AWARDS

Mr. Packard. Last year, the Committee's investigative staff reported that 87% of the grants awarded by your Office in fiscal year 1996 were awarded non-competitively. This practice went on year after year and there was no merit review of awards. The Committee has dedicated significant resources to ensure that Federal dollars are competed and that merit review processes are in place. I congratulate you, Mr. Reicher, on your efforts to improve how funds are managed over there.

In the hearing last week with the Secretary, you mentioned that your Office has dramatically increased the level of competitive awards given. You mentioned an award to Columbia University. Please tell us about the Columbia University proposal. What is new about the way to award funding for proposals? How does this compare to how funds were awarded in the past?

Mr. Reicher. The Columbia University project discussed at the hearing involves DOE co-sponsorship of an international symposium on decentralized energy alternatives which was held on March 15-17 on the campus of Columbia University. This symposium is co-sponsored by the Columbia Graduate School of Business, the Columbia Earth Engineering Center, and the United Nations Department of Economic and Social Affairs. The conference brought together stakeholders from academia, government industry, non-governmental organizations, and international agencies. This conference was designed as a foundation for the United Nations Commission on Sustainable Development Ninth Session on Energy and Transport, to be held in 2001. The findings of the conference form the basis for preliminary recommendations for the Commission.

DOE funding for the Columbia University symposium is approximately $40,000, and other organizations shouldered at least 75 percent of the costs.

In the past, funding of conferences by the Office of Power Technologies was largely conducted on a non-competitive basis. The Columbia University project was submitted under one of the 29 program areas of interest under the Broad-Based Solicitation on Information Dissemination and Outreach, released on December 3, 1998. This project was one of 7 applications selected for award under Program Area of Interest 1.L., "Utility Sector: Co-sponsorship of Conferences." Under this program area, applicants were not eligible unless they provided 75 percent of the funding for the conference, and eligibility was open to a wide range of applicants, including States, universities, non-governmental organizations, and the private sector.

In addition, all applications under the Broad-Based Solicitation were selected using a merit-based selection process involving independent experts. Until early 1998, conference proposals in EERE were not routinely subjected to merit review.

Mr. Packard. Did the Subcommittee plan a role in this effort to compete more funding? What is the effect of this change with regard to the amount of funding that is available for new ideas from new sources? Do you think we are getting better value for the funds we provided in fiscal year 1999? We are hopeful that these reforms will result in grater bang for the buck. Are you?

This represents an increase in the tens of millions for merit reviewed awards. Does this represent a significant improvement?

Mr. Reicher. The reforms in the Office's competitive processes were championed by the senior leadership of the Department of Energy. The Subcommittee's concerns also contributed to the impetus to modify these non-competitive procedures. The Broad-Based Solicitation on Information Dissemination and Outreach will involve the competition in FY 1999 of approximately $7.5 million in funds which were largely awarded on a non-competitive basis in the past. In addition, my office is pursuing other efforts to increase competition, such as the Broad-Based Solicitation on Research, Development, and Demonstration. We believe that this represents a significant improvement

In addition, we believe that this competition will result in better value for the funds provided in FY 1999 -- a "better bang for the buck."

Mr. Packard. In the budget presented you promised to compete 82% of awards. This would represent roughly a 70% increase in funds newly available for exciting new research and development subject to merit review, Please provide estimates for the amount of competitive awards the Office intends to award in fiscal years 1999 and 2000. How do these amounts compare to fiscal year 1996?

Mr. Reicher. As stated in my testimony, our spend plans indicate that 82 percent of the fiscal year 1999 program funds will be competitively awarded. The remaining 18 percent of the funds consists of two parts: 7 percent of the funds will be used for discretionary, non-competitive awards that have appropriate justifications and 11 percent of the funds will be used for projects that are specifically directed by Congressional reports that accompany the appropriation. For fiscal year 1999, we performed detailed management reviews to reduce the level of funds that are used for discretionary, non-competitive awards. The amount of competitive awards in Fiscal Year 2000 will be primarily dependent upon the amount of funds that will be used for projects that are specifically directed by Congressional reports that accompany the appropriation. If 11 percent of the fiscal year 2000 funds are again used for these projects directed by Congressional report language, approximately 83 percent of the funds will be used for competitive awards. We do not have the same level of detailed information for fiscal year 1996. However, the level of funds applied to discretionary, non-competitive awards in 1996 would probably be less than the level in fiscal year 1998, which was 73 percent of the program funds.

Mr. Packard. The Office acknowledges that the same decision-makers granting non-competitive awards will be determining the winners of the competitive solicitations. How does the Office intend to ensure that awards are granted on merit? Has the Office considered including independent review and recommendation procedures? Has the Office looked at how other Department offices select winners in solicitations in a way that ensures fair and fully competitive awards? Please advise the Committee on how the Office intends to ensure that awards are granted in a fair and fully competitive environment.

Mr. Reicher. We do not agree with the statement that "the same decision-makers granting

non-competitive awards will be determining the winners of the competitive solicitations." In fact, the Office of Energy Efficiency and Renewable Energy worked closely with financial assistance experts from the Headquarters Office of Procurement and Assistance Management to develop a detailed, written selection plan for the Broad-Based Solicitation, which assure objective and independent merit review, consistent with the requirements of the DOE Financial Assistance Regulation. The Selection Plan developed by the Office of Energy Efficiency and Renewable Energy and signed by the Assistant Secretary and all of the Deputy Assistant Secretaries, includes specific requirements to assure the independence of merit review panels and imposes requirements that are even more stringent than the DOE regulations. The development of the selection plan involved extensive input over several weeks from Headquarters Procurement Services, the Office of Headquarters Procurement Policy, and procurement experts from the Office of General Counsel. The Office of Energy Efficiency and Renewable Energy incorporated extensive suggestions based on review procedures utilized by other DOE organizations and other agencies. Procurement and General Counsel representatives also conducted training sessions that reached more than 70 individuals involved in the merit review and selection process for the solicitation.

BROAD-BASED SOLICITATION

Mr. Packard. The Department recently announced that it was extending the deadline for its broad-based solicitation for information dissemination, public outreach, training and related technical analysis and assistance activities involving renewable energy and energy efficiency. What is the total level of resources expected to be awarded under this solicitation? How much of this is targeted for renewable energy vs energy efficiency? What is the source of this funding? Are programs being taxed to pay for these activities? How does the total budget for this solicitation compare to the total amount needed to award all eligible applicants? Did the Department receive applications that will not be included in the competition? What criteria disqualify an applicant? Were any disqualified applicants former recipients of Department of Energy awards in prior years?

Mr. Reicher. Approximately $1 million will be targeted for renewable energy and approximately $1 million will be targeted for energy efficiency funding under the second round of the solicitation. Programs are not "taxed" to pay for these activities.

More than 400 applications were received under the solicitation for projects funded under the solicitation. The number of applications far exceeds the number of projects that will be funded because of limitations on the availability of funds.

The selection process for the solicitation is set forth in Section IV of the solicitation document and further clarified in the selection plan. In general, some applicants were screened out under the initial review process if they fell under the parameters of the State Energy Program Special Projects solicitation or the Million Solar Roofs solicitation. Four evaluation criteria were set forth in the solicitation -- impact/significance, feasibility, approach, and cost. Many applicants have fared poorly under the four merit review criteria and will not be funded as a result.

Mr. Packard. Why was the deadline extended? Who in your Office is responsible for extending the deadline? Will the Office make a habit of extending deadlines which could appear to benefit pre-determined applicants? Please provide under separate cover a list of applicants responding the solicitation after the original deadline.

Mr. Reicher. The Office of Energy Efficiency and Renewable Energy did not extend the initial closing date deadline for its Broad-Based Solicitation on Information Dissemination and Outreach. Under the solicitation issued on December 3, 1998, that deadline was January 8, 1999, and that deadline was not changed by the Contracting Officer from Headquarters Procurement Services. The only accomodation I am aware of is that the Office of Headquarters Procurement Services did allow applications that were postmarked on January 8, 1999 to be received on a later date because of a snowstorm that precluded air express deliveries on that date. The Office of Energy Efficiency and Renewable Energy does not have authority to extend an application deadline without the approval of the Contracting Officer.

The December 3, 1998 solicitation also contained a second closing date of March 31, 1999. This second closing date was not extended after-the-fact but was extended in advance. On February 26, 1999, a Federal Register announcement was issued which indicated that the second closing

date would be extended for two weeks until mid-April 1999. The purpose of the extension was to provide extra time to submit applications because of several factors. First, it was necessary to assess the extent of competition in the first round so that decisions could be made about which of the 29 program areas of interest would still have funds remaining for the second round of the competition. Also, it was determined that the language for new program areas interest for the second round could not be completed until early March. Therefore, it was determined that the second closing date should be extended by two weeks to provide applicants with adequate time to submit applications.

The extension of the second closing date was announced on the World Wide Web and was made known to all interested parties.

Funding decisions have not yet been completed under the solicitation, and the success or failure of organizations previously funded by the Department cannot be fully assessed until the competition is completed.

LARGE MULTI-YEAR PROJECTS

Mr. Packard. The budget justification materials include many large projects that require multi-year funding. Please provide program plans for all solar and renewable multi-year projects for which funds are requested in fiscal year 2000. The plans should include start dates, total estimated costs and completion dates.

Mr. Reicher. The following programs have multi-year projects for which funds are being requested in FY 2000:

Photovoltaic Energy

Partnerships for Technology Introduction

Purpose: The Partnerships for Technology Introduction is a partnership between the power producing industry and DOE. The partnership was created to incorporate and promote the use of photovoltaics, as a viable energy contributor, to the energy service providers and their customers.

Objectives: The objective of the Partnership is to demonstrate and validate the use of photovoltaics by electric utilities, energy service organizations, and their customers. The individual objectives are as follows:

- Expand electric energy service provider use of domestic photovoltaic systems, thereby increasing demand for PV.
- Encourage utilities and energy service organizations to take advantage of the economic development potential, business opportunities, and environmental benefits offered by PV technology.
- Further the replication of successful ventures.

Project Status: To date, contracts have been awarded contract to 36 teams to install 7.5 megawatts in new photovoltaic (PV) installations. The project includes more than 2300 individual PV systems to total the 7.5 megawatts. The installations will result in new PV installation in 30 states throughout the U.S. In FY 2000, a new competition solicitation will be issued to manage and implement the Partnerships and to solicit new 3-year contracts with industry for 3 megawatts of new projects. The partnership is scheduled to terminate in 2003.

Major Partners: To date, the Partnerships for Technology Introduction has been implemented through the Utility Photovoltaic Group (UPVG). The UPVG is a non-profit association of 98 members representing more than 45% of the kilowatt-hour sales of electricity in the United States. The UPVG membership has diversified since 1992 and currently consists of the following: 28 investor owned utilities, 28 public power utilities, 9 energy service companies, 8 rural cooperatives, 8 foreign utilities, and 3 in the other category (research institutions or associations). Some examples of investor owned utilities are: Arizona Public Service Company, Detroit Edison Company, Entergy Corporation, Georgia Power Company, Idaho Power Company. Public power utilities include municipalities throughout the U.S. like Sacramento Municipal Utility District, Salt

River Project, New York Power Authority and Austin Energy. Deregulation of the utility sector is creating opportunities in the energy service company category, which has increasing representation and includes GPU International, Planergy, Sun Power Electric, and Pacific Solar Company. In addition to regular membership, the UPVG has nearly 50 associate members including several photovoltaic system component manufacturers and photovoltaic system integrators.

Funding:

	Cost to Completion ($M)							
Project Information	Prior Year	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Partnerships for Technology Introduction	18.4	3.8	6.0	6.0	5.0	2.0	0.0	41.2
Cost Sharing	37.5	8.1	17.0	23.0	17.0	2.0	0.0	104.6
Total Partnerships for Technology Introduction	55.9	11.9	23.0	29.0	22.0	4.0	0.0	145.8

Concentrating Solar Power

In FY 2000, the CSP Program has four major projects underway requiring multi-year funding. The first three are under Distributed Power System Development while the fourth is under Dispatchable Power System Development, as described in more detail below:

Distributed Power Systems Development
Remote Indian Power Project

A key focus of this effort is to improve the operational reliability of dish/engine systems, which currently hold the world record for solar-to-electricity system conversion efficiency (29.4%). FY 2000 reliability goals of 1,000 hours between service interruptions represent a significant step toward the FY 2004 cost-of-energy objective of achieving distributed energy costs under 11¢/kWh. Given peak electricity prices over 15¢/kWh in many parts of the U.S. and prices in excess of 30¢/kWh in much of the developing world, this cost level is expected to represent substantial near-term market opportunities.

Purpose: The purpose of this project is to field an advanced-technology 10-kW_e solar-powered dish/engine system at a remote, off-grid site in the Southwestern U.S. (e.g., a Native American reservation in Arizona or New Mexico) by the end of FY 2000. It is estimated that the first units will be capable of delivering energy at less than 20¢/kWh, and will be equally suited either for stand-alone operation or for being hybridized with diesel fuel. This will be a cooperative project

between DOE, user(s) to be determined by competitive bidding, and federal and/or state Native American support organizations. Several organizations have already expressed an interest in participating in such a project.

Objectives:

- Design and assemble a dish/engine system suitable for domestic or foreign remote residential clusters (i.e., 10 kW output) based on 25 kW dish/engine technology.
- Evaluate extended operating characteristics in off-grid mode at domestic sites in cooperation with Native American groups and nearby utilities.

Project Status: SunLab's remote power team met in December 1998 to develop detailed project plans. System designs for the dish structure and mirrors have been completed, and construction of the initial prototype is underway. The test site has been selected and a solicitation of interest in participating in the project was mailed to 111 Native American Tribes in portions of seven states (AZ, CA, CO, NV, NM, TX, & UT) in April 1999. Recipients were asked to respond by April 30. The first power from the prototype unit is expected to be generated in August 1999.

Major Partners:

- WG Associates -- Dish concentrator system
- Paneltec -- Structural facets, mirrors
- Solo Kleinmorten - Receiver/engine components
- Native American Partner(s) – Site sponsor and system operator

Funding:

	Cost to Completion ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Remote Indian Power Project	0.0	1.3	1.3	0.6	0.5	0.0	0.0	3.7
Cost-sharing*	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.2
Total Remote Indian Power Project	0.0	1.3	1.3	0.7	0.6	0.0	0.0	3.9

* Cost-share for this project will be minimal in the initial project phases. Once a prototype unit has demonstrated reliability, significant cost-share is expected from the remote power purchaser.

Utility-Scale Joint Venture Project (USJVP)

Purpose: Research on solar concentrators, development of conversion components, and support

for system design and integration are critical elements of a successful CSP R&D program. However, final progress is dependent on feedback resulting from testing of completely assembled prototypes in an operating environment. Such feedback is more valuable if the testing can be conducted in a real world application in cooperation with a potential user. The latter is considered a "pathfinder" customer, who often will invest resources for the opportunity to experience first hand an emerging technology. The purpose of the USJVP Project is to complete several dish/engine test efforts that involve the cooperation of researchers, system designers, system assemblers, and pathfinder users. Preferably, one of the applications will prove to be a forerunner for penetrating "green" electricity markets that are starting to develop in the U S.

Objectives:

- Assemble and factory test a complete dish/engine prototype, and correct initial flaws.
- Install upgraded prototypes for evaluation at user sites.
- Optimize system performance through cooperative user/lab R&D team efforts.
- Provide follow-on technical support, if warranted.

Project Status:

- February 1999 – Washington, DC unit moved and installed in Phoenix, AZ.
- May 1999 – First 25kW system to pass 50-hour acceptance test
- June 1999 – Install additional systems at Arizona Public Service and Salt River Project.

Major Partners:

- Science Applications International Corporation (SAIC), San Diego, CA
- STM Corporation, Ann Arbor, MI
- Arizona Public Service (APS) Company, Phoenix, AZ

Funding:

Project Information	Cost to Completion ($M)							
	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Cost to Completion
Utility-Scale Joint Venture Project (USJVP)	8.8	1.9	2.5	2.5	0.0	0.0	0.0	15.7
Cost-sharing	8.8	1.9	2.5	2.5	0.0	0.0	0.0	15.7
Total	17.6	3.8	5.0	5.0	0.0	0.0	0.0	31.4

Dish Engine Critical Components Project (DECC)

Purpose: In the operation of experimental dish/engine systems, performance degradation or service interruptions can often be attributed to a single subsystem or component. In such cases, the appropriate action is to focus intensive technical effort on the component areas that need improvement. This is the purpose of Dish/Engine Critical Components projects. The current DECC project involves the proven McDonnell Douglas dish/engine design and takes advantage of the willingness of the design's new owner (Boeing, following the merger with McDonnell-Douglas) to invest in CSP technology and develop a state-of-the-art renewable power system capable of competing in near-term distributed markets.

Objectives:

- Update existing system and accumulate sufficient hours of operation to identify critical component issues.
- Develop, as appropriate, advanced component(s) in cost-shared cooperation with the developer.
- Assemble and test advanced integrated dish/engine system in user environment.

Major Partners:

- Boeing Corporation
- Stirling Energy Systems
- Kockums
- Utility and/or IPP

Funding:

Project Information	Cost to Completion ($M)							
Dish Engine Critical Components Project (DECC)	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
DECC Project (Phase I&II)	0.3	0.9	1.3	1.5	0.0	0.0	0.0	4.0
Cost-sharing	0.2	0.5	1.0	1.5	0.0	0.0	0.0	3.2
Total DECC	0.5	1.4	2.3	3.0	0.0	0.0	0.0	7.2

Dispatchable Power Systems Development

FY 2000 activities will focus on advanced RD&D activities aimed at reducing the near-term cost of dispatchable power systems from the current 10-12¢/kWh down into the 6-8¢/kWh range. Projects in this area include the USA Trough Initiative that will provide American

companies with a competitive edge in the emerging international solar market, efforts under the Solar Manufacturing Initiave (SolMaT) to reduce the manufacturing costs of concentrators and drives, and R&D for high-temperature system designs, as recommended by independent review boards such as PCAST, based on the high potential for achieving low-cost renewable power of around 4¢/kWh in the long-term.

Major Partners: A collaboration between the selected U.S. Industry partner(s), State partners, bilateral/multilateral funding agencies, and international industry (where required as sole component supplier).

Project Information	Cost to Completion ($M)							
	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
USA Trough Initiative	0.0	0.4	2.0	7.0	TBD	TBD	0.0	9.1
Cost-sharing	0.0	0.1	0.3	1.0	>30 %	>50 %	0.0	1.4
Total USA Trough Initiative	0.0	0.5	2.3	8.0			0.0	10.8

Purpose: Parabolic troughs currently provide the lowest cost solar electricity available today, and have the potential to reduce costs by 50% or more. The industry's Trough Technology Roadmap identified several critical issues for achieving these cost reductions: developing new trough concentrator designs, improving the lifetime and performance of the receiver tube, developing inexpensive energy storage, and integrating trough technology with modern combined cycle power technology. The USA Trough Initiative will result in a competitive position for U.S. industry in this technology area by completing a series of targeted R&D efforts. This will allow U.S. industry to compete for near-term international project opportunities, while achieving cost reductions necessary for broad deployment in the U.S. Southwest and other sunbelt areas of the world.

Objectives:

- Coalesce industrial suppliers and integrators into a working group and identify R&D interests.
- Conduct component R&D (e.g., concentrator design, receiver tubes, thermal storage).
- Validate the resulting improvements with advanced plant designs.

Project Status:

- Request for Proposals issued in March 1999, with responses due in April/May 1999.
- Contract expected to be awarded in June/July 1999.

Biomass/Biofuels Energy Systems - Biomass Power Systems

Vermont Gasification Project

Purpose: The purpose of the Vermont Gasification project is to demonstrate commercial-scale, indirect gasification technology that will enable biomass energy to be used with electric generation technology.

Objectives:

- The project will validate the performance and economic viability of the Battelle Gasification technology when integrated with a high efficiency gas turbine to produce electricity.
- Design, construct, and test gasification facility at the McNeil Generating Station in Burlington, Vermont.
- Enhance the facility for use as a Development and Applications Test (DAPT) for technology demonstration and testing (e.g., hydrogen production, liquid fuel synthesis, fuel cell evaluations, gas turbine operations, feedstock testing, etc.).
- Turbine installation and operation of the integrated plant.

Status:

- FY 1994: Start date.
- FY 1997: Installed the pressure vessels and feed handling system and successfully completed facility pressure testing.
- FY 1998: Completed mechanical completion of the Vermont Gasifier Facility and completed over 100 hours of operation using 400 tons of wood in combustion and gasification tests with over 100 MWh of electricity generated.
- FY 1999: Completion of system validation testing.
- FY 2002: Completion date.

Major Partners: Future Energy Resource Corporation (FERCO), Burlington, Electric Division (BED), Industry & Energy Associates (IEA), Operational Energy Corporation (OEC), Bechtel National Incorporated, Battelle Columbus Operations, and Siemens Westinghouse Power Corporation

Funding:

Project Information	Cost to Completion ($M)							
	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Gasification/Vermont	22.4	3.0	5.5	6.0	3.0	0.0	0.0	39.9
Cost-sharing	6.2	1.3	1.1	3.0	3.0	0.0	0.0	14.6
Total Gasification/Vermont	28.6	4.3	6.6	9.0	6.0	0.0	0.0	54.5

Biomass for Rural Development

Three partnerships initiated through the Program's Biomass Power for Rural Development initiative will be on line producing a total of 125 MW of electric power from dedicated feedstocks by 2002. These projects will establish the baseline for the future deployment of economically feasible integrated biomass power projects. The three projects will engage at least 15 new partners in the Biopower Program, and leverage commitments of over $130 million in private-sector cost share over the life of the projects (FY 1996 - 2003).

New York Salix Project

Objectives:

- Under the care of the Salix Consortium, with 25 university, association, corporate and government partners, willow trees are grown on land set aside by farmers and landowners. These trees will produce a crop every three years that can be efficiently harvested using existing machinery. Several power plants will participate in this project, cofiring the harvested feedstock with other fuels to produce electricity and reduce emissions in the Northeast and Northern Midwest.
- Scale-up willow crop production (600 acres) to support co-firing biomass with coal in New York.
- Complete co-firing modifications at two New York generating plants for up to 40 MW capacity through co-firing willow.

Status:

- FY 1996: Start date.
- FY 1997: Completed design optimization and fuel supply plan for the Greenidge plant.
- FY 1998: Completed design optimization and fuel supply plan for the Dunkirk plant and successfully co-fired at the Greenidge plant.
- FY 1999: Complete Dunkirk plant modifications, begin co-firing up to 10% biomass fuels at Dunkirk, complete planting 225 acres of willow, complete production of 1 million willow cuttings and obtain commitments for 300 additional acres of willow.
- FY 2002: Completion date.

Major Partners: Niagara Mohawk Power Corporation (NMPC), New York State electric & Gas (NYSEG), State University of New York (SUNY), Burlington Electric Division (BED), South Central New York Resource Conservation & Development (SCNY RC&D), New York State Energy Research and Development Authority (NYSERDA), Ontario Hydro, Cornell University, University of Toronto, and local farmers.

Minnesota Agri-Power Project

Purpose: The basis of co-sponsoring the Minnesota Agri-Power Project (MAP) with the Minnesota Valley Alfalfa Producers (MnVAP) is to build an advanced power plant system at the

Granite Falls, Minnesota Industrial Park that will provide a base-load electric power source and produce a competitively priced source of value-added alfalfa-based products.

Objectives:

- Demonstrate a fully integrated biomass gasification combined cycle system utilizing alfalfa stems to produce 75 MW of power.

Status:

- FY1996: Start date for project.
- FY 1997: Pilot plant gasification testing of 120 tons of pelletized alfalfa completed.
- FY 1998: Executed a Power Purchase Agreement (PPA) between Minnesota Valley Alfalfa Producers (MnVAP) and Northern States Power (NSP) to provide 75 MW of biomass generated electricity.
- FY 1999: Complete additional gasification testing, initiate detailed design, obtain permits and continue scale-up of the feedstock system.
- FY 2000: Completion date.

Major Partners: Minnesota Valley Alfalfa Producers (MnVAP), Enron Capital & Trade, University of Minnesota, United Power Association, Stone & Webster Engineering Corporation, Siemens Westinghouse Power Corporation, Kvaerner/Carbona, City of Granite Falls, and local farmers.

Iowa Switchgrass Project

Purpose: In collaboration with the Chariton Valley Resource Conservation and Development, Incorporated (representing a consortium of partners), establish 36,000 acres of dedicated switchgrass for co-firing with coal for the production of 35 MW of biomass-based generation capacity by the year 2000.

Objectives:

- Establish 4,000 Conservation Reserve Program (CRP) acres of switchgrass which are currently under the USDA CRP program.
- Verify co-firing viability of switchgrass for the production of 35 MW of electric power at the Ottumwa Generating Station.

Status:

- Start date: FY 1996.
- Completion date: FY 2002.
- FY 1998: Signed a total of 43 landowners, representing 4,000 acres.
- FY 1999: Establish the 4,000 acres of switchgrass and complete modification designs.

- FY 2000: Install and conduct co-firing tests at the Ottumwa Generating Plant.

Major Partners: Chariton Valley Resource Conservation & Development, Incorporated, Department of Natural Resources, Division of Soil Conservation, Alliant Power, Iowa State University, Iowa Farm Bureau, ABB Combustion Engineering, R.W. Beck, Thomas R. Miles Technical Consultants, Inc., and local farmers.

Funding:

	Cost to Completion ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
New York Salix	2.5	1.5	1.5	1.5	1.5	0.0	0.0	8.5
Minnesota Agri-Power	11.0	12.0	14.0	14.0	7.0	0.0	0.0	58.0
Iowa Switchgrass	1.5	1.5	1.8	1.8	0.0	0.0	0.0	6.6
Cost-sharing	15.0	14.1	63.4	42.9	13.0	10.0	0.0	158.4
Total Biomass for Rural Development	30.0	29.1	80.7	60.2	21.5	10.0	0.0	231.5

Co-firing Biomass with Coal Initiative

The biomass cofiring activity has been designed to develop a balanced portfolio of power generation technologies that will reduce emissions of SO_2, NO_x, and greenhouse gases while allowing the U.S. to sustain energy growth and development. Developing the capability to effectively utilize biomass co-firing in existing coal-fired boilers while incorporating flexible fuel firing into advanced power system designs are key elements of this effort. Numerous electric generating utilities volunteered to participate in the global climate challenge program; cofiring addresses their needs for participating in this effort while it provides services to customers, fuel diversification and fuel management support, and ancillary environmental benefits.

Purpose: The purpose of the DOE Biomass Cofiring Initiative is to demonstrate a family of technologies capable of mitigating CO_2 emissions while integrating biopower into the family of fossil fuels in a cost-effective manner.

Objectives:

- Provide technical data, analysis, and demonstration of biomass cofiring in utility boilers at a moderate level (10% by heat input analysis) for a period of time (up to a couple of years) adequate to verify the performance of the system and biomass material utilized.

- Demonstrate long-term cofiring at utility boilers and determine impacts on boiler capacity, efficiency, stability, emissions, slagging, fouling, and other related operations.
- Address fuel management logistics (procurement/handling).
- Show economic feasibility for biomass cofiring.
- Integrate cofiring with natural gas systems.
- Upgrade equipment for continuous long-term demonstrations.
- Sufficient support studies to make demonstrations successful.

Status:

- FY 1998: Demonstrations initiated and construction started at GPU Seward Station and NIPSCO Bailly Station.
- FY 1998: Conceptual design study (TVA Allen Plant) and feasibility study for cofiring at Central & South West Utility completed.
- FY 1999: Construction complete at NIPSCO and GPU and cofiring demonstration initiated.
- FY 1999: Detailed design completed for TVA Allen Fossil Plant gasification systems along with vendor selection.

Major Partners: GPU Seward Station: co-firing wood in 32MW and 147MW coal fired boiler; NIPSCO Bailey Station: Co-firing wood in 194 MW cyclone boiler; TVA Allen Station: co-firing wood in 272MW cyclone boiler; NYSEG Greenidge Station: co-firing wood in coal-fired boiler; Central & Southwest: co-firing wood in 650 MW lignite fired boiler; Southern Co. co-firing switchgrass in 100MW coal-fired boiler.

Project Information	Original Cost Estimates ($M)	Original Federal Cost Share ($M)	Current Cost Estimates ($M)	Current Federal Cost Share ($M)
Co-Firing Biomass with Coal Initiative				
GPU Seward	3,022	694	3,022	1,694
NIPSCO	14,450	7,000	14,450	7,250
TVA Gasifier	16,380	8,645	16,380	8,645
NYSEG	846	576	846	270
Central & Southwest	350	123	350	123
Southern Co-firing	2,139	964	2,139	1,400

Biomass/Biofuels Energy Systems - Transportation

Sacramento Biomass to Ethanol Demonstration Facility

Purpose: The purpose of the Sacramento Ethanol Project is to demonstrate new biomass-to-ethanol technology in cooperation with Arkenol, Inc. at a plant near Sacramento, California. This will be the first facility in the world to use rice straw to produce ethanol and citric acid on a commercial scale.

Objectives:

- Demonstrate proprietary concentrated acid technology to convert agricultural residues to ethanol.
- Develop robust fermentation organisms.

Status:

- Start date: FY1999
- Completion date: FY2000
- FY 1999 Complete engineering and permitting activities needed to obtain project financing.
- FY 1999 Continue to improve the performance and robustness of genetically engineered microrganisms.

Major Partners: Arkenol, Bateman Engineering, University of California-Davis.

Funding:

	Cost to Completions ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Sacramento Project		4.0	0.5	0.0	0.0	0.0	0.0	4.5
Cost-Sharing		4.4	0.5	0.0	0.0	0.0	0.0	4.4
Total		8.4	1.0	0.0	0.0	0.0	0.0	9.4*

*Total estimated cost of the project is $95 million, including construction of the facility. Private financing for the construction of the facility will be obtained by the industrial partner. The facility will be owned and operated by the industrial partner.

Softwood Conversion To Ethanol Projects

Purpose: The purpose of the softwood conversion projects is to develop cost effective technology for the conversion of softwood waste feedstocks which either result from timber operations or could be obtained from thinning operations. Thinning of forests is necessary to avoid catastrophic forest fires. These wastes can be used to coproduce ethanol and electricity. This is the focus of ongoing work in California and Alaska.

Objectives:

- Demonstrate softwood conversion technologies.
- Produce 6-7 million gallons of biomass ethanol annually to replace imported ethanol in Alaska, providing a self-sustainable industry.
- Develop and demonstrate technologies for the conversion of softwoods, a fire hazard, to ethanol in California.

Status:

- Start Date: FY 1997
- Completion Date: FY 2003
- Conversion testing of feedstocks from both California and Alaska are being conducted.
- Letter of Interest is being let for engineering companies to assist in Alaska Project.
- Alaska passed a law that provides $0.80/gallon for Alaskan produced biomass ethanol that is in addition to the Federal $0.54/gallon incentive.
- Quincy Library Act has passed the U.S. House allowing for forest management practices that support the project and lower the risk of forest fires. Remains to pass the Senate.

Major Partners: Sealaska Corporation; Quincy Library Group, Plumas Corporation, USDA Forest Service, California Department of Forestry, California Energy Commission

Funding:

	Cost to Completion ($M)								
Project Information	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Total to Completion
Softwoods Project		1.41	1.95	1.8	1.5	2.0	1.75	1.0	11.41
Cost-Sharing		0.0	0.0	0.06	TBD	TBD	TBD	TBD	TBD
Total		1.41	1.95	1.86	TBD	TBD	TBD	TBD	TBD

Demonstration of Enzymatic Conversion of Biomass at a Corn Ethanol Facility

Purpose: The purpose of the "Bridge to Corn Ethanol Project" is to create a sustainable cellulosic ethanol industry by working with the existing corn-to-ethanol industry. This takes advantage of the abundance of available feedstock (corn stover) and the expertise that already exists within the industry. These projects also afford a market opportunity for the enzyme industry through the production of lower cost cellulase enzymes.

Objectives:

- Demonstrate enzymatic conversion of cellulosic biomass at existing grain processing facility(s).
- Create a market for low cost cellulase enzymes.

Status:

- Start date: FY1997
- Completion date: FY2003
- FY1997: Colloquies with biomass conversion experts addressed the issue of reducing enzyme costs.
- FY 1998: Completed a corn stover resource availablility study to evaluate the potential supply for a large cellulose conversion industry.
- FY 1999: Awarded six feasibility contracts.
- FY 2000: Compete promising projects from the feasibility studies and other potential candidates to develop engineering and design plans. Continue R&D at the National Renewable Energy Laboratory.

Major Partners: Chief Ethanol, Chippewa Valley Ethanol, Delta-T, High Plains Ethanol, Merrick, NYS-TEC , Swan Biomass Company, Robbins Corn, Raytheon, USDA, Vogelbush , Williams Pekin Ethanol.

Funding:

	Cost to Completion ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Bridge to Corn Ethanol	0.5	0.5	0.8	3.0	4.0	4.0	2.0	14.8
Cost-Sharing	0.0	0.0	0.17	0.6	TBD	TBD	TBD	TBD
Total	0.5	0.5	0.97	3.6	TBD	TBD	TBD	TBD

Gridley Biomass to Ethanol Project

Purpose: The purpose of the Gridley Project is to demonstrate new biomass-to-ethanol technology in cooperation with BC International at a site near Gridley, CA. This facility will convert mixed feedstocks including softwoods, green waste and rice straw on a commercial scale. The expected capacity for the facility will be 20 million gallons per year with electricity as an essential by-product.

Objectives:

- Demonstrate proprietary dilute acid technology to convert agricultural residues to ethanol.
- Develop robust fermentation organisms.

Status:

- Start date: FY1995
- Completion date: FY2003
- FY 1995: Preliminary technoeconomic assessment with technology developer as industrial partner
- FY 1996-FY 1997: Laboratory and pilot scale research at National Renewable Energy Laboratory
- FY 1998: Identification of new technology developer and owner/operator for the facility

Major Partners: BC International, City of Gridley.

Funding:

	Cost to Completion ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Gridley	5.4	0.0	5.0	0.5	0.0	0.5	0.0	11.4
Cost-Sharing	0.6	0.0	5.0	TBD	0.0	TBD	0.0	5.6
Total	6.0	0.0	10.0	0.5	0.0	0.5	0.0	17.0

Total estimated cost of the project is $70 million, including construction of the facility. Private financing for the construction of the facility will be obtained by the industrial partner. The facility will be owned and operated by the industrial partner.

Wind Energy Systems

Wind Partnerships for Advanced Component Technologies (WindPACT)

Purpose: Promising research ideas and concepts generated under the Applied Research element of the Wind Energy Program will be further developed by performing generic concept design, fabrication, and testing studies to prove the basic ideas, and generate reliable engineering performance and design data allowing in-depth feasibility and trade-off studies to be accomplished through new competitively selected wind industry partnerships. This will provide a path to explore innovative new component technologies at lower risk and cost to the emerging U.S. industry. Possible projects to be explored include: innovative new direct-drive generators, advanced rotor controls, light-weight flexible and articulated rotor systems to reduce loads and lower costs, as well as high-efficiency power electronic converters.

Objectives: WindPACT will begin in FY 2000, and be completed in FY 2004 with the following objectives:

- Reduce the cost of wind energy by 10 to 20 percent beyond the Next Generation Turbine project, through introduction of aggressive, leading-edge technologies for increased performance and reduced capital costs.

- Encourage new U.S. companies to become wind turbine full system or component manufacturers--1 to 2 new companies by 2005.

Status: WindPACT is a proposed new start in FY 2000. The project will proceed as follows:

- FY 2000: Two to three candidate wind technology concepts will be developed by laboratory researchers to the stage needed to seek industry partners for further development and testing.

- FY 2000: Two to three R&D subcontracts will be competitively awarded to industry partners to explore potential concepts in close collaboration with laboratory researchers.

- FY 2002: Advanced component technologies will be field tested using an existing wind turbine as test platform.

- FY 2005: WindPACT component technologies will be commercially available in advanced design wind turbines supplied by 1 to 2 new U.S. wind industry members.

Major Partners: To be competitively selected in FY 2000.

Funding: Estimated costs for WindPACT are tabulated below.

	Cost to Completion ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
WindPACT	0.0	0.0	3.0	3.5	2.5	2.5	2.0	13.5
Cost-sharing	0.0	0.0	0.0	0.5	1.0	1.0	1.0	3.5
Total WindPACT	0.0	0.0	3.0	4.0	3.5	3.5	3.0	17.0

Next Generation Turbine (NGT)

Purpose: The purpose of the Next Generation Turbine project is to enable U.S. industry to apply advanced technology in the development of utility scale wind turbines. The project is focused on completing research and development with two competitively selected industry partners leading to state-of-the-art utility scale (500 kW to 2 MW) wind turbines.

Objective: The Next Generation Turbine project is the Wind Program's primary investment in achieving a cost of energy from wind of 2 ½ cents per kWh by 2002. The project began in 1998 and will be completed in 2003.

Status:

- FY 1998: Awarded competitively selected subcontracts. Conducted project kickoff meetings. Began design of scaled Proof-of-Concept (POC) turbines.
- FY 1999: Complete design and begin fabrication of POC turbines.
- FY 2000: Complete fabrication, installation and field testing of POC turbines. Complete design and begin fabrication of prototype Engineering & Manufacturing Development (EMD) turbines.
- FY 2001: Complete fabrication and installation of prototype EMD turbines and begin field testing. Begin design of prototype Next Generation Turbines (NGT).
- FY 2002: Complete field testing of EMD turbines. Complete design, fabrication, and installation of prototype NGT turbines and begin field testing.
- FY 2003: Complete field testing of prototype NGT turbines. Complete all technical work and begin project closeout.

Major Partners: Zond Energy Systems, Tehachapi, California; The Wind Turbine Company, Bellevue, Washington.

Funding: Actual and estimated costs to completion:

	Cost to Completion ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Next Generation Turbine	8.5	2.6	6.6	7.9	3.4	0.5	0.0	29.5
Cost-sharing	2.7	1.0	2.1	2.5	1.1	0.2	0.0	9.6
Total Next Generation Turbine	11.2	3.6	8.7	10.4	4.5	0.7	0.0	39.1

Hybrid Systems for Village Power (HSVP)

Purpose: The Hybrid Systems for Village Power project will follow from the ongoing wind/hybrid projects in Alaska and provide additional opportunities for field verification of new wind hybrid power systems technologies developed under Applied Research. This project will verify and improve control system technologies that enable reducing fuel use and emissions at existing stand-alone diesel power systems in Alaska, other States, U.S. trust territories, and in Native American communities. Not only will verification of a control system provide an opportunity for sale of U.S. technology in the domestic market, but it will provide a showcase for application in developing countries.

Objectives: HSVP will begin in FY 2000 and be completed in FY 2003 with the following objectives:

- Increase performance, reliability, and cost effectiveness of advanced wind hybrid systems technologies through field verification experience.
- Expand use of wind hybrid systems by introducing and supporting operation of several systems in remote communities and applications to provide relief for high power costs and environmental impacts.

Status: HSVP is a proposed new start in FY 2000. The project will proceed as follows:

- FY 2000 - Two to three projects will be competitively selected and cost-shared by the local utility and/or village. Laboratory staff will review the designs, witness factory load tests and then oversee the participants installation, instrumentation and testing of the units.

- FY 2001 - Projects installed, and begin a three year period of monitored operation. Data acquisition systems will monitor actual performance and laboratory staff will evaluate data and performance statistics.
- FY 2002 to 2004 - U.S. wind hybrid systems companies offering products enhanced by field verification experience.

Major Partners: To be competitively selected in FY 2000.

Funding:

	Cost to Completion ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Hybrid Systems for Village Power	0.0	0.0	2.5	2.5	0.6	0.6	0.0	6.2
Cost-sharing	0.0	0.0	0.6	0.6	0.1	0.1	0.0	1.4
Total Hybrid Systems for Village Power	0.0	0.0	3.1	3.1	0.7	0.7	0.0	7.6

Geothermal Energy

Modular Power Systems

Purpose: The purpose of this project is to enable production of electricity from distributed or off-grid geothermal sites by means of small-scale power modules. The Department will solicit applications for cost-shared financial assistance proposals to design, construct, install, and test a 500 kilowatt geothermal electric power module under a three-year Cooperative Agreement.

Objectives: Reduce the projected costs of electricity for distributed or off-grid power generation, thereby enabling geothermal power generation that is easily scalable in size and that is more widely applicable in the United States than large scale centrally located geothermal power plants.

- FY 2000: Establish design specifications; solicit proposals for preliminary designs
- FY 2001: Evaluate preliminary designs; select final design for construction
- FY 2002: Complete construction of power module
- FY 2003: Complete performance evaluation and prepare report

Status: In FY 1998, National Renewable Energy Laboratory completed a study entitled "Opportunities for Small Geothermal Projects: Rural Power for Latin America, the Caribbean, and the Philippines." The study finds that small systems with less than 5 MWe capacity are already common within larger geothermal developments either because they are cost effective, because they fit with incremental development plans, or because they were installed early in a site's development. It concludes that small rural geothermal electric projects, while not as common, have the *potential* to achieve competitive *technology* costs in areas of the developing world, as low as $0.05/kWh (busbar).

A 1996 assessment by the Geo-Heat Center identified geothermal resources with temperatures between 50° and 150° C located within 8 kilometers of a population center for 271 collocated cities in the western United States. Some of these resources, particularly the higher temperature ones, might have potential for off-grid or grid-supporting electric generation projects.

Major Partners: Will be competitively selected.

Funding:

	Cost to Completion ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Modular Power Systems	0.0	0.0	0.8	2.0	2.0	0.0	0.0	4.8
Cost-sharing	0.0	0.0	0.5	1.8	1.8	0.8	0.0	4.9
Total Modular Power Systems	0.0	0.0	1.3	3.8	3.8	0.8	0.0	9.7

Enhanced Geothermal Systems (EGS)

Purpose: The Enhanced Geothermal Systems (EGS) program is developing technology and methods that significantly augment the production of geothermal fields. The R&D includes: advances in rock fracturing techniques and reservoir creation; advances in reservoir augmentation/stimulation; advances in the understanding and modeling of rock fracturing and reservoir augmentation/stimulation; and advances in injection techniques. The new EGS initiative will accelerate the use of EGS technology and restore the U.S. as a world leader in this area of technology development. The project's focus will involve creation, development, and testing of a full-scale EGS prototype at an existing geothermal field, which prototype will be built in cooperation with one or more cost sharing partners.

Objectives: By 2005, develop and test a commercial-scale EGS at an exiting geothermal field in the U.S.

Status: The EGS program began in full in FY1998. DOE secured an industry partner to coordinate the program, and to coordinate with the several international EGS programs (Europe, Japan, Australia). An industry advisory panel has been created. Thus far, past U.S. efforts in reservoir augmentation and creation have been documented and studied. DOE and its industry partners have established a technology development road map and agreed on initial R&D focus areas. Additionally, an initial RFP has gone out (as a sub-topic of an existing solicitation) and a single R&D project has been selected. In FY 2000, a stand alone solicitation is planned to seek proposals from industry to develop commercial-scale EGS reservoirs in partnership with DOE.

- FY 1998: Awarded competitively selected contract for an industry partner to coordinate EGS program of with several international EGS programs (Europe, Japan, Australia).
- FY 1999: Competitively selected oan initial field R&D site industrial partner for fracturing hard rock and enhancing a existing geothermal field. Will release additional solicitation to develop a large scale EGS R&D site.

- FY 2000: Competitively select large scale R&D site. Perform site characterization and baseline well geophysical studies.
- FY 2001: Begin Fracture and Stimulation R&D; continue baseline geophysical studies. Initial well connectivity and permeability R&D.
- FY 2002: Initiate full-scale well drilling. Initiate well pressure tests; complete well connectivity and permeability R&D.
- FY 2003: Initiate comprehensive circulation flow testing; establish geophysical and geochemical monitoring R&D plan.
- FY 2004: Continue comprehensive circulation flow testing; initiate heat extraction R&D. Initiate geophysical and geochemical R&D.
- FY 2005: Complete heat extraction R&D; continue geophysical and geochemical R&D. Initiate electricity production R&D.
- FY 2006: Compete electricity production R&D; competitively select commercial operator. Issue final report from R&D contractor.

Major Partners: The EGS program has both Federal and private industry partners, and is seeking to create partnership with state governments. The U.S. Geological Survey (USGS) has agreed to provide technical expertise for EGS projects. The EGS program has assembled an industry advisory board consisting of representatives from the U.S. geothermal industry, the U.S. gas/oil industry and the USGS. All R&D projects will require an industry partner, and cost sharing from that partner.

Funding:

	Cost to Completion ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion*
Enhanced Geothermal System	0.0	0.0	3.0	5.0	8.0	3.0	3.0	23.0*
Cost Sharing	0.0	0.0	3.0	5.0	8.0	5.0	5.0	32.0*
Total EGS	0.0	0.0	6.0	10.0	16.0	8.0	8.0	55.0*

*Total to Completion includes estimates for FY 2005 and FY 2006.

Hydrogen Research

Technology Validation

Purpose: Technology Validation supports 50/50 cost-shared ventures with industry to scale-up technology from the Core Research and Development programs. This information is critical to prove technology issues such as materials of construction, safety, efficiency, emissions, life cycle cost analysis and maintainability.

Objectives: Complete the fabrication and installation of hardware for remote and distributed power generation, refueling stations for dedicated hydrogen vehicles, and cogeneration systems for arctic applications. The data from these installations will be used to validate our codes and standards activities with appropriate code organizations.

Status: The release of the solicitations are expected in the second quarter of 1999 with awards to be made by the end of the third quarter.

Major Partners: Sunline Transit, South Coast Air Quality Management District, City of Palm Desert, SRT Group, National Power Corporation, Teledyne Brown Engineering, and Northwest Power Systems.

	Cost to Completion ($M)							
Project Information: Technology Validation Projects	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Renewable/Hydrogen Utility System	0.9	0.7	1.0	0.4	0.0	0.0	0.0	3.0
50 kW Proton Exchange Membrane Fuel Cell & Refueling Station	0.0	2.3	2.3	0.6	0.3	0.3	0.0	5.8
Palm Spring Renewable Hydrogen Production	1.2	0.3	0.4	0.3	0.0	0.0	0.0	2.2
PEM Fuel Cell Cogeneration System	1.0	1.0	1.2	0.0	0.0	0.0	0.0	3.2
Total Technology Validation Projects	3.1	4.3	4.9	1.3	0.3	0.3	0.0	14.2

Hydropower Program

Advanced Turbine Engineering Design

Purpose: To develop detailed engineering designs of hydropower turbines with improved environmental performance to maintain dissolved oxygen levels of at least 6 mg/liter.

Objectives: The specific objective of this activity is to complete one or more competitively-selected engineering designs of turbines with advanced dissolved oxygen features, leading to full-scale prototype fabrication and testing at one or more operational hydropower sites.

Status: This activity is currently in the planning stage. Industry partners will be competitively selected in FY 2000, with prototype testing completed in FY 2005.

Major Partners: To be competitively selected.

Funding:

Project Information	Cost to Completion ($M)							
Advanced Turbine Engineering Design	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion*
DOE Funding	0.0	0.0	2.0	5.0	5.1	2.0	1.0	16.1*
Cost-Share	0.0	0.0	0.4	2.0	2.0	0.5	0.0	4.9
Total Advance Turbine Engineering Design	0.0	0.0	2.4	7.0	7.1	2.5	1.0	21.0*

*Includes estimates for FY 2005.

High Temperature Superconducting R&D
Superconductivity Partnership Initiative

Purpose: The purpose of the superconductivity partnership initiative is bring the energy, environmental and economic advantages of superconductivity to the electric power system of the next century by developing and installing the first superconducting versions of key power system components.

Objectives: The objectives are to develop and operate the truly first-of-a-kind versions of transformers, motors, flywheel energy systems and magnetic separation systems. The present seven major active projects began FY 1997 through FY 1999 and will be completed in FY 2002.

Status: All projects are on schedule.

- Start Date: 1993
- Completion Date: FY 2002
- FY 1999: Operate worlds first 1000 horsepower superconducting motor . Supply power to factory complex with superconducting cable.
- FY 2000: Install superconducting cable to serve downtown Detroit neighborhood.
- FY 2001: Supply electricity to manufacturing facility through superconducting transformer. Test advanced (current limiting) transformer and test flywheel electricity system.

Major Partners: ABB, Pirelli Cables, Rockwell International, DuPont, Southwire, Waukesha Electric, and Boeing.

Funding:

	Cost to Completion ($M)							
Project Information	Prior Years	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total to Completion
Superconductivity Partnership Initiative Major Active Projects	15.9	8.8	8.5	2.8	0.0	0.0	0.0	36.0
Cost-sharing	15.9	8.8	9.4	2.8	0.0	0.0	0.0	36.9
Total SPI Projects	31.8	17.6	17.9	5.6	0.0	0.0	0.0	72.9

ENVIRONMENTAL CONCERNS

Mr. Packard. The Committee continues to be concerned about the environmental impacts that renewable energy technologies have on endangered species and the by-products of certain renewable energy manufacturing plants. These problems include the bludgeoning and burning of eagles in wind turbines and solar thermal systems, the adverse impact on the fragile desert environment needed to install solar panels, solar thermal projects and wind farms and the production of toxic chemicals including arsenic, gallium and cadmium in factories that make photovoltaic cells. Please provide a description of these and any other known adverse environmental impacts that renewable energy technologies have on our environment.

Mr. Reicher. Discussion of environmental impacts of renewable energy development and use is provided by technology below.

Photovoltaic Energy Systems - Overall, the manufacture, deployment, use and retirement of PV cells is a highly benign technological endeavor. With respect to the use of arsenic, gallium, and cadmium in the manufacture of certain photovoltaic cells, numerous studies at Brookhaven National Laboratories have shown that these elements do not leach out of, or otherwise escape from, the photovoltaic cells during the service life of the cells. Additionally, PV manufacturers, with the help of Brookhaven, have developed standard procedures for the safe retirement of cells made from these materials. During manufacture of the cells, caution must be exercised to prevent escape of dangerous concentrations of precursor gases into the atmosphere. This is done through standard toxic gas containment and scrubbing techniques that are now standard in the semiconductor industry.

Concentrating Solar Power technologies have very minor impacts on the environment. Numerous environmental studies have been conducted, including those for siting the various concentrating solar power facilities. Minimal impacts result from such installations. Land surrounding these sites, which provides natural vegetation and wildlife habitat, remains undisturbed. There is no evidence of birds of prey being burned to death by flying into the solar beam. On an extremely rare occasion, Occasionally, a small bird will fly into one of the glass mirrors (heliostat) and be killed, just as happens occasionally with ordinary building windows, but this is extremely rare.

Biomass Power Systems - based both on research and on biomass energy demonstration projects currently underway, it appears that the production and use of biomass for renewable energy is environmentally benign or even beneficial if the technology is applied in the manner being recommended by DOE's biomass energy programs. The precise extent of environmental benefits will depend upon site, technology, and feedstock selection. The Department continuously assesses the environmental performance of it's biopower projects. For example, an Environmental Impact Statement (EIS) is currently being prepared for a Minnesota biomass project planning to gasify alfalfa stem residues. While the EIS will not be finalized until later in CY 1999, no environmental issues have yet been identified that would negate the substantial benefits in the areas of air and water emissions, wildlife habitat and from producing farm-grown energy resources.

The threats to the community and environment from wind energy are quite limited. Potential impacts include acoustic noise from wind turbines, visual impacts, and impacts on avian life. However, the relative impacts of wind energy compared with other energy sources must be put in perspective. The issue of concern to many environmental groups is the impacts of wind development on local and migratory bird populations. Avian impacts have proven to be highly site specific, with the majority of the concern in the United States surrounding one area of development in California. Research on avian issues with wind energy is showing that careful selection of sites and technology options, such as tower type and rotational speed, can greatly reduce potential for impact on avian life.

Concerning acoustics and visual impacts, again these must be considered on a case by case basis. New wind projects being built in Iowa, Minnesota and Texas, are being well accepted, with little if any complaints arising from visual or acoustics problems. The recent Ponnequin wind farm in Colorado has been well received by local residents. We expect that renewable energy development and use will occur in a manner in which environmental impacts are in compliance with all laws and regulations and thus have only incidental impacts.

Geothermal resources produce fluid from the earth that carries with it many naturally-occurring chemicals. At certain concentrations, some of these chemicals can become environmental concerns. Several geothermal plants produce hydrogen sulfide gas that must be remediated. The control systems in use today eliminate 99.9% of the hydrogen sulfide emissions and meet stringent California air quality standards. The products from hydrogen sulfide control and any other chemicals are typically disposed by reinjection into the underground geothermal reservoir. Reinjection of cooled geothermal fluid is critical to maintaining the pressure and productivity of geothermal systems; however, fluid injection can on occasion induce microseismic activity in geothermal fields. These microseismic events are measurable with sensitive instruments, but they cannot be felt at the surface, and they incur no damage. In some geothermal fields, a large net withdrawal of geothermal water has caused subsidence of the ground surface. The greatest subsidence of a geothermal field has occurred in Wairakei, New Zealand, where there is no injection to replenish the reservoir water. In the United States, the common practice of injection has largely counteracted subsidence, and there have been virtually no environmental impacts even in flat terrain such as the Imperial Valley of California. Geothermal developments occupy a surface area of about 5 acres per megawatt for wells, pipelines, and power plants, one of the lowest life-cycle land uses of any energy source. Commonly, several wells are drilled from a single surface location, and re-vegetation of disturbed surfaces remediates much of the surface impact.

Hydroelectric power can adversely affect fish populations by causing physical injury, creating a barrier to fish movements or reducing fish habitats in the river. Barriers to upstream movement can usually be overcome by fish ladders or lifts, but barriers to downstream movement have been more difficult to resolve. Downstream-moving fish must pass through the turbines, over the spillway, or through fish bypass systems, all of which can cause injury or mortality. By diverting and/or storing stream flows, hydroelectric power plants can reduce the amount of water in the stream, which in turn reduces the amount of habitat for aquatic organisms. Water discharged from large reservoirs may have insufficient levels of dissolved oxygen, which could reduce the quality and quantity of aquatic habitats. These impacts, which affect the reproductive capacity of fish or kill individuals, could lead to reduced fish populations. The DOE Hydropower Program is aimed at mitigating these effects by reducing turbine induced fish mortality to 2% or less and maintaining dissolved oxygen levels of at least 6g/liter.

SOLAR PROGRAMS

PHOTOVOLTAICS

Mr. Packard. How have the industry and markets for photovoltaic energy systems changed since the early 1980s?

Mr. Reicher. In 1980, the U.S. photovoltaic industry was very small. Total sales were 2.5 megawatts (MW) versus 53.7 MW sold in 1998. These companies were entrepreneurial in nature and still in the invention stage of development. The primary end-use market was for small stand-alone applications such as navigational aids, water pumping and remote radio repeaters. The U.S. industry dominated the market in 1980, with 76 percent of total world sales. Japan, which sold only 500 kilowatts in 1980, had 15 percent of the market. By 1985, total world sales had grown from 3.3 MW to 20.5 MW. The primary end-use market was still remote stand-alone applications, but consumer products such as calculators and walk lights had grown to represent 33 percent of the end-use market. Most of the consumer products were being manufactured in Japan which allowed them to take over the lead in total world sales. In 1985, the U.S. share of the market had dropped to 37 percent compared to Japan's 40 percent.

The U.S. PV industry experienced steady growth through the late 1980s and early 1990s. In 1993, the U.S. industry recaptured the world lead in sales from Japan with 22.4 MW of sales versus 16.7 MW in Japan. The U.S. market share reached 44 percent of total world sales in 1995. The growth was attributable to sales of power modules for stand-alone systems in less developed nations. Exports of photovoltaic products now comprise 70 percent of the total U.S. sales. Most recently, since 1995, heavily subsidized residential solar roof programs in Japan and Europe have been changing the dynamics of the market place. The market for PV roofs in Japan alone grew to almost 30 MW in 1998, more than doubling their industrial capacity. Japan is now poised to recapture the lead in total sales within the next year. This residential roof top market is expected to continue to grow in the near future.

Mr. Packard. How has the composition of the industry (i.e., size of the companies making photovoltaics) changed over the last 15 years?

Mr. Reicher. In 1983, the U.S. photovoltaic industry was comprised of a mix of small independent companies or small subsidiaries of large companies. The largest of these companies and subsidiaries manufactured less than five megawatts of product. Most of the companies in 1983 were producing only a few kilowatts of product. They were, as a whole, financially insecure and of the 15 manufacturers in business in 1983, nine have gone out of business and four have been bought out by foreign investors.

Today, the U.S. PV industry has solidified into six companies representing 98 percent of total sales. There are an additional seven companies that manufacture less than 100 kilowatts per year. As a whole, the U.S. PV industry is comprised of relatively small manufacturing plants that produce 20 megawatts or less. While the industry is small, the U.S. photovoltaic industry has been growing at an average annual rate of 24% over the past eight years. The companies with

recorded cell and modules shipments in 1998 are provided below.

U.S. PV Cell/Module Shipments*
By Company (MW)

Company	Shipments
Siemens Solar	20.0
Solarex	15.9
AstroPower	7.0
ASE Americas	4.0
Solec International	4.0
United Solar Systems	2.0
Entech	0.1
Other**	0.5
Total	53.5

* PV News Vol. 18 No.2 February 1999
** Amonix, PV International, Iowa Thin Films, Midway Labs, Evergreen, EPV

Mr. Packard. What types of companies are manufacturing photovoltaics, who are they, and how large are they?

Mr. Reicher. The companies manufacturing photovoltaics are small technology companies with interests in energy supply, or small subsidiaries of larger companies with interests in energy supply, electronics or aerospace. The small technology companies (all U.S. owned) with revenues in 1998 of $10 million or less are United Solar Systems, Entech, Amonix, PV International, Iowa Thin Films, Midway Labs, Evergreen and EPV. AstroPower, the largest of the small independents, had revenues in 1998 of approximately $35 million. The four subsidiaries manufacturing photovoltaics in the U.S. are: Siemens Solar, owned by Siemens Corporation; Solarex, owned by British Petroleum and Enron; ASE Americas, owned by a German aerospace conglomerate; and Solec International, owned by Sanyo. In 1998, Siemens Solar had revenues of approximately $100 million, Solarex approximately $75 million, and ASE Americas and Solec International each had revenues of approximately $20 million.

PHOTOVOLTAIC

Mr. Packard. Since the companies that sell the majority of photovoltaics are large, multinational firms (e.g., Siemens, Kyocera, British Petroleum), why is the Department funding their research and development efforts?

Mr. Reicher. Under United States law, competitive solicitations must be open to all U.S. registered companies. Kyocera, and other firms without substantial U.S. operations, do not receive DOE funding. The PV program supported research with 130 different organizations outside of the national laboratories in FY98 including universities, small and large businesses. We have done well in keeping a balanced, diverse mix of research partners, focused on producing quality research. Over 90% of PV program contracts are competitively awarded on the basis of the technical merit of research proposals, reasonable cost and the level of cost sharing offered by the research partners. We support R&D proposals that have the best potential for breakthroughs in technology whether they come from large companies or small. Where appropriate, the PV program seeks cost sharing from both large and small private sector research partners, with the cost-share requirements generally rising as the research becomes more applied. In the case of Siemens and British Petroleum, their cost sharing has always been 50 percent or more of the total contract value. In addition, these companies provide U.S. jobs and benefit the U.S. economy.

Mr. Packard. Currently, consumers are buying a significant number of photovoltaic powered devices used for the purposes including communications, buoys, and oil rigs. Are photovoltaics for these applications subsidized by DOE? If the Department is subsidizing these products, how is that a proper role for the Federal government? Why is DOE providing funding when a significant market already exists?

Mr. Reicher. The Department does not subsidize the applications cited. The applications cited are produced and marketed by the manufacturers on their own.

Mr. Packard. In addition to subsidizing the niche photovoltaic markets, the Department has been pursuing the goal of using photovoltaics to displace grid power. Since photovoltaics currently generate electricity at 23 cents per kilowatt hour, while traditional generation such as natural gas- and coal-fired plants cost about 3 cents per kilowatt hour, why is the Department continuing to fund research in an area where photovoltaics are not close to being competitive?

Mr. Reicher. While base generating capacity can be as inexpensive as three cents per kilowatt hour in some areas, peak power rates are much higher - sometimes in excess of 20 cents per kilowatt hour. Moreover, the costs for base generating power do not include the sometimes substantial cost of transmitting and distributing it to the user. Photovoltaics generates needed power at the customer's site, where it competes with retail prices of power (often 10 cents per kilowatt hour and higher). The cost of photovoltaics has dropped significantly in recent years and, with continued support for a strong R&D program, is projected to drop even further. By 2010 the price of photovoltaic generated electricity is expected to be competitive with conventional sources of power in remote locations, rural areas where transmission and distribution is high, and urban and suburban areas where transmission and distribution systems are congested.

MILLION SOLAR ROOFS

Mr. Packard. What is the average actual output (not capacity) of a residential solar roof installation?

Mr. Reicher. The Million Solar Roofs Initiative includes both photovoltaics and solar thermal energy systems. The Department is using 1 kW as the average system size for photovoltaics, which produces an average monthly output of 140 kW hours of electricity. A typical solar water heater produces the equivalent of a 2 kW photovoltaic system, an average monthly output equivalent to 280 kW hours.

Mr. Packard. What is the Department's estimate for the total unsubsidized cost of the average residential system? The total cost should include module (or shingle), inverter, supporting structure, installation, hook-up, maintenance, insurance and any other incidental costs.

Mr. Reicher. The current estimated unsubsidized cost for a 1 kW installed photovoltaic system in 1999 is $7,000, not counting maintenance and incidental costs which will vary, but are not significant. The estimated cost in 2010 would be approximately $3,000 for a 1 kW system. The current estimated unsubsidized cost for an installed residential solar hot water heater is $3,000. The estimated cost in 2010 would be approximately $1,500 for that same system.

Mr. Packard. What capacity factor should be applied to a photovoltaic installation?

Mr. Reicher. The capacity factor for a photovoltaic system, and a solar hot water system, varies depending on where the system is installed. For example, the capacity factor for a system installed in Arizona would be higher than a system installed in Maine. To answer your question we will use the national average, which is 20%.

Mr. Packard. Using the total unsubsidized cost described above, what would the total cost be to install a million residential "solar roofs"?

Mr. Reicher. The total cost of one million systems (photovoltaics progressing in average installed size from 1 kW to 4 kW out to 2010, and 2 kW equivalent solar water heaters), based on the declining cost over the next ten years for both photovoltaics and solar hot water systems -- is estimated to be approximately $6.8 billion.

Mr. Packard. Using the above capacity factor, what is the Department's estimate of the effective total capacity of a million solar roofs (in megawatts)?

Mr. Reicher. The total installed capacity of one million systems - - half photovoltaic systems and half 2 kW equivalent solar water heaters -- would be 2,500 MW. These systems would achieve their maximum output (2,500 MW) at the time of day that usually coincides with the peak system load, and therefore produce premium power for the system. However, a capacity factor of less than 100% indicates that these systems are operating at a lower output, or not at all, during certain times of the day. For one million solar roofs producing 2,500 MW peak

capacity, using a capacity factor of 20% results in the energy equivalent to a 500 MW plant running continuously.

Mr. Packard. Last year, the Department estimated that the total Federal cost would be $100,000,000. Is this the current estimate?

Mr. Reicher. No, we have revised this estimate. The current estimate for the Million Solar Roofs Initiative is that the total Federal cost will be $30,000,000.

Mr. Packard. This year's budget justification cites that $5,000,000 was spent on the million solar roofs program in fiscal year 1998. How was this money spent?

Mr. Reicher. In FY 1998, there were no funds directly spent on the Million Solar Roofs Initiative. However, 9 State and Community Partnerships were formed that include preliminary commitments for a total of 506,000 solar roofs by 2010. The $5,000,000 in FY 1998 was funding for the TEAM-UP program which is a DOE effort to catalyze the market for solar energy systems working through utility and energy service company partnerships around the country. These funds were not directly part of the Million Solar Roofs Initiative, but did support activities to install photovoltaic systems on buildings.

Mr. Packard. What amount is the Department requesting in fiscal year 2000?

Mr. Reicher. The Department is requesting $3,000,000 for FY 2000.

Mr. Packard. Please provide a detailed itemization of how the Department plans to spend this money. Who will receive this funding?

Mr. Reicher. In FY 2000, we will significantly expand work on financing mechanisms, measurement and evaluation, technical standards and infrastructure such as net metering capability in support of the State and Local Partnerships. Technical assistance will be provided to the Partnerships to familiarize them with solar energy technologies and evaluate their capabilities and limitations and will support consumer education efforts through the Partnerships and in conjunction with utilities. General training and technical assistance will be provided to Partnerships, utilities, industry groups, financial institutions and government entities. Establishment of a national MSR registry jointly with state and local governments, utilities and other MSR partners will be fully implemented. The funding level is appropriate based on comparative analysis of similar activities. It also fulfills strategic objectives in the Presidential Initiative's Action Plan. Approximately two-thirds of the funding, or $2,000,000, will be used for barrier removal work and partnership development by the DOE-approved State and Local Partnerships that are currently in place. The remaining one-third, or $1,000,000, will be used on national efforts to remove barriers to the use of solar energy including, for example, the development of financing programs specifically for the million solar roofs, establishment of net metering, elimination of restrictive codes and covenants, and establishment of uniform interconnection standards for connecting photovoltaic systems to the utility grid. These million solar roofs activities will be integrated with technical research carried out in other DOE programs.

Mr. Packard. The Department has announced that it has a considerable number of commitments already for this program. Please provide the original schedule for this initiative. Are current commitments consistent with the original schedule? Are current installations consistent with the original commitments?

Mr. Reicher. The original schedule for the Initiative had a total of 10 Partnerships established in 1997, 15 additional in 1998 and 25 additional in 1999 for a total of 50 Partnerships by the end of 1999. Solar energy systems installed were projected to be 2,000 in 1997; and an additional 6,500 in 1998 and an additional 15,000 in 1999 for a total of 23,500 by the end of 1999. The Department has adjusted the benchmarks for Partnerships to reflect fiscal year instead of calendar year metrics, while leaving the installed systems benchmarks the same. They are now as follows:

	FY 1998	FY 1999	FY 2000	FY 2005	FY 2010
Partnerships	10	25	50	200	325
Solar Energy Systems (in thousands)	8.5	23.5	51	376	1,014

At the end of FY 1998, nine Partnerships had been established, and the Initiative is on a pace to meet the goal of 25 Partnerships by the end of FY 1999. As of March 1, 1999, six additional Partnerships had been established bringing the total to 15 Partnerships. The Initiative will begin operations of the MSR Registry to track installations of solar energy systems by the end of April, 1999. Since no registry existed prior to this time, the Initiative has depended on estimates from the Energy Information Agency and the solar energy industry for systems installed. As of today, EIA and the industry estimate that approximately 30,000 solar energy systems have been installed since the announcement in June, 1997. This slightly exceeds the original goal.

BIOMASS

Mr. Packard: The Department's budget includes increases related to cogeneration plants. What technologies have yet to be demonstrated? What other DOE programs exist in the development of cogeneration plants? Are other federal agencies doing similar work?

Mr. Reicher: The Department has requested funding for cogeneration activities in the Interior and Related Agencies FY 2000 budget request. Cogeneration, or combined heat and power, has been a line item funded under Interior since 1978. The program has had many facets; in the first ten years it supported technology development of a variety of systems including organic ranking cycles, large slow speed diesels(>20MW); thermionic systems and other technologies. Through the mid-eighties it also provided technical outreach on cogeneration in support of PURPA. In the nineties the principal focus has been technology development, primarily gas turbines. In 2000, the Advanced Turbine Systems Program will end with the successful development and deployment of a new generation of gas turbines for cogeneration and industrial power generation. During the last few years, as debates utility re-structuring have occurred and people are pursing high efficiency, low emission systems, there is a new emphasis on cogeneration. An ongoing program is funded at $1 million per year, to work on reducing regulatory barriers to cogeneration systems. Barriers which prevent cogeneration deployment, include environmental permitting, local and state siting requirements, exit fees and other issues.

In the FY 2000 budget the Department has requested funds to complete the ATS program, to educate about the benefits of cogeneration and to work on further technology development such as microturbines and improved ceramic materials for engines.

What is not in the budget are demonstrations of a variety of cogeneration systems to establish how new technologies can improve cogeneration use, how these systems can operate in a open distributed generation market and how industry needs non-biased data on system performance. No work is being done to utilize District Heating and Cooling systems with cogeneration. No development is targeted at other new prime movers like reciprocating engines or at unique hybrid cogeneration system development.

There is also interest in the Federal Energy Management Program and Buildings programs to initiate a federal program on cogeneration and a program targeting cooling systems for buildings. Other agencies do not have specific programs on cogeneration. Some military and Defense A Dvanced Research Project Agency(DARPA) work on advanced ceramics and engines offer technologies which may be used in new cogeneration applications. DOE sits on several advisory boards at DARPA, the National Institute of Standards and Technology(NIST) and the National Aeronautics and Space Agency(NASA) to help with this technology transfer.

COORDINATED BIOMASS ENERGY RESEARCH AND DEVELOPMENT PLAN

Mr. Packard. The Department has announced that it is working with other Federal agencies to put together a coordinated plan to promote biomass power generation and fuel production. Please provide a brief description of the overall Federal plan to promote biomass energy research and development.

Mr. Reicher. This initiative will build on existing Department programs in biofuels transportation, biopower utilities, and bioproducts to grow a much stronger integrated bioenergy industry. It is also our intent to strengthen our alliance with DOE's Energy Biosciences Program. Input from major private sector company leaders has been obtained to develop a collective vision for this bioenergy industry. Leaders from a wide range of related industries including the utilities, forest products, chemicals, ethanol, and agriculture have participated in this undertaking. The Department of Agriculture and the Environmental Protection Agency have also participated in the visioning process. Through an interactive analytical process, technical platforms will be developed that identify major technical pathways, synergies among the different approaches, and critical gaps that are barriers to the integration effort. We will continue to work with industry to define markets, technology and policy priorities, and implement research, development and deployment programs that address top priority needs. It is our long-term goal to develop a range of cost effective bioproduct options so that a ton of biomass will be marketed and traded much as a barrel of oil is refined and sold today.

Mr. Packard. Please provide a list of all the Federal agencies with biomass programs.

Mr. Reicher. The Department of Energy has three biomass programs within the Office of Energy Efficiency and Renewable Energy: the Office of Industrial Technologies has biomass activities in its Agriculture and Forestry Industries of the Future Program, the Office of Power Technologies is responsible for the Biomass Power Program , and the Office of Transportation Technologies has research and development of Biofuels Energy Systems. In addition, the Department's Office of Science conducts basic research that supports bioenergy development. The U. S. Department of Agriculture's Agricultural Research Service conducts research on feedstocks and conversion technologies while the Forest Service conducts research on forest management and utilization. The Environmental Protection Agency (EPA) has programs in biomass power and utilization of methane from landfill gas and recovery and animal wastes. EPA also has regulatory programs that effect DOE programs, such as reformulated gasoline (RFG). Other agencies that have interest in biomass research and development include National Science Foundation (NSF), The Department of Defense (DoD) and The Department of Commerce (DoC).

Mr. Packard. How will the Department eliminate duplication?

Mr. Reicher. It is our intention to establish a coordinating working group with DOE, USDA, EPA as core members.

Mr. Packard. What distinct role will the Department assume?

Mr. Reicher. It is our intention to assume a lead role in this effort, consistent with our mission. Historically, the Department has provided basic research and applied research and development support to help provide the technology that will make a cost effective industry possible.

Mr. Packard. What activities would the Department relinquish to other Federal agencies?

Mr. Reicher. It would be premature to identify programs that might be relinquished. However, we will work closely with the Department of Agriculture and the Environmental Protection Agency to assess Federal roles as they relate to the Bioenergy Initiative. The Department would expect to continue to support research, development and demonstration activities for fuels, power and chemicals from biomass resources.

Mr. Packard. What funding consequences would result from these changes?

Mr. Reicher. Its premature to speculate on changes to our budget, or other Federal Agencies' budget requests to Congress. An important part of this process is the input we are obtaining from industry, states, environmentalists, and other Federal agencies.

Mr. Packard. How does the Department propose spending the $6,000,000 requested for this effort?

Mr. Reicher. Increased collaboration among industry partners, stakeholders, DOE programs, and DOE laboratories is resulting in converging opinions on an industry R&D agenda, and will lay the foundation for accelerating the development and use of diverse energy feedstocks. We plan to issue a competitive solicitation for integrated bioenergy projects that will demonstrate the viability of integrated biomass processing. Candidate proposals will likely identify opportunities for optimizing synergies and lowering costs to produce biomass power, biofuels, and bioproducts. An important initiative step will be to launch some targeted analyses on major topics of interest to government and industry. This evaluation combined with the industry roadmap will help determine priorities.

INTEGRATED PROCESS DEVELOPMENT

Mr. Packard. The Department has requested $11,500,000 for integrated process development. How will this funding be spent?

Mr. Reicher. The integrated process development activities are designed to develop the technology base needed to support the development and demonstration of the leading ethanol technologies through the major program industrial partners. This program area supports most of the core R&D activities and personnel at the National Renewable Energy Laboratory. Planned spending will include lignin process development and testing for $2,000,000 that is needed for higher value lignin based fuels and lignin at existing boilers (Quincy, Gridley, Sealaska, and Masada projects); dilute acid cellulose hydrolysis with softwood wastes for $2,000,000 (Sealaska, Quincy, and Gridley); pilot plant operations in support of industrial partners for $1,500,000; enzymatic process development for $2,000,000; ethanol process engineering and analysis for $2,000,000; co-products and by-products utilization research designed to improve overall ethanol economics for $1,000,000; and DOE's broad area competitive solicitations planned to select advanced innovative technologies for $1,000,000.

Mr. Packard. Why is this work independent and in addition to the demonstration projects?

Mr. Reicher. Funds in this area do not go directly to demonstration projects, but rather support research activities that will either fill technology gaps identified by NREL and a specific individual industrial partner or a group of partners. These activities often lead to an improvement of individual process step efficiencies that achieve integrated process optimization. Some of this work is performed under CRADAS that include confidentiality agreements. This program area is critical to the successful implementation into the marketplace for cellulosic ethanol technologies.

BIOMASS FEEDSTOCK DEVELOPMENT CENTERS

Mr. Packard. The Department has requested $4,000,000, a 150% increase for Biomass Feedstock Development Centers. Is this premature considering the work being done to coordinate responsibilities between Federal Agencies?

Mr. Reicher. The Department has historically requested and received funding for feedstock development centers. The work has been coordinated with the USDA. We consider it appropriate to request funds to fully support the Biomass Feedstock Development Centers for research that will result in the development of biomass crops. Feedstock Development Centers are "virtual" centers. The term is used to imply that the multiple components of research needed to develop a specific crop within a specific region is integrated and coordinated among several existing institutions. There is no effort or plan to create or construct Centers for the various major growing regions of the United States. We estimate that a fully funded Center for any region would require a minimum of $1,000,000 to cover the breeding, field trials, physiology and biotechnology research and development.

Mr. Packard. What is being proposed for fiscal year 2000 that was not being done in the current fiscal year?

Mr. Reicher. The request of $4,000,000 for the Biomass Feedstock Development Centers is to fully support the research required to develop a species as a crop for fuel, power, and chemical production on a range of sites in the various regions of the United States. The current year's limited funding has resulted in a number of research gaps. The research gaps include field trials to evaluate performance of species on some of the poorer sites that have potential, physiological studies to understand nutrient requirements to determine the optimum levels of fertilizer inputs, studies to understand the dynamics and mechanics of carbon sequestration, and studies on disease and pest resistance to improve survivability and assurance of feedstock supply.

REGIONAL BIOMASS ENERGY PROGRAM

Mr. Packard. The Department has requested $1,500,000 for biofuels production resource activities including analyses of local, State and regional nontechnical issues. For what nontechnical issues does the Department propose performing analyses?

Mr. Reicher. The Department's analysis of regional, nontechnical issues involves identifying barriers to the deployment of bioenergy technologies. These barriers may include assessing local and state regulations, environmental issues, feedstock availability issues, siting and permitting issues, and farming, forestry, and waste management practices that may impact on the successful development of bioenergy facilities.

Mr. Packard. For all of the activities proposed under the Regional Biomass Energy Program, please provide a brief description of how funds will be awarded.

Mr. Reicher. Funds are allocated to the five Regional Biomass Energy Program offices using the following formula: 1) number of states within a region; 2) population census data; 3) biomass potential within the region; and 4) ability of each region to achieve cost sharing/leveraging through request for proposals. Each region then distributes one third of funds for staff management, one third for a 50 percent matching State grant; and one third for a regional competitive solicitation.

Mr. Packard. Last year, the Committee request that the Department identify all large projects that require multi-year funding. In this year's budget, the Department has requested $5,500,000 for the Vermont gasifier, a $2,500,000 increase over the current fiscal year and a $3,950,000 increase (a 225% increase) over the amount provided in fiscal year 1998. Why wasn't this project included in the response to the Committee's question last year? When was this project started? What was the original cost estimate for this project? What cost-sharing was assumed in the original plan? Please provide a schedule of all payments made for this project. What is the current total cost for this project? What is the amount and percentage of the Federal Cost share?

Mr. Reicher: Original plans were to complete the project at the end of FY 1998. Due to a combination of financial issues with the private sector partner, Future Energy Resources Company (FERCO), and technical warranty issues with the design and construction contractor, Zurn Nepco, the project completion date was delayed by 18 months. In addition, during this delay, changes in management personnel had occurred, which resulted in changes to milestone completion dates not being brought to the attention of senior management. These delays and their impacts are now reflected in the Budget Request for FY 2000.

The Vermont Project Agreement was signed by DOE in September, 1994. The original cost estimate for the total project was $28,394,454 with a total project cost-share at completion equaling 50/50. Phase I of the project which entailed preliminary design, was planned for a 80/20 split with the Department contributing 80 percent.

At the conclusion of the current phase (Phase II) – detailed design, construction and start-up phase – DOE's cost-share is projected to be approximately 70 percent. During the transition to this phase, additional considerations have expanded the original scope of the project. Potential industrial customers of this technology have expressed a strong desire for more extensive gasifier testing, and it has become clear that, given the hours of testing required, this gasifier project represents an excellent opportunity to leverage the existing investment to evaluate a number of gas cleaning and end-use applications. These factors, combined with the delays discussed previously, have increased the total project cost estimate to its current level.

Phase III, which allows for the testing of the gas turbine and, potentially, other power generation technologies such as fuel cells, will result in a cost-share of 50/50, with the private sector partner absorbing 50 percent of the total project costs which are estimated at $60M. The estimated total cost of $60M reflects the changes to the project that were previously discussed. A schedule of payments for this project, through December 1998, are as follows:

	Amount of Payment	Date
Phase I	$ 309,475.87	2/28/95
	$ 330,019.99	3/17/95
	$ 403,997.66	5/5/95
	$ 272,633.54	6/30/95
Subtotal Phase I:	$ 1,316,127.06	
Phase II	$ 1,372,813.79	9/30/95
	$ 78,643.90	10/31/95
	$ 787,713.82	1/31/96
	$ 747,618.44	2/29/96
	$ 1,392,622.31	3/31/96
	$ 912,464.70	4/30/96
	$ 2,485,475.00	6/30/96
	$ 1,839,045.99	9/30/96
	$ 1,438,596.33	11/30/96
	$ 1,113,072.08	1/31/97
	$ 1,099,029.76	3/31/97
	$ 876,290.68	7/31/97
	$ 246,969.80	9/30/97
	$ 651,910.27	10/31/97
	$ 138,274.04	11/30/97
	$ 324,411.58	4/30/98
	$ 872,720.67	7/31/98
	$ 610,839.61	8/31/98
	$ 597,670.09	9/30/98
	$ 1,684,585.97	11/30/98
	$ 1,692,882.60	12/31/98
Subtotal Phase II:	$ 20,963,651.43	
Grand total:	$ 22,279,778.49	

The current costs to date equal $27,882,943.49. Of this total, DOE has contributed 80% or $22,279,778.49. The contribution by FERCO is $5,603,165 or approximately 20%. Estimates of current total cost of this project are $60M. The remaining funding allocation is still in negotiation. The overall Federal cost-share for the project is currently anticipated to be approximately $30M at the completion of Phase III.

Mr. Packard. For all of the biomass power system projects, please provide the following information: original cost estimates, original Federal cost-share, current cost estimates, current Federal cost-share, funding schedule, original planned plant capacity, current planned plant capacity. It appears that there are large differences between the size of the plants. How do Federal commitments compare to the relative sizes of the plants? Are Federal commitments being made to gain the best ratio between funding levels and power outputs? How are decisions made to ensure that taxpayer funds are targeted to projects that provide the most benefit to the program's mission?

Mr. Reicher: As you will note, the table below summarizes the information requested regarding original and current costs and sizes. Federal commitments to each project or plant is more reflective of the project's stage of development rather than its size. For example, in the area of gasification, the Department is examining indirect gasification at the appropriate demonstration scale of 12 MW, whereas first-of-a-kind pressurized, direct gasification with hot-gas clean-up is being demonstrated at the commercial scale of 75 MW by the Minnesota Valley Alfalfa Producers (MnVAP) project. The Vermont gasification project is at an intermediate stage of development, whereas gasification being deployed at the MnVAP project has already passed the prototype scale and is ready for full-scale demonstration. In the simplest of terms, the relative sizes of plants being developed is indicative of the relative stage of development. Generally, more proven technologies or technologies that are further along the development path receive less Federal support as measured against the total project cost. This factor translates into a measure or degree of risk associated with the total development of the project. Projects that represent the least risk, both economically and technically, are generally cost-shared by the Department at a lower level. In addition, programmatic decisions concerning cost-sharing have been carried out according to guidance provided in EPACT, Section 2603.

The Biopower Program receives input from a variety of sources that it uses to continuously evaluate and update its priorities and portfolio of projects in order to maximize benefit to its mission and to the taxpayer. As examples, the Program has recently expanded its activities in cofiring projects, development of small systems for distributed generation and village power, and in gasification projects applicable to the pulp and paper industry (the Vermont project and black liquor gasification). These actions were taken based on input from industry regarding emerging markets as well as on results from studies such as those conducted by PCAST ("Federal Energy Research and Development for the Challenges of the Twenty-First Century") and the "5-Lab Study" ("Scenarios of U.S. Carbon Reductions") which emphasized the importance of these technologies and their potential significant impact on cost-effective renewable energy supply and carbon emission reductions.

Project	Original Cost Estimates ($000)	Original Federal Cost Share ($000)	Current Cost Estimates ($000)	Current Federal Cost Share ($000)*
Vermont Gasification	28,394	14,197	60,000	30,000
Biomass for Rural Development Projects				
Minnesota Alfalfa	232,000	43,965	232,000	43,965
New York Salix (in 250MW coal fired boiler)	13,741	4,959	16,652	7,280
Iowa Switchgrass (in 350MW coal fired boiler)	10,906	5,180	15,421	7,600
Cofiring Initiative **				
GPU Seward (32MW & 147MW coal-fired boilers)	3,022	694	3,022	1,694
NIPSCO (in 194 MW cyclone boiler)	14,450	7,000	14,450	7,250
TVA Gasifier (in 272MW cyclone boiler)	16,380	8,645	16,380	8,645
NYSEG (in 108MW coal-fired boiler)	846	576	846	270
Central & Southwest (in 650MW lignite-fired boiler)	350	123	350	123
Southern Co-firing **** (in 100 MW coal-fired boiler)	2,139	964	2,139	1,400

* To project close-out.

** Figures represent EE and FE funding.

*** Not included in the FY00 budget request.

**** Not included in Fy00 budget request; funded to completion with FY98 funds on a non-severable basis.

Project	Funding Schedule FY99 ($000)	Original Planned Cap. (biomass portion)	Current Planned Cap. (biomass portion)
Vermont Gasification	3,000	12MW	12MW
Biomass for Rural Development Projects			
Minnesota Alfalfa	6,800	75MW	75MW
New York Salix (in 250MW coal fired boiler)	1,500	30-40MW	30-40MW

Iowa Switchgrass (in 350MW coal fired boiler)	1,500	35MW	35MW
Co-firing Initiative			
GPU Seward (in 32MW & 147MW coal fired boiler)	400	3MW	8MW
NIPSCO (in 194 MW cyclone boiler)	750	23MW	23MW
TVA Gasifier (in 272 MW cyclone boiler)	500	30MW	30MW
NYSEG (in 108 MW coal-fired boiler)	250	15MW	11MW
Central & Southwest (in 650MW lignite fired boiler)	350	N/A (feasibility fuel supply study)	N/A (feasibility fuel supply study)
Southern (in 100MW coal-fired boiler)	0	5MW	5MW

* Note: for GPU, NIPSCO, TVA, NYSEG - the cost sharing shown was mainly cash-basis cost sharing, substantial in-kind cost sharing was applicable and is being quantified. This should increase the cost share per project by $250,000 to $2,000,000 depending on the size of the project.

WIND

Mr. Packard. The Department of Energy and the American Wind Energy Association have justified the Department's twenty-year, $800 million wind energy spending program as a necessary program to ensure that wind energy becomes a meaningful contributor to the nation's energy portfolio. In testimony before the Congress in 1984, The American Wind Industry Association estimated that wind energy could provide 20% of the total demand of electricity in the U.S. by 1995. In reality, wind power in 1995 was 0.1%, or one-tenth of one percent. Will massive spending increases affect the affordability of coal and natural gas as compared to wind energy?

Mr. Reicher. It is not possible to predict whether the increased spending for wind energy would bring down the prices of coal and natural gas. However, increased use of wind and other renewables should act as a cost cap to increases in the market prices of these fuels through competition. With regard to the estimate from the American Wind Energy Association in 1984, we believe that this may have been taken out of context and likely refers to the size of the wind resource that might be cost-effectively developed rather than a projection of market share.

Mr. Packard. In 1982, DOE instituted a 5-year plan to terminate government funding of the wind industry. In 1997, industry sales reached $1.5 billion and grew by 27 percent a year from 1994 to 1997. Given the development of the market, when will the Department cease its funding of the wind industry?

Mr. Reicher. While the recent activity in the domestic market is encouraging, we believe that further cost/performance improvements in wind technology are needed for domestic and overseas competitiveness. In 2005, if the United States has achieved a 25 percent share of the world wind energy market, the program will transition away from aggressive technology development activities and into a reduced maintenance level, providing industry unique services such as certification testing, support for resolving crosscutting issues in the industry (such as power systems integration studies), and research to improve and maintain the analytical tools needed by industry. If the capacity goals of 2010 (10,000 MW of installed wind generating capacity in the United States) are achieved, an evaluation will be conducted to determine the appropriate level, if any, for continued Federal support for the U.S. wind industry.

Mr. Packard: In 1985, the Department published a five-year plan which was predominately a research and technology development plan. Wind energy costs have been reduced dramatically in the last decade. Today, it appears that the Department is aware that dramatic cost reductions are no longer achievable and the Department's role is to promote the domestic wind energy industry. Is this a fair statement?

Mr. Reicher: The dramatic reductions in wind energy cost have been realized primarily by development of improved technology, the application of new engineering tools, design procedures and computer techniques, the rapid improvement in manufacturing techniques and materials, and by taking advantage of economies of scale. We believe that further cost reductions and performance improvements are needed and can be realized by a program of aggressive R&D. While future wind technology improvements may not on the surface be regarded as being as dramatic as our earlier cost and performance achievements, in actuality these final advances are much more complex and difficult to accomplish. Thus, in our view, reaching these remaining goals will be as notable as our earlier achievements. But this R&D program cannot alone bring advanced technology to the market. Deployment and testing of this advanced technology in realistic operational environments are essential to verify performance, reliability and cost.

WIND

Mr. Packard: Please provide a brief description of the Next Generation Wind Turbine program. What are its goals and how do you plan to achieve them?

Mr. Reicher: The Next Generation Wind Turbine project is intended to enable U.S. industry to apply advanced technology in the development of next generation wind turbines. Its goals are to provide technology capable of 2 1/2 cents per kWh cost of energy in good wind resources. Our approach began with a number of competitively-selected conceptual designs, selection of several partners for cost-shared prototype turbine development and initiation of a multi-year industry-laboratory design and testing effort. We have two contracts underway with the Wind Turbine Company of Bellevue, Washington, and Zond Energy Systems of Tehachapi, California.

Mr. Packard. Why is the Department funding Zond Energy Systems for turbine development when Zond's parent, Enron, is a multinational corporation with annual revenues of over $20 billion in 1997?

Mr. Reicher. Zond Energy Systems (Zond) currently has two turbine development subcontracts within the Department's Wind Energy Program. One subcontract, under the Near-Term Research and Testing (NTRT) Project, is focused on improving the cost-effectiveness, reliability and maintainability of Zond's Z750 (750 kW rated power output) series turbine. The other subcontract, under the Next Generation Turbine Development (NGTD) Project, is focused on developing an advanced prototype, utility-grade wind turbine system. Zond's current next generation turbine design concept is rated at 1.5-2.0 MW power output and incorporates several innovative technologies that will result in substantial improvements in performance and reductions in weight and cost. Zond was selected for each of these subcontracts through a competitive procurement process and cost-shares 30% of the total subcontract amount.

At the time that Zond was selected for award of these subcontracts it was a privately-owned small business. In the early 1990s, Zond expanded its primary scope of business from being one of the world leaders in wind power plant development and operations to become a wind turbine manufacturer and supplier. During final negotiations of the NTRT and NGTD subcontracts, mentioned earlier, Zond was purchased by Enron and became a subsidiary of Enron Corporation. Although this acquisition had no direct bearing on the selection of Zond for subcontract award, DOE viewed Enron's association with Zond as a positive event that would add financial strength and stability to Zond and provide Zond with access to the considerable resources of Enron that would help it achieve and maintain a competitive edge in the wind energy business. Under U.S. Law, competitive solicitations must be open to all U.S. registered companies.

Mr. Packard. How much funding, in total, did Zond receive in fiscal years 1997 and 1998? What are the estimates of funding provided for Zond in fiscal years 1999 and 2000?

Mr. Reicher. For the two subcontracts together, Zond received 2.8 million dollars in FY 1997 and 3.07 million on FY 1998. We estimate funding at 3.63 million dollars for FY 1999 and 3.88 million dollars for FY 2000.

WIND

Mr. Packard. The General Accounting Office has raised concerns about the Department's plan to fund the development of a new wind company, the Wind Turbine Company. Is it true that the Department is using Federal funds to start a new business?

Mr. Reicher. The Wind Turbine Company (WTC) was founded in 1990 to design, manufacture, and sell utility-scale wind turbines. WTC employs several engineers with extensive experience in the wind industry, and focuses on the development of new, lower-cost technology. WTC's chances to successfully pursue the development and commercialization of a new wind turbine were significantly improved when it was competitively selected over several other companies to participate in the Department's Next Generation Turbine Development Project. Although WTC is a small, privately-owned business striving to commercialize its first product, it is not a new business.

Mr. Packard. How large will this company be?

Mr. Reicher. It is difficult to forecast how large WTC will be in the future. The size of the company will depend on certain business, financial, and technical factors, like the condition of the U.S. economy and energy markets, that are difficult to predict and certainly beyond the control of the Department through this one development subcontract.

Mr. Packard. Since the wind turbine industry is consolidating and increasingly consists of larger companies, does it make sense to attempt to create a relatively small company like the Wind Turbine Company?

Mr. Reicher. The wind industry has recently had some consolidation of companies and acquisitions by larger firms--most notably in the United States was the acquisition of Zond Energy Systems by Enron Corporation. However, most U.S. firms involved in the development and sales of wind technology are small companies that focus on renewable energy systems. Although these companies are typically undercapitalized and have limited resources, they maintain their competitive edge by being flexible, responsive to customer needs, willing to take more technology risks in order to achieve higher gains, and selling a limited line of high quality products. WTC, founded in 1990, also has these positive attributes. However, to increase their chances of success, WTC regularly meets with larger companies that have a keen interest in renewable energy technologies with the hope of fostering new investment and business partnerships.

Mr. Packard. What amount of funding has been spent on this effort in fiscal years 1997 and 1998? What amount is estimated for fiscal years 1999 and 2000?

Mr. Reicher. The Department's funding for this project in fiscal year 1997 and fiscal year 1998 was 1.48 million dollars and 2.4 million dollars respectively, and estimated funding is 2.44 million dollars for fiscal year 1999 and 3.78 million dollars for fiscal year 2000.

Mr. Packard. If private firms do not believe it is worthwhile to invest in the type of technology the Wind Turbine Company is developing, why does the Department believe it will be worthwhile?

Mr. Reicher. DOE selected WTC to participate in the Next Generation Turbine Development project through a competitive solicitation that involved both large and small businesses. WTC's proposal was selected for award because their next generation turbine concept showed considerable promise in meeting the aggressive cost-of-energy target established for the Next Generation project. WTC was willing to pursue a high potential, but high risk innovative concept in their proposal. WTC and many other private firms worldwide believe that it is very important to invest in the development of advanced wind technology and WTC is cost sharing these development efforts with significant amounts of their own funds (WTC is cost-sharing with 30% of their own funds. The challenges that WTC is facing in attracting investors are similar to those faced by most small businesses and certainly those involved in the emerging renewable energy industry.

RENEWABLE ENERGY PRODUCTION INCENTIVE PROGRAM

Mr. Packard. The Committee is concerned that the Department has created a multi-tiered program. What is the current estimate of applications in fiscal year 1999? What resources would be needed to fully fund all eligible applications? How is the Department allocating funds to match demand? Would the amount requested for fiscal year 2000 be sufficient to fund all eligible applications in fiscal year 2000?

Mr. Reicher. For fiscal year 1999 incentive payments, we have approximately 7.4 million kilowatt-hours of electricity produced during fiscal year 1998 by tier I (solar, wind, geothermal or closed-loop biomass generation technologies) qualified facilities that are eligible for incentive payments. For fiscal year 1999 incentive payments, we have approximately 521.5 million kilowatt hours of electricity produced by tier II (open-loop biomass generation technologies) qualified facilities during fiscal year 1998 and 305.9 million kilowatt-hours of electricity produced in prior years by these facilities that was not paid. To provide full incentive payments for the electricity produced by all qualified facilities through the end of fiscal year 1998, would require approximately $14.2 million in appropriations in fiscal year 1999. With the $4 million provided in fiscal year 1999 appropriation, we will provide full incentive payments for all electricity produced by tier I facilities and only provide incentive payments for a portion of the eligible electric production of each tier II facility. Tier II facilities will have approximately $10.2 million of unpaid electricity that they can resubmit for payment consideration in fiscal year 2000. The fiscal year 2000 budget request of $1.5 million is projected to be sufficient to fully pay incentive payments for tier I facilities. However, it will only provide incentive payments for a portion of the eligible electric production of each tier II facility (tier I facilities have priority over tier II when considered for incentive payments). Based on current information, it is estimated that an appropriation of approximately $20 million would be required in fiscal year 2000 to make full incentive payments for the electricity produced by all qualified facilities through the end of fiscal year 1999.

Mr. Packard. Please provide a list of estimated payments to each REPI recipient in fiscal year 1998 and the expected recipients in fiscal years 1999 and 2000.

Mr. Reicher. The following table contains the actual payments that were made to recipients using fiscal year 1998 funds.

1998 REPI Payments
(applied to FY 1997 electric production and prior year unpaid production)

Recipient	Energy Source	Payment (Whole Dollars)
Gainesville Regional Utilities	Solar	$135
Sacramento Municipal Utility District	Solar	$30,480
Sacramento Municipal Utility District	Wind	$107,901
Traverse City Power and Light	Wind	$13,594

Waverly Light and Power	Wind	$1,845
Clay Central/Everly Community School District, Royal, Iowa	Wind	$549
Central Valley Financing Authority	Biomass digester gas	$221,950
Snohomish County, Washington	Wood waste	$1,461,541
Glendale, California	Landfill methane	$377,106
Emerald Peoples' Utility District	Landfill methane	$58,340
Lycoming County, Pennsylvania	Landfill methane	$48,115
Pacific Northwest Generating Cooperative	Landfill methane	$99,926
University of California, Los Angeles (UCLA)	Landfill methane	$224,805
Monterey Regional Waste Management District	Landfill methane	$64,748
Jacksonville Electric Authority	Landfill methane	$29,824
Sonoma County Central Disposal Site	Landfill methane	$113,138
Total Payments		$2,853,997

Based on applications received for fiscal year 1999 payment consideration, there will be the following additional recipients: the Kotzebue Electric Association, Alaska; the Platt River Power Authority, Colorado; the New York Power Authority, New York; and the County of Dane, Wisconsin. Until we receive applications, which are due by December 31, 1999, we will not know the full list of recipients for fiscal year 2000. Based on pre-applications and subject to their facilities qualifying and applications being submitted, there may be the following additional recipients for fiscal year 2000: Akron-Westfield Community School, Iowa; Forest City Community Schools, Iowa; Sacramento County, California; and Santa Cruz County, California.

SOLAR PROGRAM SUPPORT - ELECTRICITY RESTRUCTURING

Mr. Packard. The Department chose to start another new spending program "to provide unbiased technical assessments to Federal and State officials on restructuring issues related to energy efficiency and renewable energy." Since this Administration has been an advocate of imposing higher cost energy to all consumers, including elderly on fixed incomes and single parent families struggling to pay monthly bills, what assurances can be given that realistic costs of renewable portfolio mandates are being provided to Federal and state officials? Please provide examples of unbiased technical assessments funded by this new spending program.

Mr. Reicher. The Administration advocates lowering energy costs to consumers, not raising them. To that end, the Administration submitted electricity restructuring legislation to the last Congress that would save American consumers in excess of $20 billion annually on their electricity bills. The Administration's bill contains a renewable portfolio standard (RPS), which is a flexible, market-based mechanism to encourage investment in renewable technologies that will produce clean air, reduce greenhouse gases, and produce substantial environmental and energy security benefits. The Administration's bill caps the cost of the RPS at $1.5 billion a year, to limit its potential impact on electricity prices. We believe the Administration's bill strikes the proper balance between the need to cut electricity costs, improve the environment and enhance energy security. The Department's Policy Office has conducted modeling and analysis to ensure that realistic costs are provided.

Since Congress authorized the use of funds and this program began in October 1998, several of the technical assessments the Department is funding are currently in progress and several more will be underway after the competitive solicitation awards are issued. A multi year effort is needed to thoroughly evaluate the state experiences with retail choice programs in order to determine the impacts of competition on the development and deployment of energy efficiency and renewable energy technologies. In the Department's Draft FY 1999 program plan, several essential pieces of unbiased analysis are outlined. The analysis will take place in three major categories: Emerging Trends in Retail Energy Markets: Integrated Energy Services, Green Power, and Marketing Energy Efficiency; Institutional Issues and Policy Choices Affecting the Future Development of Distributed Resources in a Restructured Electricity Industry; and Technical Assistance Activities to Disseminate Restructuring Information Widely.

Within the first category of analysis, the demand for retail energy services will be examined with respect to how that will affect high-efficiency and end-use equipment and services, distributed generation (and power quality) products, and innovative metering/communications technologies, etc. A second area of study will be conducted to examine the extent to which a customer-driven market can support the continuing development of renewable energy resources, and the implication of this for the continuing needs and rationale for other public policies to support renewables. The final area of study in this category will address the future of ten energy efficiency services industries.

The second major category of analysis will examine the opportunities for off-grid resources, such as distributed generation resources (DR). Research is needed to reduce the

technological and economic challenges associated with these resources and to increase the market acceptance of DR technologies. State regulators are beginning to consider the role of electricity distribution companies in the facilitation of markets for DR and the potential use of these resources in alleviating reliability concerns in a restructured electricity industry.

The third category of analysis in FY 1999 will focus on disseminating technical assistance information on restructuring to state officials. Various dissemination tools will be used, such as web sites, electronic newsletters, technical publications, conferences, and workshops. Technical assistance could be provided to selected states that are either implementing or considering various energy efficiency or renewable energy mechanisms.

Mr. Packard. Are there private sector businesses with the expertise needed to advance these technologies? Are there non-governmental organizations with this expertise? Are there other Federal, state or local agencies that sponsor similar programs? What will the Department be doing that cannot be done by the private sector, non-governmental organizations, or state or local agencies.

Mr. Reicher. The private sector has expertise in restructuring energy issues. However, analysis is often influenced by the economic interests of the entity funding the work. The non-governmental organizations which have interest in these issues often do not have the technical capabilities required to conduct technical assessments, and they frequently advocate specific positions on issues, which reflect the interests of their members. Other Federal agencies have interest and expertise in restructuring, but these interests and responsibilities are different from the set of interest and expertise represented at the Department. Three other agencies in particular have interest in various aspects of restructuring, however, none of them are focusing on the impacts of retail competition on energy efficiency and renewable energy technologies. The Department of Agriculture's (USDA) Rural Utility Service is concerned primarily with the impact of restructuring on rural customers and on rural electric cooperatives. The Federal Energy Regulatory Commission (FERC) has an economic regulatory interest, and is primarily focusing on wholesale power and transmission issues. The Environmental Protection Agency's (EPA) interest is primarily from an environmental protection perspective.

The Department of Energy's (DOE) role will be to provide electricity restructuring information, technical assistance, and support to states as they attempt to understand, implement, and legislate policies to help consumers and businesses capture the benefits of competition in electricity markets. DOE will facilitate the dissemination of information from the Department, the Energy Information Administration, and the national laboratories to state and local policy makers in a useful and unbiased manner. Because of its historic role in electricity technology development and facilitation of deployment of advanced energy technologies, the Department, specifically the Office of Power Technologies, has developed strong relationships with state organizations. These organizations have relied and continue to rely on this Office for providing impartial, accurate, accessible technical information on restructuring and the impacts on energy efficiency and renewable energy technologies, as evidenced by their requests for weekly information, technical reports, and participation by the Office in meetings and conferences.

Mr. Packard. Has the Office of Energy Efficiency and Renewable Energy made recommendations for the Department's electricity restructuring legislation? If so, what is the estimated cost of the recommendations? What are the costs to administer these recommendations? Would appropriated funds be requested? If so, what are the funding requirements?

Mr. Reicher. The Office of Energy Efficiency and Renewable Energy (EERE) did make recommendations to the Department's restructuring legislation on the establishment of the following provisions: a public benefits funds (PBF), a renewable portfolio standard (RPS), net metering, and distributed power. The Federal PBF would be overseen by a Joint Board composed of Federal and State officials who would set standards for fund eligibility. It would be funded through a surcharge on electric transmission, covering all power flowing through the grid, which is capped at 1/10 of one cent (1 mill) per kilowatt hour. It is estimated that a 1 mill surcharge would raise approximately $3 billion annually. States would match this amount, which would double the pool to about $6 billion, which is approximately equal to the annual public benefit spending by electric utilities in 1995. It is likely that the funds that will be needed to administer the PBF would be provided through the surcharge, not through appropriations. We have not developed any estimates about the operation of the PBF at this time. The RPS requirement was established as a flexible, market-based approach that would assure that the renewable energy goals are met in as cost-effective way as possible. Operation of the RPS requirement is not anticipated to use appropriated funds. Both the net metering and the distributed power mechanisms are requirements that are met at the state level. It is likely that evaluations will need to be done to ensure the effectiveness of all of these mechanisms, if they are implemented, and EERE is a place where this analysis could be done.

Mr. Packard. As electricity restructuring has swept across the country, various states have invested significant resources in the deployment of renewable energy technologies. Please provide descriptions of what the states are doing. What is the proper role for the Federal government? How does the Department decide which states to assist and what level of funding to provide to states?

Mr. Reicher. As restructuring has swept across the country, many states are looking for new mechanisms to invest their existing resources. To date, 14 states have enacted retail choice legislation. Twelve of those 14 have public purpose program provisions in their legislation, with 12 states enacting some variation of a public benefits funds and six enacting renewable portfolio standard provision. Three more states with comprehensive regulatory orders have also established public benefit funds.

The Department has a unique, discrete role to play in providing electricity restructuring information, technical assistance, and support to states as they attempt to understand, implement, and legislate policies to help consumers and businesses capture the benefits of competition in electricity markets.

In the past, the Department has worked with the National Association of Regulatory Utility Commissioners (NARUC) and the National Conference of State Legislatures (NCSL) to

determine the states' priorities. An organization was recently created to bring together the legislators and utility commissioners and state energy offices, along with Federal representation from DOE and EPA and FERC to facilitate discussion on electric restructuring issues. This organization, the National Council on Competition in the Electric Industry (NCCEI), helps states identify their priorities and needs on electric restructuring. NARUC, NCSL, and NCCEI all submit proposals to the Department on a competitive basis and if awarded funding, they are the ones who allocate the money to the states in accordance with their proposals. The focus of these organizations is to conduct work that can be leveraged and is useful to multiple states.

SOLAR INTERNATIONAL

Mr. Packard. Last year's appropriation under this account was provided exclusively for the U.S. Initiative on Joint Implementation. What is the status of the appropriation provided last year? Please provide a detailed description of how the funds were allocated.

Mr. Reicher. The Fiscal Year 1999 Appropriation provided $3.75 million for the U.S. Initiative on Joint Implementation (USIJI) and an additional $2.6 million in the Omnibus Budget Bill. The Committee Report accompanying the appropriation directed the USIJI to allocate $2.5 million in the following manner: $1.25 million was provided for the Federal Energy Technology Center for design and siting analysis for an electron scrubbing electron demonstration project and $1.25 million was provided for the International Utility Efficiency Partnerships, Inc. to competitively award projects continuing its leadership role in reducing carbon dioxide emissions using market-based mechanisms. The status of all the activities is provided in the following table:

Activity/Status	Amount $000
The two activities identified in the Committee Report	
Activity: Federal Energy Technology Center Status: Proposal from Virginia Accelerators Corporation has been received and is undergoing technical review.	1,250
Activity: International Utility Efficiency Partnerships, Inc. Status: Grant has been issued and first advance has been made.	1,250
Activities of USIJI	
Activity: Competitive Procurement for joint implementation project development with an emphasis on energy and industrial projects that provide large reductions in greenhouse gases. Status: Draft RFP is in preparation. Release of the RFP is anticipated by June 30 with 30 days for public response and an additional 30 days for review with contract award September 11, 1999.	500
Activity: Incremental Project Development Funds for FY 1998 Competed Cooperative Agreements Status: Planning for allocation has commenced and requests for work plans from the three selected cooperators/partners which were competitively selected in FY 1998 are being prepared. Resource allocation among these three partners/contractors is will be based on work plans and will be completed by June 30, 1999.	300

Activity: Technical Support to Project Developers, to be provided by the National Laboratories Status: Selection of National Laboratories based on technical merit has been initiated. Allocation of funds to the selected laboratories is anticipated by May 15, 1999.	150
Activity: Preparation of a Report on the U.S. Initiative on Joint Implementation to the UN Framework Convention on Climate Change Secretariat Status: Preparation has begun. The report is due to the U. N. Secretariat by July 31, 1999.	50
Activity: Project Proposal Evaluation Support Status: Planning has begun and the technical support is being identified.	30
Activity: To be allocated later among existing or new cooperators/contractors, technical support, or other agreed activities (would include items such as preparation of reports providing information on joint implementation and the printing expenses for new and existing publications and their distribution). Status: Planning for their allocation has begun. Final decisions and allocations are anticipated by July 31, 1999.	194
Activity: Program metrics and outreach activities (includes printing and publications). Status: Activities are underway.	26
Total of other activities	1,250
Grand Total of all activities	3,750

The additional $2.6 million provided in the Omnibus Budget Bill will be distributed based on competitive procurement awards. These funds were allocated to the International Solar Energy Program. The mission of the International Solar Energy Program is to encourage acceptance and use of renewable energy technologies by developed and developing countries in support of U.S. national interests and policies. The program has been redirected in response to Congressional requests to continue support for the U.S. Initiative on Joint Implementation but also to refocus activities into three broad program areas: emerging global environmental and energy issues; facilitating market and trade development; and advancing U.S. energy and environmental security interests.

A competitive process has been established to allocate these resources. The competition has begun and approximately 40 proposals are being technically reviewed. After the technical review has been completed, a program and policy review will be done. The criteria being used to evaluate the proposals are: U.S. strategic interests and policies; relevance to the DOE mission;

the level and extent of leveraging in the funding; the potential impacts on the national, regional, and global levels; the potential for replication; and the impact on U.S. competitiveness. After the review has been completed, the Deputy Assistant Secretary, Office of Power Technologies, would then make the final selections based on the recommendations made.

Mr. Packard. Please provide a description of any prior year funds available in this program. How much is available and what activities is the Department planning with these funds?

Mr. Reicher. There are no prior year funds available in this program.

ELECTRICITY RESTRUCTURING PROGRAM

Mr. Packard. The Department also sponsors international programs "to promote U.S. renewable energy technologies and services in international markets, to help ensure that U.S. companies are competitive in the large and growing global marketplace." Please provide a list and description of each program managed by EE that includes an international component. Do any EE programs benefit foreign-owned businesses? Please provide a list and description of any projects which the Department has funded, directly or indirectly, which will be built or deployed outside the United States. Please provide total costs and a complete list of partners in each project.

Mr. Reicher. The Photovoltaic Energy Systems Program in support of U.S. domestic businesses does have an international element. The international activities do not benefit non-U.S. domestic businesses. The PV Program is not funding either directly or indirectly projects to be built or deployed outside the United States.

The Concentrating Solar Power Program collaborates with the international solar community through the IEA SolarPACES. Activities include research in solar materials, hardware testing techniques, and market analysis and benefits the research of all participaing countries. The CSP Program does not directly benefit foreign-owned businesses and has not funded any projects which will be built or deployed outside the United States.

The Biomass Power Systems program itself has no direct partnerships with foreign companies nor does it currently fund any projects that will be built or deployed outside the U.S. One awardee under the Biomass Power for Rural Development program (MnVAP) has one foreign partner (gasifier supplier Carbona), and will utilize a gas turbine manufactured by Siemens/Westinghouse. Even in this instance, the MnVAP project, however, domestic partners were actively and competitively sought prior to the selection of these partners.

The Biomas Power Program is doing resource assessment and other work with the Chinese Ministry of Agriculture and other government entities under a DOE Memorandum of Understanding and US/China protocol annex; however, this information is likely to benefit U.S. exporters of conversion technology such as that being developed by the Small Modular Biopower effort.

Under the Biomass Power Program, DOE also participates in IEA activities; however, we make every effort to ensure that information is shared equally (e.g., the recent report summarizing the status of biomass gasification efforts in the U.S. and more than 10 European countries) and that co-funded efforts benefit U.S. companies or technology.

No Wind Program efforts benefit foreign-owned businesses. The Wind Program participates in the International Energy Agency Wind R&D activities, participates in certain bilateral and multilateral agreements with wind research programs of foreign governments and provides analysis and technical support to these governments as required. The Wind Program has no contracts with foreign businesses and believes that no program activities directly benefit

foreign businesses. The Wind Program has provided technical support in wind resource assessment to several foreign government ministries and government-owned electric utility companies.

The USIJI program provides technical assistance to project developers (U.S. businesses, organizations or individuals) for the purpose of minimizing the costs of taking the project "to the next level" to be accepted as a joint implementation project. The additional costs include obtaining host country acceptance, developing and utilizing analytic techniques for preparing estimates for a number of project scenarios (for example, greenhouse gas emissions with project and without project, and the primary and secondary impacts of the project) and developing monitoring and verification protocols. The analytic techniques and protocols developed for a project are also subject to a peer review by recognized experts.

TRAVEL FUNDING FOR SOLAR AND RENEWABLES ENERGY PROGRAM

Mr. Packard. Please provide an itemized list of activities in fiscal year 1998, and estimates for fiscal years 1999 and 2000. Has the Office funded any travel either for department employees or non-Department employees from any of its programs? If funding has been provided, please provide recipients and amounts for fiscal years 1977 and 1988 and estimates for 1999 and 2000.

Mr. Reicher. Travel funding for all Department of Energy employees under Solar and Renewable Energy Program comes directly out of the Solar Program Direction account, this includes funding for regional support offices as well as field office staff. Information regarding national laboratory staff travel is reflected in the following tables by program area. No funds from the program were used for travel by DOE Headquarters or field employees. Solar Buildings, Renewable Energy Production Incentive, Solar Program Support, Renewable Indian Energy Resources and Federal Buildings/Remote Power have no international travel requirements.

Program: Photovoltaic Energy Systems

International Travel Costs ($000)	FY 1997	FY 1998	FY 1999 Estimated	FY 2000 Estimated
NREL	168.0	216.0	164.0	172.0
SNL	29.0	24.0	19.0	40.0
Total PV	197.0	240.0	183.0	212.0

Program: Concentrating Solar Power (CSP)

International Travel Costs ($000)	FY 1997	FY 1998	FY 1999 Estimated	FY 2000 Estimated
NREL	5.0	25.0	14.0	12.0
SNL	35.0	30.0	25.0	30.0
Total CSP	40.0	55.0	39.0	42.0

Program: Biomass Power Systems

International Travel Costs ($000)	FY 1997	FY 1998	FY 1999 Estimated	FY 2000 Estimated
NREL	15.0	17.0	15.0	17.0
SNL	0.0	0.0	8.0	6.0
ORNL	2.5	9.0	0.0	5.4
Total Biomass Power Systems	17.5	26.0	23.0	28.4

Program: Wind Energy

International Travel Costs ($000)	FY 1997	FY 1998	FY 1999 Estimated	FY 2000 Estimated
NREL	96.4	105.3	96.8	99.0
SNL	4.9	6.8	14.9	12.0
Total Wind Energy	101.3	112.1	111.7	111.0

Program: Geothermal Energy Systems

International Travel Costs ($000)	FY 1997	FY 1998	FY 1999 Estimated	FY 2000 Estimated
NREL	0.0	1.99	0.0	10.0
SNL	6.9	0.0	0.0	30.0
INEL	0.0	33.7	0.0	30.0
LBNL	3.76	3.67	7.5	30.0
LLNL	585.0	0.0	2.0	15.0
LANL	0.0	0.0	3.5	3.5
Total Geothermal	629.5	39.36	13	118.5

Program: Solar International

International Travel Costs ($000)	FY 1997	FY 1998	FY 1999 Estimated	FY 2000 Estimated
USIJI				
NREL	0.0	15.0	10.0	25.0
SNL	10.30	11.4	9.5	6.0
CORECT				
NREL	20.96	5.	0.0	0.0
SNL	0	0	0	0
Total Solar International	31.26	31.4	19.5	31.0

Program: Hydrogen

International Travel Costs ($000)	FY 1997	FY 1998	FY 1999 Estimated	FY 2000 Estimated
NREL	32.6	44.9	32.5	29.4
SNL	11.0	5.5	11.0	15.0
ORNL	3.5	5.0	3.5	3.5
LLNL	0.0	3.5	5.0	3.5
Total Hydrogen	47.1	58.9	52	51.4

Program: Hydropower

International Travel Costs ($000)	FY 1997	FY 1998	FY 1999 Estimated	FY 2000 Estimated
ORNL	2.3	0	3.9	0.0
Total Hydropower	2.3	0	3.9	0.0

Program: High Temperature Superconducting

International Travel Costs ($000)	FY 1997	FY 1998	FY 1999 Estimated	FY 2000 Estimated
NREL	3.1	6.2	5.4	5.4
ORNL	5.8	2.7	10	10
BNL	0	2.9	3.0	3.0
LANL	2.0	9.09	3.5	3.5
Total HTS	10.9	20.89	12.9	21.9

Program: Energy Storage Systems

International Travel Costs ($000)	FY 1997	FY 1998	FY 1999 Estimated	FY 2000 Estimated
SNL	10.3	11.4	9.5	6.0
Total Energy Storage Systems	10.3	11.4	9.5	6.0

SOLAR TECHNOLOGY TRANSFER

Mr. Packard. The budget justification includes descriptions of many activities under this title in fiscal years 1998 and 1999. Please detail the funding source for these activities.

Mr. Reicher. Funding for the Energy Efficiency and Renewable Energy Clearinghouse (EREC) was received from the Interior and Related Agencies account.

Mr. Packard. Please provide a briefing description and all funding details for the Energy Efficiency and Renewable Energy Clearinghouse.

Mr. Reicher. The Energy Efficiency and Renewable Energy Clearinghouse (EREC) responds to public inquiries about Energy Efficiency and Renewable Energy technologies. In FY 1998 and FY 1999, EREC was funded at $1,150,000 from the Interior and Related Agencies account. Due to reduced funding, EREC has reduced the number the number of responses to the public from 110,000 to 60,000 year.

NATIONAL RENEWABLE ENERGY LABORATORY

Mr. Packard. Please provide the funding history for lease space related to activities at NREL for the last four fiscal years. Also, provide estimates for fiscal years 1999 and 2000. Please provide a split between space attributable to programs funded by the Subcommittee on Energy and Water and space attributable to programs funded by the Subcommittee on Interior.

Mr. Reicher. The enclosed chart shows the lease costs for NREL including leased space for the Golden Field Office and the Denver Regional Support Office for the last four years, and estimated costs for FY 1999 and FY 2000. NREL receives no funding specifically for leases. The split between Energy and Water and Interior is based on program funding received from each appropriation, but the data shown are costs.

NREL/DOE Facilities Lease Costs

NREL/DOE Facilities Lease Costs (Dollars in Thousands)			
Fiscal Year	Energy & Water	Interior	Total
1995	$2,937	$1,958	$4,895
1996	2,348	1,566	3,914
1997	2,311	1,541	3,852
1998	2,347	1,565	3,912
1999	2,489	1,660	4,149
2000	$2,023	$1,349	$3,372

NATIONAL RENEWABLE ENERGY LABORATORY

Mr. Packard. What is the status of the proposal to seek a private sector partner to build a new building at the National Renewable Energy Laboratory?

Mr. Reicher. The proposal to finance, design, and construct the Research Support Facility (RSF) at a cost equivalent to lease payments was delayed due to the competition of the Management and Operating Contract for the National Renewable Energy Laboratory (NREL). Under the terms of the contract awarded November 9, 1998, the Contractor is required to assess space needs at NREL and propose options for addressing these needs and report their findings to the Department no later than May, 1999. It is anticipated that the Contractor's report will include private sector partnerships to address NREL space needs. Construction of the RSF is anticipated to be one option discussed in the report. We will keep the Committee apprised of findings and recommendations on the matter of NREL lease costs.

GEOTHERMAL HEAT PUMP DEPLOYMENT

Mr. Packard. What was the total number of heat pumps installed in the United States over the last ten years?

Mr. Reicher. According to Energy Information Administration surveys, the geothermal heat pump (GHP) manufacturers shipped 28,094 (1994), 32,489 (1995), 31,006 (1996) and 37,156 (1997) GHP units (3.8 tons/unit). Based on an average growth rate of 10% per year before 1994 and a 20% growth rate after 1996, the estimated total number of GHPs installed over this ten year period was 278,000 (1989-1998).

Mr. Packard. Does the Department have an estimate of the number of heat pumps installed that are directly attributable to this program?

Mr. Reicher. The Department's program does not include the installation of heat pumps, and therefore we cannot claim to have affected the market directly. According to the Energy Information Administration (EIA), annual shipments of geothermal heat pumps declined in 1996, the first year of full funding under the DOE program. We estimate a 1 to 2 year lag in bringing new GHPs on-line due to planning, design, permitting and construction lead times. In 1997, EIA documented a 20% increase in shipments over 1996, and industry leaders believe this growth rate continued in 1998. Without DOE's efforts in education and outreach, along with research to reduce costs, it is conceivable that the industry would be shrinking today, since utility demand-side management programs that had provided impetus for this technology in the past have all but disappeared.

Mr. Packard. The Department did not request funding for this program in fiscal year 2000. What is the estimate for heat pump installments over the next few years?

Mr. Reicher. The Department projects that GHP shipments will continue to increase for a few more years based on the government/industry investment in the technology over the past five years and the lead times required for installing new GHPs. We estimate that up to 400,000 new units will be installed over the next five years.

Mr. Packard. The Department has signed several energy efficiency contracts offering a percentage of lower energy costs to the private sector in exchange for private sector investment in energy efficiency technologies. What is the Department's estimate of the use of heat pumps to reduce energy costs?

Mr. Reicher. The Department recently awarded five contracts for geothermal heat pumps (GHPs) under the technology-specific Super Energy Savings Performance Contract (ESPC) program, one of the most promising applications of our Federal Energy Management Program (FEMP). Secretary Richardson stated, "Federal agencies now have this exciting but little known technology, geothermal heat pumps, available to them at minimum cost and risk to help them meet their energy savings targets and cut greenhouse emissions. ESPCs provide for private sector installation of energy saving technologies, typically at no direct cost to the recipient. Installers are

compensated for their hardware costs and services by receiving a percentage of the recipient's energy bill savings over an agree-upon period of time.These contracts alone can save each site up to 40 percent on their energy bills. This innovative business and technology strategy is good for taxpayers and good for the environment." Projects performed under these contracts could provide a total of $500 million in work and about 100,000 GHPs installed in Federal facilities. Fort Polk, Louisiana, and Little Rock Air Force Base have installed over 5,500 GHPs under similar energy savings performance contracts over the past three years. At Fort Polk, statistically valid data was collected by Oak Ridge National Laboratory before, during, and after the installation of 4,000 GHPs. Peak electricity demand was reduced by 7.5 megawatts or 43% of pre-retrofit peak demand; the whole community load factor increased from 0.52 to 0.62; and the project will save 25.8 million kilowatt-hours annually, or 42% of the pre-retrofit electrical consumption for heating, cooling and water heating. Data collected by my office, in conjunction with the Department of Defense, provided the basis to establish the Super ESPC program for geothermal heat pumps.

Mr. Packard. What other Federal programs will benefit the heat pump industry?

Mr. Reicher. Aside from the FEMP program described in the prior question, we are not aware of any other major Federal effort directed solely on geothermal heat pumps. However, EPA has provided significant support and is beginning to install GHPs in their buildings. The U.S. Postal Service has installed GHPs in over a dozen facilities. The Department of Defense has dozens of sites with GHPs, and many other Federal agencies have installed GHP systems. The Department of Education included GHPs in their October 1998 "Symposium on School Design," while over 400 schools have GHP systems. Energy Smart Schools is a partnership led by the Department of Energy which has the goal to reduce school energy bills by 25% by 2010 and reinvest the savings in educating children. Geothermal heat pumps can play a significant role in helping to achieve this goal.

HYDROGEN

Mr. Packard. The budget justification includes several ongoing projects including the Montana Trade Port Authority fuel cell manufacturing facility, refueling facilities in Palm Springs and Nevada, and three projects in Alaska. Please provide a list of demonstration projects included in the hydrogen program. Provide a brief history of each project including whether the project was initiated using competitive procedures. What is the total cost of each project? What is the cost-share for each project? What amount was included in fiscal years 1997 and 1998? What are the current estimates for fiscal years 1999 and 2000?

Mr. Reicher. As part of the program's strategic planning process, business evaluations and industry interest, several demonstration activities were identified in the areas of renewable/ hydrogen systems, hydrogen infrastructure development and remote power systems. These efforts were initiated in FY 1998 and FY 1999 with the exception of the hydrogen/natural gas blends for vehicle project (included as the first item in the table below). The following table provides the data that you requested on these projects, including the Congressionally directed Montana and Nevada activities:

Projects/History	Competitive Procedure % Cost-Share	Total Cost/ DOE Cost ($000)	Prior Years	FY 1999 ($000)	FY 2000 ($000)	FY +2000 ($000)
Hydrogen/Natural Gas Blends for Vehicles FY97 Award of Unsolicited Proposal for Unique Technology	Yes 28%	880/684	463	221	0	0
Montana Trade Port Authority Specified in the FY99 Appropriations Bill	No 0%	350/350	0	240	110	0
Renewable/Hydrogen Energy Storage for Islands FY98 Solicitation	Yes 50%	982/481	92	209	180	0
Solar/Hydrogen Electricity Generation Systems FY98 Solicitation	Yes 50%	5,600/ 2,800	215	151	1,220	1,214

PV-Electrolysis-Metal Hydride Generation and Storage System FY98 Award for Solicitation on Hydrogen Business Opportunities	Yes 50%	3,456/ 1,728	39	502	841	346
Remote and Grid-Connected Hydrogen Utility Applications FY98 Solicitation	Yes 51%	9,38/ 467	95	113	139	100
Remote Wind/ Hydrogen System FY98 RAFCO Project	No 50%	6,000/ 3,000	947	700	1,000	353
Palm Springs Renewable Hydrogen Production Novation of Original Award for Renewable Hydrogen Filling station	No 50%	4,470/ 2,235	1,215	305	375	340
Nevada Refueling Station FY99 Solicitation to Comply with Appropriations Bill	Yes 50%	11,500/ 6,500	50	2,250	2,500	1,700
Industrial Fuel Cell Vehicle FY98 Award for Solicitation on Hydrogen Business Opportunities	Yes 50%	1070/ 535	45	400	90	0
Hydrogen Mining Vehicle FY99 Solicitation	Yes 50%	320/160	0	160	0	0
Fleet Refueling-Electrolysis FY98 Award for Solicitation on Hydrogen Business Opportunities	Yes 50%	3,800/ 1,900	135	675	1,000	90

High-Pressure Conformable Tanks FY98 Award for PRDA	Yes 50%	1,100/ 550	250	100	200	0
Liquid-fueled Fuel Cell for Remote Applications FY98 Solicitation for RAFCO	Yes 50%	6,400/ 3,200	1,000	987	1,200	13

HYDROGEN

Mr. Packard. How does the Department divide the responsibilities between the Office of Energy Efficiency and Renewable Energy, the Office of Science, and the programs funded by the Office of Transportation Technologies? What other Federal agencies have related programs in hydrogen fuel research and development? Please provide a table which displays all Federal funding for these activities.

Mr. Reicher. The responsibility for applied research and development for power and transportation technologies respectively, reside in the Office of Energy Efficiency and Renewable Energy (EERE). The responsibility for basic research resides within the Office of Science. In seeking applied research awards, EERE issues broad-based solicitations seeking research and development projects in the areas of production, storage and utilization of hydrogen. The Office of Science issues solicitations that broadly covers disciplines such as reacting flows, materials chemistry, and the mapping of genome. Although the applied and basic proposals are peer reviewed by experts in the respective fields, the endpoint of the research results are different. The applied projects must meet a programmatic target or milestone, while the basic projects provide knowledge which can be used by all other programs in the Department. The Agencies which fund hydrogen and hydrogen related activities are as follows:

Agency	Key Areas of Research	Current Funding ($000)
National Aeronautics and Space Administration	Analysis of benefits to use hydrogen as the fuel for subsonic aircraft in terms of emissions and efficiency improvements.	150
Department of Transportation	Provide two transit buses to California: one fuel cell bus for Sunline Transit and one hydrogen/natural gas blended fuel for U.C. Davis for generating emissions and efficiency testing.	3,100
Department of Commerce	High efficiency, low-cost PEM fuel cell systems operating on natural gas.	1,500
Department of Defense	Small fuel cell systems and hydrogen storage for marine applications and low thermal signature power systems.	42,000
Department of Energy Office of Science	Atomic/molecular level understanding of chemical, photochemical, photosynthesis and photobiological reactions involving hydrogen	3,008

Department of Energy Office of Fossil Energy	Gasification for the direct production of hydrogen, improved reforming, separation/purification technology, and Vision 21 and materials program.	11,000
Department of Energy Office of Energy Efficiency and Renewable Energy	Development of PEM fuel cells for stationary and vehicle applications, advanced reformers, biomass gasification, hydrogen storage systems and sensors.	28,951

RENEWABLE INDIAN ENERGY RESOURCES

Mr. Packard: Please provide a list of projects under construction and a brief progress report on each project.

Mr. Reicher: The following projects, undertaken by the Renewable Indian Energy Resources program as established by Title XXVI of the Energy Policy Act of 1992, are currently in progress:

Reynolds Creek Hydroelectric Project (Haida)
Capacity: 1.5 MW
Funding: FY 1996 appropriation of $2,000,000, FY 1997 appropriation of $1,000,000; cost-sharing $4.475M
Status: License application to FERC 11/25/97; application accepted 2/11/98; license expected February 1999; construction to begin June 1999; commercial operation June 2000.

Power Creek Hydroelectric Project (Eyak Native Corp.)
Capacity: 6 MW
Funding: FY 1997 appropriation of $2,000,000; additional appropriations of $1,939,000 in FY 1998 and $1,243,000 for FY 1999; cost-sharing $13.505M.
Status: FERC license issued 12/24/97; construction begun Sept. 1998; estimated start-up January 2000.

Prince of Wales Island Regional Intertie
Capacity: Transmission capacity: 34 kilovolts
Funding: FY 1997 appropriation of $1,000,000; cost-sharing $1.753M.
Status: Right-of-way partially completed; project completion expected in the fall of 1999.

Old Harbor Hydroelectric Project (Kodiak Island)
Capacity: 335 kW
Funding: FY 1998 appropriation of $800,000, FY 1999 appropriation of $383,000.
Status: FERC license estimated June 1999; completion Dec. 2000.

Scammon Bay Hydroelectric Feasibility Study
Funding: FY 1998 appropriation of $100,000.
Status: Completion Dec. 1999.

Pyramid Creek Hydroelectric Project (Unalaska Island)
Capacity: 600 kW
Funding: FY 1999 appropriation of $1,000,000; grant of $92,000 from state.
Status: Project under negotiation between Idaho Operations Office and recipient.

Sitka Diesel Backup System
Capacity: 4.5 MW
Funding: FY 1999 appropriation of $1,000,000.
Status: Completion estimated by fall 2001.

ELECTRIC ENERGY SYSTEMS AND STORAGE - TRANSMISSION RELIABILITY

Mr. Packard. The Department chose to start a new spending program to "develop advanced technologies that will enable the lowest cost efficient power delivery systems with integration of distributed resources." What does this mean? Please provide examples of the work products funded by this program in fiscal year 1999. If no work products are available, please provide a description of the anticipated work product.

Mr. Reicher. In the FY 1999 appropriations, Congress added $2.5 million in funding and directed the Department to conduct research on the reliability of the nation's electricity infrastructure. The Department's FY 2000 budget request states, "The goal of the Transmission Reliability Program is to insure an efficient, reliable power delivery system in the U.S. during the electricity industry transition to competitive markets, through development of advanced technologies that allow lowest-cost, efficient power delivery systems, and integration of distributed resources."

The Program will apply advanced communications, computing, and control technologies to obtain and use power system information to maintain the reliability of the system, and enable competitive markets under electric industry restructuring. These advanced technologies will allow maximum utilization of the existing utility infrastructure, and provide information to facilitate transactions by competing market participants on a power grid that was not originally designed for these types of transactions. In addition, the program will support integration of distributed resources such as photovoltaics, wind, fuel cells, gas microturbines and energy storage into the distribution system, providing individual customers a choice of clean, competitive energy as an alternative to central station generation. Distributed resource integration will address technical, institutional, and regulatory barriers to their deployment on the distribution system where they do not exists in significant numbers today.

There are no work products available as yet from FY 1999 funds. Anticipated work in FY 1999 falls into four research areas: Assessing reliability technology issues and needs, investigating real-time system management, integration of distributed technologies, and defining the relationship between reliability and markets. The primary work product for FY 1999 will be the development of six white papers that explore issues in the four research areas, and a workshop to review these papers and help prioritize future research. These white papers will present reliability research in the context of market economics and competition, and allow the DOE Program to develop reliability options whose adoption will be supported by financial incentives under a competitive market structure. Other work will be initiated to plan a distributed technologies test bed, and investigate system monitoring, simulation, and analysis of the ancillary (reliability) services that are fundamental to power system operation.

Mr. Packard. Are there private sector businesses with the expertise needed to advance these technologies?

Mr. Reicher. There are private sector businesses that have the expertise to apply these technologies. However, the private sector does not have the financial incentive to initiate the strategic research to insure the reliability of the electric power grid during the transition to full competition. The market structures that would provide these incentives are not yet in place due to State and Federal lag in legislation and regulation.

Mr. Packard. Are there non-governmental organizations with this expertise?

Mr. Reicher. Non-governmental organizations in the electric power industry in general do not have this expertise. The national laboratory/electric industry/university partnership formed to conduct this research, as called out in the FY 1999 appropriations language, has the technical, regulatory, and economic expertise and experience to address this multi-discipline research. However, other qualified private sector or non-governmental organizations that can contribute to the program will be sought through competitive solicitations.

Mr. Packard. Are there other Federal, state or local agencies that sponsor similar programs?

Mr. Reicher. State agencies such as the California Energy Commission (CEC) and the New York State Energy Research and Development Administration have funded electric delivery system research and may continue to do so. However, under utility restructuring, State research funds are often derived from public benefits charges on electric power sales that are authorized for a limited number of years, and tend to focus on work of immediate benefit to the State, as opposed to strategic research.

Mr. Packard. What will the Department be doing that cannot be done by the private sector, non-governmental organization, or state or local agencies?

Mr. Reicher. The Department will support long-range transmission and distribution reliability research that is available to all regions of the country, and will benefit all electric industry organizations. This research will not be performed by the private sector until a market structure is in place that provides incentives for the competitors to fund this work. In addition, the program maintains an independent technical, regulatory, and economics expertise to develop policy options to support Federal decision-making on regulations and restructuring legislation. As I mentioned earlier non-governmental organizations do not have the expertise necessary to conduct this work. State and local agencies are focused on activities with their jurisdiction, not on the regional structures and benefits that this program addresses.

HIGH TEMPERATURE SUPERCONDUCTIVITY

Mr Packard. Like every other description of an EE program, the budget justification description for high-temperature superconductivity is generously padded with paragraphs describing how many thousands of metric tons of emissions will be avoided, how nice it will be to have better efficiencies, lower costs and increased reliability. These predictions for the future supplement the "objective" stated for this program: "to achieve sufficient advances in high temperature superconductivity by 2010." What relationship is there between all these words and DOE's stated intention to establish performance goals? What does "sufficient advances" mean? Are there quantifiable benchmarks? In the Department's description of the high-temperature superconductivity program, why not mention what temperatures are considered "high-temperature?"

Mr. Reicher. The goals of the superconductivity program are to support development of high performance electrical wire and the development of energy related applications that use this wire. These goals relate to the use of "high-temperature superconductivity" materials - a special class of ceramic material that was discovered in the late 1980s that becomes superconducting (losing all resistance to electric current) when cooled to temperatures much higher than scientists then believed possible. Yes, there are quantifiable benchmarks, such as the performance goal for HTS wire is to carry 100 times the electrical current of similarly sized copper wire, while eliminating electrical resistance losses. The performance goal for applications (such as transformers, transmission cables, motors, and generators) is that they halve the size and energy losses of conventional alternatives with the same power ratings. Making 'sufficient advances" means accomplishing these aggressive goals..

In addition, there are many specific, quantifiable goals for the next several years contained in our multi-year plan and in our technology roadmap for accelerated development of "Second Generation Wire."

The term, "high-temperature superconductivity," designates a special class of materials that achieve a superconducting state (losing all resistance to electric current) at liquid nitrogen temperatures (minus 320 degrees Fahrenheit) and above. Discovery of this new class of materials in 1986 merited a Nobel prize in physics, because these temperatures can be achieved easily and inexpensively compared with previously known superconducting materials .

HIGH TEMPERATURE SUPERCONDUCTIVITY

Mr. Packard. The Department has entered into several multi-year partnerships with industry under this program. Please provide a list of these partners and agreements. What funding was provided in fiscal years 1997 and 1998? What are the estimates for fiscal years 1999 and 2000? What are the out-year funding requirements needed to meet the commitments made by the Department? Is the amount requested for fiscal year 2000 sufficient to meet the commitments made for fiscal year 2000?

Mr. Reicher. Direct funding for Large Multi-Year Projects for which funds are requested in FY 2000 are given below. In addition to the funding on collaborative projects with industry shown below, additional funding supports national laboratory research on critical technical issues that benefit these projects.

Partners and Agreements	Funding FY 1997 ($million)	Funding FY 1998 ($million)	Estimated Funding FY 1999 ($million)	Estimated Funding FY 2000 ($million)	Out-Year Funding Requirements ($million)
ABB, Fault Current Limiting Transformer	0	.61	0	1.76	2.81
Boeing, Flywheel Energy System	0	0	1.41	2.33	3.73
DuPont, Magnetic Separation System	0	0	.79	2.41	0
General Atomics, Fault Current Limiter	3.26	1.36	0	0	0
Pirelli, Transmission Cable	0	2.13	0	0	0
Reliance,1000 HP HTS Motor	4.13	2.22	3.90	0	0
Southwire, High Power Density Cable	0	1.56	2.41	0	0
Waukesha, 10 MVA Transformer	0	0.94	0	2.00	0

I feel that the amount requested is sufficient to meet our commitments to these important projects in FY 2000.

Mr. Packard. Although the Department was in a position to add approximately $123,000,000 to the level of funding provided in last year's Energy and Water Development Appropriations bill, the Department chose to cut funding for this program. While the Department continues to request 50%, 60% and 70% increases for the other programs funded by this Office, it has actually cut funding for this program. Is it fair to say that this is the lowest priority program for this Office?

Mr. Reicher. The High-Temperature Superconductivity program does not have a low priority in my Office. I am excited by the possibilities of this groundbreaking technology and am extremely impressed by the continued record of achievement. Program participants include the finest talent of our National Laboratories and universities as well as some of our finest companies, both small and large. I personally support the program, as does the Secretary, and we shall continue to request the resources necessary in future budgets to continue this exemplary record of accomplishment.

ENERGY STORAGE SYSTEMS

Mr. Packard. Another EE program objective is "to achieve sufficient component and system integration improvements by 2010 -- Advances will result in commercial availability of energy storage systems for large scale power quality and solar or wind applications from at least three companies." What storage systems are commercially available today? How many companies produce energy storage systems? What is the difference between an electricity device that stores electricity from a wind or solar generator vs. a storage device that would store electricity from a non-renewable source of electricity? Why is the Department of Energy seeking to establish three energy storage manufacturers? Why not two or four?

Mr. Reicher. Storage devices for utility applications are primarily available today as small, components (e.g. batteries, flywheels, supercapacitors, etc.) not integrated into effective systems. These components are mainly used in uninterruptable power supplies for standby power. Complete, utility-scale energy storage systems are not available commercially.

There are at present no companies commercially producing complete energy storage systems. However, about five companies are developing such systems, most of them in collaboration with the DOE/Energy Storage Systems (ESS) Program. These companies are either small businesses with limited resources or large companies whose research portfolios include only a tiny amount of their budgets for R&D on storage systems. Many companies are developing and producing components (e.g. batteries, flywheels, power conversion systems, and controllers), but do not work on integrating the complete system into an effective turn-key product.

There is no fundamental difference between storage devices for renewable or non-renewable applications. However, there are significant differences in the selection of components, the engineering integration into complete systems, and the field implementation of systems. Some applications require long-term storage, while others require short-term storage. High power electronics, capable of both real and reactive power output, may be necessary in some devices while not necessary in others. Industry, with help from the DOE/ESS Program, is determining the specifications and requirements of storage systems for utility grids, as well as for distributed generation and renewable applications. Much of the remaining research will be focused on integrating improved components into complete systems with optimized control hardware and software.

The DOE/ESS Program would like to see at least three energy storage manufacturers established in the U.S. Even more would be better for competition. The program is conducting research in collaboration with industry and academia to develop the technology and information required for the ultimate commercialization of cost effective, reliable, well-integrated storage systems. DOE is not establishing companies to commercialize these systems, but provides critically needed research support so that several companies can ultimately succeed in this area.

ALUMINUM MATRIX COMPOSITE

Mr. Packard. Please provide a brief description of the history of this (aluminum matrix composite development) program and the Department's plan to pursue this technology.

Mr Reicher. The use of an Aluminum Matrix Composite (AMC) as a substitute for steel for the strength member in an overhead transmission conductor is a concept proposed by the 3M company. The base technology of AMC material was developed by 3M with a high level of cost sharing by the Department of Defense's Advanced Research Projects Agency. 3M representatives first met with our staff in the summer of 1995 to propose a cost-shared research and development program to use AMC material for transmission conductors. We informed 3M that we did not have available appropriations for this type of work. The Conference report that accompanied the fiscal year 1997 Energy and Water Development Appropriation Bill states: "Due to budget constraints, the conferees have not included the Senate language encouraging the Department to start a new program developing metal matrix composites." The Conference report that accompanied the fiscal year 1998 Energy and Water Development Appropriation Bill states: "The conference agreement includes up to $1,000,000 for a research and development partnership to manufacture electric transmission lines using aluminum matrix composite materials." The President used the line-item veto for this project. Subsequently, the line-item veto was retracted and $1,000,000 in funding was provided to this project. Oak Ridge National Laboratory is negotiating a Cooperative Research and Development Agreement (CRADA) and a subcontract with 3M to further develop the AMC conductor. This effort is just starting up, and will investigate alternative material compositions, improved manufacturing processes, and the potential benefits of AMC conductors.

The conference report that accompanied the fiscal year 1999 Energy and Water Development Appropriation Bill states: "The conference agreement includes $2,500,000 to support a national laboratory/utility industry partnership to conduct research on reliability of the nation's electricity infrastructure including the impact of electricity restructuring on safety and reliability." The Department does not plan to pursue any type of advanced conductor research as part of this reliability research in FY 1999 or FY 2000, but will reassess this position in later years. If additional advanced conductor research is carried in the program in future years, these research projects will be selected through competitive procurement.

PROGRAM DIRECTION

Mr. Packard. Please provide a table showing the matrix of programs and management/procurement responsibilities. For each of the programs and distinct subprograms managed by the Office of Renewable Energy and Efficiency, indicate which office have management and procurement responsibilities.

Mr. Reicher. Enclosed, as requested, is a table showing the matrix of programs and management/procurement responsibilities.

Mr. Packard. The Golden Field Office has requested a 56% increase in funding for fiscal year 2000, including a 54% increase in salaries, a 46% increase for travel, a 16% increase for support service contractors and a 400% increase in related expenses. Since the Golden Field Office is not requesting any additional staff, what justification is there for these massive spending increases?

Mr. Reicher. The 56% increase for the Golden Field Office translates to a $945 thousand increase from $1,700 thousand in FY 1999 to $2,645 thousand in FY 2000. The change is projected to be less than 7% when Workforce 21 costs are excluded from FY 2000 and based on EE providing an additional $200 thousand in FY 1999 to help with landlord costs for work from increasing competition in contracting. A breakdown of the $945 thousand will help clarify the major drivers.

A total of $615 thousand of the increase reflects an additional 7 FTEs resulting from Workforce 21 plans to address the loss through downsizing of technical and professional staff. These FTEs are described in the Request but they were not included in the total FTE request because final decisions were pending when the Request was completed. However, the funding for these 7 FTEs was included in the Request to ensure that the final decisions resulting from Workforce 21 could be implemented.

A total of $65 thousand of the increase is for projected pay raise costs for the 15 FTEs reflected in the Budget. A total of $5 thousand of the increase is the result of inflationary changes for federal employee travel. Finally, $260 thousand of the increase is for landlord activities such as rent, communication, office supplies, utilities, and support services.

Although requirements currently exceed the available funding in Solar Program Direction, EE is currently considering allocating an additional $200 thousand from within this account in FY 1999 for the Golden Field Office to help with unplanned costs associated with increasing competition in contracting. The impact of this will further reduce the funding change in FY 2000 to less than 7%.

Solar and Renewable Energy
Program Management and Procurement Matrix

Program	Office	Management Responsibility	Procurement Responsibility
Solar Building Technology Research	Office of Photovoltaic and Wind Technology, OPT	Yes	Yes
Photovoltaic Energy Systems	Office of Photovoltaic and Wind Technology, OPT	Yes	Yes
Concentrating Solar Power	Office of Concentrating Solar Power, Biomass Power and Hydrogen Technologies, OPT	Yes	Yes
Biomass Energy Systems	Office of Concentrating Solar Power, Biomass Power and Hydrogen Technologies, OPT	Yes	Yes
Biofuels Energy Systems	Office of Fuels Development, OTT	Yes	Yes
Wind Energy Systems	Office of Photovoltaic and Wind Technology, OPT	Yes	Yes
Renewable Energy Production Incentive Program	Office of Power Technologies, OPT	Yes	Yes
Solar Program Support			
Electricity Restructuring	Office of Power Technologies, OPT	Yes	Yes
Competitive Solicitation	Office of Geothermal Technologies, OPT	Yes	Yes
International Solar Energy Program	Office of Energy Outreach, OPT	Yes	Yes
National Renewable Energy Laboratory	Office of Management and Operations	Yes	Yes
Geothermal	Office of Geothermal Technologies, OPT	Yes	Yes
Hydrogen Research	Office of Solar Thermal, Biomass Power and Hydrogen Technologies, OPT	Yes	Yes
Hydropower	Office of Geothermal Technologies, OPT	Yes	Yes
Renewable Indian Energy Resources	Office of Geothermal Technologies, OPT	Yes	Yes
Electric Energy Systems and Storage			
Transmission Reliability	Office of Power Technologies, OPT	Yes	Yes
High Temperature Superconducting R&D	Office of Geothermal Technologies, OPT	Yes	Yes
Energy Storage Systems	Office of Geothermal Technologies, OPT	Yes	Yes
Climate Challenge	Office of Power Technologies, OPT	Yes	Yes
Program Direction			
Electricity Restructuring	Office of Power Technologies, OPT	Yes	Yes
Golden Field Office	Office of Management and Operations	Yes	Yes
Idaho Operations Office	Office of Management and Operations	Yes	Yes
All Other	Office of Management and Operations	Yes	Yes
	Office of Power Technologies, OPT	Yes	Yes
	Office of Budget Planning and Customer Service	Yes	Yes
	Office of Fuels Development, OTT	Yes	Yes
Federal Buildings/Remote Power Initiative	Office of Energy Outreach, OPT	Yes	Yes

ADVANCED RADIOISOTOPE POWER SYSTEMS

Mr. Packard. Please provide a list of known NASA missions for which the Department is responsible for supplying power systems. This list should only include systems to which the Department has formally committed. For what other future missions is the Department preparing?

Mr. Magwood. NASA is providing funding to the Department for the development of an advanced radioisotope power system for expected use on three projected missions after the turn of the century. These missions include a mission to orbit Europa (one of the moons of Jupiter) in 2003, the Pluto/Kuiper Express mission in 2004, and the Solar Probe mission in 2007. The Department is also planning to provide small radioisotope heater units to NASA for projected science exploration missions to Mars in 2001, 2003, and 2005.

NASA long range planning continues to evaluate a broad range of future missions, including those that might require radioisotope power systems. As the planning for missions becomes firmer, NASA will typically identify specific missions that potentially require radioisotope power sources. NASA's long range planning has not yet evolved to identify specific missions that may require radioisotope power systems; thus, NASA has not yet provided funding to the Department for developing systems for specific missions.

The Department is also receiving user funding to develop and provide radioisotope power systems for national security applications.

Mr. Packard. Please provide a brief description of the process used to complete agreements between NASA and DOD and the Department. What amount of funding was provided by NASA and DOD in fiscal years 1997 and 1998? What are the Department's estimates for fiscal years 1999 and 2000? Are these funds available for any expenses otherwise included in program direction? Please provide an itemized description of the activities to be funded by NASA and DOD in fiscal year 1998 and estimates for fiscal years 1999 and 2000. Have these agreements been completed?

Mr. Magwood. In 1991, the Department signed an overall Memorandum of Understanding with NASA on radioisotope power systems. As specific missions that require radioisotope power systems are identified, supplements to this overall agreement are developed. The process begins with informal discussions to establish projected delivery schedules and projected costs. As the requirements and projected costs become firm, the supplemental agreement is then refined and signed. NASA normally begins providing some funding in advance of the final agreement being signed for planning purposes. However, mission specific funding is not provided until the mission funding is approved by Congress as a line item in NASA's budget. The process is similar for the national security applications.

In fiscal year 1997, NASA provided $6,700,000 and DOD provided $2,290,000. In fiscal year 1998, NASA provided $11,400,995 and DOD provided $2,880,000.

The Department has received $ 8,500,000 from NASA for fiscal year 1999 and expects to receive $19,900,000 in fiscal year 2000. We anticipate that DOD will provide $5,800,000 in Fiscal Year 1999 and $11;100,000 in Fiscal Year 2000.

NASA and DOD-provided funds do not supplement or augment Nuclear Energy's program direction funds. The funds received from NASA and DOD are used for mission specific activities related to design, development, fabrication and deployment of specific radioisotope power systems, including mission specific travel (such as travel to NASA launches or related events to support emergency planning and public information activities) and quality assurance efforts.

NASA funding in fiscal year1998 was to support launch activities for the Cassini mission and to begin the development and conceptual design of an advanced radioisotope power system using the Alkali Metal Thermal to Electric Conversion (AMTEC) technology for use on future missions. In fiscal year 1999, NASA is providing funding to complete the conceptual and preliminary designs, to initiate the final design of the advanced radioisotope power system and to continue the development of the AMTEC technology. In fiscal year 2000, NASA funding will be used to complete the final design of the advanced radioisotope power system, initiate fabrication of a qualification unit of the system, and testing of the AMTEC technology.

In fiscal year 1998 DOD provided funding to continue the maintenance and refurbishment of radioisotope thermal electric generators (RTGs) for the ongoing national security program and to initiate the pre-conceptual design of an advanced RTG for an expanded national security program. In fiscal year 1999, DOD is providing funding to continue maintenance and refurbishment of the RTGs for the ongoing program and to proceed into conceptual design of the advanced RTG for the expanded program. In fiscal year 2000, DOD is expected to continue to fund for maintenance and refurbishment activities for the ongoing program and for completing the conceptual and preliminary designs, proceeding into final design, and initiating component fabrication of the advanced RTG for the expanded program.

NASA and the Department have agreed on the funding profile and hardware delivery schedules for the advanced radioisotope power system for the next three missions and negotiations will soon be initiated on the formal supplemental agreement. We expect to reach agreement within the next few weeks with DOD on the delivery schedules and funding profiles for the expanded national security effort.

ADVANCED RADIOISOTOPE POWER SYSTEMS

Mr. Packard. What is the Department's estimate of current demand for Pu-238 for this program? What future demand is forecast? Please provide an itemized list of future missions with corresponding Pu-238 requirements. What is the estimate of Pu-238 currently in the Federal inventory? What is the estimate of Pu-238 available for purchase from all sources? What is the Department's estimate for salvageable Pu-238?

Mr. Magwood. The total near-term demand for Pu-238 through the 2006 time frame is about 39 kilograms. The Europa Orbiter, Pluto/Kuiper Flyby, and Solar Probe missions will each require a minimum of 3.7 kilograms of Pu-238 for the power systems and heater units, with an additional 1.8 kilograms for a backup power system to serve as a common spare for these missions. The Mars missions in 2001, 2003, and 2005 will each require 0.1 kilograms for the heater units. Thus, a minimum of 13.2 kilograms of Pu-238 will be required to support these near-term NASA missions. These NASA requirements could grow significantly depending upon the final configuration of the spacecraft involved. About 25.8 kilograms is needed to support the national security programs through 2006.

NASA long-term plans include several missions which potentially may require radioisotope power sources. For example, it is expected the Mars Exploration Program will continue to require radioisotope heater units and possibly small electrical power systems and deep space exploration missions, e.g., to further explore Europa or Neptune, will likely use two or more larger power systems. NASA is in the very earlier planning stage for the missions scheduled beyond the near-term missions and has not yet established the power levels required. Thus, it is premature to predict the amount of Pu-238 that will be required. However, based on NASA's preliminary planning, we project that 2 to 5 kilograms will be required each year to meet future mission needs. We will continue to work with NASA to develop the future Pu-238 requirements as planning for these missions become firmer.

The current inventory available for use on NASA space missions is about 9 kilograms and about 31 kilograms for use on national security missions. It is expected that this inventory will be essentially depleted in the 2006 time frame as it is used on the near-term missions. Depending upon final spacecraft requirements, it is possible that the Department's current inventory could be exhausted before fabrication of the power system for the Solar Probe spacecraft is completed.

The only source known to have Pu-238 available for purchase is Russia. The Department recently extended a contract with Russia to purchase up to 40 kilograms of Pu-238. The Department previously purchased 9 kilograms from Russia, with an additional 31 kilograms available for purchase under the contract. The terms of the agreement state that the material cannot be used for national security purposes.

Of the 39 kilograms of Pu-238 in the current inventory, about 19 kilograms must be salvaged by processing it through the scrap recovery line currently being developed at the Los Alamos National Laboratory.

Mr. Packard. The Department has stated its intention to consolidate operations in this program. When will the decision on whether to proceed with the Mound EIS be made?

Mr. Magwood. Secretary of Energy Richardson announced on March 22, 1999, that the space power system operations would remain at the Mound Plant in Miamisburg, Ohio, rather than be transferred to another Department of Energy site.

In October 1998, the Department announced its intention to prepare an Environmental Impact Statement for proposed transfer of space power system operations at the Mound Plant to another Department of Energy site. Based on numerous comments the Department received from the public during the EIS scoping meetings, the Department elected to perform an additional review on the reasonableness, acceptability, and economics of maintaining the space power program's operations at the Mound Site. This analysis confirmed that operations could be safely and cost effectively maintained at Mound, even as a stand-alone operation after the rest of the site is decommissioned and turned over to the City of Miamisburg, Ohio. Detailed economic analysis, in fact, demonstrated that to move the program to any of the sites currently conducting space power system activities would increase rather than decrease the Department's costs. As a result, the Environmental Impact Statement will be terminated.

With respect to the broader issue of streamlining the space power program, the Department transmitted the report, *Plan for Streamlining the Advanced Radioisotope Power Systems Program* to Congress this March in response to report language contained in the conference report on Energy and Water Development Appropriations for Fiscal Year1999. The conference report directed DOE "to prepare a plan to streamline and reduce costs for" the Advanced Radioisotope Power Systems Program and to include the plan with the Fiscal Year 2000 budget request.

The report addresses the significant streamlining that has occurred in the space power program over the last several years and DOE's approach to streamlining, which is based on a strategy focused on sustaining the basic capability for production and for the user agencies to fund mission-specific development and hardware fabrication. The success of this strategy is based in large part, on our ability to reduce program costs to the minimum amount, including reducing staffing levels at key facilities to just those required to maintain the facilities in an operational mode. The net effect of this revised strategy and the effort on reducing costs have been to reduce the overall program level from a peak of $58.7 million in FY 1995 to the current FY 1999 level of $37 million. Although we believe that significant streamlining has occurred, we will continue to identify and evaluate additional opportunities for streamlining, where possible.

Mr. Packard. Which "lower priority" capital equipment expenditures are being deferred? How does this correspond with the $1,600,000 reduction displayed in the budget justification?

Mr. Magwood. The equipment purchases being deferred include the purchase of a laser welder to provide an improved method to weld the iridium cups that encapsulate the Pu-238 pellets and acquisition of a backup system to safely transport radioisotope power units.

The deferred equipment totaled about $1,000,000. The remaining $600,000 in the budget justification reflects the completion of the interim consolidation activities at Mound.

UNIVERSITY REACTOR FUEL ASSISTANCE AND SUPPORT

Mr. Packard. The budget justification cited nine distinct programs for awarding education assistance. Please provide a table showing all nine programs with funding provided in fiscal year 1998 and estimates for fiscal years 1999 and 2000.

Mr. Magwood. There are now just 8 distinct programs in the University Reactor Fuel Assistance and Support program. We have eliminated the separate activity funding line to provide fellowships and scholarships activity for students at Historically Black Colleges and Universities and other minority institutions and will instead work with those students as a part of our overall fellowships and scholarships program. The table showing the funding levels for these eight program areas is shown below:

Funding Levels for the University Reactor Fuel Assistance and Support Program
(Dollars in Millions)

	FY 1998	FY 1999	FY 2000
Fuel Assistance	$2.1	$2.3	$2.8
NEER	2.2	4.5	4.5
Matching Grants	.8	1.0	.8
Reactor Sharing	.5	.7	.6
Fellowships and Scholarships	1.1	1.4	1.3
Reactor Upgrade	.3	.8	.845
Radiochemistry	----	.3	.3
Nuclear Education Recruitment	----	----	.2
Total	$7.0	$11.0	$11.345

Mr. Packard. The Department has proposed a new program to be managed "in conjunction with a professional society." What has the Department done to prepare a plan for this program.

Mr. Magwood. The program is entitled the Nuclear Engineering and Science Education Recruitment Program with a requested first year funding level of $200,000. It is intended to provide university students who are in the process of choosing their major areas of study with information about nuclear engineering and the career options associated with that discipline. Prior to formulating this program, the Department reviewed studies and conducted research to find why the numbers of students enrolling in nuclear engineering programs has been declining. We found that was a great amount of misinformation about nuclear careers and students were not aware of what nuclear engineering was or the wide array of job opportunities available to nuclear engineering graduates. In the past, the Department supported universities in conducting summer workshops to instruct teachers in nuclear science and engineering topics so that they would use this material in the required science curriculum. Our proposed program would help fill the information gap left in the absence of these activities. We plan to cooperate with the American Nuclear Society and possibly other professional organizations to carry out these activities.

Mr. Packard. Please provide a description of the Department's new radiochemistry program for which $300,000 was allocated in fiscal year 1999. What are the goals of this program and how will funds be awarded?

Mr. Magwood. The radiochemistry program, which Congress funded beginning in FY 1999, is designed to enhance the viability of radiochemistry education in the United States through the awarding of cost-shared grants to universities to support educational programs in this discipline. An active community of nuclear and radiochemists is needed in the U.S. today to contribute to the resolution of many issues confronting or likely to confront the Nation. These include:

- Radioactive waste management problems that have complex matrices and systems for which the chemistry is poorly described. These systems will require treatments and separations which must be developed from a sound radiochemical foundation; development and design of new reactors and new reactor technologies to address future energy needs; and continuing development of safe, efficient nuclear fuel systems.

- An understanding of the chemistry of radionuclides in materials and processes proposed for use in non-proliferation programs is essential for proliferation resistant strategies to be effective.

- Stewardship of the existing stockpile of radioactive materials since knowledge of the underlying nuclear and radiochemical behavior of radioactive materials in weapons and non-weapons programs is essential to safely and efficiently handle and store these materials.

Radiochemistry programs at universities have always been small and our national infrastructure is disappearing as remaining faculty retire. The meeting of a group of representatives from the academic community and national laboratories involved in radiochemistry recommended the program be designed to enhance the viability of radiochemistry education, recognize the interdisciplinary nature of radiochemistry and as such strongly encourage the involvement of nuclear engineering programs, and be designed to seek the direct involvement of DOE facilities which have ongoing radiocheimstry programs. The funding will be used for the support of new faculty, graduate students, postdoctoral students, laboratory and equipment improvements and course work. A competitive peer review process will evaluate all proposals to work on radiochemistry related topics that compliment nuclear engineering programs.

TEST REACTOR AREA LANDLORD

Mr. Packard. Funding for this program has increased from $2,000,000 in fiscal year 1997 to $4,000,000 in fiscal year 1999. By what amount has this program been underfunded as asserted in the budget justification? Environmental compliance costs in fiscal year 1998 were $425,000. The request for fiscal year 2000 is $3,200,000 - a 653% increase. Please provide a description of the basis for this increase and provide outyear estimates through fiscal year 2004.

Mr. Magwood. The Office of Nuclear Energy, Science and Technology became Landlord for the Test Reactor Area in fiscal year 1995 at which time an assessment of projected needs was undertaken based on the expectation that the site would continue to operate well into the twenty-first century. The Test Reactor Area common user facilities and infrastructure are generally old, some installations being well over 40 years old. Many of the common user facilities and utilities are at the end of useful life, and, in addition, many do not meet current environment, safety and health regulations. Since fiscal year 1995, requested funding for both operations and construction has been increasing to address the long term maintenance and needed facility and infrastructure upgrades. Underfunding referred to in the budget justification was to indicate that funding has only been available to proceed with these projects on a modest schedule.

During and since calendar year 1997, major environmental legacy waste issues have been identified for all of the Idaho National Engineering and Environmental Laboratory by both the State of Idaho and the Department's Idaho Operations Office. This has resulted in a Notice of Violation and fines from the Idaho Department of Environmental Quality and Voluntary Consent Orders between the Department and the State of Idaho for cleanup. Starting in fiscal year 1998, specific environmental compliance funding has been requested to resolve legacy waste environmental non-compliances identified at the Test Reactor Area. The level of funding requested for each year is based on estimates of the time required to plan and accomplish the work necessary to meet the Voluntary Consent Order milestones. Examples are disposal of legacy waste stored in the Advanced Test Reactor Canal, cleanup and disposition of approximately 50 abandoned tanks containing either radioactive or potentially hazardous waste or both, cleanup and decontamination of legacy radioactive waste from the Test Reactor Area Hot Cells, and deactivation of numerous inactive facilities to meet environmental and safety requirements. Failure to meet these milestones could result in additional civil penalties. The outyear estimates for environmental compliance are: $3,500,000 in fiscal year 2001; $3,100,000 in fiscal year 2002; $800,000 in fiscal year 2003; and $800,000 in fiscal year 2004.

Therefore, the increase from $2,000,000 provided in fiscal year 1997 to $4,000,000 in fiscal year 1999 in operating funds are: (1) increases in General Plant Projects to provide needed upgrades to common use facilities that are at the end of useful life, (2) modest increases in site preventive and corrective maintenance funds for the aging facilities, and (3) funding for environmental compliance to clean up legacy waste. Increases in construction funding have also been requested in order to address needed major upgrades to site fire and life safety and utilities.

Mr. Packard. The budget request for the electrical utility upgrade project is $1,430,000, $3,255,000 less than estimated last year. The total estimated cost for this project has increased and the date for completion has been extended fifteen months. Who is responsible for managing this project? Please provide a short narrative explaining the differences between this project as proposed last year and the project proposed this year.

Mr. Magwood. The fiscal year 2000 budget request for this project was reduced to $1,430,000 due to overall Office of Nuclear Energy, Science and Technology budget constraints. This extended the project schedule by 1-1/4 years. Extending the schedule has increased the operating funds needed to support the project by $240,000 thereby increasing the Total Project Cost from $7,320,000 to $7,560,000.

My office, The Office of Nuclear Energy Science and Technology, has overall responsibility for management of this project. The direct oversight of the project is provided by the Idaho Operations Office. The day-to-day management is provided by the site Management and Operating contractor using funding and guidance provided from my office.

NUCLEAR ENERGY RESEARCH INITIATIVE

Mr. Packard: Two years ago, the Congress included a prohibition on providing funds to prepare or initiate requests for proposals for programs that have not yet been funded by Congress. Nevertheless, last year, before the Department could know whether this program would be supported by Congress, considerable efforts were undertaken to disseminate the Department's proposal, organize potential recipients, and collect feedback from potential beneficiaries. Are these activities comparable to the work done to prepare a request for proposals? If not, how are they different? Please provide the total funds used in fiscal year 1998 in support of the NERI. Why would the Department proceed with preparations for an RFP before knowing whether this program would be funded?

Mr. Magwood: The activities the Department conducted in fiscal year 1998 were entirely unrelated to the request for proposal process conducted in fiscal year 1999. The Department's efforts in FY 1998 with respect to the Nuclear Energy Research Initiative (NERI) were in response to the recommendations of the President's Committee of Advisors on Science and Technology (PCAST), Energy Research and Development Panel's November 1997 Report *Federal Energy Research and Development for the Challenges of the Twenty-First Century*. The report recommended that DOE establish a focused multi-year R&D program called the nuclear energy research initiative (NERI) to fund investigator-initiated, peer-reviewed projects to address the problems of nuclear waste, proliferation, safety, and economics. The Panel recommended that technologies to be addressed include, but not be limited to, work on proliferation-resistant reactors or fuel cycles; new reactor designs with higher efficiency, reduced cost and enhanced safety to compete in the global market; lower output power reactors for applications where larger reactors may not be advantageous; and new techniques for on-site and surface storage and for permanent disposal of nuclear waste. PCAST proposed funding this new nuclear energy R&D program initially at $50 million per year expanding in 5 years to $100 million.

The Department analyzed the PCAST Panel recommendation and decided to request funding in its FY 1999 budget for the new nuclear energy research initiative. In order to assist in developing a new direction for nuclear energy R&D for the next decade, as recommended by PCAST, the Department held a workshop in April 1998, attended by 123 participants from universities, national laboratories, and industry. NE was informed by both the staff of the House Committee on Science and the White House Office of Science and Technology Policy that such a workshop, held as early as possible, was an essential step in reforming the Department's nuclear energy R&D program. Congressman Knollenberg of Michigan was a speaker at the workshop.

The participants identified key science and engineering questions associated with nonproliferation technology issues, innovative reactor concepts, nuclear waste issues, and other nuclear power issues. The results of the workshop were published in a summary report. The input from the workshop was used by Departmental program managers in deciding on the approach and focus of research the Department should conduct. Subsequently, after both chambers of Congress indicated support for NERI funding, DOE staff began preparations necessary to ensure that requests for proposals would be ready to issue at the beginning of the fiscal year if the program was funded. The cognizant DOE managers realized that they needed to

be prepared to move quickly in order to issue the solicitation, receive pre-proposals and full proposals, conduct a peer review and relevance review of every proposal, select proposals for funding, and make awards within a one-year period. No potential proposers or potential recipients of awards were involved in this process. The financial assistance solicitation and the program announcement were not issued until FY 1999, after the NERI program was funded by Congress.

I should note that after both the House and Senate had approved NERI funding, we were interested in issuing a Notice of Intent regarding the Solicitation in the Federal Register shortly before the end of fiscal year 1998. Such a notice would have provided potential grant applicants additional time to prepare their applications. However, we first consulted with the Energy and Water Development Appropriations Subcommittee staff and were informed that such a notice would be inappropriate. We therefore dropped our plans to issue early notification. We did, however, spend approximately $70,000 through an existing support service contract to gather information about the Federal peer review process, sending staff to courses relevant to the advisory committee process, and other actions that would enable us to begin the NERI proposal process in fiscal year 1999.

No fiscal year 1998 program funds were used in support of the NERI program. The efforts by the involved DOE managers to develop the concepts for NERI were considered to be within their strategic planning responsibilities required by their job descriptions. Logistics, technical and administrative support were provided to the DOE managers by a support service contractor as part of their assigned support function. We estimate that approximately $26,000 of program direction funds were used to support the workshop and publish the report.

Mr. Packard. Apparently, the Department has awarded more grants than it was able to fund in fiscal year 1999. Please provide justification for partially funding grants rather than fully funding grants. What amount of funding has been committed to fulfill terms of grants? What would the Department do if Congress, due to budget constraints, is unable to provide funds for this program in fiscal year 2000? Who is managing this program? What other research program awards relatively modest grants incrementally? Are these multiple-year funding arrangements consistent with laws and guidelines applicable to one-year funding?

Mr. Magwood: The NERI program has not awarded any grants to date. The solicitation process for NERI is currently at the technical evaluation stage. We have received more than 300 applications which are currently under review. The bid selection will be completed by the end of April 1999 with the award of grants scheduled to start in May 1999. The applications we have received for consideration encompass approximately $100 million in research activities for fiscal year 1999 (and $325 million over three years); therefore, the FY 1999 appropriation of $19 million will allow us to fund only a fraction of the total proposals.

NERI grants commit the Department to only one year of funding. Research awards usually include a project period consisting of one to three year budget (funding) periods. Typically, budget periods are established on an annual basis with funding committed for the initial period at

the time of the grant award. In some cases, a longer or shorter budget period may be established for compelling programmatic or administrative reasons such as to allow for project phases not evenly divisible with 12-month increments or to provide program personnel with logical decision points to evaluate whether the project should proceed. At the end of each budget period, the grantee submits a continuation application with a detailed budget request for the upcoming period. The amount and award of continuation funding is subject to the availability of appropriations.

The NERI solicitation called for proposals and grant applications for scientific and engineering research projects in several, specific areas of research which could have positive impacts on the long-term future of nuclear energy. Recognizing that meaningful work in these areas could take several years to complete, the Department allowed in the solicitation for a period of performance of up to three years. The Department made clear to potential proposers in the solicitation that we will provide only one year of funding at a time. Following the practice of the Office of Science, the National Science Foundation, the Environmental Management Science Program and others, the Department set up the NERI program in a manner that allows performers to write a single proposal that would permit DOE funding in three successive years without requiring new proposals each year. This approach reduces bureaucratic overhead costs and saves monies that can be applied to research work. Despite the relief that this approach provides proposers from submitting new proposals each year, the Department makes no guarantee that funding will be provided beyond one year, as future funding would be subject to a federal appropriation. This method of incrementally funding grants in the NERI program is consistent with the manner in which we award grants under the successful University Reactor Fuel Assistance and Support Program and is consistent with the laws and guidelines applicable to one-year funding.

Of the $19 million appropriated, approximately $17.5 million is available to fund grants. $503,500 was made available for the Small Business Innovative Research and the Small Business Technology Transfer Pilot Research Programs, as required by law. $220,000 was applied to a general reduction, and approximately $776,500 will be used to fund the Oak Ridge Institute for Science and Education (ORISE) to administer the peer review process including paying travel and honoraria for the 120 independent science and technology experts to conduct the objective merit review of 305 proposals.

Should the Congress not be able fund the NERI program in FY 2000 due to budget constraints, the Department would notify each of the research organizations and close out all NERI programs within available funding.

The Office of Nuclear Energy, Science and Technology is managing the NERI program. The Office of Science, based on their experience with grants and the peer review process, has provided invaluable advice and guidance to my organization in establishing the NERI program.

TERMINATION COSTS

Mr. Packard. Please provide a list of each of the legacy clean up projects funded in this account. For each project, please provide a lifetime funding profile with total estimated costs. For projects with alternative disposition plans, please provide each plan with current cost estimates.

Mr. Magwood. The deactivation of the Department's Experimental Breeder Reactor-II (EBR-II) at the Argonne National Laboratory-West (ANL-W) site at the Idaho National Engineering and Environmental Laboratory and the removal of spent fuel from a B&W facility in Lynchburg, Virginia are the two projects which are considered to be legacy clean-up projects at this time within the Termination Costs account. The project is scheduled for completion in January 2002. The funding required for completion of the EBR-II shutdown project is $4.2 million, $4.6 million , and $1.2 million in fiscal years 2000, 2001 and 2002, respectively. This funding represents the incremental funding required over and beyond the basic site infrastructure costs for maintaining and operating the ANL-W site. The fiscal year 2000 budget request is for $4.2 million.

B&W, Lynchburg, presently stores approximately 1032 g of fissile uranium and plutonium isotopes at their Virginia facilities as a legacy of the DOE-sponsored high burnup commercial fuel program of the 1980's. These materials are being stored temporarily in aluminum containers except for three intact fuel rods being stored in a cooling pool. In 2002 these materials may be moved to Idaho in accordance with existing agreements between the Department and the State of Idaho. To move them requires that the materials be placed in new stainless steel canisters suitable for long-term storage. The $700 thousand request in fiscal year 2000 will be used to initiate the procurement of new stainless steel canisters and in performing the engineering design work required to ship the materials to Idaho. Four million dollars in outyear funding will be needed to transfer the fuel from the old canisters to the new canisters, pay for interim storage at B&W, license a transportation cask, transport the material to dry storage at the Idaho Nuclear Technology and Engineering Center, and finally to store them there until the national spent fuel repository. All spent nuclear fuel must be removed from the State of Idaho by 2035 per the Settlement Agreement with the State.

Mr. Packard. The budget request includes $10,700,000 to maintain the Fuel Conditioning Facility (FCF) pending the decision on the use of electrometallurgical treatment of EBR-II fuel. Please provide an itemization of the funding requirement for both continuation and decommissioning of the FCF. What amount of funding was attributable to the FCF in fiscal years 1998 and 1999.

Mr. Magwood. In fiscal years 1998 and 1999, the Department funded $41 million and $40 million, respectively on the electrometallurgical treatment activities. This work is principally conducted in the Fuel Conditioning Facility (FCF), but also involves significant activities in the Hot Fuel Examination Facility (HFEF), the Analytical Laboratory, and several glove box facilities at Argonne National Laboratory's West and East sites.

The funding to continue electrometallurgical treatment operations to dispose of the Department's inventory of sodium bonded spent nuclear fuel has been estimated through fiscal year 2004 and is provided in the following table. The funding to continue these operations in addition to the infrastructure costs for environment compliance and safety and security activities at the Argonne National Laboratory-West (ANL-W) site. If the Department decides to apply electrometallurgical technology to the treatment of its sodium-bonded spent nuclear fuel, we anticipate that a campaign of approximately eight to ten years will be required to treat the entire inventory of sodium-bonded spent fuel.

Continuation of Treatment Operations: ($ in millions)

Activity	FY00	FY01	FY02	FY03	FY04
Electrometallurgical treatment operations in FCF and HFEF	21.0	32.3	35.2	36.6	38.1
Technical support for treatment operations including operation of support laboratories at ANL-West and ANL-East	10.4	10.0	8.0	6.0	4.0
TOTAL	31.4*	43.3	43.2	42.6	42.1

* The funding in fiscal year 2000 assumes no fuel treatment operations during the first four months of the fiscal year while the Electrometallurgical Treatment Environmental Impact Statement and Record of Decision are completed.

The funding requirements for the deactivation of the FCF has also been estimated through fiscal year 2004 and is provided in the following table.

Preliminary Estimate for FCF Deactivation ($ in millions)

Activity	FY00	FY01	FY02	FY03	FY04
Maintain FCF System Operational Pending NEPA Review of FCF Deactivation.	10.0	5.0			
Organize Deactivation Project and Prepare Detailed Plans. Project Management.	1.0	2.0	2.0	2.0	2.0
Prepare Environmental Assessment and other environmental requirements documents (RCRA, NESHAPS). Support waste disposal activities.	2.0	1.0	1.0	1.0	1.0
Complete qualification of the electrometallurgical waste forms to enable disposal of the wastes generated during the electrometallurgical treatment research and demonstration project.	20.0	15.0	5.0		
Provide technical support for deactivation of the electrometallurgical treatment equipment and the FCF facility including safety analysis, criticality analysis and decontamination methods development.		5.0	8.0	6.0	4.0
Complete FCF modifications needed to assure continued reliable operation of the inert hot cell atmosphere, overhead handling systems, remote equipment repair equipment, and low level waste packaging systems.	1.0	1.0			
Initiate orderly equipment shutdown, disposal and decontamination operations	2.0				
High level waste form production, low level waste packaging and disposal, and hot cell deactivation.		15.0	30.0	35.0	35.0
TOTAL	36.0	44.0	46.0	44.0	42.0

TERMINATION COSTS

Mr. Packard. The budget request includes $10,000,000 for new technology activities. Please provide an itemized list of these activities with corresponding funding requirements.

Mr. Magwood. The $10 million funding request for technology activities in fiscal year 2000 is for waste form production and testing required to stabilize the salt and metal wastes from the electrometallurgical treatment demonstration project. This funding, which continues work begun in previous years under the former "Nuclear Technology R&D" line item, is needed independent of whether the Department decides to continue with electrometallurgical treatment of the remaining inventory of sodium bonded spent nuclear fuel. If the electrometallurgical technology is not used to treat the remaining sodium bonded fuel, the waste materials resulting from the demonstration project will still need to be stabilized in a form that can be safely disposed of in a geological repository. Therefore, it is important that the waste form production, characterization, and qualification activities continue during fiscal year 2000. An itemized list of these activities and corresponding funding requirements are provided in the following table.

Activity	($ in millions)
Equipment for characterization of ceramic and metal waste form samples, including samples from actual process waste	$0.4
Design, fabrication, or procurement of waste form equipment and materials such as a zeolite dryer, zeolite 4A, and glass frit	$0.5
Characterization of ceramic and metal waste form samples, including samples from actual process waste	$3.1
Development and testing of larger scale process equipment for ceramic and metal waste	$2.0
Computer modeling for use in obtaining Nuclear Regulatory Commission approval for emplacement of ceramic and metal waste forms in a geological repository	$1.4
Hot cell facility operations to support waste form development and testing	$2.6
Total	$10.0

FAST FLUX TEST FACILITY

Mr. Packard. The budget request includes $30,000,000 to maintain the Fast Flux Test Facility (FFTF) pending the decision on whether to restart or decommission the reactor. Please provide an itemization of the funding requirement for both continuation and decommissioning of the FFTF. What plant systems required for operation would be "permitted to fail" as described in the budget justification. If additional funding is required in fiscal year 2000, please provide potential funding sources.

Mr. Magwood. The fiscal year 1999 funding includes $30 million appropriated by Congress in fiscal year 1999 and $9.2 million of prior year balances reprogrammed into the FFTF account in fiscal year 1998. The funding maintains the Fast Flux Test Facility in a safe standby condition. The fiscal year 2000 budget request of $30 million will support a minimum level of surveillance and maintenance required to keep the facility in compliance with safety and environmental requirements. At this minimum level of funding, however, we will cease conducting preventive maintenance on those plant systems which are not necessary to keep the facility in an occupationally and environmentally safe condition. We will no longer maintain or repair equipment in non-safety related systems where a redundant capability exists (e.g., heating, ventilation, and air conditioning components). Once a component is determined to be inoperable, we will rely on the redundant unit for operation. In the event the redundant unit becomes inoperable, we will then conduct the necessary repairs to return it to operation.

An itemization of costs for both continuation and deactivation of the Fast Flux Test Facility is provided in the following table. Additional funding of $10 million beyond the fiscal year 2000 budget request would be required to reinitiate preventive maintenance not being conducted during standby operations and to conduct the necessary National Environmental Policy Act review to support returning the facility to operation. Additional funding of $20 million in fiscal year 2000 would be needed to conduct those deactivation activities necessary to place the facility in a radiologically and industrially safe shutdown condition.

Secretary Richardson has committed to making a final decision on the future status of the FFTF this spring. The additional funding required, if any, in fiscal year 2000 to implement the decision will depend upon the Secretary's decision.

Restart Support Activities	FY 2000 Estimated Cost
Facility surveillance and maintenance	$32.7M
Resume preventative maintenance activities on non-operating plant components to ensure availability	$1.0M
Continuation/completion of repairs to fuel handling equipment (SWC, CLEM, SRS)	$2.8M
Conduct NEPA review	$1.2M
Initiate conceptual design for system upgrades and specialized isotope production equipment	$2.3M
Total	$40M

Deactivation Activities	FY 2000 Estimated Cost
Facility surveillance and maintenance	$32.7M
Continuation/completion of repairs to fuel handling equipment*	$4.6M
Preparations for and completion of Secondary and Primary sodium drain	$1.2M
Continue system/facility deactivation and fuel wash activities	$2.5M
Purchase Interim Storage Casks for fuel offload	$9 M
Total	$50M

*Deactivation requires accelerating schedule to complete repairs to offload fuel.

ISOTOPE SUPPORT

Mr. Packard. For the following activities, please provide funding levels in fiscal year 1998 and estimates for fiscal years 1999 and 2000: radioactive and stable isotope research, nuclear medicine research and support of administrative activities.

Mr. Magwood. The table below shows the actual and projected funding for research, nuclear medicine research, and support of administrative activities.

	FY 1998	FY 1999	FY 2000
Radioactive Isotope Research	$ 200	$ 135	-0-
Stable Isotope Research	$ -0-	$ -0-	-0-
Nuclear Medicine Research	$ 250	$ 150	$2,000*
Administrative Support	$1,965	$1,750	$1,500

* Total request for the Advanced Nuclear Medicine Initiative is $2.5 million, with about $500,000 for fellowships and scholarships and $2.0 million for peer-reviewed research.

Program-direction related costs, were removed from the isotope program budget in fiscal year 1998. As such, the Administrative Costs item above does not include Federal employees salaries, travel, or expenses and does not include support services. As identified above, the isotope program account does continue to pay for management and operations (M&O) contractor costs associated with the direct conduct of isotope production, sales, and distribution such as sales order processing, customer credit checks, customer inquiries or visits, inventory storage and control, privatization activities, and customer outreach and surveys.

Mr. Packard. Please provide revenues for fiscal year 1998 and estimates for fiscal years 1999 and 2000. For each year, provide sources of these revenues.

Mr. Magwood. The Department produces and sells hundreds of types and forms of isotopes. Among them, less than two dozen are the primary revenue producers. The remainder are research isotopes. About twenty customers provide 75 percent of program revenues. The Isotope Program's data base includes hundreds of customers, including pharmaceutical companies such as Nycomed Amersham International, MDS Nordion, Bristol-Meyers Squibb, Du Pont Pharma, and Mallinckrodt Medical, Inc.; industrial users such as Spectra Gases, General Electric Power Systems, and AEA Technology; and many researchers at national laboratories, universities, and hospitals. The table below shows the actual and projected revenue and sources for the fiscal year requested.

	FY 1998	FY 1999	FY 2000
Radioactive Isotope Revenue			
Commercial *	$ 4,875,000	$ 4,080,000	$3,800,000
Research**	$ 2,625,000	$ 2,720,000	$2,400,000
Stable Isotope Revenue			
Commercial	$ 3,200,000	$ 2,350,000	$ 900,000
Research	$ 850,000	$ 850,000	$ 900,000
Total Revenue	$12,000,000	$10,000,000***	$8,000,000***

* Commercial isotope products and services are sold to the private/public sector, are used in established/routine applications, and are priced to recover the Department's cost of production. They are often resold by the customer to hospitals and other commercial entities.

** Research isotope products and services are used in basic or applied research in an effort to develop new or improved applications. Research isotopes may or may not achieve full cost recovery.

*** The decrease in revenue is attributable to (1) privatization of yttrium-90, (2) termination of all helium sales because helium continues to be reserved for potential use for tritium accelerator production, (3) competition from Russia and other foreign suppliers who price their isotopes below DOE production costs, and (4) the eight-month outage of High Flux Isotope Reactor in order to replace the beryllium reflector scheduled in fiscal year 2000.

Mr. Packard. What purpose is served by having appropriated funds deposited in the Isotope Production and Distribution Fund?

Mr. Magwood. The Isotope Program operates under a revolving fund as established by Public Law 101-101 and as modified by Public Law 103-316. All program sales transactions and costs are financed by revenues from sales of isotopes and associated services and through payments from the Isotope Support decision unit, which is funded through annual appropriations. Depositing appropriated funds into the Isotope Production and Distribution (Revolving) Fund maintains the solvency of the fund and provides continued support for research, development, production, processing, distribution and associated services to isotope customers. The Revolving Fund's revenue and expenses are audited annually consistent with Government Auditing Standards and the Chief Financial Officers Act of 1990 and the Government Performance and Results Act of 1993.

Without annual appropriations, Isotope Programs would be forced to sell only commercial isotopes. It would be unable to provide the more expensive low-volume research isotopes or continue research and development of isotopes and related applications. Furthermore, since research and commercial isotopes are produced simultaneously using the same labor force and facilities, additional administrative cost would result if the annual appropriations was not deposited into the revolving fund. Separating the annual appropriations from the revolving fund would be inefficient and make the task of reconciling revenues with expenses difficult.

Mr. Packard. The budget justification includes a new program, the Advanced Nuclear Medicine Initiative. What other Federal programs support nuclear medicine research? Has the Department worked with any other agencies to coordinate responsibilities? Has the Department worked with potential applicants in the development of this program? Please provide funding requirements for the three activities listed in this initiative.

Mr. Magwood. The other Federal programs that support research in nuclear medicine include programs within the National Institutes of Health (NIH), the Department of Defense (DOD), and the Office of Science (SC) within the Department of Energy. The NIH program concentrates primarily on the clinical research of the use of isotopes. The DOD programs sponsor research, some of it in nuclear medicine, and on breast and lung cancer. The SC primarily conducts pre-clinical research in a few selected areas of molecular nuclear medicine. The Office of Nuclear Energy's proposed Advanced Nuclear Medicine Initiative will concentrate on conducting research related to the development of new medical isotope technologies that may be useful in diagnostics and therapy, and particularly developing technologies that use our large inventory of alpha-emitting isotopes.

The National Cancer Institute within NIH, the Office of Science, and the Office of Nuclear Energy have sponsored several workshops and conferences in recent years whose functions have been to identify and coordinate the required research and coordinate the various offices' responsibilities in these areas. The Department also attends and participates in symposiums and conferences hosted by the Society of Nuclear Medicine. The clinical and human physiological aspects of nuclear medicine are sponsored by the National Institutes of Health (NIH). The Department draws on its unique facilities and its extensive knowledge of nuclear physics, chemistry, and biology to develop radioisotope-based products and processes for application in nuclear medicine. The ANMI will sponsor selected nuclear medicine research projects at universities, hospitals, and the national laboratories. The Department is working with a subcommittee of the Nuclear Energy Research Advisory Committee that will assist and advise the Department as to the development of a process to select the most advantageous proposed projects to be funded. We anticipate an independent peer-review process similar to that conducted in other Departmental research. Several of these NERAC subcommittee members are from the isotope user community and as such, they would be precluded from receiving AMNI funds if they are involved in the selection process. While the medical isotope community has

long advocated the establishment of such a research program in the Office of Nuclear Energy, Science and Technology, the Department has not interacted with potential applicants in developing this program. The preliminary division of fiscal year 2000 funding is given below:

Peer Reviewed Research	$1,000,000
Application of Alpha-Emitting Isotopes	$1,000,000
Training in Nuclear Medicine Disciplines	$ 500,000

Mr. Packard. The cost and schedule for the Isotope Production Facility at Los Alamos have changed dramatically from last year. Why has the cost for design increased 44% when, according to the schedule provided last year, the design was to be completed in 1998? Who is responsible for managing this project?

Mr. Magwood. The detailed design activities and costs did not increase by 44% but were rescheduled to fiscal year 1999. The 100 MeV Isotope Production Facility (IPF) under construction at the Los Alamos Neutron Science Center (LANSCE) accelerator is funded and managed by the Office of Isotope Programs within the Office of Nuclear Energy, Science and Technology. When the Office of Nuclear Energy learned of the Defense Program's schedule for this facility and the subsequent need to initiate detailed design in fiscal year 1999, it was essentially too late in the budget cycle to include the required funding for detailed design. Because of this, we could not authorize detailed design and had to shift the work to the subsequent fiscal year. In the future, we will require no additional appropriated funding beyond fiscal year 2000; however, it is possible that the schedule will shift as we have to postpone some construction activities (such as major earth moving and IDF equipment installation) that cannot occur while the accelerator is operating for the Defense Programs' or Office of Science's mission.

BETTER COORDINATION BETWEEN THE OFFICE OF SCIENCE AND DEPARTMENTAL MISSIONS

Mr. Packard. The Committee has provided considerable direction to better link the Department's research activities to the energy resources and clean-up functions of the Department. Recently, the Under Secretary has announced a formal effort to devise and enforce road maps that will lay out milestones, timeliness and decision points that meet program goals. Will these road maps include budget requirements? Will road maps include quantifiable 'off-ramps' which represent program or activity terminations when programs fail to meet cost or schedule goals?

Dr. Krebs. Over the past year, the Department has been developing and implementing a comprehensive approach to better integrate and strengthen the planning, management, and administrative elements of our R&D enterprise to ensure that all the R&D activities supported by DOE, or performed by DOE's laboratories, serve the missions and goals set out for the Department.

The underlying management philosophy of DOE's R&D program is to view the program as an integrated system of R&D requirements, activities, and performers. By improving our capacity to build comprehensive, mission-oriented R&D portfolios and to perform portfolio analysis--e.g., does the allocation of resources match our strategic objectives; are activities spread appropriately across basic research, applied research, and development; is there an appropriate mix of performers--we seek to improve the focus and relevance of the entire DOE R&D enterprise. By developing and using technology roadmaps we seek to make clearer our R&D requirements and to improve strategic planning by better identifying priorities and aligning them with the best performers and available financial resources.

Roadmaps provide an agreed upon direction of where we want to go in a program or with specific technologies and a pathway forward for getting there. They are developed by a consensus building process with key stakeholders in the public and private sector. Roadmaps are not the same as project plans with formal timelines and budget requirements; rather, they provide guidelines of technology needs and goals and describe a path forward with specific intermediate goals for R&D investments. Not all roadmaps will include quantifiable "off-ramps" which represent program or activity terminations when programs fail to meet cost or schedule goals. When appropriate, roadmaps will include such "off-ramps." The Department is in its pilot phase of developing and utilizing roadmaps and expects to incorporate both roadmapping and portfolio analysis into the budget process over the next two years.

NEW CHARACTERIZATION OF THE DEPARTMENT'S R&D PORTFOLIOS

Mr. Packard. In your statement, you mention that the Department will be releasing a new organization of its R&D programs. What is wrong with the way the programs are currently organized? Can you share any of the changes with us today? Has the Department looked at how its R&D efforts may be duplicative of other agencies? Is the Department proposing to eliminate any activities? If not, why not?

Dr. Krebs. There is no initiative underway to create a new organization of the Department's R&D programs. It has not been determined that anything is "wrong" with the way the programs are currently organized and there are no plans to eliminate any activities. The Under Secretary asked that we rethink how we characterize our R&D efforts across the business lines of the Department so that we may improve our analysis and management of our investments. The result is a set of R&D Portfolios that capture the spectrum of DOE R&D efforts in each business line. The Science Portfolio, written by the Office of Science, is structured around five high-level goals with twelve strategic objectives that provide a framework for our current programs and a platform for future efforts. This Science Portfolio supports the Department's Strategic Plan and supports and enables the R&D of the other business lines. As the R&D Portfolios evolve, the Office of Science will continue it's practice of coordinating with other agencies to ensure strong linkages and prevent duplication of efforts between the different agency programs. Strong interagency coordination exists in the U.S. Global Climate Change Research Program, Human Genome, High Energy and Nuclear Physics. Material Sciences is coordinated through the Materials Technology Subcommittee of the National Science and Technology Council.

PROGRAM TAXES

Mr. Packard. Please provide a comprehensive list of the program taxes assessed against the amounts provided for the research programs managed by the Office of Science in fiscal years 1996 through 1998, and estimates for the fiscal years 1999 and 2000. Please indicate whether the taxes are required by statute, rulemaking or other requirements (please identify).

Dr. Krebs. I would be pleased to provide the requested information for the record for Office of Science programs. (The information follows.)

OFFICE OF SCIENCE
PROGRAM TAXES*
(B/A in thousands)

	Actual			Estimate	
	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000
Basic Energy Sciences					
SBIR	13,228	13,916	14,622	15,391	15,449
STTR	999	833	877	923	927
Science Education	0	677	809	0	0
Rose Hulman Institute of Technology "Center for Technological Research with Industry" (Congressional Direction in Conference Report No. 104-782, dated 9/12/96)		6,709			
Alabama, Univ. of, Tuscaloosa "Energy, Minerals, and Materials Research Center" (Congressional Direction in Conference Report No. 104-782, dated 9/12/96)		9,104			
BNL Tritium Remediation		4,850			
Computational and Technology Research					
SBIR	0 a/	3,430	3,582	3,739	4,590
STTR	0 a/	202	215	224	275
Science Education	0	252	780	0	0

a/ The Computational and Technology Research program was established in FY 1997.

* Items directed by legislation or other Congressional direction, without appropriation of funds.

OFFICE OF SCIENCE
PROGRAM TAXES
(B/A in thousands)

	Actual			Estimate	
	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000
Fusion Energy Sciences					
SBIR	4,491	5,360	5,157	5,104	5,275
STTR	342	321	309	306	317
Science Education	0	277	629	0	0
High Energy Physics					
SBIR	9,532	12,410	12,833	14,165	13,732
STTR	715	745	770	850	824
Science Education	0	553	1,148	0	0
Nuclear Physics					
SBIR	4,097	5,447	5,660	6,969	7,576
STTR	307	328	340	418	463
Science Education	0	264	563	0	0
Biological and Environmental Research					
SBIR	6,072	8,118	9,614	10,237	9,627
STTR	459	484	577	613	579
Science Education	0	477	749	0	0
Indiana University School of Medicine "Allow the University to expand its efforts in the research and treatment of cancer, AIDS, and other life-threatening diseases" (Congressional Direction is in Conference Report No. 104-782, dated 9/12/96)	0	2,866	0	0	0
Energy Research Analyses					
SBIR	66	43	36	23	25
STTR	5	2	2	1	2

FACILITY OPERATIONS

Mr. Packard. For several years, the Congress has been supportive of fully utilizing the nation's user facilities. Congress has provided modest increases over the budget requests to ensure that maximum value is gained from our investments in these expensive machines. Again last year, Congress provided modest budget increases for facility operations. Please provide facility operations funding levels as proposed versus the amount appropriated. For fiscal year 2000, please provide comparisons to the appropriated level for fiscal year 1999. Also, please provide funding requirements needed to fully utilize user facilities to maximum capability.

Dr. Krebs. The Office of Science recognizes and appreciates the increases provided by Congress in FY 1999 for facility operations; these increases have helped ensure that the facilities are effectively used by the broad scientific community. In preparing the FY 2000 Request, we have balanced the recommendations for facility operations given by our advisory committees with the overarching recommendation given repeatedly that facility operations and upgrades not come at the expense of the core research programs. While perhaps not as obvious as a single facility, the core research programs provide value to the Nation by assembling outstanding research communities in many institutions across the Nation. Slow erosion of these communities is just as destructive to the research infrastructure of the Nation and just as wasteful as is the failure to robustly fund the scientific user facilities. Maintaining the balance between facility operations and the core research programs requires continuous judicious oversight. For example, this year, BES provided a small increase to its facilities at the expense of the core programs because of demonstrated unique and pressing needs at the facilities.

I will be pleased to provide this information for the record. (The information follows.)

OFFICE OF SCIENCE
FACILITY OPERATIONS
(B/A in thousands)

Basic Energy Sciences	FY 1999 Appropriation	FY 2000 President's Request	FY 2000 Funding Required for Maximum Facility Use
Large BES Facilities			
Light Sources			
Stanford Synchrotron Radiation Laboratory	22,686	21,968	21,968
Advanced Light Source (Lawrence Berkeley National Laboratory)	31,166	31,732	32,750
Advanced Photon Source (Argonne National Laboratory)	86,226	87,703	88,208
National Synchrotron Light Source (Brookhaven National Laboratory)	32,176	32,756	35,200
Neutron Sources			
Intense Pulsed Neutron Source (Argonne National Laboratory)	11,982	11,985	12,985
High Flux Beam Reactor (Brookhaven National Laboratory)	22,568	22,580	22,580
High Flux Isotope Reactor (Oak Ridge National Laboratory)	34,959	36,974	37,474
Los Alamos Neutron Science Center (Los Alamos National Laboratory)	11,897	13,547	16,047
Spallation Neutron Source (Oak Ridge National Laboratory)	28,600	17,900	17,900
Pending Peer Review a/	20,000	20,000	20,000
Total, (Large BES Facilities)	302,260	297,145	305,112

a/ Research funds that will be distributed to universities and laboratories and BES users after peer review is completed.

OFFICE OF SCIENCE
FACILITY OPERATIONS
(B/A in thousands)

Basic Energy Sciences	FY 1999 Appropriation	FY 2000 President's Request	FY 2000 Funding Required for Maximum Facility Use
Small BES User Facilities			
Center for Microanalysis of Materials (University of Illinois)	752	779	779
Electron Microscopy Center for Materials Research (Argonne National Laboratory)	1,754	2,038	2,038
Materials Preparation Center (Ames Laboratory)	888	938	938
National Center for Electron Microscopy (Lawrence Berkeley National Laboratory)	2,616	2,753	2,753
Shared Research Equipment Program (Oak Ridge Institute for Science and Education)	194	240	240
Shared Research Equipment Program (Oak Ridge National Laboratory)	1,803	2,026	2,026
Combustion Research Facility, Phase I (Sandia National Laboratory)	5,024	5,116	5,866
Total, (Small BES Facilities)	13,031	13,890	14,640
Subtotal, Basic Energy Sciences	315,291	311,035	319,752
Less SNS Project	(28,600)	(17,900)	(17,900)
Total Basic Energy Sciences	286,691	293,135	301,852
Computational and Technology Research			
National Energy Research Scientific Computing Center (Lawrence Berkeley National Laboratory)	26,500	27,500	29,500
Total, Computational and Technology Research	26,500	27,500	29,500

OFFICE OF SCIENCE
FACILITY OPERATIONS
(B/A in thousands)

Fusion Energy Sciences	FY 1999 Appropriation	FY 2000 President's Request	FY 2000 Funding Required for Maximum Facility Use
DIII-D National Fusion Facility	51,100	52,400	82,400
Alcator C-Mod	17,523	17,900	31,900
National Spherical Torus Experiment	26,600	26,300	41,300
Total, Fusion Energy Science	95,223	96,600	155,600
High Energy Physics and Nuclear Physics			
Fermilab	260,091	262,464	273,464
Stanford Linear Accelerator Center	142,317	145,117	159,117
Alternate Gradient Synchrotron (Brookhaven National Laboratory)	62,813	32,233 b/	42,233
Tandem/Alternate Gradient Synchrotron (Brookhaven National Laboratory)	8,570	0	8,000
Relativistic Heavy Ion Collider	48,947	118,500	123,500
Thomas Jefferson National Accelerator Facility	70,305	73,450	77,950
Radioactive Ion Beam Facility (Oak Ridge National Laboratory)	13,245	14,650	15,400
Massachusetts Institute of Technology-Bates	15,400	4,000 c/	16,000
88 Inch Cyclotron (Lawrence Berkeley National Laboratory)	9,025	10,410	10,910
ATLAS (Argonne National Laboratory)	11,630	12,990	13,740
Total, High Energy and Nuclear Physics	642,343	673,814	740,314

b/ Reflects AGS as the injector for the RHIC facility in the Nuclear Physics program.

OFFICE OF SCIENCE
FACILITY OPERATIONS
(B/A in thousands)

Biological and Environmental Research	FY 1999 Appropriation	FY 2000 President's Request	FY 2000 Funding Required for Maximum Facility Use
Environmental Molecular Sciences Laboratory (Pacific Northwest National Laboratory)	28,986	29,415	30,858
Structural Biology Beamlines			
Advanced Photon Source (Argonne National Laboratory)	2,775	2,775	3,600
National Synchrotron Light Source (Brookhaven National Laboratory)	1,900	1,900	2,450
High Flux Beam Reactor (Brookhaven National Laboratory)	1,175	1,175	1,175
Los Alamos Neutron Science Center (Los Alamos National Laboratory)	2,025	1,025	1,025
Advanced Light Source (Lawrence Berkeley National Laboratory)	850	1,150	1,600
High Flux Isotope Reactor (Oak Ridge National Laboratory)	385	400	400
Stanford Synchrotron Radiation Laboratory	2,450	2,550	3,100
Total, Biological and Environmental Research	40,546	40,390	44,208
TOTAL, OFFICE OF SCIENCE	1,119,903	1,149,339	1,289,374
Total Less SNS	1,091,303	1,131,439	1,271,474

c/ Funds are provided for completion of data analysis and the initiation of Decommissioning and Decontamination (D&D) activities. The Administration is currently considering a FY 2000 budget amendment to continue Bates facility operations.

USE OF FACILITIES BY FEDERAL AGENCIES
OTHER THAN THE DEPARTMENT OF ENERGY

Mr. Packard. Last year, the Department estimated that research for non-DOE Federal agencies amounted to more than $800 million in fiscal year 1997. Please provide the amount for fiscal year 1998 and estimates for fiscal year 1999 and 2000. Please provide estimates by program and estimates for each Federal agency using DOE facilities.

Dr. Krebs. In Fiscal Year 1998, the DOE laboratories received approximately $803 million from other Federal agencies to conduct a variety of research and development activities. The preliminary estimates for Fiscal Years 1999 and 2000 are $770 million and $740 million, respectively. The primary non-DOE sponsor is the Department of Defense, which continues to provide close to 60% of these funds to our laboratories. The Nuclear Regulatory Commission and the National Institutes of Health continue to provide another 5% - 6% each. The remaining funds come from a large number of other Federal agencies, including the National Aeronautics and Space Administration, the Environmental Protection Agency, and the Transportation and Agriculture Departments.

Recognizing the unique resources available within the DOE laboratory system and their potential to solve critical and challenging advanced research and technology problems for non-DOE organizations, the Department's laboratories are available to conduct work for other federal agencies and non-federal entities (including state and local governments) on a reimbursable basis. These types of projects are unique activities that require a special working relationship among the various staff at DOE, laboratory sites and sponsor organizations. Certain unique operational rules apply to ensure that work undertaken (1) pertains to the mission of the laboratory; (2) does not conflict or interfere with the achievement of Departmental program requirements, and (3) does not directly compete with the capabilities that are available in the private sector.

The DOE laboratories have developed a variety of world-class core competencies available to non-DOE sponsors in areas such as: alternative energy technologies, pollution control and environmental remediation, advanced materials and instrumentation, biological sciences and medical technology, high-performance computing, modeling and simulation, and advanced technologies for national security.

HIGH ENERGY PHYSICS

Mr. Packard. Considering the priorities expressed in the recent HEPAP (High Energy Physics Advisory Panel) report on the high energy physics, do you think that the Facilities Operations budgets are optimal at your laboratories, and what are the long range implications for the field of a 30% cut in linear collider R&D as proposed in the Department's budget?

Dr. Krebs. We believe that the FY 2000 budget request is generally consistent with the priorities of the recent HEPAP subpanel. In particular, we believe that Facilities Operations budgets are in line with the Subpanel's recommendation for optimal utilization of the new facilities, the B-factory at SLAC and the Tevatron with the new Main Injector at Fermilab.

The proposed reduction in linear collider R&D will allow continued research that can provide reliable cost information and advance this technology to the point where a decision can be made on whether or not to proceed with such a new facility. When this R&D is sufficiently advanced, we plan to ask HEPAP to conduct appropriate reviews to determine how to proceed.

NUCLEAR PHYSICS
BATES ACCELERATOR

Mr. Packard. As you know, the budget sent up included a proposal to eliminate Federal support for the Bates Accelerator. On February 2, you released a statement that the Department would be submitting a Budget amendment to restore funding to Bates and to allow it to continue its operations in Fiscal Year 2000. What is the status of that amendment and when do you expect it to be sent up here?

Dr. Krebs. The Administration is currently developing an amended budget request which would allow the Bates facility to continue operations in FY 2000. The Amended Budget Request will be provided to Congress as soon as it is finalized.

Mr. Packard. As you know the Subcommittee has been very supportive of the basic research activities funded in the Science account. Does the Department plan to take funding away from other basic research programs to fund the work being done at Bates?

Dr. Krebs. The details of an Amended Budget Request to allow continued operations of Bates, including the source(s) of funds, have not yet been finalized.

Mr. Packard. The Subcommittee would be more supportive of a budget amendment that does not adversely impact programs both within the Nuclear Physics account and elsewhere in your Office. From where will the money for the amendment come? Are you working with the OMB to see that this money does not come from high-priority science programs that you oversee? If the money does come from within your office, are you confident that other Science programs will not be adversely impacted?

Dr. Krebs. In formulating this request, it is certainly our intention to try and protect the high priority scientific research efforts that we support. As soon as the details are finalized, the Amended Request will be sent to the Congress.

Mr. Packard. The budget justification cities the Department's intent to peer-review and use a competitive merit review process to award 80% of its research projects. How will the remaining 20% of the awards be selected? Is this a change from the current fiscal year?

Dr. Krebs. Essentially 100% of research projects are reviewed, and well over 80% (i.e; > 96%) are peer-reviewed. All research activities at universities and national laboratories, and all Small Business Innovative Research (SBIR) projects awarded to private companies undergo peer-review. The Nuclear Physics Program provides funding for General Plant Projects (GPP) and General Purpose Equipment (GPE) projects at National Laboratories, and for Accelerator Improvement Projects (AIP) and some Capital Equipment projects at Facilities which undergo internal and DOE review, but are not subjected in general to scientific peer-review. Funding for these activities comprise less than 4% of the FY 2000 Budget Request. There is no change from the current year.

NEUTRINOS AT THE MAIN INJECTOR EXPERIMENT (NuMI/MINOS)

Mr. Packard. Please provide a brief description of this program. What were the original cost and schedule estimates for this project? How do current estimates compare?

Dr. Krebs. The Neutrinos at the Main Injector (NuMI) project at Fermilab will provide a world-class facility for studying the physics of neutrinos, specifically oscillations between different flavors of neutrinos. It includes the design and construction of a neutrino beam line and experimental facilities at the Fermilab site, an experimental hall in the Soudan mine in Minnesota, and two multi-purpose detectors. A beam of neutrinos, produced using protons from the Main Injector, will be aimed at both detectors, one located on the Fermilab site and the other in Soudan. The MINOS experiment will look for evidence of neutrino oscillations between the two detectors.

The project has been baselined at a total estimated cost of $76.2 million, a total project cost of $136.1 million, completion of construction in the second quarter of FY 2003, and operation beginning in the last quarter of FY 2003. The preliminary estimate provided in the FY 1999 budget request was a total project cost of $135.3 million. The FY 1998 budget requested $6.3 million for architect-engineering and technical design work only.

HUMAN GENOME PROJECT

Mr. Packard. Please provide estimates for the total cost of this project and include non-Departmental activities that support the goals of this project for fiscal years 1997 and 1998 and estimates for fiscal years 1999 and 2000. There have been major changes in the community since this program was originally conceived. Please provide a brief description of these changes and how the Department has changed its program to reflect the contributions provided by others including the private sector. Have these changes resulted in changes to the funding requirements?

Dr. Krebs. The total cost for the U.S. human genome project at DOE and NIH for FY 1997, FY 1998, FY 1999 and FY 2000 follows in the table below:

U.S. Human Genome Project Funding
(B/A in millions)

	FY 1997	FY 1998	FY 1999	FY 2000
DOE Total	$ 77.9	$ 85.2	$ 88.8	$ 90.3
NIH Total	188.9	218.0	240.1	275.6
Total U.S. Funding	$266.8	$303.2	$328.9	$365.9

These figures include funding for both the NIH extramural grants program (the human genome project numbers reported by NIH) and the NIH intramural research program, which increased from $43,700,00 in fiscal year 1997 to a projected $56,500,000 in fiscal year 2000. In addition, NIH's total human genome budget for FY 1999 increased after DOE had submitted its FY 2000 budget; therefore, the current total U.S. funding for the Human Genome Project in FY 1999 is $353,700,000.

The original goal of the human genome program, described in the first genome program plan in 1990, was to determine the complete DNA sequence of a representative human genome by 2005. That is still the principal goal of the genome program today. However, technology advances have accelerated progress in DNA sequencing so that completion is now expected in 2003. Details for implementing the overall genome program plan have also changed as technologies and resources improved and as strategies for high throughput DNA sequencing were tested and employed. Now, in addition to delivering a complete sequence of the human genome by 2003, the international genome program will deliver a high quality draft sequence that biologists can use by 2001. Markers of the subtle but biologically important differences in DNA sequence that make each of us unique will be identified. The complete sequence of important model organisms, the worm, the fly, and the mouse, will also be completed. In the end, we are getting much more for our investment than was initially envisioned.

The private sector has also entered the genome project in a big way. A new company, Celera Genomics (Celera), formed in May 1998, plans to sequence the human genome by 2001 using a new, untested approach. In fact, DOE supported the development of key elements of Celera's proposed methodology. However, Celera's sequencing approach differs from the public sequencing effort. It will not produce a "complete" high quality sequence of the human genome. The DNA sequence produced is likely to contain gaps where the continuity of the sequence is broken. It is likely that the exact location of some DNA sequences will be difficult to place precisely on human chromosomes. Celera will also use DNA from three people resulting in the identification of commercially valuable information about human variation. Finally, Celera will release most of its DNA sequence data every 3 months, but it will keep some sequence data as "proprietary." In the end, we anticipate that Celera's sequencing effort will be complementary to current public sequencing efforts but that complementarity is based on several, as yet unproven, assumptions. We anticipate that Celera's effort, coupled with the public sequencing efforts, including those of our international partner, the Sanger Center in the United Kingdom, will reduce overall errors in the sequence data, fill in remaining gaps in the sequence, identify additional human variation, and accelerate overall completion of sequencing the human genome. A second private company, Incyte, announced its intention to sequence the human genome in 2 years; however, Incyte data will be held privately and not released.

Scientists need human DNA sequence information for their ongoing research that is currently not available. NIH has estimated that up to $500,000,000 is spent on human DNA sequencing each year by individual scientists to obtain information needed for their research, information that will soon be available to all scientists from the Human Genome Project. Thus, there is a real sense of urgency to complete the sequence as quickly as possible. The demand and need for even more efficient DNA sequencing technology will continue to grow even after the first human sequence has been determined so DOE continues to invest in research to develop the next generation of this technology. These needs are, in part, reflected in the increased investment in the U.S. genome project in fiscal year 1999 with the NIH genome program increasing by 21.7 percent and the DOE human genome program increasing by 4.2 percent.

NATIONAL INSTITUTE FOR GLOBAL AND ENVIRONMENTAL CHANGE (NIGEC)

Mr. Packard. Please provide a detailed spending plan listing the activities funded by NIGEC for fiscal years 1995 through 1998 and estimates for fiscal years 1999 and 2000. Please provide an itemized list of any grants, contracts or other financial awards made on a non-competitive basis in any of the fiscal years 1995 through 1999.

Dr. Krebs. The spending plan for NIGEC in FY 1995 through 1998 was as follows:

In FY 1995, $7,946,000 was awarded to the six regional centers at Harvard University, Indiana University, the University of Alabama in Tuscaloosa, Tulane University, the University of Nebraska, and the University of California at Davis to solicit and fund research through a competitive, merit review process. Each regional center was awarded $1,324,000 (i.e., one-sixth of this amount) to fund research subcontracts selected through a competitive process. The National Office of NIGEC at the University of California at Davis was awarded the same amount to run NIGEC for DOE and to fund research that transcends the six NIGEC regions and scientific workshops and meetings to coordinate research activities within and among the regions.

In FY 1996, $7,695,000 was awarded to the six regional centers to solicit and fund research through a competitive, merit review process. Each regional center was awarded $1,283,000 to fund research subcontracts selected through a competitive process and to organize and sponsor meetings of the funded scientists to organize and coordinate their research activities within and across the regions. The National Office of NIGEC was awarded the same amount of $1,283,000 for research subcontracts and to operate NIGEC.

In FY 1997, $7,269,000 was awarded to the six regional centers to solicit and fund research through a competitive, merit review process. Each regional center was awarded $1,212,000 to fund research subcontracts selected through a competitive process. The National Office of NIGEC was also awarded $1,212,000 in research subcontracts and to operate NIGEC.

In FY 1998, $6,931,000 was awarded to the six regional centers to solicit and fund research through a competitive, merit review process. Each regional center was awarded $1,155,167 to fund research subcontracts selected through a competitive process. The National Office of NIGEC was also awarded $1,155,167 in research subcontracts and to operate NIGEC.

It is anticipated that in FY 1999 and 2000, each NIGEC Regional Center will be awarded approximately $1,237,000 or one-seventh of the NIGEC budget to solicit and fund research through a competitive review process. The National Office of NIGEC will receive the same share of NIGEC funding to operate NIGEC, to fund research activities that transcends the six NIGEC regions, and to sponsor workshops and meetings to coordinate NIGEC-funded research across the regions.

The only one type of financial assistance in NIGEC that is not competed is the cooperative agreement which has been renewed annually between DOE and the University of California to run NIGEC for DOE. This funding to run NIGEC is not competed because Congress specified the host institution of the national office. Most of the funds provided to the University of California through the cooperative agreement, however, is competed through competitive solicitations for research contracts through each of the six NIGEC regional centers housed at Harvard University, Indiana University, the University of Alabama in Tuscaloosa, Tulane University, the University of Nebraska, and the University of California at Davis. The funds provided through the cooperative agreement that are not competed include resources provided to the regional centers to cover (1) their administrative costs of the annual competitive solicitations for research contracts and to produce an annual workplan and annual report, (2) the cost of sponsoring regional science team meetings to plan and coordinate research funded through a regional center and to share research findings and to plan future research solicitations. The national office's share of the funds are used to administer NIGEC, including reviewing the regional centers' annual workplans, producing a NIGEC annual report, reviewing, and assisting in the coordination of the research funded through the six regional centers. The NIGEC national office can also fund research that transcends the six NIGEC regions but the research it supports must be reviewed for scientific and technical merit.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH

Mr. Packard. The budget justification cites the establishment of a new environmental meteorology program. Please provide a list of other Federal agencies that have environmental meteorology programs. How is the Department's program different from those of other agencies?

Dr. Krebs. The DOE Environmental Meteorology Program (EMP) supports the Department's Global Change Research Program, the U.S. Global Change Research Program, and the Administration's goals to understand the meteorological processes associated with air quality and climate change. This program is a follow-on to previous programs that have focused on the release and transport of atmospheric emissions from DOE facilities. The focus of EMP is on the transport, transformations, and environmental consequences of energy-related emissions, i.e., how emissions are transported and transformed into chemical species other than the form in which they were originally emitted, and how they are affected by meteorological processes.

No other federal agency has an environmental meteorology program. However, several agencies have related, complementary programs. NOAA manages the U.S. Weather Research Program (USWRP) which focuses on weather phenomena relating to safety and economic consequences, but the USWRP does not focus directly on atmospheric emissions or their transport through the atmosphere. NOAA also sponsors research on tropospheric ozone and various photochemical processes. EPA has a substantial research program associated with the new particulate matter (PM 2.5) standards, primarily a monitoring program focused on the sources and sinks of atmospheric particulate matter, and the relationship to human health. But the EPA program does not focus on what happens to particulate matter between the time it is released into the atmosphere and the time it is removed from the atmosphere. The DOE program complements the NOAA and EPA programs and is filling the critical, most important gaps in basic understanding that the other programs are not addressing. EMP will also investigate links between climate change and air quality, e.g., local and regional impacts of climate change on energy-related emissions. EMP thus provides a unique activity, conducting critically-needed research relating to global change, air quality, and energy policy. The DOE EMP is actively coordinated with other agencies, through two Committee on Environment and Natural Resources subcommittees, the Subcommittee on Global Change Research and, primarily, the Subcommittee on Air Quality Research.

Mr. Packard. The budget justification includes a program to provide humanitarian research awards to scientists in the Former Soviet Union. Who is managing this program?

Dr. Krebs. The Biological and Environmental Research (BER) program has been funding these humanitarian research awards, primarily in the area of genome research, since 1993. The program was initiated at the request of Office of Science and Technology Policy following a visit to nearly 100 Russian labs by a team of American scientists including BER staff. These grants are managed by BER and administered through the Oak Ridge Institute for Science and Education.

Mr. Packard. What funding requirements are being requested?

Dr. Krebs. The majority of the research grants have been very small, as little as $5,000 per year, although some "large" grants of up to $50,000 per year have been awarded. Current funding for these projects is about $160,000/year.

Mr. Packard. How would awards be made?

Dr. Krebs. Requests received from Former Soviet Union scientists are peer reviewed and those that are funded are monitored for their annual progress. The fate of these projects has been diverse: some have been discontinued; several eventually received more substantive support through the U.S. Civilian Research and Development Foundation or other sources; some team leaders took visiting or full time positions in Europe or the United States where they have been very successful in developing their technologies; and some set up effective collaborations with U.S. scientists that continue to result in scientifically useful products.

Mr. Packard. The budget justification includes a line item for biological research which received $18,202,000 in fiscal year 1998 and $7,975 in fiscal year 1999. In fiscal year 2000, the Department is proposing to eliminate these activities. Please provide a description of the activities that are being eliminated.

Dr. Krebs. The general budget category, "biological research," has traditionally supported a wide variety of research including studies on DNA repair, studies on the health risks of energy-related materials, and animal carcinogenesis studies. These more general studies have been phased out and replaced by more focused research programs that better address Departmental mission needs. These new research programs include low dose radiation research, the use of model organisms to help us understand the human DNA sequence that is rapidly being determined, and the development and use of new technologies to determine the physical structures of proteins that are important to DOE needs, including energy use and production and environmental cleanup.

Mr. Packard. The budget justification includes funding for a third Atmospheric Radiation Measurement (ARM) site on Christmas Island in the Pacific Ocean. What funding was allocated in fiscal year 1999 for this third ARM site?

Dr. Krebs. The funding for the third ARM site on Christmas Island for FY 1999 was $2,700,000. The funds were used to obtain instrumentation for the third ARM site on Christmas Island.

Mr. Packard. What funding is being requested in fiscal year 2000?

Dr. Krebs. The requested funding for the third ARM site on Christmas Island for FY 2000 is $1,900,000. The funds will be used to complete the instrumentation system, prepare the site, and install the instruments on the site.

Mr. Packard. What is the total funding requested for the Global Change Research Education program? What was provided in prior fiscal years?

Dr. Krebs. The funding for the Global Change Research Education Program is displayed in the table below:

Global Change Research Education Program
(dollars in thousands)

	FY 1997	FY 1998	FY 1999	FY 2000 Est.
GCEP	$2,305	$2,018	$757 (a)	$2,459
SOARS	(40)	(40)	(40)	(40)
Total	$2,305	$2,018	$757	$2,459

(a) Awards made in late FY 1998 continue into FY 1999. The program activity is approximately level funding across fiscal years.

Mr. Packard. The budget justification includes funding for the Significant Opportunities in Atmospheric Research and Science program (SOARS). Please provide a brief description of this program. What amount of funding is requested for this program in fiscal year 2000? What amount was provided in prior fiscal years?

Dr. Krebs. The Biological and Environmental Research Program has established the Global Change Education Program (GCEP) to promote undergraduate and graduate training in support of the Department's global change research activities. Global change research encompasses a wide variety of study areas, including atmospheric sciences, ecology, global carbon cycles, climatology, and terrestrial processes.

The GCEP includes the Summer Undergraduate Research Experience (SURE), the Graduate Research Environmental Fellowships (GREF), and DOE sponsorship of several proteges in the Significant Opportunities in Atmospheric Research and Science (SOARS) program. SURE and GREF involve student research collaborations with scientists in DOE laboratories and/or DOE research programs. SOARS is a multi-agency program managed by NSF and implemented by the National Center for Atmospheric Research (NCAR). DOE sponsored SOARS proteges spend summers at NCAR, work on DOE-related research projects, and learn about career opportunities in global change research. SOARS proteges are primarily minority students.

The SOARS portion of the Biological and Environmental Research budget request is about $40,000 per year. Most of the SOARS total budget of $515,000 is provided by NSF. NASA, and NOAA also contribute funds for SOARS.

Mr. Packard. Please provide a brief description of the AmeriFlux program.

Dr. Krebs. The AmeriFlux Program represents an evolving network for direct measurement of carbon dioxide exchange (i.e., flux) between the atmosphere and terrestrial ecosystems. The integrated annual measure determines how large the carbon sink is for different landscape units. Preliminary data suggest that forest ecosystems are sequestering 2 to 5 metric tons of carbon per hectare per year, which could represent a substantial sink for excess carbon dioxide produced by fossil fuel.

Mr. Packard. What other partners are in this program?

Dr. Krebs. The Department of Energy supports about 70% of the AmeriFlux Network in the USA. Other partners are the National Oceanic and Atmospheric Administration, the National Aeronautics and Space Administration, the U.S. Department of Agriculture, the National Science Foundation, and the Smithsonian Institution. AmeriFlux is part of an International Fluxnet Program to measure carbon dioxide flux in different countries as part of a worldwide study of the global carbon cycle.

Mr. Packard. To whom are funds awarded?

Dr. Krebs. AmeriFlux is implemented through grants to Universities, contracts with Federal Laboratories and by Interagency Agreements.

Mr. Packard. How are funds awarded?

Dr. Krebs. Awards are made on the basis of strongest scientific merit using open competition. DOE's program elements that support AmeriFlux are Terrestrial Carbon Processes and the National Institutes for Global Environmental Change (NIGEC).

Mr. Packard. Why is funding expected to double in this program from $7,819 000 in fiscal year 1998 to $14,831,000 in the budget request for fiscal year 2000?

Dr. Krebs. To the approximately 35 AmeriFlux sites, 18 of which are presently funded by DOE, BER is proposing to add as many as 10 new measurement locations in FY 2000. The site locations will be based on a strategic plan for flux measurements across continental USA and Alaska, which will identify critical areas where additional measurements are needed for reliable estimates of terrestrial carbon sinks over a wide range of North American landscape types. Strategic planning will be based on a Science Plan that is now under review by Federal Agencies. The Science Plan recommends that the present network of approximately 25 flux measurement sites in the U.S. being increased by a factor of 2 to 10 to assure the critical data for understanding and quantifying the North American carbon sink. Increased funding will also improve mechanisms for data exchange and research coordination with interagency and international partners.

Mr. Packard. The budget justification includes a large increase for activities listed under Human Interactions. What is driving these spending increases?

Dr. Krebs. The Human Interactions activity includes research to improve integrated assessment of the economic and environmental implications of human-induced climate change, and integration and dissemination of global change data and information to the global change research community, global change education efforts, support for a portion of the National Institute for Global Environmental Change, and partial support for the DOE Science Education program.

The increase in budget from FY 1999 to FY 2000 is driven by the two education programs. In the global change education program, research fellowship awards were made late in FY 1998 and continue into FY 1999. The activity is roughly level funded, however these late fiscal year 1998 awards account for the decrease from FY 1998 to FY 1999 and the increase from FY 1999 to FY 2000.

The Science Education program will fund new opportunities for pre-college teachers so that they can participate directly in cutting-edge research at DOE science laboratories and renew their understanding of scientific investigation. Where teachers do not possess sufficient background to participate directly in research, DOE will provide supervised research experiences where teachers can work with teams of scientists and science educators to understand the nature of DOE's scientific reach. The goal is to provide educators with the tools to sharpen their science and math foundations and apply these tools to their classroom practice. Funds will be provided to pay for the teachers' stipends, travel, housing, and subsidize laboratory scientists' time for this activity.

Mr. Packard. To whom are funds awarded?

Dr. Krebs. The Human Interactions activity conducts research through the National Laboratories and academia.

Mr. Packard. How are funds awarded?

Dr. Krebs. All activities are peer reviewed and awarded either through grants to the private sector or contracts to the National Laboratories.

Mr. Packard. Please provide a detailed list of program activities with funding provided in fiscal years 1997 and 1998 and estimates for fiscal years 1999 and 2000.

Dr. Krebs. I will be pleased to provide this information for the record. (The information follows.)

HUMAN INTERACTIONS
(B/A in thousands)

	FY 1997 Actual	FY 1998 Actual	FY 1999 Estimate	FY 2000 Request
Information and Integration	1,793	1,860	1,927	1,909
Integrated Assessment	3,122	3,345	3,053	3,038
Portions of NIGEC included in Integrated Assessment	1,696	1,648	1,746	1,752
Global Change Education	2,305	2,018	757	2,459
Science Education	0	0	0	1,947
Total	8,916	8,871	7,483	11,105

Mr. Packard. The budget justification includes funding for Garden State Cancer Center. How much funding is included? What is the purpose of this funding?

Dr. Krebs. The BER FY 2000 budget includes $5,000,000 for the Garden State Cancer Center. The purpose of this funding is to complete the renovation of an existing facility for the Garden State Cancer Center at the current Belleville, New Jersey, location. This facility will conduct research in the diagnosis of cancer and infectious diseases.

Mr. Packard. What is the status of the construction work being done at the Manuel Lujan Jr. Neutron Scattering Center at the Los Alamos Neutron Science Center?

Dr. Krebs. The BES supported instrument spectrometer development project at the Manuel Lujan Jr. Neutron Scattering Center at the Los Alamos Neutron Science Center is proceeding on schedule and on budget. Four spectrometers are being funded by BES; $6,000,000 of capital equipment funds is requested for design/fabrication of these spectrometers in FY 2000. The following summarizes the progress in the selection and fabrication of those spectrometers. In January 1997, the selection process for the spectrometers was initiated through a call for letters of intent to build and operate new spectrometers at LANSCE. Nineteen letters were received and reviewed by a Proposal Evaluation Committee (PEC) in June. Of the nineteen Spectrometer Development Teams (SDT), four were asked to submit full proposals for accelerated fabrication in October 1997, and five were invited to submit proposals in January 1998. On October 22, 1997, the PEC met to consider the four proposals for accelerated spectrometer design, fabrication, and deployment. The Committee recommended that the Spectrometer for Materials Research at Temperature and Stress (SMARTS) and the High-Pressure Preferred-Orientation Spectrometer (HIPPO) instruments be considered for accelerated fabrication. In March 1998, the PEC met to consider the remaining proposals and recommended the HERMES and HELIOS instruments, with suggestions for modifications to the instrument design and capabilities. The SDT Management Steering Committee agreed to proceed with both instruments as well. The SDTs will lead the design, fabrication, installation, and operation of the new spectrometers. Each SDT includes participants from academia, National Labs, and LANSCE. LANSCE provides overall coordination of the Spectrometer Development Project. SMARTS is a new, improved powder diffractometer for strain measurements; HIPPO is a new, improved high-intensity powder diffractometer for texture measurements; HELIOS is a high-intensity, direct-geometry, time-of-flight spectrometer for the study of dynamical processes in a wide variety of materials; and HERMES is crystal backscattering expected to become key in a broadly based scientific program that will include investigations of topics in biology, chemistry, geology, materials science, and physics.

Mr. Packard. How do the current cost estimates and schedule compare to the original cost estimates and schedule?

Dr. Krebs. The current cost estimates and schedule are the same as the original cost estimate and schedule.

Mr. Packard. The Office of Science (SC) and the Office of Energy Efficiency and Renewable Energy (EE) each manage separate high-temperature superconductivity programs. What are the goals of the program managed by SC?

Dr. Krebs. High-temperature superconductivity work in the Office of Science (SC) is primarily funded in the Basic Energy Sciences program. The goals of the high-temperature superconductivity program managed by SC/Basic Energy Sciences are to understand the

phenomena of high temperature superconductivity and the mechanisms that promote or inhibit it. Among the issues being pursued are the development of a theory or a predictive model for superconducting behavior, i.e. a first principles qualitative model that will predict whether a material will or will not exhibit superconducting behavior, and a quantitative model that will predict the magnitude of superconducting parameters such as superconducting transition temperature and superconducting electrical current carrying capacity (critical current density). Other scientific issues under pursuit are the phenomena of superconducting magnetic flux and vortex pinning, the superconducting to insulator transition, and the role of grain boundaries and various crystalline defects in the transport of superconducting current. Other high-temperature superconductivity research under the Office of Science takes place in the High Energy and Nuclear Physics programs. Their objectives pertain to applications of high-temperature superconductivity in high-energy physics.

Mr. Packard. What amount of funding was provided for this program in fiscal years 1997 and 1998?

Dr. Krebs. High-temperature superconductivity funding in the Basic Energy Sciences program was approximately $12.7 million in fiscal years 1997 and 1998. The High Energy and Nuclear Physics programs funding for fiscal years 1997 and 1998 is $0.5 million.

Mr. Packard. What are the estimates for fiscal years 1999 and 2000? Please describe how this program is coordinated between the two offices.

Dr. Krebs. The Basic Energy Sciences program estimate for fiscal year 1999 is about $9.7 million; and for fiscal year 2000, the estimate is approximately $9.2 million. The High Energy and Nuclear Physics programs estimate for fiscal years 1999 and 2000 is $0.5 million.

There are several mechanisms of coordination of high-temperature superconductivity between the Office of Science and the Office of Energy Efficiency and Renewable Energy. One formal mechanism is the activity under the Subcommittee on Superconductivity under the Energy Materials Coordinating Committee which involves program staff from both the Office of Basic Energy Sciences and the Office of Energy Efficiency and Renewable Energy. A second formal mechanism is by the annual practice of having one of the Office of Basic Energy Sciences program managers and one of the Office of High Energy and Nuclear Physics program managers serve as a peer reviewer at the annual peer review of the Office of Energy Efficiency and Renewable Energy superconductivity program. A third formal mechanism is by participation by Office of Basic Energy Sciences program staff in individual laboratory management reviews carried out by the Office of Energy Efficiency and Renewable Energy Superconductivity program. Another interaction involves participation by contractors to the Office of Energy Efficiency and Renewable Energy Superconductivity program in the annual "Superconductivity Wire Workshop" sponsored by the Office of High Energy and Nuclear Physics, and Basic Energy Sciences staff participated in the Office Energy Efficiency and Renewable Energy's "Wire Development Workshop." Yet another coordination activity takes place under two Cooperative Research and Development Agreements (CRADAs) under the SC Laboratory Technology Research Program that have promoted interactions between scientists funded by

Basic Energy Sciences at Argonne National Laboratory and Brookhaven National Laboratory with industrial contractors that are supported by the Office of Energy Efficiency and Renewable Energy's superconductivity program. Another example of coordination pertaining to joint planning for future research activities was the August 1998 Research Assistance Task Force entitled "Coated Conductor Development: An Assessment of Some Scientific Issues" which was jointly sponsored by the Office of Basic Energy Sciences and the Office of Energy Efficiency and Renewable Energy, and brought together a representation and dialogue amongst researchers that are supported by both programs. Another coordination mechanism is the twice-monthly publication "High Tc Update" which is sent to all superconductivity researchers supported by the Office of Science and/or the Office of Energy Efficiency and Renewable Energy, and regularly reports on superconductivity matters of common interest.

Mr. Packard. The budget justification cites an evaluation of the Partnerships for Academic-Industrial Research program (PAIR). When will this evaluation be completed?

Dr. Krebs. The effectiveness of the PAIR program will be evaluated by BES staff and management at the end of FY 1999.

Mr. Packard. The Department has stated its intention to award an additional $1,500,000 for this program if evaluation is favorable. What would be the source of the additional funds?

Dr. Krebs. Based on the response of the community to this program and on the quality of proposals that we received, an additional $1.5 M may be added to this program in FY 2000. Funding will be provided from normal turnover of programs within the Basic Energy Sciences program.

Mr. Packard. The overall funding increase for the Office of Science is approximately $137,500,000. Funding increases for just two initiatives -- the Spallation Neutron Source and the new Scientific Simulation Initiative total more than $160,000,000. What activities is the Department cutting to fund these large spending increases?

Dr. Krebs. In Biological and Environmental Research there were one time congressionally directed projects totaling about $46 million, some of which was applied to these initiatives as well as science education. In formulating the budget for FY 2000, we had to make a number of difficult but defensible choices.

Mr. Packard. The funding request for the Climate Change Technology Initiative in fiscal year 2000 is $19,504,000, a 150% increase over last year. What are the projected costs of this program in fiscal years 2001 through 2004?

Dr. Krebs. The Climate Change Technology Initiative is currently projected to have constant funding during the years FY 2001 through FY 2004.

BASIC ENERGY SCIENCES

Mr. Packard. The budget justification makes reference to BES staff studies of hydrogen activities managed by the Office of Energy Efficiency and Renewable Energy (EE). Please provide a short description of these studies. Please provide a copy of these studies to the Committee. Also, please provide any other Office of Science studies, report or evaluations of EE programs.

Dr. Krebs. The reference to the Office of Energy Efficiency and Renewable Energy's hydrogen program is one in which a member of our program staff served as a peer reviewer for the biohydrogen program's annual review. Copies of the materials we provided the biohydrogen program and our recommendations have been requested from the program and should be received in the near future. A more complete response will be provided to the committee upon receipt of the requested materials.

In FY 1998 and 1999, funds provided by the Energy Research Analyses (ERA) program supported peer reviews assessing the technical quality of 119 separate research projects sponsored by the Office of Building Technologies and State and Community Programs in the Energy Efficiency and Renewable Energy Program. The Department uses the results of these analyses to provide program managers with a measure of the technical quality of their projects, an independent technical assessment of the performance of individual projects and technical validation and guidance to the project investigators. Following is the list of projects funded by the Office of Energy Efficiency and Renewable Energy that were assessed with ERA funds:

1. "Prototype Development for GAX Residential Absorption Heat Pumps"
2. "5 Ton GAX Absorption Heat Pumps System Development"
3. "System Testing"
4. "Solid Adsorption System Development"
5. "8 Ton VXGAX Heat Pump Development"
6. "Commercial Chiller System Development"
7. "Commercial Chiller Corrosion & Fluid Properties"
8. "Heat Transfer Fundamentals of Refrigerant/Lubricant Mixtures"
9. "Natural Refrigerants & Hydrocarbons"
10. "Thermophysical Properties of Alternative Refrigerants"
11. "Dupont CRADA Heat Transfer"
12. "Heat Pump Modeling for Refrigerant Mixtures"
13. "Electrohydrodynamic Heat Transfer"
14. "Compact Heat Exchangers"
15. "Oil Heat Burner Design"
16. "Oil Heat Burner Controls"
17. "Combustion System for Residential Absorption Heat Pump"
18. "Combustion System for Commercial Absorption Chiller"
19. "Unmixed Reformer Development"
20. "UOB Reformer Development"
21. "SBIR: Bi-Polar Plate Development"

22. "SBIR: CO2 Tolerant Anodes"
23. "Risk Assessment"
24. "Contaminant Effects"
25. "Desiccant Equilibrium"
26. "Lean Flammability Limits"
27. "Elastohydrodynamic Lubrication Behavior"
28. "Motor Life Accelerated Test Methods"
29. "Effect of Temperature on Desiccant Catalysis"
30. "Compatibility of Motor Materials"
31. "Building America Technical Support"
32. "Builidng America Consortium"
33. "Building America Consortium"
34. "Building America Consortium"
35. "Building America Consortium"
36. "Passive Research & Residential Exemplary Buildings"
37. "Industrialized Housing Research"
38. "Monitoring & R&D"
39. "Technical Support"
40. "Enthalpy Wheel Pre-Conditioner Development"
41. "Field Testing of Desiccant Systems"
42. "Desiccant System Testing"
43. "Testing and Standards Development"
44. "IAQ Field Evaluation"
45. "Liquid Desiccant System Development"
46. "Field Testing of Desiccant Systems"
47. "Low Cost Heat Pump Water Heater"
48. "Water Heating Field Test"
49. "Supermarket Applications & Field Test"
50. "AHAM CRADA on 1 kWhr/day Refrigerator"
51. "Liquid Overfeed Applications - Vending Machines et al."
52. "Alternative Cycles"
53. "Residential Attic & Ceiling Research"
54. "Research User Center"
55. "TEWI Environmental Effects"
56. "Whole Wall Rating Procedure"
57. "Cool Roofing Membranes and Coatings"
58. "R30/30 Roofing System"
59. "Moisture Control Strategies"
60. "Evacuated Panel Insulation"
61. "Non-HCFC Closed Cell Foam Insulation"
62. "Existing Materials Performance"
63. "New Initiative on Radiative Heat Transfer in Attic Insulation"
64. "New Initiative on Hygrothermal Property Measurement Capability"
65. "Test & Evaluation"
66. "Icynene Foam"

67. "Wet Spray Fly Ash"
68. "Life-Cycle Economics of High Performance Buildings"
69. "IEA Annex 34 Fault Detection"
70. "450 Golden Gate Field Study"
71. "Commercial Exemplary Buildings"
72. "Building Design Advisor"
73. "SPARK Development"
74. "International Alliance for Interoperability"
75. "Energy Plus Development"
76. "Benchmarking Tool"
77. "Diagnostic Software"
78. "Passive Solar Diagnostic Tools"
79. "ENERGY-10"
80. "Computational Tools for Performance-Based Design: The SEMPER Project"
81. "Control Strategies"
82. "Healthy Buildings and Productivity"
83. "Energy Performance of Buildings"
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88. "Advanced Materials and Performance"
89. "Thin Film Deposition Technologies"
90. "Electrochromic Materials"
91. "Electrochromic Durability"
92. "Electrochromic Development"
93. "Electrochromic Development"
94. "Electrochromic Development"
95. "Electrochromic Deposition"
96. "Smog Modeling in Cool Communities"
97. "Pavement Studies"
98. "Cool Materials Data Base", and "Highly Reflective Roofing Products"
99. "Heat Island Data and Meteorological Studies"
100. "Standards Development"
101. "Highly Reflective Surfaces"
102. "Residential Field Testing and Standards Development"
103. "Commercial Thermal Distribution Research"
104. "Hydronic System Efficiency"
105. "Field Test"
106. "STTR: Air flow Measurement"
107. "STTR: Improved Connectors"
108. "Technical Support for Standards and Rating Systems"
109. "Glazing Properties Research"
110. "Advanced Thermal Performance Models and IR Validation"
111. "Software Development (Window5, Therm, Optics)"

112. "Thermal Testing"
113. "Thermal Performance"
114. "Solar & Optical Performance"
115. "Annual Ratings, Software (Resfen) and Demos"
116. "Thermal Field Tests"
117. "Non-Energy Benefits"
118. "Commercial Building Glazing Performance"
119. "Commercial Building Guidelines"

SPALLATION NEUTRON SOURCE

Mr. Packard. The Committee is aware that the United States scientific and research and development communities are wholeheartedly supportive of the need for a new neutron source. Please provide a brief summary of the different groups that would use this facility if it is built. What efforts have been made to attract other sources of funding for this widely supported facility?

Dr. Krebs. The various groups that will be using the SNS are researchers from universities, industries, and government laboratories. Typically, about 50% of the users of the Basic Energy Sciences facilities come from universities, 25% from government laboratories, 15% from industries. The other 10% are from non-profit organizations and foreign institutions. We expect that the SNS will have a similar user profile because university researchers and industry researchers have already been involved in setting the specifications for the SNS through DOE advisory committees and through the laboratories advisory committees.

As the SNS was in early planning stages, the Department participated in several international meetings reviewing the need for neutron sources. The Organization for Economic Cooperation and Development's (OECD) Megascience Forum held an Expert Meeting in December 1996 at the Riso National Laboratory in Roskilde, Denmark to consider neutron and synchrotron radiation sources. The Expert Meeting was attended by 64 representatives from 16 OECD countries. The main conclusions regarding neutron sources were that there was a shortage of neutron sources and that consultation among agencies and governments should be encouraged. The group also concluded that a follow-on meeting on neutron sources should be held. The follow-on meeting on neutron sources was held in Knoxville, Tennessee in November 1994. The conclusions were:

- "...plans for new facilities should be developed in co-ordination with representative national user groups...and in close co-operation with the major science agencies in the various major countries."

- "A growing disparity exists between the need for neutron-based research and the availability of neutron facilities to meet these needs."

- "...future spallation sources would benefit from international collaboration in R&D."

Based on the conclusions of these two meetings, the Megascience Forum established the Neutron Sources Working Group (NSWG) in January of 1996. The NSWG has 35 delegates, comprising both government and scientific officials, from 17 OECD countries and Russia. The objectives of the NSWG were:

"to estimate the future level of neutron undersupply, giving consideration both to likely demand, and supply, over a 20-year timescale; to establish what is required to meet the anticipated demands in terms of new and refurbished facilities and instrumentation; to identify technical problems associated with the development or upgrading of new or existing neutron

sources and to recommend, where appropriate, co-operative R&D activity to solve these problems."

The NSWG met in Lisbon, Portugal (May 1996); Interlaken, Switzerland (October 1996); and Toronto, Canada (August 1997). The NSWG published a summary report of their findings in January 1998.

The conclusions of the NSWG were:

"Decisions on new facilities are necessary in the next few years, and certainly before the year 2005. Otherwise, vital areas of science and technology will be deprived of a crucial and unique research tool."

"The next generation neutron sources will create significant new scientific and engineering opportunities as well as replace out-dated capacity. The NSWG recommends a scenario which aims at the construction of an advanced neutron source in each of three different world regions, to be operational within 20 years, and catering for regional needs in a wide range of science and technology. This is consistent with the plans for next generation multi-megawatt spallation sources which are already at advanced sources are supplemented by a network of local sources, to be developed as required by national measurement needs."

"The development of the advanced sources as well as the up-grading of existing ones and the continued development of instrumentation requires R&D for proof of concepts, design, testing and validation as well as prototyping. International collaboration and task-sharing is strongly recommended in order to achieve technical synergy and cost reductions."

The NSWG sponsored two international collaborative activities. It sponsored a workshop on cold moderators for spallation sources in September of 1997 and it sponsored the Alternate Gradient Synchrotron (AGS) Spallation Target Experiment at Brookhaven National Laboratory. This effort is supported jointly by the European Spallation Source (ESS) project, the SNS project, and the Japanese spallation source projects. This collaboration has already saved the SNS project about $1.4 million in R&D costs for the target. The SNS project has agreements in place with the ESS project, the Japanese, and the Rutherford Appleton Laboratory. Already these agreements have saved the SNS project substantial funds. The Project Director estimates that the agreement with the ESS project saved millions of dollars in the preparation of the Conceptual Design Report of the SNS.

At other Basic Energy Sciences facilities, users have provided large amounts of funding to instrument beamlines. For example, beamline investment at the Advanced Photon Source exceeds $100 million. The SNS will follow this pattern. Of the 18 available beam lines, only 10 will be instrumented as part of the project. Even these are likely to have co-funding because they will be built by teams from academia, industry, and governmental laboratory researchers.

Mr. Packard. What is the latest cost estimate for constructing this facility?

Dr. Krebs. The fiscal year 1999 appropriation for SNS was $130 million. This amount was $27 million less than the Administration's Budget Request of $157 million. We estimated that this 17 percent funding shortfall would delay the completion of certain near-term design tasks and long-lead hardware procurements. The net result is a 3-month delay in project completion to the first quarter of fiscal year 2006 and a cost of living effect that increases the total project cost from $1.333 billion to $1.360 billion as displayed in the latest fiscal year 2000 request to Congress.

Mr. Packard. How does this compare to the original estimate? How does this compare to the estimate provided last year?

Dr. Krebs. In June 1997, the Department's Office of Science conducted a Technical, Cost, and Schedule Review of the proposed Conceptual Design. In response to recommendations from this review, the project schedule was extended from 6 to 7 years and other adjustments were made that increased the total project cost from the $1.226 billion in the proposed Conceptual Design to $1.333 billion. This cost and schedule was subsequently validated by an independent cost estimate done by Burns and Roe. The $1.333 million total project cost and 7-year construction schedule were the baselines that the Department approved and provided to Congress in the fiscal year 1999 budget request.

Mr. Packard. The Department has trumpeted the State of Tennessee's statement that it will provide $8,000,000 for construction of the Joint Institute of Neutron Sciences. However, the Department has been quiet about the State of Tennessee's intention to assess $35,400,000 in taxes on this project. Do all States where DOE has facilities impose such a similar "Sales/User Tax" and if so, which ones?

Dr. Krebs. The U.S. Supreme Court affirmed that DOE is liable for Tennessee Sales/Use Tax in 1964. Applicable state tax from New Mexico is also included in the estimate. Other collaborating laboratories (in California, Illinois and New York) are exempt from their local sales tax due to their non-profit status. (These states do have state income taxes that will be levied on salaries of people employed by the SNS project at those locations.)

Mr. Packard. When and how was the Department made aware of the State's intention to tax this project? If the Department was aware of these taxes before submission of its fiscal year 2000 budget, why were these taxes not identified in the justification?

Dr. Krebs. Applicable state taxes are included in the SNS Total Project Cost shown in the FY 1999 and FY 2000 budget requests. These taxes are not identified separately in the Project Data Sheet, since they are an embedded component of the project's cost estimate in the same manner as contractor overhead rates and fees.

SPALLATION NEUTRON SOURCE

Mr. Packard. Is the Department aware of any studies or estimates of the benefits to the Oak Ridge community should this project be completed at Oak Ridge National Laboratory?

Dr. Krebs. A $1.3 billion Spallation Neutron Source in Oak Ridge could mean 4,300 more jobs over the life of the project and millions of dollars in added sales tax revenue each year, according to a University of Tennessee Business and Economic Research study. This study includes conservative estimates of "ripple" effects of SNS construction on the local economy. The benefits on the other States have not been estimated, but will also be significant.

Mr. Packard. Is the Department aware of any geological or other impediments to building this project at the current site at Oak Ridge National Laboratory?

Dr. Krebs. The preferred site at Oak Ridge is satisfactory for construction of the facility. Detailed site characterization and preparation cannot take place until the Record of Decision is issued. However, there are established engineering practices to deal with any geological problems that may arise, in particular with respect to settling.

Mr. Packard. It has been five months since the Congress approved the construction phase of this project, over a year since the design was approved, and the project is already falling behind schedule. Why has the Department allowed the project to progress this far without requiring Oak Ridge National Laboratory to fill key positions, such as a Project Director who was hired just last week, and a Technical Director who can integrate the designs of the participating laboratories?

Dr. Krebs. It is more accurate to say that the project is behind in costing as projected in the original plans. This has arisen because the project had to be rebaselined to reflect a 17% reduction in funding for fiscal year 1999; and as noted by our review committee, the management team has been slow in "moving from conceptual design to construction phase." With respect to scheduling, the review in January noted that "that the SNS Collaboration is continuing to work well together, technical progress is generally good, and teamwork is clearly evident in their approach to design, R&D, and value engineering activities." Some parts of the project are ahead of schedule. For example, the ion source has demonstrated current and duty factor in excess of that required for the SNS. The Review Committee commended the project "for beginning to address the commissioning and operations issues at this early stage of construction." The Review Committee noted that "the recommendations from the June 1998 DOE/SC review have been satisfactorily completed, and with the exception of hiring a Project Director, the principal recommendations are being adequately addressed."

Most of the positions have, in fact, been filled. Since early in its life, the Project has had an Associate Laboratory Director responsible for the project reporting to the Laboratory Director. The project's Science Director, ES&H Director, Project Manager, and Senior Team Leaders at all of the Laboratories have been appointed. Our review committee clearly identified a problem with the management of the project and recommended that a new Project Director, reporting directly to the ORNL Laboratory Director, with extensive experience in the construction of large

technical and scientific facilities be appointed. Within a week of that recommendation, the Laboratory Directors of the five collaborating laboratories unanimously selected David Moncton to fill that position. Dr. Moncton was responsible for the Advanced Photon Source, which is a technical and scientific project of similar size and complexity as the SNS. Furthermore, Dr. Moncton is a respected scientist in the area of neutron scattering.

Mr. Packard. In a hearing last week, you acknowledged that the Department had identified a few areas of concern including hiring of managers, work being done at Los Alamos National Laboratory and the low contingency cost estimate in the current baseline. We note that obligations and costs are lower than estimated and that there are currently funds in excess of requirements. Nonetheless, in the budget justification, the Department faults the Congress for 100% of the $27,000,000 cost increase over last year's estimate. To quote the Department: "The schedule delay and increased costs are a result of the planned funding being reduced by $27,000,000 in the FY 1999 appropriation." Is the only reason for the overruns the reduction in the amount appropriated?

Dr. Krebs. The only reason for the change in the total project cost is the change in the fiscal year 1999 budget for the project from $157 million to $130 million. We estimated that this 17 percent funding shortfall would delay the completion of certain design tasks and long-lead hardware procurements. The net result is a 3-month delay in project completion to the first quarter of FY 2006 and a total project cost increase from $27 million to $1.360 billion.

Mr. Packard. Is it fair to blame the Congress for these overruns?

Dr. Krebs. There is no intent to assign any blame. A project's schedule is affected by the amount of funding available during each fiscal year. This increase is simply the estimated effect of not having the necessary budget authority to carry out tasks according to the original schedule. The project is indeed behind its planned spending rate. However, the current plans are for the project to recover in the latter half of fiscal year 1999.

Mr. Packard. The Oak Ridge National Laboratory M&O contract is being recompeted this year and Lockheed Martin has said it is not competing as the prime for the new contract. I also understand that the current Oak Ridge National Laboratory director has publicly stated that the recompetition will jeopardize the SNS project. What is DOE doing to ensure there are no disruptions to the project from the planned change in ORNL operating contractors?

Dr. Krebs. The recompetition will not affect performance on the SNS project. The Management and Operating contract solicitation will make clear that DOE expects the successful bidder to ensure that no disruptions (e.g., staff turnover, procurements) occur in the SNS while transitioning to the new contract. The new Management and Operating contractor will be required to support the SNS vigorously.

Mr. Packard. The development of a detailed baseline of the project's cost and schedule has been delayed until July 1999 -- six months later than planned. What effect will this have on the project's total cost and schedule?

Dr. Krebs. One of the action items from our review in June of 1998 was to rebaseline the project at the Level 1 level to reflect the fiscal year 1999 funding. The January review clearly stated that this effort was not complete and that it should be completed by the time of the next review. The development of the Level 1 baselines will not have any effect on the project's total cost and overall schedule, which are the Level 0 baselines.

Mr. Packard. According to the Government Accounting Office, project spending is well below the planned budget. Also, the new project director will need time to familiarize his team with the project, and may have scope and schedule changes. Given these conditions, will the Department really be able to spend the full amount of its budget request? What is a more realistic level DOE should be seeking for fiscal year 2000?

Dr. Krebs. The current plans are for the project to obligate the full fiscal year 1999 appropriated amount and the full fiscal year 2000 amount. The new project team is committed to building this project on cost and on schedule. Much of the project's staffing is complete. The Department's review found "that the SNS Collaboration is continuing to work well together, technical progress is generally good, and teamwork is clearly evident in their approach to design, R&D, and value engineering activities." The review committee noted that the "addition of an experienced Project Manager at ORNL and a new Senior Team Leader at LANL as positive steps toward strengthening the overall project team." The review Committee faulted Oak Ridge National Laboratory for not "asserting technical leadership and taking project-wide ownership of the Level 1 cost/schedule baselines. This is primarily due to insufficient experience of the current ORNL SNS Project Office staff, as a whole, in the management and leadership of large, complex technical project." This criticism was addressed within a week of the review. The 5 laboratory directors unanimously selected David Moncton to be the Project Director reporting directly to the Director of Oak Ridge National Laboratory. David Moncton was responsible for the Advanced Photon Source at Argonne National Laboratory, which was a project of similar size and complexity as the Spallation Neutron Source. In addition to his experience in building large, complex projects, Dr. Moncton is also a recognized scientist in neutron scattering.

Mr. Packard. How will non-binding memorandums of agreement between the laboratories create accountability for this project?

Dr. Krebs. The responsibilities of the collaborating laboratories and the governing management procedures for the SNS project have been formally established in the inter-laboratory Memorandums of Agreements.

Mr. Packard. What systems are in place to ensure that the participating laboratories are on schedule and within costs for their components?

Dr. Krebs. ORNL will control all funding and work scope assignments for the project work plans with specific deliverables, milestones, cost plans, and schedules that are approved annually and monitored monthly. Additionally, ORNL has initiated extensive project reviews at each collaborative site.

SPALLATION NEUTRON SOURCE

Mr. Packard. Is meeting the project tasks a performance element built into each participating laboratory's contract?

Dr. Krebs. The June 1997 DOE Office of Science review of the SNS project recommended that DOE consider adding an SNS performance measurement factor among each of the participating laboratories' Management and Operations (M&O) contract performance measures. The Office of Science has determined that all of the SNS laboratories will have SNS-specific performance measures. These are being put in place.

BROOKHAVEN

Mr. Packard. The Department has recently extended the timetable for deciding whether to restart the High Flux Beam Reactor (HFBR). The Department has estimated that approximately 300 employees were needed to operate the HFBR. The reactor has been shut down for 26 months. What has been the effect of the shutdown on the Brookhaven workforce?

Dr. Krebs. The normal operating complement for the HFBR is 130 people plus another 316 indirect support for a total of about 446. Presently the operating staff is at 80 people with about 192 indirect support people for a total of 262.

If the reactor were to be shut down there would be no immediate reduction in workforce. Operations personnel are working on a number of plant modifications such as primary purification system piping modifications, liquid waste piping modifications, and canal purification system modifications. These are all required by Article 12 of the Suffolk County Code. All of these activities are needed for either shut-down or restart.

Mr. Packard. If a decision is made to permanently shut down the reactor, what would be the estimated reduction in the contractor workforce?

Dr. Krebs. Following a shut-down decision, activities will start to place HFBR in a safe shut-down condition. These activities include draining and removal of all radioactive fluids and removal of activated components in the pressure vessel. These activities will continue throughout FY 2000. During this time there would not be any change in the workforce. In fiscal year 2000, there will not be any reduction in funding requirements. All of the funds will be needed to place the facility in a safe storage condition.

Mr. Packard. What corresponding reduction would follow in funding requirements at Brookhaven National Laboratory?

Dr. Krebs. There will not be a significant reduction in funding of the HFBR until all activities necessary to place the reactor in safe storage are completed.

Mr. Packard. Prior to the problems at Brookhaven, had the Department considered shutting down one of its reactors?

Dr. Krebs. The Department has shut down the EBR-2 reactor based on lack of mission need. The FFTF reactor has been placed in standby while its mission need is being evaluated.

Mr. Packard. The Department cites an effort to select "marked Internet traffic for priority service over unmarked traffic in cross-country demonstration." What is the purpose of this demonstration?

Dr. Krebs. This demonstration was part of an effort that has been underway in the Internet for some time to implement differentiated services. The current Internet model treats all traffic identically – electronic mail, web browsing, and remote operation of scientific instruments. This limits the effectiveness of the Internet to support scientific researchers because some classes of applications are much more sensitive to network performance and response than others. The DOE demonstration was the first demonstration that the underlying network support for this type of service was possible. Future research will develop the technologies that will enable the level of network service to be negotiated end-to-end by applications and the networks over which their traffic flows. This is critical to enable large DOE experimental programs, such as high energy physics detectors and synchrotron source beam lines to operate remotely over the Internet.

Mr. Packard. How will the decision to select priority over non-priority traffic be made? Who will make these decisions?

Dr. Krebs. The user of the network marks the traffic requesting priority service. In the future, the user's request for priority service would be assembled with other requests for priority service and the networks would determine which requests they could satisfy based on available resources and policies established by the individual networks. The DOE demonstration showed that the underlying network support for this was possible. One of the goals of the DOE Next Generation Internet (NGI) program is to understand what tools are needed to support deployment of this technology to improve the usefulness of the Internet for scientific research.

Mr. Packard. Are these procedures intended to be applied to all Internet traffic?

Dr. Krebs. In the future, after these technologies are tested and deployed in the research community, they are expected to be a foundation for future commercial services which provide performance guarantees for different classes of network service at different prices.

SCIENTIFIC SIMULATION INITIATIVE (SSI)

Mr. Packard. There appear to be several activities under this program that are similar to activities funded in prior years. Can you provide an estimate of the amount of funding provided in fiscal years 1998 and 1999 that are similar to the activities consolidated under the SSI in fiscal year 2000?

Dr. Krebs. The SSI represents a number of focused investments that build on existing efforts in the Office of Science. The Office of Science has been investing in these scientific areas for many years. For example, the proposed investments in Computer Science and Enabling Technology for the SSI build on previous investments in high performance computing and communications and the Next Generation Internet Initiative (NGI) in the Mathematical, Information, and Computational Sciences (MICS) subprogram of the Computational and Technology Research program. The MICS subprogram totals $124,026,000 in FY 1998 and $138,834,000 in FY 1999. However, it is important to remember that the SSI activities are focused on taking the investments in the ongoing programs and focussing them on a specific set of important scientific problems where access to terascale computing enables new types of scientific discovery.

Mr. Packard. What are the out-year funding requirements for the SSI?

Dr. Krebs. While the outyear funding projections for the Department are flat, the actual funding level for the SSI in the outyears is yet to be determined.

Mr. Packard. How many of the large-scale applications are assumed to be pursued using these funding profiles?

Dr. Krebs. At the current level of funding, we will be able to make modest investments in our two major programs -- global systems and combustion systems. Further, we will be able to initiate programs in two of the basic science areas relevant to the research portfolio of the Office of Science.

Mr. Packard. The Committee is aware of the Department's intention to use supercomputers for domestic applications. The SSI is advertised as a program that would tap the expertise, experience and appropriate assets of the defense supercomputing programs to avoid "reinventing the wheel" and to gain as much value from the defense-related supercomputer program as possible. Please provide a brief description of how the Department intends to manage this program.

Dr. Krebs. The SSI was developed in close coordination with the Advanced Scientific Computing Initiative (ASCI) at both the policy and technical level to ensure: (1) maximum transfer of applicable experience, and (2) future program coordination. Joint workshops were held related to the technological base underlying both programs to identify specific areas in which joint development work might be most effective. Under the auspices of the DOE R&D Council, a new Large-Scale Simulation Subcommittee (LSSS), co-chaired by the SSI Director

and the ASCI Program Manager, will provide Department-wide program direction and policy related to large-scale simulation activities including the SSI and will establish joint work programs where appropriate. For example, a SSI/ASCI Joint Science and Technology Task Group responsible for close coordination of computer science, applied mathematics, and other enabling technologies that benefit both SSI and ASCI, will report to the LSSS and will develop specific coordination/management mechanisms to ensure that investments in these areas are maximized, risks are minimized, and the programmatic needs of both initiatives are met.

Mr. Packard. Are there people funded in the defense programs that will work on this Program? If there are, what is the funding requested for these people. If not, why not?

Dr. Krebs. A researcher fully funded by defense programs will not compete for involvement in the SSI since all of his/her time is committed to meeting existing obligations. Until the competition for research is completed, the specific performers of the SSI are not known. In areas such as visualization and data management, it is the job of the SSI/ASCI Joint Science and Technology Task Group to ensure coordination of research relevant to both programs. In all cases, funding from the SSI will not be used to directly support Defense Programs and vice versa.

Mr. Packard. Are there machines purchased under defense programs that will be used in this program? If there are, what is the funding requested for these activities. If not, why not?

Dr. Krebs. We have evaluated the possibility of using ASCI computing hardware for SSI programs and concluded that this would have extremely undesirable consequences. Current ASCI computing resources are being fully utilized to meet stockpile stewardship needs, which also includes time used by universities under the Academic Strategic Alliance Program. Because the Stockpile Stewardship Program and the ASCI requirements are driven by national security considerations, availability to meet SSI milestones and computational requirements cannot be assured. In addition, the ASCI machines are generally operated in a classified mode and switching to an unclassified environment to execute SSI models and simulations, such as climate change, is time consuming and costly.

Mr. Packard. The budget justification includes $29,417,000 to acquire a five teraflop-class computer system. Did the Department consider using a defense-funded machine?

Dr. Krebs. We have also carefully considered the option of using an ASCI computer after ASCI has released it and moved on to the next stage of its technology roadmap. We have concluded that this is also highly undesirable for a number of reasons. The most important of these is that the experience of ASCI in using these computers has led the vendors to make significant improvements in the underlying technology for later ASCI systems. These improvements will make later ASCI systems significantly easier for ASCI scientists to use effectively. If we restrict the SSI scientists to the older released ASCI systems, they lose the advantage of the lessons learned in the ASCI program. In addition, if SSI must wait for released ASCI machines, then the schedule of SSI becomes critically dependent on the vendors' ability to deliver upgraded ASCI systems. This is of particular concern for the delivery of the first SSI

machine in FY 2000. Finally, it is important to note that this option has significant costs because ASCI's contractual arrangements with the vendors assumed that these computers would be "traded in" as part of the ASCI upgrade and many expensive peripheral devices, such as high speed disk drives, would need to be replaced due to security concerns. In fact, in the case of ASCI Blue Pacific, the cost of replacing the disk drives alone would be approximately $5 million. For all of these reasons, we have concluded that the SSI should acquire an improved five teraflop class computer system for its use.

Mr. Packard. The budget justification includes a 27% increase for SBIR/STTR programs. Why is this increase so large?

Dr. Krebs. The increase in the FY 2000 budget for SBIR/STTR is a consequence of the Strategic Simulation Initiative, which represents a 21% increase in the CTR budget. SBIR & STTR are funded as set-asides from the Department's extramural R&D budget. Public Law 102-564 establishes the SBIR set-aside at 2.5% in FY 2000. The STTR set-aside is 0.15%.

ENERGY RESEARCH ANALYSES EVALUATIONS

Mr. Packard. Please provide a list of the evaluations funded in Fiscal years 1998 and 1999 from the funds provided for energy research analyses. Provide a brief description of how these analyses are used by the Department?

Dr. Krebs. In FY 1998 and 1999, funds provided by the Energy Research Analyses (ERA) program supported peer reviews assessing the technical quality of 119 separate research projects sponsored by the Office of Building Technologies and State and Community Programs in the Energy Efficiency and Renewable Energy Program. The Department uses the results of these analyses to provide program managers with a measure of the technical quality of their projects, an independent technical assessment of the performance of individual projects and technical validation and guidance to the project investigators. Following is the list of projects funded by the Office of Energy Efficiency and Renewable Energy that were assessed with ERA funds:

1. "Prototype Development for GAX Residential Absorption Heat Pumps"
2. "5 Ton GAX Absorption Heat Pumps System Development"
3. "System Testing"
4. "Solid Adsorption System Development"
5. "8 Ton VXGAX Heat Pump Development"
6. "Commercial Chiller System Development"
7. "Commercial Chiller Corrosion & Fluid Properties"
8. "Heat Transfer Fundamentals of Refrigerant/Lubricant Mixtures"
9. "Natural Refrigerants & Hydrocarbons"
10. "Thermophysical Properties of Alternative Refrigerants"
11. "Dupont CRADA Heat Transfer"
12. "Heat Pump Modeling for Refrigerant Mixtures"
13. "Electrohydrodynamic Heat Transfer"
14. "Compact Heat Exchangers"
15. "Oil Heat Burner Design"
16. "Oil Heat Burner Controls"
17. "Combustion System for Residential Absorption Heat Pump"
18. "Combustion System for Commercial Absorption Chiller"
19. "Unmixed Reformer Development"
20. "UOB Reformer Development"
21. "SBIR: Bi-Polar Plate Development"
22. "SBIR: CO2 Tolerant Anodes"
23. "Risk Assessment"
24. "Contaminant Effects"
25. "Desiccant Equilibrium"
26. "Lean Flammability Limits"
27. "Elastohydrodynamic Lubrication Behavior"
28. "Motor Life Accelerated Test Methods"
29. "Effect of Temperature on Desiccant Catalysis"
30. "Compatibility of Motor Materials"

31. "Building America Technical Support"
32. "Builidng America Consortium"
33. "Building America Consortium"
34. "Building America Consortium"
35. "Building America Consortium"
36. "Passive Research & Residential Exemplary Buildings"
37. "Industrialized Housing Research"
38. "Monitoring & R&D"
39. "Technical Support"
40. "Enthalpy Wheel Pre-Conditioner Development"
41. "Field Testing of Desiccant Systems"
42. "Desiccant System Testing"
43. "Testing and Standards Development"
44. "IAQ Field Evaluation"
45. "Liquid Desiccant System Development"
46. "Field Testing of Desiccant Systems"
47. "Low Cost Heat Pump Water Heater"
48. "Water Heating Field Test"
49. "Supermarket Applications & Field Test"
50. "AHAM CRADA on 1 kWhr/day Refrigerator"
51. "Liquid Overfeed Applications - Vending Machines et al."
52. "Alternative Cycles"
53. "Residential Attic & Ceiling Research"
54. "Research User Center"
55. "TEWI Environmental Effects"
56. "Whole Wall Rating Procedure"
57. "Cool Roofing Membranes and Coatings"
58. "R30/30 Roofing System"
59. "Moisture Control Strategies"
60. "Evacuated Panel Insulation"
61. "Non-HCFC Closed Cell Foam Insulation"
62. "Existing Materials Performance"
63. "New Initiative on Radiative Heat Transfer in Attic Insulation"
64. "New Initiative on Hygrothermal Property Measurement Capability"
65. "Test & Evaluation"
66. "Icynene Foam"
67. "Wet Spray Fly Ash"
68. "Life-Cycle Economics of High Performance Buildings"
69. "IEA Annex 34 Fault Detection"
70. "450 Golden Gate Field Study"
71. "Commercial Exemplary Buildings"
72. "Building Design Advisor"
73. "SPARK Development"
74. "International Alliance for Interoperability"
75. "Energy Plus Development"

76. "Benchmarking Tool"
77. "Diagnostic Software"
78. "Passive Solar Diagnostic Tools"
79. "ENERGY-10"
80. "Computational Tools for Performance-Based Design: The SEMPER Project"
81. "Control Strategies"
82. "Healthy Buildings and Productivity"
83. "Energy Performance of Buildings"
84. "IAQ of Industrialized/Building America"
85. "Ventilation Studies"
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87. "The Contribution of Building Design and Operation to Productivity"
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91. "Electrochromic Durability"
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95. "Electrochromic Deposition"
96. "Smog Modeling in Cool Communities"
97. "Pavement Studies"
98. "Cool Materials Data Base", and "Highly Reflective Roofing Products"
99. "Heat Island Data and Meteorological Studies"
100. "Standards Development"
101. "Highly Reflective Surfaces"
102. "Residential Field Testing and Standards Development"
103. "Commercial Thermal Distribution Research"
104. "Hydronic System Efficiency"
105. "Field Test"
106. "STTR: Air flow Measurement"
107. "STTR: Improved Connectors"
108. "Technical Support for Standards and Rating Systems"
109. "Glazing Properties Research"
110. "Advanced Thermal Performance Models and IR Validation"
111. "Software Development (Window5, Therm, Optics)"
112. "Thermal Testing"
113. "Thermal Performance"
114. "Solar & Optical Performance"
115. "Annual Ratings, Software (Resfen) and Demos"
116. "Thermal Field Tests"
117. "Non-Energy Benefits"
118. "Commercial Building Glazing Performance"
119. "Commercial Building Guidelines"

FUSION

Mr. Packard. The Congressional Research Service (CRS) reports that the Federal government has spent more than $13.5 billion (constant 1994 dollars) over thirty years on magnetic fusion energy research. Is this an accurate estimate?

Dr. Krebs. This estimate appears to cover all federal funding for magnetic fusion energy research since 1953. A recent calculation in our office indicates that the Federal government spent about $8.4 billion in as spent dollars during the period 1953-1998. This corresponds to about $13.8 billion in constant 1994 dollars.

Mr. Packard. Critics have said that fusion power is the power source of the future, and that it will always be the power source of the future. The fusion program has made some very exciting contributions to our understanding of plasmas. Please provide a few examples of the successful studies and applications in fusion science.

Dr. Krebs. For approximately 40 years, progress in plasma physics has been propelled largely by the Department's fusion programs. One of the great scientific successes of recent years has been the understanding of small-scale turbulent structures (or waves) in plasmas and their effect on the transport of energy out of the plasma. Advances in plasma physics and fusion technology have also led to major advances in plasma processing of semiconductor electronics, coating of materials, plasma displays, superconducting magnets, plasma lighting, plasma thrusters for space propulsion, astrophysics, and space science. Plasma processing is indispensable for the manufacture of modern integrated circuits, such as the Pentium III. Plasma sprayed coatings can meet the friction and wear requirements of improved fuel economy and reduced emissions diesel engines. Finally, advances in space science are making it possible to predict "space weather," which is critical for the protection of the many satellites now in use for communications and national security.

Mr. Packard. Please provide program direction funding related to the fusion program for FY 1995 through FY 1998. Also, provide estimates for fiscal years 1999 and 2000.

Dr. Krebs. I will be pleased to provide this information as requested. (The information follows.)

Fusion Energy Sciences Program Direction
(dollars in thousands)

Appropriation					President's Request
FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	FY 2000
$9,400	$8,734	$8,407	$6,900	$6,450	$6,800

Mr. Packard. Consistent with congressional direction, the Department has increased resources available to study alternate concepts. Please provide a list and brief description of the known alternative concepts for production of electricity using a fusion machine. What alternatives to the tokamak is the Department exploring in the area of plasma confinement concepts approach? Has the Department determined how it will choose among alternatives?

Dr. Krebs. Probably more than one hundred alternate concepts have been proposed over the years since fusion research began in the decade of the 1950s. The main classes of alternate concepts and the Department's current research programs in each class are described below. Each concept is characterized by its level of development. The exploratory stage is where basic issues are studied individually. The proof-of-principle stage is the first stage where a powerful enough experiment is operated to study many issues simultaneously. The Department presently has not determined how it will choose among the various alternate concepts and advanced tokamak ideas, but has asked for advice on the balance of program emphasis from the Fusion Energy Sciences Advisory Committee.

Most of the magnetic fusion energy concepts have 'donut' shaped toroidal geometry in order to minimize energy loss. The Tokamak is the most developed toroidal concept that produces the highest performance plasmas. Knowledge gained in any of such toroidal concepts usually contributes to the advancement of other toroidal concepts. For example, the Spherical Torus can make rapid progress because it utilizes most of the existing tokamak physics and much of the technology.

Advanced Tokamak is a major evolution of the tokamak; the plasma pressure and current profiles are controlled externally, whereas in a conventional tokamak they evolve to less than optimum conditions. Such control leads to increased efficiency in the use of magnetic fields, and reduces the auxiliary power required to operate a power plant continuously, both improving the economics and attractiveness of fusion power plants. This Advanced Tokamak mode of operation was discovered on existing tokamaks (DIII-D and TFTR) and it has been demonstrated in almost all of the tokamaks in the world. Both JET and JT-60U, the largest tokamaks in the world, achieved their highest performance in such an Advanced Tokamak mode of operation. The Advanced Tokamak concept is being applied to the design of the reduced-cost ITER, and is the focus of the experimental programs on DIII-D and Alcator C-Mod.

The **Spherical torus** is a low aspect ratio tokamak that seeks to decrease the size and complexity of the tokamak by the use of a resistive centerpost which provides the tokamak toroidal magnetic Field. This resistive centerpost removes the requirement for the inner blanket needed in superconducting tokamaks, thus greatly reducing the size of the power plant. The large reduction in size could lead to a significantly faster, lower cost path to a fusion power plant. The U.S. programs include the Pegasus Experiment at the University of Wisconsin and the Helicity Injection Experiment at the University of Washington. The National Spherical Torus Experiment is a proof-of-principle experiment presently coming into operation at Princeton Plasma Physics Laboratory (PPPL).

Stellarators are a class of magnetic systems invented by Lyman Spitzer of Princeton in which all the confining helical fields are applied externally. The U.S. presently has several innovative university scale stellarator experiments including the Helically Symmetric Experiment at the University of Wisconsin which will be the world's first stellarator to study the recently discovered stellarator symmetry principles. Compact stellarators are a class of symmetric stellarators that have size and magnetic fields comparable to advanced tokamaks but with significantly lower recirculating power. Based on recent theoretical advances and with the large worldwide stellarator program, the compact stellarator is being considered for proof-of-principle status within the U.S. The centerpiece of this program would be a medium size experiment, the National Compact Stellarator Experiment, located at PPPL.

The **spheromak** is similar to the low aspect ratio tokamak but without the need for a centerpost. Reconnection processes within the plasma provide the toroidal magnetic Field. The spheromak would make a small compact toroidal fusion power plant if the plasma can be maintained at a high temperature in the face of the reconnection processes occurring within the plasma. A small BUT powerful experiment named the Sustained Spheromak Physics Experiment now under construction at Lawrence Livermore National Laboratory will test whether a high temperature spheromak configuration can be sustained.

The **reversed Field pinch** is related to the spheromak but has a small externally applied magnetic toroidal magnetic Field that actually reverses the toroidal Field produced by the plasma itself. Recent experimental advances in the Madison Symmetric Torus at the University of Wisconsin using current profile control have shown vastly improved energy confinement (but still lower than the tokamak). These experimental results have led to a proof-of-principle reversed Field pinch program proposal.

The **Field reversed configuration** provides its own confining fields requiring only an external vertical Field for equilibrium stability. Many believe it would be an ideal magnetic fusion reactor because of the low applied fields and linear geometry. The field reversed configurations (LSX) facility at the University of Washington is the world's most advanced facility for studying Field-reversed plasmas.

Inertial Fusion Energy (IFE) seeks to produce fusion energy by the implosion of millimeter scale targets filled with deuterium and tritium using energetic laser or particle beams. The physics research is supported by Defense Programs for other purposes and is carried out in Defense Program Facilities like the Omega laser at the University of Rochester and the National Ignition Facility (NIF) now under construction at LLNL. The Office of Fusion Energy Sciences supports the development of the inertial confinement approach as an energy source by funding development of energy relevant components including drivers like the heavy ion accelerator at Lawrence Berkeley National Laboratory and also by conducting engineering feasibility studies.

Magnetized Target Fusion is a concept intermediate between inertial and magnetic fusion wherein Field reversed plasmas are rapidly compressed by metal liners to fusion conditions. The final densities are between magnetic and inertial fusion densities. The Department's Defense Programs is developing the required liner technology and the use of defense facilities opens the

possibility of a very low cost path to plasmas with moderate energy gain per shot. A proof-of-principle program proposal for this concept has been developed.

The **levitated dipole concept** is based on a superconducting ring surrounded by fusion plasma. Such dipole plasmas occur in nature, e.g., the earth's magnetic Field is a dipole, and dipoles are observed to have very good confinement properties at high plasma pressure (relative to the magnetic pressure). A major experiment named the Levitated Dipole Experiment (LDX) which is under construction at MIT in collaboration with Columbia University will test dipole confinement under conditions of interest to magnetic fusion.

Inertial electrostatic confinement is one of the oldest fusion concepts. In such systems plasma ions are accelerated and confined by a space charge of electrons. The ions converge to the center of the spherical system where fusion reactions occur. Recent theoretical advances have led to the use of Penning Trap technology to eliminate the electrodes used in previous experiments. An experiment named The Penning Fusion Experiment-Ions is being fabricated at Los Alamos National Laboratory to test ion confinement in Penning systems.

Ion rings are a concept in which a ring of ions is created with enough ion current to reverse the static equilibrium linear magnetic field, thus creating a closed trap. Advocates believe burning of advanced fuels may be possible in such systems. A facility named the Fusion Ion Ring Experiment is operating at Cornell University and has thus far achieved about 50% field reversal.

A variety of other activities is supported under alternate concepts, including a PPPL program which offers PPPL support and collaborations to about fifteen university fusion and basic plasma science programs, several small scale experimental efforts in helicity injection and compact toroid fueling, and scoping studies of concepts not included in the list above. In addition, a reserve has been established in the FY 2000 budget to start one or more proof-of-principle programs.

FUSION

Mr. Packard. The Committee is aware of an activity called the "Next Step Options" which features a "Burning Plasma Experiment -- Advanced Tokamak" (BPX-AT). Please describe the features and objectives of such a machine and how it would contribute to domestic and global fusion energy development.

Dr. Krebs. At Congress' direction, the Department is closing out its activities in ITER this year. Our partners are proceeding with the design of ITER, and may well agree to construct ITER. In the event that the reduced-cost ITER should be unaffordable, we have applied a small effort to reassess earlier, less ambitious designs for next step device. This reassessment will take into account new scientific insights and the latest advances in technology. The objective of the "Next Step Option" activity is to investigate and assess various opportunities for advancing the scientific understanding of fusion energy, with an emphasis on plasma behavior at high energy gain and for long durations. As part of this effort, there is an activity underway to assess the ability of a BPX-AT to contribute to this understanding. The BPX-AT is a compact copper tokamak (less than one-third the size of the current reduced-scale ITER design) that uses extremely strong magnetic fields to give it the high performance needed to study advanced tokamak burning plasmas at low cost. The BPX-AT is intended to have pulse lengths of 10-20 seconds, which are deemed adequate for the investigation of most of the scientific issues associated with burning plasmas. The assessment is presently underway using a multi-institutional team, and it is anticipated that we will have a better understanding of how a BPX-AT can contribute to the scientific understanding of high energy gain plasmas in the context of domestic and global fusion energy development by the end of this fiscal year.

Mr. Packard. The Office of Fusion Energy Sciences and Inertial Confinement programs have been asked to coordinate their activities for commercial power production. We understand that a "Roadmap" for collaboration has been prepared, that the National Ignition Facility for inertial confinement is being built now, and that a facility called the Engineering Test Facility (ETF) for inertial confinement, roughly comparable to the BPX-AT may be ready for construction by calendar year 2010 or so. Would you comment on the plausibility of the "roadmap," the costs to implement the DOE fusion collaborations, and the adequacy of the current and projected fusion budgets to achieve success.

We note that the BPX-AT and the ETF are expensive as individual facilities. Likewise, we have heard that other confinement approaches such as the "Spherical Torus" may be ready for a similar step in the next five years or so. Congress feels that should such machines merit construction and operation, then a consolidation of resources may be desirable.

Dr. Krebs. The Fusion Energy Sciences Program has undergone significant restructuring during the past few years. This restructuring has been guided by community input reviewed by the Fusion Energy Sciences Advisory Committee. More recently, a draft roadmap, "An Outline Roadmap for Fusion Energy Science Portfolio Approach", was developed by a broadly based group of fusion experts representing both the inertial and magnetic fusion communities. While this roadmap is still under development and has no official standing within the DOE, it does

present a plausible path to a commercial fusion power plant. Increased Fusion Energy Sciences budget levels would be required to meet the decision points identified in the roadmap. This roadmap does not include funding for the decontamination and decommissioning of Tokamak Fusion Test Reactor at PPPL.

The Secretary of Energy Advisory Board is presently carrying out a review of DOE's fusion programs as requested by Congress and the results of this review will be one of several factors, including recommendations from the Fusion Energy Sciences Advisory Committee, that will be considered in defining future DOE fusion programs.

Mr. Packard. A national test site for this class of machines would be expected to result in considerable cost savings through the use of common facilities such as power systems, buildings, tritium handling systems and the like. Likewise, we note a serial effect in that different systems would be tested more or less consecutively. Would you comment on whether such a site is in the planning of the DOE. If not, why not since such a site would seem to offer significant advantages for a fusion program with serious objectives?

Dr. Krebs. No such site is currently being planned because these facilities are not now in the Department's plan. For fusion experiments that involve the burning of substantial amounts of fusion fuel, as is envisioned for such facilities as the BPX-AT and the ETF, an experiment site would need to be identified. Criteria would be developed for evaluation of candidate sites and an open competitive process would be used to select the best site. We expect one of the evaluation criteria to be the capability to act as a national test site that could accommodate a broad class of fusion machines in order to obtain cost savings benefits through the use of common facilities, such as power systems, buildings, tritium handling systems, and the like.

Mr. Packard. Finally, we note that the U.S. fusion program is not isolated from the Global programs that seem now to emphasize a reduced cost ITER that may or may not be built and in which the U.S. may or may not participate. Would you comment on the "relevance" of the U.S. planning as suggested above in terms of Global fusion activities. In particular, we are very interested in hearing about the details of the "Multiple Machine Strategy", embraced by many U.S. fusion researchers and the 1995 PCAST, which would seem to achieve the objectives of the ITER, be less costly and risky, and possibly result in an earlier demonstration of pre-commercial fusion power. Likewise, it would seem to satisfy the need to more or less distribute fusion development and costs across the globe in an "equal" fashion which was an obvious objective of the ITER project.

Dr. Krebs. The U.S. fusion program is in the midst of an extensive review and planning process that has as its objective the development of a new fusion plan. In previous discussions with our international partners, they had indicated that they felt that a reduced-cost ITER, which is to demonstrate fusion technologies and fusion energy level plasmas for long pulse lengths, was central to their fusion strategies. They feel that proceeding with the reduced cost ITER, because of its ability to integrate all the features of a fusion reactor, will save time and money. This view was unanimously supported by the ITER Special Working Group #2 that had broad based U.S. representation. The U.S. fusion community has previously indicated that they would support the

U.S. participation in a reduced-cost ITER if it proceeds to construction. In the meantime, one of the options that is being considered in our U.S. planning process is the idea of having an international program with a number of international fusion facilities. This, however, is a back up option in case our partners are not able to go forward with ITER, or in the case that they go forward but without us.

Mr. Packard. The Committee has been made aware that private companies are investigating plasma-based radioactive waste separation and have a number of patents in this area. These companies apparently see a compelling national need for a new approach to remediation of both the nuclear weapons production and the spent commercial fuel waste problems. Is the Department aware of these efforts? Does the Department intend to join with and invest in these plasma-based separation activities? Please provide any information available regarding the Department's involvement or intentions with regard to these activities.

Dr. Krebs. I believe the Department is aware of these efforts. The knowledge from plasma research has contributed to the invention of many technologies that produce and manipulate plasma for useful purposes, among them being plasma-based waste separation. The Fusion Energy Sciences Program carries out a basic plasma science program that contributes to the basic understanding needed to succeed in this and other plasma applications, such as manufacturing of semiconductors and materials coatings. While the Fusion Program does not specifically sponsor research on plasma-based radioactive waste separation, it encourages the publication of basic plasma research for application of basic plasma research for all interested users. We are not aware of active work in this field by other offices of the Department responsible for dealing with radioactive waste separation issues.

Mr. Packard. If the Department feels that it can contribute to remediating National radioactive waste problems, how would efforts be coordinated with other organizations within the Department? What kind of goal-orientated collaborative programs would be considered and what Department organizations would be included?

Dr. Krebs. Beyond disseminating the results of basic plasma science research that might contribute to the development of technologies for plasma-based radioactive waste separation, the Office of Science has no direct involvement in remediation of national radioactive waste problems, which is the responsibility of other offices in the Department.

Indeed the Department does feel it can contribute and has already undertaken efforts to establish coordinated efforts within the Department. The Office of Science contributes to these efforts through collaborations with the technology offices. In 1995 the Office of Science began a collaboration with the Office of Environmental Management which evolved into their Environmental Management Science Program in FY 1996. This program sponsors medium to long term research focused on addressing significant problems at the Department's former production sites. Radioactive wastes are among the most significant of these problems and constitute a major part of the ~$50 million/year the program has been spending. In addition, the Office of Science assists the Office of Nuclear Energy Science and Technology with their Nuclear Energy Research Initiative. A small but important component of that $19 million

program, now in its first year, is research on radioactive waste from power reactors. Selection of the first awards is scheduled to begin in early May of this year.

Other research supported by the Office of Science is also contributing to the remediation of national radioactive waste problems. The National Accelerated Bioremediation Research Program (NABIR) Biological and Environmental Research program, for example, is supporting research to develop efficient, cost-effective ways of remediating radioactive wastes at DOE sites by exploiting the capacity of naturally occurring microorganisms in soils and sediments to reduce the transport and biological availability of radionuclides in contaminated soils and sediments. Some of this research involves modifying the activity and distribution of microorganisms to immobilize radionuclides in contaminated soils, thereby reducing or preventing their entry into, and dispersion by, ground water and surface waters where they are more biologically available. This research is coordinated with other remediation research supported through the DOE Environmental Management Science Program.

INTERNATIONAL THERMONUCLEAR EXPERIMENTAL REACTOR (ITER)

Mr. Packard. Last year, the Congress provided $12 million for the final year of funding or engineering and design activities. What is the total amount of funding provided for ITER? What is the most current cost estimate for ITER? What are the prospects for building ITER?

Dr. Krebs. As per Congressional direction, we have provided $12.2 million in FY 1999 to closeout the U.S. participation in the ITER activities. There are no funds planned for ITER in FY 2000. With regard to the current cost estimate for ITER, the original cost estimate for constructing ITER, in U.S. terms and in 1998 dollars, was about $10 billion. Since the end of the original 6 year ITER EDA Agreement in July 1998, the three remaining ITER Parties, the European Union, Japan and the Russian Federation, have been working to design a reduced-cost ITER, while trying to maintain as much of the technical capability as possible. As of today, a detailed cost estimate for ITER, similar to the original cost estimate, has not been made. However, the goal of the Parties is to develop a reduced cost design that is about fifty percent of the original cost estimate. The remaining ITER Parties are proceeding with a three-year extension and are expected to decide in two to three years whether and where to construct ITER. Reducing the cost of ITER should increase the probability of ITER being constructed.

Mr. Packard. Please provide program direction funding related to the fusion program for FY 1997 through FY 1998. Also, provide estimates for fiscal years 1999 and 2000.

Dr. Krebs. I will be pleased to provide this information as requested. (The information follows.)

Fusion Energy Sciences Program Direction
(dollars in thousands)

Appropriation			President's Request
FY 1997	FY 1998	FY 1999	FY 2000
$8,407	$6,900	$6,450	$6,800

Y2K AND NEXT GENERATION INTERNET

Mr. Packard. The Subcommittee on Government Management, Information and Technology graded Federal agencies on their efforts to address the problems associated with reprogramming computers to ensure that systems continue working in the year 2000. Five agencies received an A or B grade and eight received a C grade. The Department of Energy received a D. Why is the Department of Energy, with its expertise in the reliance upon complex computer systems behind most other Federal agencies including Veterans Affairs, Labor, Interior, EPA and the NSF?

Dr. Krebs. In the past year the Department has made significant progress in improving its Y2K compliance. In fact, the last Congressional assessment of the Department's progress raised its rating to "B". We continue to work to improve this. It is important to note that the number and complexity of the systems in the Department was a significant challenge that the Department successfully addressed resulting in its improved rating. In addition, all of the Department's scientific computing systems have already addressed the Year 2000 problem.

Mr. Packard. If the Department is already behind on a problem we've known about for a generation, what sense does it make to place the Department in a leadership role in the Next Generation Internet initiative?

Dr. Krebs. The Department has a long history of leadership in high performance computing and communications that includes 20 years of remote access to supercomputers as well as the DOE2000 National Collaboratories program, which is already changing the way science is conducted. This history of leadership, along with the fact that DOE has thousands of users nationwide for its unique experimental facilities and high performance computing centers, uniquely qualifies DOE to examine along with other Federal agencies what the Internet will look like 20 years from now.

Mr. Packard. The Department has hundreds of millions of dollars built into its Defense and Non-Defense accounts that pay for design and development of computer software and hardware. The goals of the NGI are to improve speeds, security and network compatibility. Is it fair to say that the Department has been working for years on most of the challenges of the NGI program?

Dr. Krebs. The Department's missions have required effective use of computer networks for decades. Thus we have invested in a number of network technologies to improve the effectiveness of networks for scientific research. The DOE sponsored work on the Internet Protocol (IP) as well as the High Performance Parallel Interface (HiPPI) are a part of this history, as are the ground-breaking efforts in DOE2000 National Collaboratories. These efforts, as well as our planning for the scientific facilities of the future, have identified a number of network research issues which must be studied. The DOE NGI program is focused on discovering, testing, and validating the networking technologies which will be required to enable the wide area, data intensive, and collaborative computing applications which are critical to the Department's future. Thus, the NGI program builds on the successes of the Department of Energy's long involvement in network research and will accelerate the development of the tools that future Department research programs, such as SSI, will require.

SPALLATION NEUTRON SOURCE

Mr. Packard. Many of DOE's science projects have historically exhibited substantial overruns in cost and schedule. There are a variety of reasons for these problems including:

- Failure to really establish an understanding of the scope of the work before starting the project,
- Failure on DOE's part to control changes that adversely affect cost and schedule,
- Lack of experience at the laboratories in managing major design and construction projects.

The most notable evidence of these problems in the recent past was the Superconductor Super Collider Project where DOE's inability to properly establish a controllable project baseline ultimately led to the project's cancellation after spending hundreds of millions of taxpayer dollars. What assurances can you provide that the SNS Project will not yield the same result?

Dr. Krebs. First, the Basic Energy Science's program management is very experienced and has successfully overseen the recent delivery of large scientific projects, including the Advanced Light Source and the Advanced Photon Source; and the SNS is critical to the mission of this program. The Superconducting Super Collider was managed outside the traditional line generally used by the Office of Science. Second, the Superconducting Super Collider project was not subject to the independent review process of the Office of Science's Division of Construction Management. The SNS has been reviewed by this Office from the beginning. We also have established the Level 0 baselines after very extensive reviews. The Level 0 baselines are the total project cost of $1.36 billion and completion in the first quarter of fiscal year 2006. The project is currently developing the Level 1 baselines to reflect the fiscal year 1999 appropriation. These will be completed by the time of the next review in August of 1999. The new SNS management is committed to providing DOE the Level 1 baselines by the time of the next review in August, 1999. While baselining is underway, the January 1999 independent review affirmed that progress has not slowed down.

There has been a sustained recognition that strong technical leadership is critical for this project. The inability of ORNL to attract that leadership with its then existing management structure led to the January 1999 review recommendation that a new project management structure was necessary to attract the leadership required to move the project from the conceptual design phase to the construction phase. The leadership structure was changed, and Dr. David Moncton was recruited to head up the project. He is experienced at managing large construction projects, having completed the Advanced Photon Source on time and as budgeted.

Mr. Packard. One of the major changes in the SNS project is integrating design and hardware supplied by several National Laboratories operating as essentially independent entities. In order for the project to be functional, this work must be carefully integrated and the design and hardware delivery schedule managed to make sure that the design, manufacturing, testing and delivery are closely coupled to the construction schedule. What experience does Oak Ridge have in integrating projects of this magnitude?

Dr. Krebs. The Congress and various DOE advisory groups have encouraged the Department to treat its laboratories as a system. SC has been steadily moving in this direction in our research programs and our facility projects. Most recently the B-factory and the Large Hadron Collider are collaborative efforts. A facility the scale of SNS would be a challenge for any of our laboratories. From the start it was recognized that success would require commitment from the directors of the partner laboratories. That commitment was tested and reaffirmed most recently by the assignment of Dr. Moncton to lead the project.

The integration of the SNS design, fabrication, delivery, and testing of the technical systems with the construction schedule is the principal responsibility of the Oak Ridge project office, supported by the considerable expertise brought to bear by all of the partner laboratories and the Architect Engineer/Construction management firm of Knight/Sverdrup. Progress has been made in the last several months filling key staff positions with experienced people, including the ES&H Manager, the project leader at Los Alamos National Laboratory and several engineering positions. The new management of the SNS project is aggressively seeking, over the next several weeks, the best expertise available from all national laboratories and private industry to fill the remaining key positions quickly.

Mr. Packard. We understand that the AE/CM team was recently selected to provide the design and CM function for the project. What experience does the select team have in 1) integrating design and construction contracts of this magnitude, 2) integrating the work on several national labs?

Dr. Krebs. The Lester B. Knight and Sverdrup team combines the resources of two organizations with significant experience in design and construction of facilities for Department of Energy laboratories and other advanced technology projects. Assigned team responsibilities are Lester B. Knight & Associates, Inc. (Knight), for Architecture/Engineering (A/E) services and Sverdrup, for Construction Management (CM) services.

Knight, as a firm, has extensive experience in the design of conventional facilities for accelerator projects, including the Fermilab KTeV facility, the Stanford Linear Accelerator Collider, and Argonne National Laboratory Advanced Photon Source. Knight was the Architect of Record for $145 million of conventional facilities at the Advanced Photon Source Facility, Argonne National Laboratory, covering 120 acres. The experimental facilities included the linear accelerator, the 7 GeV synchrotron, and the 1104 meter circumference storage ring. Knight also designed the following: 200,000 sq. ft. Central Lab and Office Facility; the 200-room Residence Facility; the Central Utility Building; as well as all site utilities and construction. Sverdrup is one of the world's largest firms in engineering, architecture, construction, construction management, and design/build. Sverdrup is providing construction management services for $160 million in conventional facilities at the multi-lab National Ignition Facility (NIF) project at Lawrence Livermore National Laboratory, covering 20 acres. The two main facilities are the 300,000 sq. ft. Laser and Target Area Building (LTAB) and the 25,000 sq. ft. Optics Assembly Building (OAB). Lester B. Knight provided, through its San Francisco office (Keller & Gannon), conceptual design report services for the conventional facilities for NIF.

Mr. Packard. Apparently, there is a complete lack of credible central project master schedule and cost estimate, this is one of the keys in controlling changes on the project. What effort is being made to develop a baseline schedule and cost estimate, who is leading the effort, and what's their experience in project's of this size?

Dr. Krebs. A Level 0 baseline schedule and cost is in place. The SNS project cost estimate was developed from the Conceptual Design Report, approved and accepted in 1997 and re-verified in June, 1998 by DOE; the project schedule is well developed and considerable progress has been made in completing the necessary integration of all activities among the partner labs over the past several months, as recently documented by the January 1999 DOE review of the project. As pointed out in the January 1999 review, additional work is required to ensure that the new management of the project has full understanding and ownership of this estimate and schedule. The new Project Director has significantly increased the level and experience of resources in this area. Personnel with extensive complex project management experience with multi-million dollar projects in DOE, DOD and industry have been recently assigned to complete the development of the cost and schedule baselines expeditiously, including two experienced project managers from the Advanced Photon Source, and the current SNS Project Manager who joined the project in September. Additionally, DOE has assigned a very experienced federal project manager to work closely with the SNS contractor management team to ensure success.

Mr. Packard. On what basis should we feel confident about the prospective success of this project considering that Oak Ridge has not managed a major design/construction project in more than 20 years?

Dr. Krebs. Considerable talent and experience has been assembled from all of the partner national laboratories working on SNS to ensure all the needed skills were available for successful execution. The selection of the very experienced firms of Lester B. Knight and Sverdrup Construction as the project Architect-Engineer and Construction Manager further improves the experience and expertise required for this complex project. The new management of the SNS project continues to aggressively seek additional expertise to strengthen the project management team and organization as it transitions to the execution phase.

Mr. Packard. We understand that at DOE's insistence, Lockheed recently replaced the SNS Project Manager with David Moncton from the Argonne National Laboratory, reportedly because of his successful management of the Advanced Photon Source Project. That project has none of the management complexities of the SNS in terms of the design and hardware integration challenges. For example, the National Ignition Facility Project is a closer parallel to SNS. Why are you convinced that this was the right decision, rather than pursuing a candidate with a track record of successful commercial project integration and management experience?

Dr. Krebs. David Moncton, Associate Laboratory Director for the Advanced Photon Source (APS) at the U.S. Department of Energy's Argonne National Laboratory, directed the design, construction, and operation of this billion-dollar national user facility. The APS facilities occupy an 80-acre site and comprise a particle-beam injection and storage system (450-MeV linac;

positron accumulator ring; 7-GeV booster synchrotron; 7-GeV storage ring); undulators; wigglers; x-ray beamline front ends; an undulator test line; a support building to provide utilities; a circular experiment hall to accommodate experiment beamline stations; user laboratory/office modules adjacent to the experiment hall; a central laboratory and office building for operations staff; conference facilities; and a residence facility for APS users. Construction of this project required the design and integration of highly complex accelerator systems, sophisticated x-ray optical sources, x-ray optics, and x-ray beamline instrumentation, and extensive conventional office/laboratory and utility facilities fully supportive of the national user facility mission. As a national user facility, it is closely parallel to the SNS mission that will serve a broad range of neutron research interests. On the contrary, the National Ignition Facility is a research concept demonstration project with much more narrowly defined mission, with a very challenging but more highly focused set of technical objectives.

Design and construction of the SNS depends critically on the integration of the scientific and engineering talents of the DOE national laboratory system. Moncton has led research and technical construction teams at two of the participating National Laboratories, Argonne and Brookhaven, contributing to the SNS project; and he is entirely familiar with the DOE construction procedures and project management methods employed by DOE in the construction of major scientific research facilities. The SNS project requires such experience rather than a more general experience with integration of commercially managed construction activities.

The SNS project requires both successfully demonstrated construction project experience and scientific leadership in the field of neutron scattering. Moncton possesses high qualifications that fill both these needs. Under Moncton's leadership, the Advanced Photon Source project was completed in 1996, $7 million under the total estimated project cost. The project was also completed over 6 months ahead of schedule with an exemplary safety record, including no significant injuries. In recognition of this achievement, Moncton was awarded the 1996 Safety Excellence Award from the Construction Safety Assoc. of America, and the project was also awarded the 8th Annual Illinois Pollution Prevention Award and the 2nd Annual DOE Pollution Prevention Award. In 1997, APS was cited as Project of the Year by the Illinois Engineering Council "as an outstanding engineering project of innovation and creative solutions for the benefit of the public welfare."

As a scientific leader, Moncton's research interests lie in two primary categories: x ray scattering studies of phase transitions, and long range order and novel states of matter, together with the development of new techniques for using synchrotron radiation; and neutron scattering studies of structural phase transitions, lattice dynamics, and magnetic ordering transitions, especially in superconductors. He received the Department of Energy's Ernest Orlando Lawrence Memorial Award in 1987. Moncton holds a B.S. in engineering from Cornell University (1970), and an M.S. (1973) and PhD (1975) in physics from the Massachusetts Institute of Technology, where he studied under Prof. Clifford Shull, the 1994 Nobel Laureate in Physics and pioneer in neutron scattering research. Moncton is well recognized within the neutron scattering community of researchers as a scientific leader. He understands the critical

neutron scattering specifications needed to carry out forefront research in this field, a factor considered essential to assuring that the facility ultimately built will successfully serve the future user research program at the SNS.

Mr. Packard. Have you reviewed the results of the congressionally-mandated review of the NIF project for lessons learned?

Dr. Krebs. The National Ignition Facility is the last project undergoing the Congressionally mandated independent review process. The study was initiated in December, 1998 and the final report is expected to be issued soon. As soon as the results of this congressional mandated study become available, SC and the Oak Ridge project team will review them for their application to the SNS Project.

Mr. Packard. Why is Congress not being kept apprised of DOE's own concerns about cost, schedule, and management issues on the SNS project?

Dr. Krebs. Congress was apprised of DOE's concerns virtually as soon as I was. Our reviews are very open. Since 1997, we have provided the two previous independent reviews of the project to Congressional staff. Indeed, representatives from GAO were invited to observe and did participate in our January review, and representatives from the Congressionally mandated review of the Department's projects also participated in the review. All concerns were openly addressed during the review and the GAO was provided a copy of the exit brief. In his oral testimony before the Science Committee on March 3, 1999, Victor Rezendes of the GAO acknowledged that the DOE review was the source for the specific concerns on the SNS raised in his testimony. He noted the openness of the SC process.

FUSION ENERGY SCIENCES

Mr. Packard. Dr. Krebs, I have been a strong supporter of the fusion energy research program for many years. I have supported it in large part because it seems unique: it is a basic science program with the very specific goal of creating an unlimited, environmentally sound source of energy. Therefore, I am very disappointed that the Department's budget recommendations for this program have shown no growth the past few years while most other DOE Science programs have grown. Can you explain why this is, particularly in light of the fact that the fusion program suffered an enormous cut just a few years ago and in light of the fact that the Administration has made global warming a major priority?

Dr. Krebs. The Fusion Program does offer the unique and attractive combination of fundamental science and the prospect of a new and essentially unlimited, environmentally attractive energy source. However, in response to congressional direction we have scaled back the energy development segment of the fusion program. Over the last few years, the roll-off of our ITER program participation, and other energy development activities, has been generally transferred to enhanced funding for fusion science programs. Overall constraints on federal funds have forced us to do this within flat overall funding for fusion.

We recognize the potential value of increased effort in fusion and have chartered reviews of the approaches to fusion energy (SEAB), the quality of science in the Fusion Program (NAS), and balance of effort within the Fusion Program (FESAC). These reviews will provide the basis for revising fusion program plan by the end of 1999.

Mr. Packard. Dr. Krebs, I am aware and am pleased that you have increased the utilization of many of your DOE user facilities with the so-called "facilities initiative." I'm interested to know why fusion facilities were not included in this initiative. Of particular interest to me is DIII-D ("D-Three-D") facility in San Diego. It is presently the largest magnetic fusion facility in the U.S. and is utilized by 19 universities and 30 national and international laboratories. It is also considered by many to be the premier fusion device in the U.S. and perhaps the world. The President's budget projects that this facility will be operated at perhaps only a fraction of its capacity in FY 2000 as has been the case for the last several years. How many weeks is considered to be full utilization? How much would it cost to utilize this facility more fully? **(A full year's run on DIII-D is about 27 weeks, current operation is about 14. That level of utilization, plus needed upgrades, could be accomplished with approximately $5 million in additional funding. *A 10% increase in funding would enable a 50% increase in utilization.*).**

Dr. Krebs. At the time that decisions were made regarding the "facilities initiative," the fusion program was attempting to embark on an energy development path, inconsistent with the concept of "scientific user facility." The restructuring process, begun in response to FY 1996 congressional direction, has now proceeded to the point that the fusion facilities are included in the facilities initiative for FY 2000.

With regard to DIII-D, full utilization would ideally be on the order of 32 weeks of operation with staff increasing to allow 2 shifts per day, a total of approximately 2,500 hours per year.

This would entail an incremental cost of $35,000,000 over the present $52,400,000 annual budget. However, in FY 2000, DIII-D will be down about 2 months for hardware upgrade. Therefore, full utilization in FY 2000 would be limited to 24 weeks of operation or about 1,900 hours, requiring an incremental funding of $30 million, for a total budget requirement of $82.4 million in FY 2000. A more modest and very cost effective program in FY 2000 on DIII-D would be to increase operating time by 50% (1,100 hours), which would not require an increase in the physics staff, for an incremental cost of $5 million.

Mr. Packard. Dr. Krebs, the University of California at San Diego has been very involved in enabling technology work for fusion energy science. From what I can see in the FY 2000 budget request, the enabling technology budget for the fusion program has taken a substantial cut. Isn't fusion just like high energy physics, astronomy, or any other scientific field that depends on progress in enabling technologies to do better science? **(The FY 2000 budget request reduces Engineering Research from $35 million in FY 1999 to $20 million in FY 2000 -- a 43% reduction. While some of this is ITER related reductions, it greatly constrains a part of the program that is substantially under funded anyway).**

Dr. Krebs. The FY 2000 budget reduction for enabling technologies work is of two kinds: elimination of ITER work and shifts to fusion science. Most of the reduction can be accounted for by the fact that all ITER activities are being terminated in FY 1999, with $12.2 million provided for this purpose, and no funding is to be provided for ITER in FY 2000. Within the overall constraints of the fusion program budget, the only way to meet the most pressing needs for starting the TFTR decontamination activity and enhanced fusion science activities was to further reduce the budget for enabling technologies from FY 1999 levels. Since the effort to reorient technology activities away from ITER and toward a broad portfolio of activities that serve the fusion program's domestic and international collaboration interests began only at the start of FY 1999, it is not yet certain whether such enabling technology cuts are optimal. There are three major fusion program reviews now in progress that will help us to address questions of appropriate balance and arrive at an optimum funding level for enabling technology.

Mr. Packard. Dr. Krebs, now that we have dropped out of the ITER process, what is the status of our international fusion collaborations?

Dr. Krebs. In the wake of the U.S. choice not to participate in the current ITER activities, the Department is working with the fusion program leaders of the European Union, Japan, and Russia to develop a new arrangement that will provide a basis for international collaboration on fusion energy science and fusion energy development. This new arrangement would build on existing frameworks, and would establish for the first time a mechanism for annual discussions by the fusion program leaders of the full array of existing and possible future international collaborations.

The Department continues to support a broad spectrum of bilateral and multilateral collaborative activities in fusion research as delineated in the document "The Strategic Plan for International Collaboration on Fusion Science and Technology Research (DOE/ER-0723). In addition, the Department has asked Princeton Plasma Physics Laboratory to work with the fusion community to identify additional research opportunities abroad which offer strategic advantages to the U.S. fusion program.

EPSCoR

Mr. Clyburn. Thank you, Mr. Chairman, and I thank the witnesses for their testimony.

Mr. Magwood, I would like to express my support for your University Programs. I know you have met with my staff and will be sending me additional information on your Fellowships Program, and I want to go on record in support of this low budget but significant activity.

Dr. Krebs, I fully recognized the importance of your programs. Western Civilization would not exist as we know it without basic research, and I support the extremely complex undertakings you oversee.

Mr. Chairman, in addition to supporting this activity, I would like to go on record as to have asked the Department to remain vigilant in its oversight of administrative costs in research activities. Now I know the purpose of research is to discover not previously known facts, and I know it costs money to do this. But I would simply ask that you as an Administrator keep a careful eye on indirect costs in these research programs.

Having said this, I want to commend Dr. Krebs for the program entitled, "Experimental Program to Stimulate Competitive Research" which is more commonly referred to as EPSCoR. South Carolina institutions have been lead participants in the EPSCoR Program, and indeed my own alma mater, South Carolina State University, has participated in this cutting edge program.

Dr. Krebs, can you briefly tell me what you envision for this program (EPSCoR) in the future?

Dr. Krebs. In FY 2000, DOE/EPSCoR will provide continuing support for the States of South Carolina and Wyoming Research Implementation Awards, assuming the results of the FY 1999 merit review of their renewal applications are favorable. The program will also announce new Research Implementation Award opportunities for those EPSCoR states without active Research Implementation Awards. The program notice is expected to be released in the spring of 1999. While the program notice is still being revised, it should be similar to that of previous years. A total of $3.0 million is being budgeted for the new awards in FY 2000, which would allow support for approximately three or four new Research Implementation Awards. These awards support the human and physical infrastructure necessary to build targeted research areas to a self-sustaining, nationally competitive level, in addition to supporting energy-related research of interest to the Department.

The DOE EPSCoR State/Laboratory Partnership awards, which were initiated in FY 1998, provide support to individual investigators to encourage the formation of collaborations between academic and industrial researchers in the DOE/EPSCoR states and researchers at the DOE national laboratories, facilities and centers. In FY 2000, pending satisfactory progress and the availability of funds, DOE/EPSCoR will provide continuation support for the DOE EPSCoR State/Laboratory Partnership awards made in fiscal years 1998 and 1999. The program will also announce the availability of approximately $850,000 for new EPSCoR State/Laboratory Partnership awards in FY 2000.

RENEWABLE ENERGY PRODUCTION INCENTIVE

Mr. Clyburn. Mr. Reicher, as you know, the Renewable Energy Production Incentive Program was created to encourage public power to invest in renewables. You may also be aware that public power has a large presence in South Carolina. I see in your written testimony that you plan to "revisit" the 62.5% reduction that you have proposed for this program for FY 2000. Can you elaborate as to exactly what you mean by "revisit?"

Mr. Reicher. We share a common goal of reducing the present uncertainties of incentive payments, thereby making the Renewable Energy Production Incentive (REPI) an effective incentive. To accomplish this, we want to work with the Committee to first revisit the level of this year's request with the objective being a higher level of funding. Second, we plan to proactively work with the affected public power stakeholders, and keep the Committee advised, on ways to make REPI an effective incentive while concurrently maintaining a balanced portfolio of activities in our annual budget requests. This will require an assessment of what effective incentive mechanisms can realistically be used for the various eligible renewable energy technologies. Based on this assessment, we will identify the associated regulatory and/or legislative changes that would be required for implementation.

SCIENCE EDUCATION

Mr. Pastor. Dr. Krebs, could you explain the relevance of the Administration's proposed Science Education activities to the DOE mission?

Dr. Krebs. There is a national need to maintain worldwide leadership in the development of science and technology in order to stay competitive in critical research areas such as nuclear physics, computer technology and energy related technologies. The DOE - Office of Science mission is to invest in the program we are proposing to encourage our Nation's young Americans to pursue scientific careers. The proposed program is founded on providing faculty, students and K-12 teachers research experiences in our National laboratories. Thus, the participants will be exposed to and motivated by DOE mission related problems and through their research contribute to solutions. There are benefits on both sides of this equation.

According to the latest data published by the Federal Government, since the early eighties there is a declining number of graduates in the natural sciences and engineering in 1996, especially for women, even for those who have displayed a natural aptitude for science and math on standardized test scores. By instituting a program that effectively promotes proficiency and motivation of students in the sciences, we can assure our future as competitive developers of technology needed for DOE missions. The proposed science education program effectively educates students, faculty and the laboratory's researchers by increasing communications and improving connections between colleges and the DOE-Science Laboratories.

Mr. Pastor. Dr. Krebs, what efforts are being made to ensure that DOE's educational resources and programs are accessible to communities beyond the vicinity of DOE facilities?

Dr. Krebs. The proposed education activities and the on-going Office of Science Energy Research Undergraduate Laboratory Fellowship (ERULF) Program are intended to be highly visible national initiatives, clearly identified with the Department. They are mechanisms to recruit a diverse group of students and teachers from across this country, and provides access to laboratory equipment, facilities and staff through research experiences not generally available on campus. Last summer alone the ERULF program provided research fellowships to over 500 students representing over 220 universities and colleges across the country.

PROMOTING RENEWABLE ENERGY TO NATIVE AMERICAN TRIBES

Mr. Pastor. Mr. Reicher, what are you doing to promote the use of renewable energy by Native American tribes?

Mr. Reicher. There are tremendous opportunities for the use of renewable technologies on Native American reservations and tribal lands. In remote locations, these technologies can provide a real improvement in the quality of life and foster new productive uses. The Department, in FY 1999, has provided $300 thousand to the Federal Energy Management Program (FEMP) to employ renewable technologies in federally owned buildings on tribal lands. More importantly, the Department has recently issued a competitive solicitation which seeks proposals for renewable energy projects on Native American and Alaskan Native tribal lands. A total of $1.8 million will be granted to some 10 to 20 meritorious projects. The referenced $1.8 million is comprised of $1 million from the Omnibus Appropriations Act, $500 from the Remote Power Program and $30o thousand from Wind Energy. Finally, the Department has made available, through the State Energy Program competitive solicitation, an additional $1 million for remote applications of renewable technologies for which Native Americans may apply.

In addition, the Department also issued a solicitation through the Hydrogen Program seeking projects for remote applications. The solicitation requests proposals from companies for 50/50 cost-shared projects to validate fuel cells integrated with: (1) renewable energy technologies such as wind; (2) liquid fuel reformers that co-produce thermal energy for heat and electricity; and (3) regenerative fuel cells that can produce hydrogen as a fuel and storage medium for peak power. These technologies will provide electricity and fuel for remote Alaskan villages that use diesel/gasoline generators.

SOLAR CELL TECHNOLOGY

Mr. Pastor. Mr. Reicher, your plans call for the development of a 40%-efficient solar cell. What would be the benefit of developing such a high technology cell?

Mr. Reicher. The solar cell referred to is a novel four-junction device that sequentially absorbs different components of the sun's spectrum, and turns them into electric current. The idea behind this cell is an extension of the very successful two-junction (or tandem-junction) cell that was developed at NREL and is now in mass production for flat-plate space application. On earth, the four-junction solar cell will achieve about 40% efficiency under concentrated sunlight. The overall efficiency of a concentrator system using this cell is expected to be about 33%. Calculations developed at NREL indicate that such a system will achieve the DOE long-term photovoltaic goal of six cents per kilowatt hour, and thus, help to make PV power more competitive with conventional power.

PHOTOVOLTAIC R&D PROGRAM

Mr. Pastor: Mr. Reicher, what role does Arizona State University play in the Photovoltaic Program?

Mr. Reicher. The Arizona State University (ASU) has a group of research engineers, led by Professor Robert Hammond, which is internationally recognized for the development of photovoltaic testing standards. ASU's Photovoltaic Testing Laboratory (PTL) plays a critical role for the PV industry by certifying PV systems and components. In fact, it is the first laboratory in the world to be accredited to test PV modules by the International Electrotechnical Commission Quality Assessment System for Electronic Components (IECQ). The PTL is also the first testing laboratory to be recognized by the Global Approval Program for Photovoltaics. The Department has provided technical support, funding and donated equipment to ASU to support this vital and unique capability.

ASU has also successfully competed in the Universities Capital Equipment solicitation and the Future Generation PV Technologies solicitation. In the former solicitation, ASU received $67,000 from the Department to purchase equipment to enhance their test facility. In the latter solicitation, ASU was awarded a three-year, $240,000 contract to develop testing standards for future generation PV technologies including PV concentrators that concentrate sunlight before converting it to electricity.

PHOTOVOLTAIC R&D PROGRAM

Mr. Pastor. How does the Photovoltaic R&D budget compare to the Japanese and European R&D budgets, and how strong is foreign competition?

Mr. Reicher. Foreign competition to the U.S. photovoltaic industry is very strong, and is attributable to the very aggressive government R&D programs being funded in Japan and Germany. The Japanese budget alone is over three times the U.S. R&D budget in FY 1999 ($230M vs $72.2M). Both the Japanese and German governments spend millions of dollars on subsidies for their residential roof programs which have dramatically increased sales for their industries. For example, Japanese PV manufacturers reported shipment increases of 41 percent, from 35 megawatts in 1997 to 49.2 megawatts in 1998. In the same time period, U.S. shipments rose only 5 percent, from 51 megawatts in 1997 to 53.7 megawatts in 1998. If this trend continues, Japan will surpass the U.S. next year and become the world leader in PV shipments, a position the U.S. has held since 1993.

1999 Photovoltaic R&D Budgets by Country
(Dollars in Thousands)

	United States	Japan	Germany
Total R&D Program	$75,083	$230,000	$180,000
Million Solar Roofs**	$1,500	$130,000	$100,000

*Includes the Office of Science and Energy Research.
**Japan has a residential solar roof program that installs 10,000 PV roofs per year which subsidizes one third of the cost of the PV system, and Germany just approved a six-year, 100,000 PV roof program to be funded at one billion Marks, or $600 million.

World PV Cell & Module Shipments*
(MW)

	1997	1998
United States	51.0	53.7
Japan	35.0	49.2
Europe	30.4	30.1
Rest of World	9.4	18.7
Total	125.8	151.7

*PV News, February 1999

PROGRESS IN PHOTOVOLTAIC AND OTHER RENEWABLE ENERGY

Mr. Pastor. Mr. Reicher, since we discussed this last year, has there been any significant progress in making photovoltaic and other renewable energy technologies more commercially marketable?

Mr. Reicher. There has been substantial progress on many renewable technologies including a number of actions that have assisted in making solar energy systems more commercially marketable in the last year. A key aspect of improving the marketability of photovoltaics has been to increase the efficiency of the cells to convert sunlight to electricity and to reduce the manufacturing costs of cells and the cost of assembling modules and systems. During the past year marked improvements have been made in efficiency, and lower costs in manufacturing have been realized.

In addition, many barriers have been either completely removed or the process has had significant interim successes. For example, in the area of finance, private sector finance companies like GMAC mortgage have announced a national solar energy mortgage. Other private financial institutions are considering adding other financing products. At the Federal level, the Department has worked with Housing and Urban Development and Small Business Administration to make solar financing available and to ensure that all Federal financing programs include solar energy systems.

A key success of the Million Solar Roofs Initiative has been the establishment of State and Local Partnerships across the nation. These Partnerships bring together state and local government, utilities and energy suppliers, the solar energy industry, non-governmental organizations and other businesses such as financial institutions, builders and developers to develop the infrastructure and markets for the sales and installation of solar energy systems. At the end of FY 1998, nine Partnerships had been established. As of March 1, 1999, six additional Partnerships had been established bringing the total to 15 Partnerships. By the end of FY 1999, there will be at least 25 Partnerships established.

In Concentrating Solar Power the lowest cost solar power option available today is parabolic trough technology. With 354 MW installed and over 100 plant-years of experience in the California desert, trough plants have proven to be a reliable source of clean power. In fact, with the help of DOE's O&M cost reduction project in the mid-1990s, these plants are breaking performance records after 10 years of operation. Over the course of time, the cost of energy from these plants has dropped from over 16¢/kWh down to 12¢/kWh, with the potential for near-term cost reductions down to 8¢/kWh by the time the next commercial plants come online. Projects proposed for Egypt, Mexico, and Morocco are being seriously considered by the World Bank/GEF, while others in Brazil, Crete, and South Africa are actively being pursued. At a recent industry-led technology roadmapping workshop, participants identified further opportunities to increase performance and reduce costs, with the potential of achieving costs as low as 6¢/kWh by 2010 and 4¢/kWh by 2020. Based on these results, solar trough systems can play a major role in meeting both domestic and international power needs, while making a significant contribution to meeting the Kyoto emission standards before 2010. In response to these findings, the CSP

Program has launched the USA Trough Initiative, an advanced RD&D effort which will bring industry partners together to develop advanced components for more efficient and lower cost trough designs.

In the last year, that Department has made substantial progress in demonstrating technologies that will enhance the marketability of biopower. Biomass/coal cofiring, for example, is the nearest-term and lowest-cost option for efficiently generating electricity from biomass. The Department has entered into partnerships with the Electric Power Research Institute (EPRI) to demonstrate applicability of cofiring in a very wide range of commercial boilers. This also leverages and benefits the cofiring activities underway as part of the Biomass Power for Rural Development Program. The Department, its Laboratories, and subcontractors are also participating in activities to foster recognition and monetization of biopower's environmental benefits by those certifying, generating and consuming "green power." These markets will help to retain the environmental benefits of the existing industry while paving the way for more efficient and integrated systems in the future. The Department's biomass and black liquor gasification efforts also seek to benefit from the natural capital-replacement cycle in the forest products industry to overcome the otherwise substantial cost barrier to widespread adoption of new technologies.

In Wind Energy, for example, Enron Wind Corporation dedicated the world's largest wind plant, Lake Benton Power Partners I, in Lake Benton, Minnesota in September 1998. Enron and other wind energy developers are installing or operating new wind projects in Minnesota, Iowa, Texas, Wyoming, Colorado, Oregon and Alaska. The Department's partners in the Next Generation Turbine project are making progress aimed at completion of prototype testing in 2002. These innovative next generation wind turbines will reduce the cost gap between wind and fossil generation and allow U.S. technology to compete in world markets.

The Hydrogen Program has as one of its goals to produce commercial quantities of hydrogen from renewable resources. The challenge is to produce hydrogen from sunlight and water at a price competitive with conventional fossil processes. During the last year, the program made significant technical progress in two areas to produce hydrogen from renewable energy sources: photo biological hydrogen production using algae to split water was demonstrated to produce one-half a liter per hour of pure hydrogen and photoelectrochemical hydrogen production which uses advanced semiconductors to split water into hydrogen and oxygen with a round-trip efficiency of 12.7 percent. Both technologies have had technical breakthroughs which keep efforts on track to make these processes economically feasible in the future at a projected cost equivalent to fossil derived hydrogen. At this time, however, we cannot predict which process(es) will compete with conventional methods.

PV-Battery-Diesel Hybrid systems are being field tested by the Energy Storage Program. Use of batteries in such systems extends the period of available solar power, increases fuel efficiency of the diesel generator, and dramatically improves power quality. System design and operational strategies of more than 15 stand-alone PV systems of various sizes are being studied to minimize fossil fuel use, optimize effective utilization of solar energy, and extend the life of the battery. Significant improvements in cost effectiveness and reductions in life cycle costs will increase acceptance and marketability of stand-alone generation facilities for remote sites.

EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH (EPSCoR)

Mr. Callahan. The Department's request for the DOE Experimental Program to Stimulate Competitive Research (EPSCoR) program is $6,815,000. What are your plans for the EPSCoR program in the coming year?

Dr. Krebs. Assuming the results of the FY 1999 merit review of their renewal applications are favorable, one of the priorities for FY 2000 funding will be to provide continuation support for the States of South Carolina and Wyoming Research Implementation Awards. DOE/EPSCoR is also planning to announce in FY 2000, the availability of $3.0 million for a new round of competition of the Research Implementation Awards.

The DOE EPSCoR State/Laboratory Partnership awards, which were initiated in FY 1998, provide support to individual investigators to encourage the formation of collaborations between academic and industrial researchers in the DOE/EPSCoR states and researchers at the DOE national laboratories, facilities and centers. Since 1998, DOE has awarded a total of 28 grants (18 in FY 1998, and 10 in FY 1999) to individual researchers in 17 states to support these collaborations. In FY 2000, pending satisfactory progress and the availability of funds, DOE/EPSCoR will provide continuation support for the DOE EPSCoR State/Laboratory Partnership awards made in fiscal years 1998 and 1999. The program will also announce the availability of approximately $850,000 for new EPSCoR State/Laboratory Partnership awards in FY 2000.

Mr. Callahan. Can you highlight for the Committee the Agency's full plans for funding appropriated in FY 1999?

Dr. Krebs. In FY 1999, assuming the meritorious review of the applications received (from the States of Alabama, Kentucky, Nevada, South Carolina, Wyoming, and the Commonwealth of Puerto Rico) for the renewal of the Research Implementation Awards, DOE/EPSCoR plans to provide an estimated $5,245,000 for these ongoing efforts. Early in FY 1999, DOE/EPSCoR staff awarded ten additional applications with DOE EPSCoR/Laboratory Partnership grants. These additional applications were selected from among the highly ranked applications submitted in response to the Office of Science Program Notice 98-02, "Building DOE EPSCoR/Laboratory Partnerships" which were kept active into FY 1999 for further consideration of funding. DOE/EPSCoR provided a total of $425,000 for the 10 awards in FY 1999, and expects to provide a total of $830,000 for the continuation of the EPSCoR State/Laboratory Partnership grants awarded in FY 1998, subject to satisfactory progress. The program will also provide approximately $315,000 for merit review of applications, site reviews, scientific workshops, meetings for EPSCoR researchers, and database support.

Mr. Callahan. Several of the states that received research implementation grants have completed those grants. Alabama is one of those states. Will there be a new round of research implementation grant awards in FY 2000? How will that process work?

Dr. Krebs. In FY 1999, the projects supported by the Research Implementation Awards for the States of Louisiana, Maine and Montana will "graduate" from DOE/EPSCoR support, having been funded for the maximum period of six years. The State of Alabama recently submitted a renewal application for an additional year of support for its DOE/EPSCoR funded efforts. Subject to the results of the FY 1999 merit review of the applications, the Alabama Research Implementation Award is expected to continue through September of FY 2000.

In FY 2000, DOE/EPSCoR is planning to announce new Research Implementation Award opportunities for those EPSCoR states without active Research Implementation Awards. The Program Notice is expected to be released in the spring of 1999. While the program notice is still being revised, it should be similar to that of previous years.

Mr. Callahan. How many awards does DOE plan to make with the available funding?

Dr. Krebs. A total of $3.0 million of funds budgeted for DOE/EPSCoR will be available for the new awards in FY 2000, which would allow support for approximately three or four new Research Implementation Awards.

Mr. Callahan. DOE is planning new work for the EPSCoR program that will involve the National Laboratories and the world class facilities at those labs. Please describe those plans.

Dr. Krebs. The Department of Energy and National Science Foundation EPSCoR Offices, in collaboration with the American Association for the Advancement of Science and Oak Ridge National Laboratory (ORNL) are planning a workshop on August 18-20, 1999, at Oak Ridge National Laboratory. The purpose of the workshop is to promote the formation of partnerships between the faculty from the EPSCoR states and the scientific and engineering staff of federal agency national laboratories and facilities. The workshop will highlight the present and planned neutron facilities and high performance computing facilities at ORNL, and their applications to the materials sciences, chemical sciences, environmental sciences and biological sciences. The agenda will include one-on-one meetings with federal laboratory scientists and tours of the facilities at ORNL. A similar workshop was held at Argonne National Laboratory, May 1-2, 1997.

Mr. Callahan. How have DOE-sponsored workshops helped states to build depth in their scientific personnel and research facilities to better participate in energy research programs?

Dr. Krebs. The DOE sponsored workshops have helped to educate EPSCoR state researchers about the facilities, research interests and other opportunities available at the federal agency national laboratories. In addition, the workshops have created opportunities for interaction between lab scientists and EPSCoR state researchers which have resulted in mutually beneficial collaborations.

Mr. Callahan. What are some of the accomplishments of the Alabama DOE EPSCoR program? Please provide examples of some of the accomplishments of the DOE EPSCoR program in other states.

Dr. Krebs. The Alabama DOE/EPSCoR program provides support for collaborative research efforts in three energy-related research areas: Petroleum Reservoir Characterization, Fusion Energy, and Novel Organic Semiconducting Materials. Since the initial Research Implementation Award in FY 1994, Alabama researchers have reported a total of 418 publications (journal articles, books, and articles in conference proceedings), 257 individual presentations, five patents, and approximately $12 million in new award monies directly related to the DOE/EPSCoR supported research.

Researchers involved in the Petroleum Reservoir Characterization research cluster have been attempting to identify appropriate recovery technologies for the northern margin for the Gulf of Mexico in Alabama, leading to the production of the maximum amount of hydrocarbons from the reservoir. It is anticipated that the site characterization work being performed by this group will lead to identifying locations of bypassed oil that can be produced through geologically-targeted infill drilling.

Notable progress has been made in this research effort. For example, Smackco, LTD., the operator of the site for the initial characterization study, Appleton Field (an oil field that was considered to be "dead"), evaluated the results of the cluster research and successfully drilled a sidetrack in-fill well in the field to recover additional 'attic' oil (approximately 130 barrels of oil per day). The success of this study demonstrated the utility of the characterization technology which is now being applied to larger sites in Alabama, including North Choctaw Ridge in Choctaw County, and Chatom Field in Washington County, AL. Also, in FY 1998, the University of Alabama established a Center for Sedimentary Basin Studies as a result of the success of the Petroleum Reservoir Characterization effort. This Center will sustain the research efforts initiated by the DOE/EPSCoR program and will assist the independent operators of the oil producing companies in Alabama.

The DOE/EPSCoR supported effort for the Fusion Energy Research Cluster in Alabama has led to the participation of the project principal investigators' on a national committee to develop and recommend to DOE a long-term, comprehensive plan for stellarator research at the national level. Under this plan, the researchers at Auburn University will carry on a substantial upgrade of the Compact Auburn Torsatron (CAT) device to perform stability studies of current driven stellarator plasmas that would be relevant to the large scale National Compact Stellarator Experiment (NCSX) under development at the Princeton Plasma Physics Laboratory.

Other examples of accomplishments from other DOE/EPSCoR supported Research Implementation Award efforts include:

Nevada - Chemical Physics Research Cluster - A high density z-pinch plasma device for pulsed-power research which was acquired from Los Alamos National Laboratory, has been permanently installed in the Sage building near Reno. This 50-ton device has already attracted

$1.2 million in external research funding from DOE Fusion Energy Sciences and Defense Programs, and is playing a critical underpinning role in a new cooperative agreement between the DOE-Nevada and the Nevada University System related to Science-based Stockpile Stewardship (valued at $10 million over a two-year period).

Kentucky - Fossil Energy Cluster: This DOE/EPSCoR supported effort has made significant technical advances in the development of a new instrument for on-line analysis. At the newly created Institute for Applied Physics at Western Kentucky University, university faculty and staff from Oak Ridge National Laboratory have designed a new coal analysis technique, based on pulsed fast-thermal neutrons, that is superior to present day analysis systems. A prototype of the analyzer has been constructed and installed in a tractor-trailer located at a fenced site on the University's farm. The technique has attracted both national and international interest from coal operators and utilities and is believed to have potential applications to the detection of drugs and explosives. The Western Kentucky University recently filed for a patent for the device.

NATIONAL INSTITUTE FOR GLOBAL AND ENVIRONMENTAL CHANGE (NIGEC)

Mr. Callahan. The NIGEC is funded as part of the environmental process activity of Biological and Environmental Research. Please describe this program in detail, including funding history and current request.

Dr. Krebs. NIGEC funds through six regional centers both strategic and basic research which is intended to provide scientifically based analyses of the consequences of global change for this Nation. Two major areas of research currently being funded through NIGEC are the role of major terrestrial ecosystems as a sink for atmospheric carbon dioxide and other trace gases and regional analyses of the environmental and economic consequences of human-induced changes in climate averages and variation, particularly the effects on major ecological systems and resources of economic and societal importance. The research is intended to address global change issues on a local to regional scale yet be integrated among the six NIGEC regions. NIGEC funding history and current request:

NIGEC FUNDING
(B/A in thousands)

Prior Years (total from 1990-96)	FY 1997	FY 1998	FY 1999	FY 2000
$65,263	$8,481	$8,086	$8,735	$8,763

Mr. Callahan. How does NIGEC support the DOE's Global Change Research Program?

Dr. Krebs. NIGEC supports the DOE's Global Change Research Program by funding research relevant to the DOE's global change research priorities. DOE reviews and approves the NIGEC research plans annually to ensure the research it funds is relevant to the Department's needs and priorities. Carbon cycle research is one area in which NIGEC is an important supporter of DOE's program in global change research. For example, most of the AmeriFlux sites supported with DOE funding are provided through NIGEC. AmeriFlux is providing unique and important information on the amount of carbon being sequestered on an annual basis by major terrestrial ecosystems in the U.S., including forests, grasslands, croplands, and tundra. It is also providing important information on the biophysical processes controlling the net exchange of carbon between the atmosphere and terrestrial biosphere and how environmental factors such as climate variation, land use patterns, and pollution are affecting carbon sequestration in terrestrial ecosystems.

NIGEC also supports the DOE program by funding research to improve the scientific basis for assessing ecological and economic implications at regional scales of human-induced changes in climate, including climate variation and atmospheric composition. The Regional Centers of NIGEC play an important role in organizing and coordinating these regional-scale research activities by bring investigators together within each region to share information and plan joint research activities.

Mr. Callahan. How do the six regional centers function?

Dr. Krebs. The six regional centers of NIGEC function by soliciting research proposals from scientists within their respective regions, by sponsoring and organizing meetings of scientists to coordinate and plan research activities relevant to DOE's global change research priorities and needs.

Mr. Callahan. How are their activities coordinated?

Dr. Krebs. The activities are coordinated through workplans developed by each regional center each year, reviews of the workplans by an advisory committee, meetings of the regional center directors, and meetings of scientists funded by each region, and meetings of scientists working on specific topics such as carbon cycling. Scientists funded through NIGEC are encouraged to attend topical meetings of scientists funded through DOE's other core global change research programs.

Mr. Callahan. Please describe some of the accomplishments of the NIGEC program.

Dr. Krebs. Scientific accomplishments of the NIGEC Program include documenting that both a 60-year old deciduous forest and a 90 year old conifer forest in northern New England take up significant amounts of carbon dioxide on an annual basis, on average 2 metric tons of carbon per hectare per year. This finding is the first direct evidence that mid-latitude forests could be taking up and sequestering globally significant quantities of carbon dioxide in soils and trees. In contrast, a 90 year old boreal conifer forest on permafrost appears to be losing more carbon suggesting that peat-dominated boreal forests may be starting to release potentially large amounts of carbon in response to recent climate warming.

Other examples of NIGEC accomplishments include documenting that: (1) soil warming releases carbon dioxide from two major pools of soil organic matter that have distinctly different residence times in the soil. Decomposition of the pool that has a longer residence time in the soil releases significant quantities of nutrients as it decomposes which could stimulate uptake of carbon dioxide by plants. This result provides a demonstration of an important feedback that had been hypothesized concerning an indirect effect of climate warming on the uptake of carbon by terrestrial ecosystems. (2) nitrogen availability in soils has a major effect on the growth of poplar tree saplings grown in an atmosphere containing a carbon dioxide concentration that is twice the current ambient level. Saplings growing in soils with a high nitrogen availability and exposed to the elevated carbon dioxide level exhibited significantly greater growth (leaf area, stem volume) than saplings exposed to the same carbon dioxide level but growing in soils with a low nitrogen
availability.

Mr. Callahan. What are some of the accomplishments of the Southeast Regional Center in Alabama.

Dr. Krebs. Accomplishments from the Southeastern Regional Center include documenting

that: (1) elevated atmospheric carbon dioxide levels and/or dry conditions reduce the damage to forests from insects and plant pathogens, (2) drought frequencies of 20 percent or less (i.e., one in five years) are unlikely to have a major impact on forest production, (3) elevated temperatures can lead to substantial mortality of insect herbivores and possibly reduced reproduction, suggesting that earlier speculation about potential enhanced insect damage to forests due to global warming may be unfounded, (4) low levels of phosphorus in soils, an essential element for plants, may restrict or even negate the positive effects of elevated carbon dioxide levels on nitrogen-fixing plant species and (5) subtropical to subarctic wetlands are a net source of greenhouse gases to the atmosphere due to the release of both methane and carbon dioxide.

Mr. Callahan. How does the NIGEC program relate to the Climate Change Technology Initiative?

Dr. Krebs. The NIGEC program supports research to improve understanding of both the fate of greenhouse gases, particularly carbon dioxide that is emitted to the atmosphere, and the potential effects of human-induced changes in climate and atmospheric composition due to such emissions. The CCTI will support research to, for example, develop approaches and strategies to enhance the natural processes that sequester carbon dioxide in terrestrial and marine ecosystems. Thus, some of the research currently funded through NIGEC on the biophysical processes which control the sequestration of carbon in terrestrial ecosystems is relevant to the CCTI in that it will help identify processes which might offer the opportunity to enhance natural carbon sequestration processes in terrestrial and marine ecosystems.

Mr. Callahan. How does NIGEC contribute to the US Global Climate Change Research Program?

Dr. Krebs. NIGEC contributes to the U.S. Global Change Research Program (USGCRP) by funding research relevant to the DOE's global change research priorities and needs. DOE is one of nine Federal agencies that participate in and contribute to the interagency USGCRP. The mission of NIGEC is to support the Department of Energy's global change research needs. DOE reviews the annual workplan for NIGEC to ensure that the research proposed for funding is relevant to the Department's priorities.

Mr. Callahan. Do you think that contribution should be broadened and why?

Dr. Krebs. No additional regional centers are necessary in NIGEC because the existing six centers solicit research applications from universities and non-profit research institutions in every State in the U.S., including Alaska and Hawaii.

BLACK LIQUOR GASIFICATION

Mr. Callahan: Congress appropriated $1 million for FY99 in the Energy and Water Bill last October with the intention it be used to fund preliminary engineering for the forest products gasification demonstration project in my state. Why hasn't the award been made yet? When do you expect the award will be made? With respect to the FY 99 appropriated funds, what will happen if it can not be spent between now and October 1, due to the delay in making the award?

Mr. Reicher: A commitment to this effort requires a large financial responsibility. The Department's goal is to ensure that a competitive process is in place, which will provide the best opportunity for successfully developing advanced technologies. Keeping this in mind, a two-phased approach was devised to expeditiously execute our plan. The first phase in FY1999 will support preliminary engineering design, cost estimates and supporting analyses, which will be used to determine the economics of demonstrating integrated gasification combined cycle technologies in pulp mills. Revised proposals were requested from the two companies that responded to the May 12, 1998 Agenda 2020 Request for Proposals to specify work, costs and schedules for the initial phase. Merit review and program policy committees evaluated the proposals. The outcome is pending further negotiation, however, awards are expected to be made in late April. Due to the nature of the work proposed and the contractual vehicle to be used, a non-severable financial assistance award will allow incurred costs to be carried forward beyond this fiscal year. In the subsequent phase, the Department is planning a biomass and black liquor gasification demonstration solicitation for financial assistance in FY2000.

Mr. Callahan: How much money does the Department envision spending on BLG in FY2000? Will that entire amount be funded in the Interior Appropriations bill, or is there an opportunity or need to seek BLG funding in the FY2000 Energy and Water Appropriations bill?

Mr. Reicher: The FY2000 President's Budget Request under the Interior Appropriations bill includes the entire amount of funding for biomass and black liquor gasification, ($9 million). This funding will support the initial year of a competitive solicitation for multi-year field evaluations of biomass and black liquor gasification technologies.

Mr. Callahan: What is the expected process for making the FY2000 awards?

Mr. Reicher: It is the Department's intent to conduct a competitive solicitation in FY2000 that will demonstrate biomass and black liquor gasification technologies in a cost-shared partnership with industry.

Mr. Callahan: How many technology initiatives can you afford to support?

Mr. Reicher: The planned release of the FY2000 solicitation is dependent on favorable House and Senate appropriation marks. Proposals submitted to the solicitation will be evaluated by merit and program policy review committees. Selections will be made based upon the outcome of the reviews and availability of appropriated funds.

Mr. Callahan: Will Congress know before the passage of the FY2000 bill which projects have been selected?

Mr. Reicher: Anticipated release date for this solicitation is the fourth quarter of FY1999 and awards will be made in the second quarter of FY2000. Once received, submitted proposals will be evaluated by merit review and program policy committees. Selections will be made based upon the outcome of these reviews followed by the appropriate Congressional notification of selection prior to award. Appropriate Congressional notification of selections from the FY2000 solicitation will be made prior to negotiation for award.

Mr. Callahan: The Agenda 2020 program has already had a competitive process and the entire forest products industry is supporting this project, why do you need another competition?

Mr. Reicher: The Agenda 2020 program, which is predominantly composed of members from the Forest Products industry, typically funds universities, laboratories and suppliers to perform research and development in support of the forest products industry priorities. It was determined by the DOE Procurement Policy Office that a DOE gasification solicitation, separate from the Agenda 2020 program, is necessary in FY2000 to avoid potential conflicts of interest between gasification proposers and the Agenda 2020 process.

Mr. Callahan: How does BLG fit into DOE's new bioenergy initiative? By my understanding, there is approximately $6 million in bioenergy funding in the Energy and Water bill. Can any of that be spent on the proposed project in Alabama?

Mr. Reicher: Through the Bioenergy Initiative, we intend to issue a solicitation that will examine a host of integrated bioenergy projects and processes that will demonstrate the viability of coupling the various aspects of the Department's biomass programs to an emerging bioenergy industry. An important step in this undertaking will be to solicit input from industrial partners as well as state and local entities. This will be carried out in several visioning and roadmapping meetings being planned for early spring and summer. Since the scope of the bioenergy activity is led by industry, the $6 million would be distributed according to priorities set forth by industry through these visioning activities. The forest products industry is a vital partner in this process.

Mr. Callahan: What is the contingency plan if you do not get enough money to fund more than one technology in the forest products gasification initiative?

Mr. Reicher: If funds do not become available through appropriations, alternatives will be considered such as increasing industry cost share or reducing the number of gasification technologies.

Mr. Callahan: Will you limit the number of technologies or will you try to do lower cost shares?

Mr. Reicher: To reiterate this point, if funds do not become available through appropriations, alternatives will be considered such as increasing industry cost share or reducing

the number of gasification technologies.

Mr. Callahan: I know Champion International project in Alabama will go forward without full 50% cost sharing. Their alternative is to spend approximately $2 million to upgrade an existing boiler instead of their share of the private sector match (approximately $12 million). There are eight pulp and paper mills in my state and more than 100 others around the country that could ultimately benefit from the development and implementation of the technology. I would like to see a greater commitment on the part of the DOE to spend the money to ensure that this technology can be proven in partnership with industry and made available to the entire forest products industry. What assurances can you provide the Committee that this will occur?

Mr Reicher: I can assure you that we are committed to this effort. The Department is currently in the process of selecting black liquor gasification proposals for consideration of funding in FY1999. The president's FY2000 budget request for Interior and Other Related Agencies also includes $9 million for biomass and black liquor gasification demonstrations. We believe that the established industrial partnerships, coupled with the resources offered by the national laboratories and universities represent the greatest chance for successfully demonstrating biomass and black liquor gasification technologies. The American Forest and Paper Association in partnership with the Technical Association for the Pulp and Paper Industry will assist the Department in disseminating the technical accomplishments of this effort to the entire forest products industry.

HUMAN GENOME

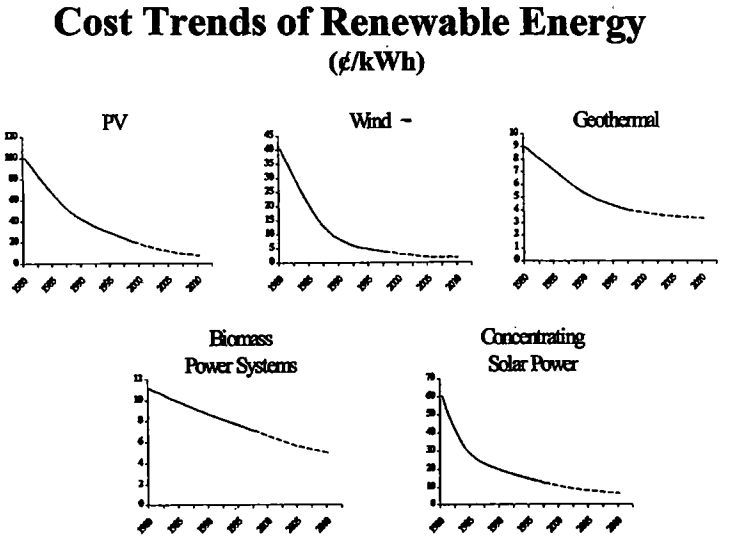
Mr. Frelinghuysen. What relation does the Human Genome project have with the N.I.H. efforts?

Dr. Krebs. The U.S. Genome Project has been a joint effort between the DOE and the NIH since we signed a Memorandum of Understanding with NIH in 1988 to coordinate the Project. Long range planning for the U.S. Genome Project is done as a joint DOE/NIH process involving our advisory committees, program staff, and the broader scientific community. A new joint five-year plan for the U.S. Human Genome Project was published in *Science* magazine this past October. DOE and NIH genome program staff interact regularly to minimize duplication of funding for research, to monitor program progress, and to continue program planning. Program staff attend each other's advisory committee meetings and merit review panels. The DOE and NIH programs even co-fund some research grants. DOE's current efforts in the Human Genome Project focus on three areas: high throughput human DNA sequencing, sequence annotation, and advanced technology development. The NIH program is also focused on high throughput human DNA sequencing with additional emphases on disease genes, DNA sequencing of model organisms, and an emphasis on human polymorphisms.

COST TRENDS OF RENEWABLE ENERGY

Mr. Frelinghuysen. Please provide evidence for the "amazing growth curves" for renewables.

Mr. Reicher. The historical data represented in the cost reduction curves for renewables technologies have been accumulated through the years from program plans and other materials which reflected the costs of the technologies at the time the documents were published. Current and projected future costs are derived from the *Renewable Energy Technology Characterizations* published by the Electric Power Research Institute.



ELECTRICITY FROM RENEWABLES

Mr. Knollenberg. As you may know, the Energy Information Administration (EIA) states that to comply with the Kyoto Protocol, the United States must reduce coal produced electricity by 77 percent. Furthermore, Mr. Magwood may be pleased to know that the EIA also would increase the amount of electricity produced by nuclear energy, but I am not convinced the Clinton Administration has changed their policy on nuclear energy enough to get us there.

With regards to Solar, Wind, and other non-hydro renewable energy sources, I also want to understand the DOE's expectations over the next two decades, and especially the next ten years which will get us to 2008 – the budget period of the Kyoto Protocol.

Please describe briefly now and in more detail for the record, in the United States, what percentage of our nation's electricity does DOE anticipate will be produced by each of the following:

-photovoltaics
-wind
-biomass
-geothermal

Mr. Reicher. The Energy Information Administration (EIA), in its Reference Case Forecast for the *Annual Energy Outlook 1999* (*AEO99*), projects the following percent contributions to the nation's grid connect electricity production in 2010 and 2020 for various renewable sources:

	2010	2020
-photovoltaics:	0.02%	0.03%
-wind:	0.18%	0.18%
-biomass	1.44%,	1.88%
-geothermal	0.42%	0.48%.

These projections are based on moderate rates of improvement in the performance and cost likely to be achieved through current levels of DOE and industry sponsored R&D. Research and development breakthroughs may lead to higher rates of installation and power production. In a "High Renewables Side Case" for the *AEO99*, which uses performance and cost improvement targets for these technologies published by the Electric Power Research Institute (DOE's Office of Energy Efficiency and Renewable Energy co-produced this document with EPRI), EIA projects the following contributions for 2010 and 2020:

	2010	2020
-photovoltaics:	0.02%	0.03%
-wind:	0.80%	1.63%
-biomass	1.89%	3.18%
-geothermal	0.52%	0.70%.

Although these projections assume EPRI/EERE technology improvement targets, they do not assume future prices for natural gas being higher than those assumed in the Reference Case Forecast, nor do they assume Climate Change or electricity restructuring policies which may be implemented in the future. Either of the latter scenarios may well result in increased contributions of the listed renewable energy resources to the nation's electricity production. It should also be noted that off-grid electricity generation, which is not included in this projection, could provide futher opportunities for renewables, especially photovoltaics.

Mr. Knollenberg. And I would also be interested in knowing what percentage of U.S. electricity the DOE anticipates will be produced by:

-coal
-natural gas
-other

Mr. Reicher. The *AEO99* Reference Case Forecast projects the following contributions to the nation's electricity production in 2010 and 2020 for various energy sources:

	2010	2020
-coal	49.04%	48.83%
-natural gas	26.61%	32.84%
-other*	22.29%.	15.76%.

*In this table, "other" includes hydroelectric, nuclear, and oil-fired power generation.

ELECTRICITY DEREGULATION

Mr. Knollenberg. Many of the Electricity Deregulation bills have required a minimum percentage of U.S. electricity to be produced by solar and renewable energy sources. This seems like a difficult federal mandate which again has the federal government picking winners and losers. I am a firm believer that the best place to decide which energy sources to use is a free and open marketplace.

As Congress continues to debate the opening of the marketplace through Electricity Deregulation, does the Department of Energy support this policy of forcing utilities to use sources of electricity they may not choose in an open market?

Mr. Reicher. The Administration's Comprehensive Electricity Competition Plan supports the adoption of a Renewable Portfolio Standard (RPS) that would require all electricity sellers to cover a percentage of their electricity sales with generation from non-hydroelectric renewable sources such as wind, solar, biomass or geothermal energy until a period of time during which renewable energy is more cost competitive. The RPS is a market-based approach which does not favor one particular renewable technology over another and permits those utilities selling insufficient amounts of renewable energy to purchase credits from those selling greater amounts than is required.

The Department of Energy believes that a RPS approach is important as we transition to competitive markets because, initially, renewable energy may not be cost-competitive with other technologies. Renewable energy provides important environmental and energy diversification benefits that should be promoted in a competitive environment.

Mr. Knollenberg. According to the Department of Energy, should the Federal Government decide what percentage or should the marketplace decide?

Mr. Reicher. The Administration supports the enactment of a RPS, as part of comprehensive electricity restructuring legislation, which would establish a specific minimum target for renewable energy. However, the Administration's proposed legislation also includes a 1.5 cents/kwh cost-cap on renewable energy credits. To the extent the cost of power from renewable facilities exceeds the market rate for power by an amount greater than the cost cap, power marketers would simply purchase RPS credits from the Department of Energy rather than generate the required percentage of renewable energy. Combined with the tradeable credits aspect of the RPS and the ability of consumers to purchase green power, we believe the marketplace will effectively decide which renewable sources are used for generating electricity.

WIND

Mr. Knollenberg. How much would it cost to build a new wind farm using current technology using the same megawatt capacity as the nuclear plant that Mr. Magwood described in the hearing of about 1,300 - 1,400 megawatts?

Mr. Reicher. Total installed costs for large wind plants are currently running around $800/kilowatt to $1,000/kilowatt. Therefore, capital costs would be $1.04-$1.40 billion for that capacity installation. These capital costs are scaled from wind farms that are currently being installed in the 50-150 megawatt size range, using turbines that are rated at 750 kilowatt each. A plant order in the 1,300 megawatt size range would probably result in significant cost saving, perhaps 10-20 percent or more, both in turbine manufacturing and installation costs.

Mr. Knollenberg. With regards to the environmental impact, what would the size of the footprint be for such a wind farm facility?

Mr. Reicher. The land area of a wind plant is heavily affected by terrain and wind resource characteristics. Most of this land area can continue to be used productively for compatible activities like farming and grazing, while the landowners receive royalties from the wind plant operator. Wind energy may also be located in many vast remote areas unsuitable for agricultural or other uses. In general, the turbines are spaced from 5 to10 rotor diameters apart, resulting in a power density of around 7.8 to 15.5 megawatts per square mile. Therefore, a 1,300 megawatt plant could be expected to cover between 83 to 165 square miles. However, only about 2-5 percent of the land area is actually "consumed" for roads, turbine foundation platforms, and miscellaneous support facilities.

Mr. Knollenberg. What types of threat to the community or environment, including endangered species would such a facility cause?

Mr. Reicher. The threats to the community and environment from wind energy are quite limited. Potential impacts include acoustic noise from wind turbines, visual impacts, and impacts on avian life. However, the relative impacts of wind energy compared with other energy sources must be put in perspective. The issue of concern to many environmental groups are the impacts of wind development on local and migratory bird populations. Avian impacts have proven to be highly site specific, with the majority of the concern in the United States surrounding one area of development in California. Research on avian issues with wind energy is showing that careful selection of sites and technology options, such as tower type and rotational speed, can greatly reduce potential for impact on avian life.

Concerning acoustics and visual impacts, again these must be considered on a case by case basis. New wind projects being built in Iowa, Minnesota and Texas, are being well accepted, with little if any complaints arising from visual or acoustics problems. The recent Ponnequin wind farm in Colorado has been well received by local residents. We expect that renewable energy development and use will occur in a manner in which environmental impacts are in compliance with all laws and regulations and thus have only incidental impacts.

Mr. Knollenberg. How long would such a facility last?

Mr. Reicher. With routine scheduled maintenance, wind plant and turbine design lifetimes are nominally 30 years.

Mr. Knollenberg: With current technology, on the margin what is the per kilowatt cost to run such a facility?

Mr. Reicher: The marginal cost of a wind plant consists entirely of operations and maintenance costs, since there is no fuel cost. Routine maintenance costs (including labor and materials) are around $10,400 per year per 750 kilowatt turbine, resulting in a contribution to cost of energy of about $0.005 cents per kilowatt-hour.

Mr. Knollenberg. Please discuss the waste streams for such a facility?

Mr. Reicher. Waste streams from a wind plant are minimal. Primary waste includes used gear box and hydraulic oil and component parts resulting from maintenance replacements. A 750 kilowatt turbine under normal conditions will have its oil changed once every 5 years, producing perhaps 60 gallons of waste oil. These synthetic oils can be recycled.

Mr. Knollenberg. How much of the year, or some other appropriate time period, is the wind farm not operating, i.e., for maintenance or lack of wind?

Mr. Reicher. Mechanical down-time for wind farms is very low. Reliability of wind machines has increased dramatically over the machines installed in the 1980s. In addition, the modularity of wind plants (the fact that if one turbine has a mechanical failure, the remaining turbines continue to operate) contributes to overall reliability. Wind farm developers and operators are routinely seeing mechanical availability numbers in the 97-99% range, the highest of any electric generation technology.

The amount of time a wind farm is producing energy is highly dependent on the wind resource. Wind farms in the United States are typically installed in areas with average wind speeds of 13-15 miles per hour measured at 10 meters above ground level. For this situation a wind turbine will on average operate at about 25-40% of its rated output. Thus a 1,000 kilowatt turbine operate at a yearly average power output of 250 to 400 kilowatts, for an annual energy production of 2.2 to 3.5 million kilowatt hours. However, any wind turbine will have some output anytime the wind is above 10-12 mph, which is about 50 percent of the time, and below its cut-out wind speed that is typically 45 to 55 miles per hour. The time lost to wind speeds above cut-out is usually less than 5 percent per year.

Mr. Knollenberg. How does the grid respond to these down times?

Mr. Reicher. The interconnected utility grid system responds to times of zero wind power just like it does to times of other power plant outages or increased demand. The grid system has built in capacity redundancy for forced and planned outages of all types.

PHOTOVOLTAIC ENERGY SYSTEMS

Mr. Knollenberg. How much would it cost to build a new photovoltaic (PV) solar electric plant using current technology using the same megawatt capacity as the nuclear plant that Mr. Magwood described in the hearing of about 1,300-1,400 megawatts?

Mr. Reicher. It should be noted that the maximum economical value of PV technology for grid-tied electricity is achieved when implemented as distributed power systems that augment the electrical grid rather than as base load-type plants. When a photovoltaic system is installed at the end of a utility's distribution line or on the roof of a building, the electricity is generated at the point of use. One principal advantage to using photovoltaic systems in distributed applications is the PV system's ability to supply electricity without using the utility's transmission and distribution line, saving the ultimate consumer as much as six to seven cents per kilowatt hour in transmission charges.

Calculating the cost of a large multi-megawatt PV system using current technology requires cost estimations over a ten year period. Since the worldwide shipments of PV modules in 1998 was estimated to be 151.7 MW, a large gigawatt size base load plant would consume almost 7 years of world PV production. The PV industry is therefore not in a position today to supply large, base load plants. Given demonstrated PV market growth rates of 15 to 20 percent per year, PV production capacity should be capable of delivering such systems in a little over ten years. By then, PV system costs are anticipated to be in the range of $3/watt. Some estimates project costs as low as $1.50/watt. The proposed 1,300-1,400 megawatt plant using system costs of $3/watt might, therefore, cost around $4 billion when the industry is in a position to supply such plants.

An estimate of the current state of the technology is provided by the results of a competitive Request for Quote (RFQ) issued in 1997 by the Public Service Company of New Mexico (PNM) for a 5 MW, grid-tied PV power plant. The bids for these systems were in the range of $7 per Watt at peak summer load condition in Albuquerque. The lowest documented PV system costs is around $5/W for residential rooftop PV systems for a municipal utility (Sacramento Municipal Utility District). These capital costs were estimated to correspond to an energy cost to the consumer between $0.15 and $0.20/kWh.

The program is focused on significantly improving the performance of the technology while reducing the manufacturing costs. This will lead to smaller, more cost effective systems.

Mr. Knollenberg. With regards to the environmental impact, what would the size of the footprint be for such a PV plant?

Mr. Reicher. PV systems will generally be installed on existing residential, commercial, or industrial structures. Rooftop and building-integrated PV systems would utilize space already allocated to these buildings. For ground-mounted PV systems, the size of the plant depends upon the conversion efficiency of the PV system and the packing density of the PV arrays in the field. For non-tracking systems and an overall system efficiency of 10%, a PV field can produce

between 0.1 and 0.15 MW per acre. A one-axis tracking system, such as proposed for the PNM project, could achieve between 0.15 and 0.2 MW per acre. Assuming a figure of 0.15 MW per acre, a hypothetical 1,300-1,400 MW plant would require around 9000 acres about 14 square miles. It should also be noted however, that the estimates of area requirements are based on current technology. The Department is proposing a fundamental research effort that will double the conversion efficiency of current PV modules, resulting in a proportionally smaller footprint for both stand alone and building mounted systems.

Mr. Knollenberg. What types of threats to the community or environment, including endangered species, would such a facility cause?

Mr. Reicher. A salient feature of PV for power production is the absence of environmental impacts. As an electrical generation source, appropriate safety precautions and standards (e.g., Underwriters Laboratories, National Electrical Code, etc.) are routinely implemented with PV systems to minimize potential injuries to the community.

Mr. Knollenberg. How long would such a facility last?

Mr. Reicher. PV systems have few or no moving parts, and have a proven record of high durability. With proper maintenance, PV systems have a very long lifetime. There are examples today of PV systems and modules operating very well after 20 years of operation. Major module manufacturers warranty their products for 20-25 years. This is longer than most other industrial products.

Mr. Knollenberg. With current technology, on the margin, what is the per kilowatt cost to run such a facility?

Mr. Reicher. PV systems have no fuel costs, so the cost of operation is due primarily to maintenance. Current technology for grid-tied PV systems is still not mature – particularly for the power electronic components. With anticipated improvements in power electronic component reliability, operation and maintenance costs of around $0.002/kWh are expected by 2020.

Mr. Knollenberg. Please discuss the waste streams for such a facility?

Mr. Reicher. An attractive feature of PV power production plants is the lack of any waste streams. Regarding plant decommissioning, the PV modules have demonstrated sufficient performance and value to be economically salvaged from PV systems disassembled to date. Methods have also been proposed to recycle critical materials from discarded PV modules in order to minimize potential environmental impact.

Mr. Knollenberg. How much of the year, or some other appropriate time period, is the PV plant not operating; i.e., for maintenance or lack of solar resource? How does the grid respond to these down times?

Mr. Reicher. PV solar energy systems only produce power during daylight hours.

Availability of the PV system, which is defined as the time when the system produces power divided by the time when solar resource is available, is in the mid-90% range. The overall capacity factor (delivered energy divided by rated plant capacity) is 26% if located in the Southwest U.S. It should also be noted that photovoltaic solar energy generally matches the peak load profiles of utilities fairly well, which is highly advantageous since the intermittent generation sources used to meet peak loads, such as gas fired generators, are fairly expensive. The ability to meet the utility load profile is known as the "load carrying capacity". For the proposed Public Service of New Mexico project, the load carrying capacity was as high as 80%.

The grid will not be affected if the intermittent energy sources are less than between 10% and 20% of the total capacity. The largest penetration by a non-dispatchable intermittent energy source in the US is in the service territory of PG&E in California, where wind energy provides 2% of the electrical energy. PG&E reports no technical issues associated with this penetration level. Higher penetration levels can be accommodated through good forecasting tools for the intermittent energy source and power wheeling. For example, wind supplies 30% of the electrical energy in Denmark today with no interruptions in the energy supply. Also, as previously mentioned, PV solar energy in general matches the utility load profile fairly well due to daytime peak loads.

NEW NUCLEAR POWER PLANTS

Mr. Knollenberg. How much would it cost to build a new nuclear power plant using current technology and how many megawatts facility would it be.

Mr. Magwood. Based on the cost estimate prepared for the General Electric Advanced Boiling Water Reactor (ABWR), which was certified by the Nuclear Regulatory Commission in 1997, the first plant built would cost approximately $2.6 billion. Subsequent units would cost less, because of lessons learned from the construction of previous units. As mentioned in our testimony before the Subcommittee, the Japanese have constructed and are operating the first two ABWRs, units 6 and 7 at the Kashiwazaki Kariwa Nuclear Power Station. Our understanding is that the last unit brought online, cost about $2.24 billion. Using modular and prefabrication construction techniques, these plants were constructed in less than 51 months for a combined cost of less than $5 billion. These units are each rated at 1356 megawatts electric.

If a smaller, passive AP600 plant were built, the first plant cost would be approximately $1.1 billion. The Westinghouse AP600 design is a 600 megawatt passive plant which has received final design approval from the NRC and is in the public review period for certification, and it is expected to be completed next year. Westinghouse predicts that an AP600 can be constructed in less than 36 months.

Mr. Knollenberg. With regards to the environmental impact, what would the size of the footprint be for such a facility?

Mr. Magwood. The approximate site footprint for an ABWR plant is 0.44 square kilometers (0.17 square miles or about 110 acres). The approximate site footprint for an AP600 plant is 0.143 square kilometers (0.055 square miles or about 35 acres). These are the site areas required to build a single-unit facility. If multiple units were located on the same site, the area required per unit would be less because some areas could be shared. The advanced light water reactors present a small footprint when compared to other operating nuclear power plants. A good example is the Kashiwazaki Kariwa Nuclear Power Station in Japan, where the footprints of units 6 and 7, ABWRs, are noticeably smaller than the older units. Overall, there are 7 nuclear power plant units located at this site of about 4 square kilometers (1.54 square miles or 986 acres) and it is our understanding that there is room at this site for additional units.

Mr. Knollenberg. What types of greenhouse gas emissions are emitted from a nuclear power plant?

Mr. Magwood. Essentially zero air emissions of any type are released from the operation of a nuclear power plant. The only use of fossil fuels at a nuclear plant is from infrequent testing and operation of emergency diesel generators and auxiliary heating plants. Their emissions are negligible compared to the millions of metric tons of carbon emissions from a fossil fuel-fired plant each year.

Mr. Knollenberg. What types of threats to the community or environment, including endangered species would such a facility cause?

Mr. Magwood. Unlike other technologies, there are no endangered species issues associated with nuclear power plant technology per se. Further, if a new nuclear plant were to be constructed in the United States in the future, it is likely it would be located at a current nuclear power plant site. As such, environmental impacts for these sites would be well understood, analyzed, and mitigated, as needed.

Because nuclear power plants do not burn fuel, they do not emit combustion byproducts. The substitution of nuclear energy for other fuels in electricity production has significantly reduced U.S. and global emissions of carbon dioxide (CO2), the chief greenhouse gas. Additionally nuclear power plants do not emit any nitrogen oxide and sulfur dioxide -- pollutants controlled under the Clean Air Act. Each year, U.S. nuclear plants avoid the discharge of over 150 million metric tons of carbon into the atmosphere.

To make sure that nuclear power plants operate well within EPA standards governing radiation emissions, radiation levels at every plant are monitored 24 hours a day, seven days a week. Soil cows' milk from neighboring farms, and fish and sediment in nearby rivers and lakes are monitored periodically. Nuclear power plant emissions have always been well below the safe levels permitted by federal standards.

As it generates electricity, a nuclear power plant must take in water for cooling. Therefore, nuclear power plants are located on rivers, lakes and bays. After the water is used for cooling, it is now slightly warmed and needs to be discharged. Water discharged from a plant does not come in contact with radioactive materials and contains no harmful pollutants, but still must meet regulatory standards for temperature designed to protect aquatic life. Because the area around a nuclear power plant is so clean, the areas around cooling ponds are often developed as environmentally rich wetlands, providing better nesting areas for waterfowl and other birds, new habitats for fish, and favorable environments for flowers, grasses, and other wildlife. Electric utilities voluntarily work to protect the fish, mammals, reptiles, birds and plants found on or near power plant sites. Many have created special nature parks or wildlife sanctuaries on plant sites.

Mr. Knollenberg. How long would such a facility last?

Mr. Magwood. The life of such a facility is expected to exceed 60 years. The plant with multiple license renewals will operate for as long it is safe and economical.

Mr. Knollenberg. With current technology, on the margin what is the per kilowatt cost to run such a facility?

Mr. Magwood. For our currently operating nuclear power plants, the average production costs (which includes fuel, operation and maintenance) for 1996 was 1.91 cents per kilowatt hour (kwh). An advanced light water reactor (ALWR) facility is expected to operate at lower costs than the current industry average. These advanced plants were designed to the requirements of the Utility Requirements Document which specifies a goal of 1.5 cents per kwh for ALWRs. Top 10 performers among our existing nuclear power plants had production costs less than 1.5 cents per kwh in 1996. These costs are very competitive with production costs for coal, which averaged 1.83 cents per kwh in 1996; and are much lower than those for natural gas, which averaged 3.38 cents per kwh in 1996. Nuclear does not produce any harmful air emissions. Compliance with the Clean Air Act is likely to add to the cost of producing electricity from fossil fuels but will not affect nuclear generation costs.

Mr. Knollenberg. Please discuss the waste streams for such a facility.

Mr. Magwood. Nuclear plants have two main waste forms: 1) low-level contaminated waste; and 2) spent nuclear fuel. Low-level contaminated waste results from maintenance and outage activities at nuclear plants. These materials are typically disposable, slightly contaminated materials that are drummed and shipped to a low level waste storage facility such as at Barnwell, SC. Spent fuel assemblies are removed from the reactor during a refueling outage and stored in a spent fuel pool to allow the radiation levels to decay. Typical reactor cores have between 150-200 fuel assemblies depending on the plant size and design. Approximately one-third of these assemblies are replaced with new fuel assemblies every 18-24 months of full power reactor operation. On average, a nuclear power plant produces about 20 metric tons of spent fuel each year. This is several orders of magnitudes less in weight and volume compared to wastes generated by a comparable coal plant. Many nuclear plants have reached the maximum capacity of the spent fuel storage pools and have started to transfer the spent fuel to interim on-site dry cask storage until a permanent federal repository is established.

Mr. Knollenberg. How much of the year, or some other appropriate time period, is the nuclear plant not operating, i.e. for maintenance or refueling? How does the grid respond to these down times?

Mr. Magwood. Typical nuclear plant outage time for maintenance and refueling ranges between 30 and 60 days every 18 to 24 months depending upon the scope of maintenance to be performed. Some nuclear plants have completed refueling outages in as little as 25 days. Refueling and maintenance outages are planned so that other utility power plants are operating when the nuclear plant is shutdown. Also, utilities maintain some level of "spinning reserve" for plants operating at low power levels that could be brought up to full power immediately as needed. In addition, utilities power pools can immediately provide replacement capacity from the reserves of other power pool utilities.

NUCLEAR ENERGY PLANT OPTIMIZATION (NEPO) PROGRAM

Mr. Knollenberg. I also know the budget request included $5 million for the Nuclear Plant Optimization (NEPO) program. What do you anticipate the average cost would be to optimize our existing plants and how long would you expect the plants to last if they were relicensed?

Mr. Magwood. The cost to optimize a typical U. S. nuclear power plant is a function of the age of the plant, plant design and what aspect of the plant is enhanced. Optimization can be approached from two perspectives: optimization of the power output of the plant (increase the number of kilowatts per hour of operation) or optimization of the availability (increase in number of years and/or number of days per year the plant is available to operate). The combination of these two factors will impact the plant capacity factor (a measure of the productivity of a plant). For example, the output power of a plant can be increased by the installation of computational capability which uses plant real time data to compute very accurate reactor power margins, thus permitting the operator to increase the power level closer to the technical specification margin. Industry experts project that systems of this type would cost approximately $10 million per nuclear plant, resulting in providing on average, an additional 8 percent increase in output power (an additional 80-100 MWe). We expect that research to improve this technology could substantially reduce the price of such a system.

With respect to optimizing the availability of a nuclear power plant, several approaches are possible; however, one of the key items which utilities are considering is the upgrade of the instrumentation, controls, and sensor technology in nuclear plants. Current plants, designed in the 1960s and 1970s have analog instrumentation that has not been upgraded to digital technology because of cost and regulatory uncertainties. Because of the high reliability of digital instrumentation, a substantial increase in plant availability would be achieved if the upgrades can be achieved. The cost of this upgrade is presently estimated to be in the range of $80 million - $100 million per plant. However, if the outstanding technical and regulatory issues related to the use of digital technology in these existing nuclear power plant can be addressed on a generic basis, these costs can be substantially reduced. This is one of the planned high priority tasks in the proposed NEPO program.

The proposed NEPO program would fund intermediate-term R&D directed at optimization of existing plants at an initial level of $5 million in fiscal year 2000. This program would be cost-shared with industry to leverage R&D funding; coordinated with the NRC to preclude any possible duplication of effort and overseen by the NERAC to assure the proper focus of the research. Under this initiative, industry, through the Electric Power Research Institute would at least match the level of funding provided by the Department. Additionally, industry continues to fund short-term R&D at approximately $100 million annually that would also be directed at plant improvements as well as license renewal. Each plant that receives a renewal of its operating license from NRC would be allowed to operate an additional 20 years beyond its' initial license

period of 40 years. The NEPO program is critical to sustaining our existing electric supply infrastructure. The Department expects that as we demonstrate the value of the NEPO program to the Nation, we will be in a position to recommend greater Federal investment.

Mr. Knollenberg. What was the budget recommendation per year by the PCAST for the NEPO program?

Mr. Magwood. PCAST recommended a funding level of $10 million per year, to be matched by industry.

Mr. Knollenberg. With the goal of extending the life of existing nuclear plants in the United States, please explain how the NEPO program will best help us reach that goal.

Mr. Magwood. NEPO would achieve the goal of ensuring that the current plants can continue to deliver adequate and affordable energy supplies up to and beyond their initial 40-year license period by resolving critical issues related to plant aging, and by applying new technologies to improve equipment reliability, lower operating costs, and increase power output, while maintaining high levels of safety.

Component and structure material degradation occurs in nuclear plants as a result of long-term operation and exposure of materials to harsh environmental conditions. R&D conducted under NEPO will provide a better understanding of the long-term effects of degradation mechanisms and how they occur, enabling development of cost-effective aging management strategies which will provide capabilities to easily prevent, detect or repair the degradation.

Current nuclear plants were designed and are operating with technology developed over twenty-five years ago. As these nuclear plants age, components and parts degrade or become obsolete, creating inefficiencies, added costs, and unreliability. There have been significant technology advancements over the past twenty-five years that are applicable to power generation, particularly in computers, communications, materials, sensors and digital electronics, and artificial intelligence, providing more accurate, reliable and cost-effective technologies. Further research and technology developments will produce new technology applications that will make nuclear plant operation and maintenance processes more economical and increase overall plant productivity. Demonstrations of technology performance will be an integral part of this R&D effort in order to achieve regulatory acceptance of these new technologies.

NUCLEAR ENERGY RESEARCH INITIATIVE

Mr. Knollenberg. Please give an update of how the NERI program is proceeding in its first year of funding.

Mr. Magwood. The NERI solicitation is currently in the technical evaluation stage. 308 research proposals were received by the Department. Three proposals were eliminated from further evaluation as being non-responsive to the solicitation requirements. Each of the remaining 305 proposals is currently being evaluated for technical and scientific merit by at least three technically and professionally qualified reviewers. During the week of March 15, 1999, peer review panels consisting of 120 researchers, scientists, and engineers will evaluate the proposals and identify those with the highest scientific and technical merit. A relevance review will be conducted to evaluate the proposals with respect to programmatic and policy factors. Final selection by the DOE selection official is planned for late April 1999. NERI awards will commence in May 1999.

ELECTROMETALLURGICAL TECHNOLOGY

Mr. Knollenberg. Argonne National Laboratory has been developing electrometallurgical technology as an innovative waste disposal technique so that we do not leave another legacy of DOE spent fuel disposal problems for future generations. The program has made good progress, the EBR-II spent fuel treatment demonstration project will be completed by the end of FY99, and in order to move forward beyond the demonstration phase, an EIS is expected to be completed by the end of the year. However, DOE is proposing a precipitous $20 million funding reduction in FY00, which would result in significant layoffs.

How do you plan to maintain the highly talented and skilled workforce, their technology know-how, and the unique facilities so that our investment in the three year demonstration project can be paid off by applying this technology to help solve DOE's spent fuel disposal challenges?

Mr. Magwood. The Department's fiscal year 2000 request includes funding to maintain Argonne National Laboratory's unique facilities. Further, the request will support the continued work of the Laboratory's skilled workforce as they continue to investigate the application of electrometallurgical technology to the Department's spent fuel management challenges until a decision is made on the future use of the technology. After the Department completes its Environmental Impact Statement on the use of electrometallurgical technology, it will issue a formal Record of Decision n January 2000. If the Department decides to proceed with the use of this technology, we will seek to reallocate sufficient funds to implement such a decision; if, instead, the Department decides against using electrometallurgical technology, we will proceed to terminate this technology program.

FUSION ENERGY SCIENCES

Mr. Knollenberg. Although I don't see the fusion program as the silver bullet which will reduce greenhouse gas emissions by 2008 as prescribed by the Clinton Administration's CCTI program, I am a strong supporter of the fusion program and I believe the program holds promise as an energy source in the next generation of energy sources.

DOE's budget request for the fusion program continues to be substantially below the PCAST's recommendation. Although I know the overall budget remains tight, I am interested in learning how the DOE envisions the future of the fusion program, and how the DOE plans to ensure the fusion program is successful under its existing funding levels.

Dr. Krebs. The Fusion Energy Sciences program, which has been restructured over the past few years, is a broad-based, fundamental research effort with the goal of acquiring the knowledge base for an economically and environmentally attractive fusion energy source. In response to Congressional direction we have scaled back the energy development segment of the fusion program. An integral part of the program will be engineering research and development of support experiments and a vigorous theory program using advanced computational capabilities.

Mr. Knollenberg. Finally, the fusion community has impressed upon me that additional funding will be the difference between a struggling program and a program that thrives. Please comment on how additional funding would add to the productivity of the fusion program and how much more of an annual appropriation would ensure the fusion program to its optimal funding level.

Dr. Krebs. A broadly based group of fusion experts representing both the inertial and magnetic fusion communities has developed a draft roadmap, "An Outline Roadmap for Fusion Energy Science Portfolio Approach," which presents a plausible path to an attractive commercial fusion power plant. This road map is still under development and has not been reviewed by the SC Fusion Energy Sciences Advisory Committee. The roadmap could not be followed with present funding levels.

The Secretary of Energy Advisory Board is presently carrying out a review of DOE's fusion programs as requested by Congress and the results of this review will be one of several factors, including recommendations from the Fusion Energy Sciences Advisory Committee, that will be considered in defining future DOE fusion power programs.

REQUEST TO OMB

Mr. Visclosky. What was your request to OMB for all funding under your programs? Please provide specific details on each program?

Mr. Reicher. The enclosed funding table provides the details on the Department's request to OMB for the Solar and Renewable Energy Programs.

Funding Profile

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Solar and Renewable Resources Technologies	OMB FY 2000 Request
Solar Building Technology Research	$5,500
Photovoltaic Energy Systems	84,000
Concentrating Solar Power	18,700
Biopower/Biofuels Energy Systems	86,391
Wind Energy Systems	42,600
Renewable Energy Production Incentive Program	1,500
Solar Program Support	10,000
International Solar Energy Program	6,000
National Renewable Energy Laboratory	6,409
Geothermal	29,500
Hydrogen Research	24,000
Hydropower	7,000
Renewable Indian Energy Resources	0
Electric Energy Systems and Storage	41,000
Program Direction	17,500
Federal Building/Remote Power Initiative	0
Resource Assessment	3,000
Subtotal, Solar and Renewable Resources Technologies	383,100
Use of Prior Year Balances	0
Total, Solar and Renewable Resources Technologies	$383,100

SOLAR

Mr. Visclosky. How do you justify a 52 percent increase for solar buildings research?

Mr. Reicher. The sale of solar water heaters has plummeted by well over 90% since the solar tax credit days of the 1980's. During the last ten years, much research has gone into making the technology more efficient and more reliable. The cost, however, remains prohibitively high except in a few markets within the United States. In order to reduce the cost by 50% or more, DOE has begun research to radically change how solar water heaters are designed and built. During the last 50 years, there has been little change in the materials (copper, glass, and steel) that make up a solar water heater. These materials have proven to be durable and efficient. They are also expensive and heavy. Designs using lightweight, inexpensive polymers offer the promise of lowering both the hardware and installation costs. There is considerable risk, however, in this approach; as durable polymers must be found that can withstand solar radiation and high temperatures for the 15 to 20 years required for a commercial product. This is a high risk technology development activity that requires the formation of teams consisting of the solar industry, polymer experts, and the national laboratories. A considerable amount of materials development, analysis, and testing will be required. Methods of testing the polymer formulations will have to be developed that can accurately predict their long term durability. These solar water heaters must not only be low cost, but as reliable and efficient as today's more expensive systems. The increased budget supports the technology development effort required to develop a low cost solar water heater that can be purchased for under $1000 and provide home buyer savings from the day it is purchased.

SOLAR PROGRAM SUPPORT

Mr. Visclosky. For solar program support, where is the $10 million going to be spent? Where is the activity going to occur, at a lab?

Mr. Reicher. The Solar Program Support line comprises two activity areas: Electricity Restructuring and a multi technology Competitive Solicitation. I will address each of these areas in turn.

In the Electricity Restructuring program, for which $2.0M is requested in FY 2000, we estimate that about $0.6M will be provided to the National Laboratories for technical analyses on electricity restructuring issues; $0.15M will be for technical analyses on Clean Air Act requirements and economic issues in restructuring; and, the remaining $1.25M would fund a competitive solicitation for technical assistance to state decision-making organizations responsible for restructuring. In this latter category, recipients could include organizations such as the National Association of Utility Regulatory Commissioners (NARUC), the National Council on Competition in the Electric Industry (NCCEI), and the National Conference of State Legislatures (NCSL).

For the Competitive Solicitation, $8.0M is requested in FY 2000. This program represents a proposal by the Department to consolidate the Renewable Indian Energy Resources and the Federal Buildings/Remote Power programs into a single, integrated, technology-focused competitive field validation program. A technologically and geographically-diverse range of proposals would be solicited on the best ways to use renewable technologies, either singly or in combination, or in hybrid configurations with fuel cells, natural gas, or energy storage systems. In keeping with the origins of this program, the Solicitation would designate two targeted areas for competitive awards - projects benefitting Native Americans and projects addressing the needs of Federal facilities - in addition to providing for an "open" segment for other applications of these systems. Remote power needs will continue to be addressed as aspects of all three segments. Up to $3.0M will be allocated to Native American projects; the remainder will be divided equally between the Federal facilities and "open" portions of the Solicitation. We estimate that the National Laboratories will receive roughly $0.5M to help merit review incoming proposals and provide technical assistance to award recipients.

WIND

Mr. Visclosky: How much of the funding is for basic r&d, rather than for commercialization-like activities?

Mr. Reicher: The Department's Wind Energy Program does not fund basic research, nor does it fund commercialization activities. The Wind Program's effort are organized in three areas: Applied Research to develop and improve tools for the design and operation of wind turbines; Turbine Research to develop and test in partnership with industry improved wind turbine designs; and Cooperative Research and Testing to support industry in resolving near term problems and to resolve barriers to deployment. The latter activities include participation in international standards development to assure that the U.S. industry is treated fairly in world markets, and the development of a U.S. certification program to obviate the need of U.S. manufacturers having to contract with European laboratories for certification.

Of the 45.6 million dollars requested for FY 2000, 13.5 million dollars is for Applied Research, 20.2 million dollars is for Turbine Research, and 11.9 million dollars for Cooperative Research and Testing.

Mr. Visclosky. Many parties, both within and outside the Congress, believe that propping up these technologies forever is an inefficient use of scarce federal dollars. At what point do you try to back out of some of these activities and leave it up to the industry; so if a technology does not have market support, it is no longer subsidized?

Mr. Reicher. Wind energy markets in the United States are strengthening due to better technology and consumer demand despite the uncertainty regarding electric utility restructuring. Overseas, wind energy markets are booming in Europe, the third world, and elsewhere. Without continued Federal support in research and development, the wind markets in the United States will eventually be dominated by foreign owned firms, weakening the U.S. economy in the long term. The Department believes that continued support for wind energy is in the economic best interest of the United States as has been shown by rapidly growing interest by consumers to buy electricity generated by renewables even when there may be a premium for purchase of these non-polluting technologies.

The Department has identified goals for the Wind Program that once achieved may eliminate the need for continued Federal funding. In 2005, if the United States has achieved a 25 percent share of the world wind energy market, the Wind Program will transition away from aggressive technology development activities and into a reduced maintenance level, providing industry unique services such as certification testing, support for resolving crosscutting issues in the industry (such as power systems integration studies), and research to improve and maintain the analytical tools needed by industry. If the goal to achieve 10,000 MW of wind generating capacity in the United States by 2010 is realized, an evaluation will be conducted to determine the appropriate level, if any, for continued Federal support for the U.S. wind industry.

USER FACILITIES

Mr. Visclosky. Of the total amount of funding you are requesting, how much would be targeted to HBCU's?

Dr. Krebs. The Office of Science research programs provides $6.8 million to HBCU's through a variety of research grants throughout our programs such as Basic Energy Science, Biological Environmental Science and High Energy Physics. The new science education proposal will complement our science programs by supporting faculty/student science teams to develop long-term research collaborations with DOE-Science Laboratories. $5 million of the total request will be targeted to institutions who receive less than one million dollars worth of federal R&D funds on a competitive-merit review basis.

Mr. Visclosky. Are the user facilities fully optimized?

Dr. Krebs. Within the Office of Science we attempt to fully optimize not only the user facilities but our core research programs as well. We strive to optimize the scientific output of the program as a whole and fund our facilities to operate at levels consistent with scientific priorities established in concert with our advisory committees. While the facilities may not receive all of the funding they might hope for, this office has made difficult decisions to fund them all adequately and most facilities are operating at or near their maximum number of hours.

NUCLEAR ENERGY

Mr. Visclosky. It is clear from the results of Kyoto, that in order to meet emissions reduction requirements, nuclear power will have to play a key role. Having said that, why is the budget increase for nuclear R&D program so much more modest than the increases requested for renewables?

Mr. Magwood. The Administration's budget request for fiscal year 2000 includes $30 million for nuclear fission energy R&D, including $25 million for the Nuclear Energy Research Initiative (NERI), ($5 million for Nuclear Energy Plant Optimization Program (NEPO)). Given the very stringent budget environment, we believe these are reasonable funding levels for these new initiatives. The fiscal year 2000 budget request of $25 million for the Nuclear Energy Research Initiative program builds on the work started in fiscal year 1999 and funded by the Congress at $19 million. While this amount is smaller than the $70 million recommended by the President's Committee of Advisors on Science and Technology (PCAST), we believe it is sensible to increase funding slowly until the program is given time to demonstrate its value to the Nation.

With respect to the Nuclear Energy Plant Optimization Program, we have requested $5 million in our FY 2000 budget. We have not requested a higher level of funding because we believe first year funding of $5 million is sufficient to begin to demonstrate the benefits of this program. Also, we are confident that with evidence of FY 2000 accomplishments, we can achieve PCAST recommended funding levels increases in future years.

The Department believes that NEPO as well as the NERI program are essential to retain nuclear energy as a viable option for the future and to ensure the continued operation of our existing nuclear power plants, that are key to meeting demand for electricity as well as our international commitments on climate change in the 21st Century.

FUSION ENERGY SCIENCES

Mr. Edwards. Dr. Krebs, given that fusion research has a fairly good chance of ultimately yielding an energy source that is plentiful, safe and greenhouse gas free, and given that abating greenhouse gasses and the specter of global warming is an important priority for the President and DOE, why has the President's budget contained barely level funding for the program over the past few years? If global warming is indeed a concern, isn't it a concern in the same basic timeframe that fusion may be able to make a substantial contribution to our energy supply?

Dr. Krebs. It is probably correct that the time scales for global warming and for fusion to make a substantial contribution to our energy supply are comparable, in general terms. It is also true that relative safety, abundance and the absence of greenhouse gases are among the prospective attractions of fusion energy. The Fusion Energy Sciences program, which has been restructured over the past few years, is a broad-based, fundamental research effort with the goal of acquiring the knowledge base for an economically and environmentally attractive fusion energy source. In response to Congressional direction we have scaled back the energy development segment of the fusion program. An integral part of the program will be engineering research and development of support experiments and a vigorous theory program using advanced computational capabilities.

Mr. Edwards. Dr. Krebs, you are probably aware, as I am, of the extraordinary contribution of the University of Texas to fusion, through the excellent research it has performed, as well as through the University's support of the Institute for Fusion Studies. Indeed, the University has matched every DOE dollar of Institute funding, to an amount that now exceeds $20 million dollars. You may also know that the State of Texas may not be able to continue its matching support indefinitely. In view of this extraordinary contribution, how does the DOE intend to continue to benefit from fusion research performed at the University of Texas?

Dr. Krebs. The Institute for Fusion Studies (IFS) is indeed a center of excellence in fusion theory. The current grant for the IFS runs through the end of FY 2000. The University is beginning to work on a renewal proposal and has consulted with the Office of Fusion Energy Sciences about possible scenarios for the next grant period. I am hopeful that the IFS can continue its outstanding work through some combination of DOE funding and modest continued matching funds from the University. I am also pleased to note that the University is a strong participant in experimental collaborations on our major national facilities.

HIGH FLUX BEAM REACTOR

Mr. Forbes. Thank you all for appearing here today. I would especially like to thank Dr. Krebs for being a champion of DOE's research facilities, particularly Brookhaven National Lab (BNL).

As you know all too well, I have long been critical of the Lab's past environmental transgressions, nonetheless I continue to advocate increased Federal research dollars for BNL so that the facility remains a major Long Island employer.

As we resolve the problems of the past, I would like to expand the Lab's multidisciplinary scientific mission and bolster its position as one of America's premier research institutions.

High Flux Beam Nuclear Reactor (HFBR) at Brookhaven National Laboratory

The environmental, health and safety concerns of Long Islanders are my top priority, and this is the reason Secretary Richardson's decision on the fate of the High Flux Beam Nuclear Reactor (HFBR) at BNL is paramount to me.

DOE's own Basic Energy Science Advisory Committee (BESAC) advised that restarting would not be practical or feasible from a technical and economic standpoint unless it operates at 60 megawatts (MW):

> It [the HFBR] should restart at 30 MW, and move to 60 MW in a timely manner. All the actions required for this move should be completed before start-up; if the start-up were to be at 30 MW with ne clear plan to move to 60 MW, it should not be done.

(See BESAC HFBR Recommendations to Dr. Martha Krebs, November 21, 1997). The HFBR did not run at 60MW for the first 17 years of its operation.

The HFBR has not operated at 60MW since 1989, when it was shut down because the National Academy of Sciences determined that BNL's operation the HFBR at 60MW violated the principles of reactor safety. In light of these and more recently discovered threats posed by the HFBR, restarting the HFBR is not practical or feasible from technical or economic standpoints; much less from environmental, health and safety standpoints.

On November 13, 1998 the Government Accounting Office issued a 45-page analysis of events surrounding a radioactive tritium leak from the High Flux Beam Reactor (HFBR) at BNL and the resulting termination of Associated Universities as the contractor at BNL. The report found that poor oversight by DOE officials and inattention to environmental issues provided for working conditions that allowed radioactive tritium to lead undetected for possibly 12 years. On February 23, 1999, the Nuclear Regulatory Commission (NRC) released its evaluation of HFBR safety procedures and programs.

The NRC report found several instances on non-compliance with DOE and BNL's requirements including: failure to place low-level contaminated material in a radioactive material storage area; radiation postings not updated in a timely manner; two instances of incomplete corrective actions; several late or missed reviews or audits; and a failure to inform a manager of radiation survey reductions.

In July of 1997 EPA investigators released a report on BNL, citing it for "sloppy housekeeping" and lax safety procedures, including those at the HFBR. As a result of this investigation was BNL was fined $80,000 in March 1998.

Why has the Record of Decision on the future of the HFBR been delayed for so long and how does the delay affect the cost and complexity of attempting restart?

Dr. Krebs. During the Environmental Impact Statement (EIS) scoping process a year ago, the community requested that the Department expand analysis of the reactor's potential environmental impacts. To ensure that a comprehensive review is conducted, the Department has taken additional time for analysis and evaluation. The scheduled activities have been delayed to address issues of importance to the environmental health and safety of Long Island. The Draft EIS is now scheduled for public comment from April 1999 through mid-July 1999, and the Final EIS is expected to be published in November 1999. The change in schedule for the Draft EIS and Final EIS caused the delay in the Record of Decision, which is to be issued no earlier than December 1999. The delay does affect the complexity of restart because until a Record of Decision (ROD) is made all work has to be appropriate for all alternatives in the EIS. If restart were the alternative selected in the ROD, many activities related to restart could be started earlier; and the reactor could restart at an earlier date.

Also, while the reactor is in standby condition, many systems, such as the pumps, are regularly exercised. Surveillance of all of the facility continues. Therefore, there is regular maintenance that would help make restart easier.

Mr. Forbes. Originally the record of decision was expected in January 1999. What activities or preparations for either shutdown or restart were originally made in anticipation of the January 1999 deadline and what alternatives is the Administration currently considering?

Dr. Krebs. Two categories of activities are underway. The first is surveillance and maintenance. The reactor contains radioactive fluids in the primary cooling system, and staff is needed to maintain the reactor in a safe condition. The other activities, which were started in Fiscal Year 1998, are required to meet the requirements outlined in the Suffolk County Sanitary Code Article 12, complete seismic upgrades, and repair and seal the floor drains. These modifications and repairs are needed regardless of which alternative is selected for the future of the HFBR, and do not result in any adverse environmental impacts.

The Department is also evaluating a proposal to construct and install a stainless steel liner in the spent fuel pool during the preparation of the EIS. The storage pool is an essential component of the HFBR regardless of whether or not the reactor operates. It would be needed to store spent

fuel during operations. During deactivation activities, it would be used to handle various highly radioactive reactor components that must be dismantled or cut apart in preparation for shipment offsite. A usable pool may also be necessary for maintenance of the HFBR during an extended period of time in its present shutdown condition.

Mr. Forbes. Even if the Administration decided to restart the HFBR, how realistic is it to think that you could run the HFBR at 60 megawatts as recommended by your Basic Energy Sciences Advisory Committee (BESAC), when the HFBR did not run at 60MW for the first 17 years of its operation and has not operated at 60MW since 1989, when it was shut down because the National Academy of Sciences determined that BNL's operation of the HFBR at 60MW violated the "principles of reactor safety?"

Dr. Krebs. No facility in the Department will be operated if it cannot be operated safely.

BESAC recommended that the HFBR be restarted "at 30 MW and move up to 60 MW in a timely manner." BESAC also stated that "if the start-up were to be at 30 MW with no clear plan to move up to 60 MW, it should not be done." The EIS and other reviews such as the one recently completed by the Nuclear Regulatory Commission (NRC) will determine whether this alternative is viable.

HFBR was upgraded in 1982 with new heat exchangers to support an increase in operating power from 40 MW to 60 MW. The reactor operated satisfactorily at 60 MW until 1989 when questions were raised about certain postulated accidents. Analysis done since then has resolved these questions. The analysis was reviewed by the NRC staff during the just completed review of the HFBR. NRC found that the HFBR can be operated safely at power levels up to 60 MW. If the 60 MW restart option were selected, DOE would follow normal practice for restarting a reactor after a long shutdown, including operator training, an Operational Readiness Review, checking and setting safety set points, and updating administrative paperwork for 60 MW operation.

THE RELATIVISTIC HEAVY ION COLLIDER (RHIC) AT BROOKHAVEN NATIONAL LABORATORY (BNL)

Mr. Forbes. Throughout my tenure in Congress I have worked diligently to secure and safeguard the funds necessary for the completion and operation of RHIC. In Fiscal Year 1999, RHIC received $16.6 million to complete construction. The Administration's Fiscal Year 2000 budget request contains $118 million for operation of RHIC and the use of the Alternating Gradient Synchrotron as RHIC's particle injector.

Last week Secretary Richardson mentioned in his testimony that the Relativistic Heavy Ion Collider (RHIC) at BNL will be coming on line in Fiscal Year 1999. He also mentioned the Bates Laboratory at MIT - originally slated for closure in the DOE budget, will now be funded.

Is RHIC still on schedule to begin operations this August and has DOE fully funded operations of RHIC at Brookhaven in FY 2000 budget?

Dr. Krebs. RHIC is on schedule for completion in the 3rd Quarter of FY 1999 and the initiation of commissioning and first operations in the 4th Quarter. In the FY 2000 Budget Request, funding of $106.1 Million is provided for RHIC Operations. Included in RHIC Operations are both accelerator operations and experimental support for the experimental complex, which includes detectors, experimental halls, computer center and support for users. This funding allows for a 33-week running schedule, which is only 4 weeks less than what had been recommended in a Nuclear Science Advisory Committee (NSAC) review as an optimum steady-state running schedule to exploit the physics potential of RHIC. In addition $12.4 million is provided to BNL for Research at RHIC.

Mr. Forbes. Will the Bates Laboratory at MIT be funded from the Nuclear Physics budget? If so, will it effect funding for RHIC?

Dr. Krebs. The Department is currently preparing an Amended Budget Request to provide sufficient funds to allow for continued operations of Bates. The details of the Amended Request have not yet been finalized. It is not anticipated that the RHIC budget will be impacted.

NATIONAL SYNCHROTRON LIGHT SOURCE at BNL

Mr. Forbes. The National Synchrotron Light Source (NSLS) at BNL has the most heavily used light source in the country. It is valuable resource for industry as well as academia. I understand that the Energy Department is collaborating with National Institutes of Health and the overall budget for the NSLS has increased by 15%, but this is not operating money, it is construction money. There is difficulty in meeting the needs of the user community for NSLS at DOE's current funding level.

What is DOE's share of the operating budget of the NSLS?

Dr. Krebs. The Department of Energy provides the total operating budget for the NSLS. As a result of recommendations from the Basic Energy Sciences Advisory Committee (BESAC) based on the 1997 report "Synchrotron Radiation Sources and Science" [Professor Robert Birgeneau (MIT), Chair; Professor Z.-X. Shen (Stanford), Vice Chair], BES provided a $2.0 million increase in funding for operations to NSLS in FY 1998. This rapid action showed our commitment to addressing the problems identified by BESAC. We provided an approximate cost-of-living increase in FY 2000. Through the Birgeneau/Shen study, we identified and addressed the most serious problems with our light sources. Furthermore, the study identified the growing numbers of users in macromolecular crystallography. Partially as a result of that report, NIH entered into serious discussions with DOE about how they might better serve their community of users. In FY 1999, NIH is planning to add funds for beamline upgrades at NSLS and has agreed to put an additional $4 million to upgrade the NSLS x-ray storage ring itself.

BNL GENERAL FACILITIES

Mr. Forbes. It has been widely recognized that the Energy Department Laboratory complex is aging. The Office of Science, to address this complex wide issue. The Department of Energy has a line item entitled, "Multiprogram General Purpose Facilities," which supports the upgrading of various laboratory facilities at its sites. As you know, Brookhaven National Laboratory has a significant backlog of items that need upgrading and repair.

What is the status of your plans for Brookhaven in this account and are there any plans to accelerate the backlog of projects that exist at Brookhaven?

Dr. Krebs. The Multiprogram Energy Laboratories - Facilities Support (MEL-FS) program provides line item construction funding (i.e., projects with a total estimated cost of $5,000,000 or above) for general purpose facilities to support the infrastructure of the five Office of Science (SC) multiprogram national laboratories. These national laboratories are: Brookhaven, Argonne, Oak Ridge, Lawrence Berkeley and Pacific Northwest.

The goal of the program is to ensure that the support facilities at the SC multiprogram laboratories can meet the Department's research needs in a safe, environmentally sound, and cost-effective manner primarily by refurbishing or replacing deteriorated, outmoded, unsafe, and inefficient general purpose infrastructure.

The Program objectives are:

- to correct Environment, Safety and Health (ES&H) inadequacies;
- to reduce risk of operational interruptions due to failed support systems;
- to provide cost effective operations and reduce maintenance costs;
- to provide quality space for multiprogram research and support activities;
- to preserve the government investment in the physical plant of the laboratories; and
- to promote performance-based infrastructure management.

The current backlog of higher priority projects for the Office of Science multiprogram laboratories for the FY 2001 to FY 2004 period is $305 million. Brookhaven backlog is $70 million of this total and is comparable with the backlog levels of other SC multiprogram labs.

Each budget year, the multiprogram laboratories submit their highest priority projects for consideration. These are reviewed by the program staff and prioritized based on the above criteria. The highest priority projects across the five multiprogram laboratories are then funded based on funding availability.

The current projects funded at Brookhaven National Laboratory are:

		($000)	
		FY 1999	FY 2000
-Electrical Systems Modifications	TEC $5,730	$849	$3,881
-Sanitary Systems Upgrade, III	TEC $6,500	500	3,000

DOE EDUCATIONAL INITIATIVES

Mr. Forbes. I applaud DOE for their efforts to reach out to teachers and engage a wider group of students in the good science being done at the various facilities in the DOE complex. The Secretary, in his testimony last week, highlighted the initiative that is included in the FY 2000 budget relating to science education. It includes new opportunities for undergraduate research and teacher institutes at DOE facilities. Brookhaven has had a long history of undergraduate research opportunities and science and math education programs.

What is the Department's role in the training of undergraduates and teachers to develop the next generation of scientists and engineers?

Dr. Krebs. The Department of Energy is a major component of the nation's scientific and technical community, and one of the largest supporters of science and technology in the Federal Government. The scientific and technical challenges of the Department's science and defense missions demand an adequate supply of scientists, engineers, and technicians. The Department, and its national laboratories, has unique physical and intellectual resources available to support the nation's efforts to prepare the next generation of scientists and engineers to meet the challenges of the 21st century in both industry and government. By opening its laboratories to students and teachers, giving them hands-on research opportunities, and lending it's technical expertise to the development of the Internet and other exciting technical tools will create a rich learning environment for both students and teachers.

Mr. Forbes. I want to discuss with you a meritorious proposal from Tim Hallman, a Brookhaven Physicist and Group Leader of about 40 staff responsible for operating the Solenoidal Tracker At RHIC (STAR) detector and someone who you appointed to the "Nuclear Science Advisory Committee (NSAC). Mr. Hallman's idea for an "On-Line Science Classroom" could be a flagship program on Long Island that might become a model for improving science education across the nation.

The basic idea is that, each year, there would be a national competition to select a number of school systems to participate in the program. During the summer, educators from those school systems would come to BNL for 2-3 weeks, to receive preparation and instructional materials to allow them to give their students a focused orientation on the basic scientific principles needed to understand the scientific data they will acquire in the live, "on-line" part of the program. Then in the fall, when classes begin, there would be a number of live, interactive sessions with the students in their classes.

The subject of each session would be a different area of research which is ongoing at BNL (RHIC, the on-line Forest in Duke, N.C., weather and atmospheric studies, studies of brain function using the BNL Positron-Emission-Tomography (PET) facility, trace element analysis, real time information on the oceanographic conditions in the Peconic Bay, there are many possibilities. To insure the relevance of the topics selected, a focus group of secondary educators would be formed to select from the scientific research projects ongoing at BNL the ones felt to be most relevant to the curricula being used.

During the interactive sessions, the students would have the opportunity to acquire real research data (seconds old) from BNL in real time, using menu-driven software developed to anticipate the decisions process they would use in making their own experiment. In this way, using their new understanding of the basic scientific principles presented by their educators, the students would have the opportunity to perform their own research, and make their own discoveries, using state-of-the-art facilities, on line. Some of the science areas they might explore could lead them to recreate real discoveries which received the Nobel Prize not many years before. It is even possible they could make new discoveries of their own.

Resources to accomplish the interactive links would be provided by BNL and funded by NSF and perhaps DOE, to insure equal opportunity among school districts. The goal is to improve science education and science literacy in the United States by providing direct interactive access to facilities and expertise which are available at Brookhaven National Laboratory.

The program could be introduced on Long Island, with the goal of demonstrating the success of this model for use across the Nation. A very tangible immediate benefit would be improved science and technical literacy of the young people going into the work force on Long Island or wherever the program takes hold.

There is plenty of room for participation by companies and software houses. One of the challenges of this program will be establishing a means of providing effective interactive access with multiple sites simultaneously, so that the interaction of students expertise is truly live, just as though they were sitting in a large distributed classroom.

This will require some work on communications technology, and on information transmission on the Internet, as well as on software to provide the students with a scientific studies "tool kit" to draw graphs, make charts, display data, determine probabilities, etc.

There is a similar program at Fermi National Accelerator called "Quarknet." "On-Line Science Classroom" will be much more comprehensive and will deal with many different areas of science - not just high energy physics.

"On-Line Science Classroom" will involve the development of a math and science tool kit to give students the foundation they will need to interpret data correctly and draw scientific or mathematical conclusions. This idea has already been proposed to Mr. Dennis Kovar, Program Manager for Nuclear Physics in the Office of Science and there is an April deadline for submission of a pre-proposal to the National Science Foundation.

On December 4, 1997, former Secretary of Energy Peña and Luther Williams announced that the DOE and NSF would collaborate to stimulate systemic reform in science education, and that in particular, the multi-disciplinary energy labs (like BNL) would be made available to provide unique research opportunities to reach this goal. Current NSF Director, Rita Colwell has identified K-12 science and math education as a top NSF priority and the "On-Line Science Classroom" would be a prime example of a practical way to meet the NSF goal of stimulating systematic change to improve science literacy.

RHIC is a facility that may provide opportunities for education. What is your opinion of Mr. Tim Hallman's proposal to create an "On-Line Science Classroom using BNL's RHIC?

Dr. Krebs. The Office of Science encourages laboratory scientists throughout the complex to leverage their knowledge, expertise and resources to assist or mentor science education activities at all education levels. The proposal to create an "On-Line Science Classroom" using Brookhaven's RHIC facility has the potential to enhance the on-going activities of all science laboratories conducting scientific experiments from a distance and having a educational outreach component. We have forwarded the proposal to the Office of Nuclear Physics for further review. The scientific staff of our Science Laboratories in collaboration with schools have been very successful in competing for funds managed by the National Science Foundation's Pre-college programs. We are optimistic that this proposal will receive a fair and equitable review.

MEDICAL ISOTOPE PROGRAM AT BNL

Mr. Forbes. Brookhaven National Laboratory has been very successful over the past several years in identifying compounds for a wide variety of medical applications such as cocaine addiction. BNL has a unique set of facilities that exist for development of isotopes and applications for medical purposes. The convergence of a set of special capabilities on Long Island provides a unique opportunity for DOE, yet preliminary estimates show a steady decrease in funding in this account for Fiscal Year 1999 and Fiscal Year 2000 for BNL.

Does the Department of Energy have any plans to take advantage of this unique set of capabilities and this increasingly important medical field to create a Center of Excellence that would take into account Brookhaven, State University of New York at Stony Brook, and surrounding hospitals?

Mr. Magwood. The Office of Nuclear Energy, Science and Technology is very aware of Brookhaven National Laboratory's (BNL) unique facilities and capabilities that can be used in the development of medical isotopes and related technologies. We consider BNL to be a vital component of our effort to advance medical isotope technology and we expect to make the fullest possible use of the Laboratory's capabilities. Over the last several years, Nuclear Energy has increased its funding to BNL while the Department's other programs have decreased their funding. For example, we are sponsoring the development and production of xenon-127, used in brain perfusion studies, at BNL. We have doubled Isotope Program funding at BNL in recent years and, budget permitting, we hope to significantly increase our support for the Laboratory's medical isotope efforts in the future. In addition, in fiscal year 2000, we anticipate significant BNL participation in the Department's proposed Advanced Nuclear Medicine Initiative.

FEDERAL STANDARD FOR DIRECT CURRENT POWER SOURCES

Mr. Forbes: NEXTEK Power Systems is a young company in my district that has patented an innovative power supply. NEXTEK visited with DOE officials on January 20 and 21st 1999, and discussed their vision of how to best manage America's future energy needs. Nextek's products, as I understand them, may make on-site power generation by solar or wind power economically practical.

Their technology has unique qualities that could have significant positive implications for emergency lighting, cost savings and safety. Additional research into various aspects of how direct current (DC) electrical applications could be part of the larger effort to increase energy efficiency and decrease pollution. The DOE should study Interconnection - a utility and regulatory issue that governs the way in which photovoltaics, fuel cells and other distributed generation sources are connected to an electrical grid. Conventional thinking supports two-way interconnection requiring expensive and complex interfaces between the AC electricity grid and site-generated energy.

The Federal Energy Regulatory Commission (FERC) has delegated interconnection issues to the states that have allowed individual utilities broad latitude. Two way interconnection necessitates new rate structures, safety equipment and losses in energy efficiency. Direct coupling, which is a one way connection to the grid is a simpler, less expensive and more efficient approach. There are independent studies demonstrating the relative strengths and weaknesses of these distinct approaches to siting the less polluting distributed generation resources.

The DOE should study the critical issues regarding interconnection. The study should identify options to current interconnection practice, including one way connection, and regulatory changes or incentives that would enhance the market utilization of distributed generation. DOE should also quantify likely energy savings and related reductions in pollution.

Electric use in offices, industry and homes is increasingly made up of electronic devices, including phones, faxes, computers and most lighting. These devices require direct current (DC) power. This DC power is provided by a supply in each device that converts AC power in a building to DC.

The energy efficiency of these power supplies is not regulated (except in the case of fluorescent lighting). Most distributed generation sources including fuel cells and photovoltaics, generate DC power that is "inverted" to AC power for distribution within a building and then converted to DC in each device causing significant energy losses. A study by DOE should also identify alternatives to using the current configuration of an inefficient AC power supply in each device.

Recommendations for strategies to enhance the use of the technologies/approaches that produce energy efficiency and pollution reduction in inherently DC devices, would be the result of the study. Many electrical loads in homes, offices and industry remain power by AC power.

These include electrical heating, air conditioning, washers, dryers and refrigeration that would be more efficient as DC devices.

Manufacturers build to the AC standard because there are no regulations or incentives create the demand for DC. DOE should study specified lines of AC devices to determine if they can operate more energy efficiently as DC devices. If potential efficiencies are found, they should be quantified. The study should then survey manufacturers and consumers to determine the mechanisms that would most cost-effectively cause the manufacture of energy efficient DC devices.

Mr. Forbes: What are your impressions of NEXTEK's power interface technology and could NEXTEK's technology be included as part of future Government building projects?

Mr. Reicher: There is a program within the Office of Energy Efficiency and Renewable Energy, the Federal Energy Management Program (FEMP), that demonstrates technologies to speed up federal adoption of new energy efficient technologies. NEXTEK may want to investigate the possibility of submitting their technology for consideration. The New Technology Demonstration program was established by the Department in 1990 to introduce new energy-efficient technologies to the federal sector more quickly, to reduce federal sector energy costs and improve overall energy efficiency and help federal agencies implement pollution prevention strategies that reduce operations and maintenance costs. The program benefits the technology manufacturers by allowing them to establish a federal track record and improve technologies based on performance analysis. Technologies are selected through a competitive solicitation that is managed through the Pacific Northwest National Laboratory. For more information please contact the Department's Federal Energy Management Office.

FEDERAL STANDARD FOR DIRECT CURRENT POWER SOURCES

Mr. Forbes. Who in the Administration is precisely responsible for setting a DC standard and any formal process by which such an event might occur?

Mr. Reicher. At the present time, the statutory authority does not exist for the Department or, as far as I know, any other part of the Administration to establish a Federal standard for direct current power sources. However, the Department, through its national laboratories, has participated in the development by the Institute of Electrical and Electronics Engineers (IEEE) of a recommended practice for the interface of photovoltaic (PV) systems with the electric power grid. The Department is also participating in an IEEE activity to develop a uniform national standard for the interconnection of a larger class of distributed power resources (e.g., PV, wind, fuel cells, batteries, fly wheels, gas turbines) with electric power systems.

Mr. Forbes. How can NEXTEK work with your agency to be part of decisions affecting their industry and which parts of DOE and which individuals would be their best interlocutors?

Mr. Reicher. NEXTEK may wish to join in the IEEE distributed power interconnection standard activity. The individual NEXTEK should contact concerning their participation in this process is Mr. Richard DeBlasio at the National Renewable Energy Laboratory, who chairs the IEEE working group developing the interconnection standard. As a follow-up to NEXTEK's meeting with Energy Efficiency and Renewable Energy's Office of Power Technologies (OPT), NEXTEK was provided with information on how to contact Mr. DeBlasio.

BROOKHAVEN NATIONAL LABORATORY RENEWABLE ENERGY PROGRAMS

Mr. Forbes: Brookhaven National Laboratory has traditionally had very little funding from the Office of Energy Efficiency and Renewable Energy. However, there have been niche projects over time that Brookhaven has been selected to support. They include items for transportation and fuel cells. I understand there are some efforts underway within the Department to utilize DOE-developed technologies for application at remote sites and villages that have minimal infrastructure.

Can you provide some examples of how the renewable budget can be used for these applications?

Mr. Reicher: In FY 1999, the Department has issued a competitive solicitation through the State Energy Program for $1 million seeking projects based on a remote application of renewable energy technologies. These grants are available for the design, purchase, and installation of renewable energy technologies including solar hot water, photovoltaic, wind, and biomass technologies, geothermal heat pumps, fuel cells and direct use of geothermal resources in remote areas where they would displace or avoid the use of diesel fuel and gasoline. Examples of remote applications could include island mini-grid systems that supplement or displace existing or planned diesel/gasoline generation, or end-of-line systems or off-grid applications that could not be cost-effectively served by line extensions. Additionally, the Department, through a competitive solicitation, is seeking proposals for projects using renewable energy technologies on Native American tribal lands. This solicitation seeks 10-20 projects with a Federal cost share of $1.8 million in FY 1999. In FY 2000, the Department plans a Competitive Solicitation which will seek proposals for additional remote applications, including those to be undertaken by Native American tribes.

In addition, the Department also issued an FY 1999 solicitation through the Hydrogen Program seeking projects for remote applications. The solicitation requests proposals from companies for 50/50 cost-shared projects to validate fuel cells integrated with: (1) renewable energy technologies such as wind; (2) liquid fuel reformers that co-produce thermal energy for heat and electricity; and (3) regenerative fuel cells that can produce hydrogen as a fuel and storage medium for peak power. These technologies will provide electricity and fuel for remote Alaskan villages that use diesel/gasoline generators.

GEOTHERMAL RESOURCES

Mr. Forbes. Energy Efficiency and Renewable Energy budget in Fiscal Year 1999 was appropriated $28.5 million and the Administration Fiscal Year 2000 Request is $29.5 million. Cost-shared Department of Energy investments in geothermal energy R&D, starting in the 1970's, have made possible the establishment of a new energy industry in the United States. Today that industry generates over 16 Billion kilowatt-hours per year in the U.S., alone. It returns over $41 million annually to the Treasury in royalty and production payments for geothermal development on Federal ands.

Geothermal energy supplies the total electric=power needs of four million people in the U.S., including over 7 percent of the electricity in California and 25 percent of the electricity for the Island of Hawaii. It displaces the emissions of 16 million tons of carbon dioxide, 20 thousand tons of sulfur dioxide, 41 thousand tons of nitrogen oxides, and 1300 tons of particulate matter every year, compared with production of the same amount of electricity from a State-of-the-Art coal-fired plant. To date, the geothermal industry has used only the highest grade geothermal resources in the U.S. The key to realizing the enormous potential of geothermal energy is improved technology to tap resources that can not be economically developed.

Substantial investments in R&D by the geothermal industry alone is unlikely because investments in R&D typically pay off only after many years, a time horizon that is too long for most companies.

Also, research and development contain inherent risks of failure, a disincentive corporate boards and even if the above problems can be overcome, a company usually has little assurance that is can capture research results and present is competitors from making use of them.

The United States is being strongly challenged today in the arena of international competitiveness. The Japanese spend about $150 million per year on Geothermal technology. The time-proven way to address this challenge is with our own, superior technology.

Applied R&D is essential to reduce the technical and financial risks of new technology to a level that is acceptable to the private sector and its financial backers. The U.S. geothermal industry has conducted a series of workshops to determine the industry's needs for new technology and has recommended cost-shared R&D programs to DOE based on the highest-priority needs. The Strategic Plan of DOE's Office of Geothermal Technology calls for increased spending, up to $50 - $60 million per year, consistent with the recommendation of the President's Committee of Advisors on Science and Technology (PCAST) in their 1997 report.

Mr. Reicher, as you know, Brookhaven National Laboratory has been working extensively on the ability to handle corrosive fluids from Geothermal resources, and their work applies to every geothermal utilization effort ongoing in the country. We are very proud of their work.

Can you tell me, how much electricity was generated from Geothermal energy in the

country over the past year or so? How does this compare to the amount generated by solar and wind?

Mr. Reicher. According to statistics from the Energy Information Administration (EIA) for 1997, geothermal power plants in the United States produced 15.67 billion kilowatt-hours. Over the same time period, the EIA reports that solar facilities generated 0.9 billion kilowatt-hours and wind facilities generated 3.41 billion kilowatt-hours.

Mr. Forbes. Also, how much cost sharing does the Geothermal industry generally provide in their research and development contracts?

Mr. Reicher. The Geothermal industry typically provides 50% cost-share in collaborative activities. FY 1998, for example, industry's cost-share for research and development totaled $13.3 million to which the Department provided $10.9 million in matching funds. Remaining FY 1998 funds were primarily used to support advanced and innovative R&D at the national laboratories and at various universities across the country.

SUPERCONDUCTIVITY

Mr. Forbes. Mr. Reicher, on the subject of Superconductivity, BNL is also a leader in this technology. I am interested in energy savings benefits, environmental benefits, and electric cost benefits that could be passed on to our taxpayers.

The Superconductivity budget in Fiscal Year 1999 is $32.5 million and the Fiscal Year 2000 Administration Request is $31 million. The President's Committee of Advisors on Science and Technology (PCAST) in their 1997 report recommended a budget for Superconductivity of $36 million for Fiscal Year 2000.

Superconductivity is the property of a material to conduct unusually large quantities of electrical current with virtually no resistance. Since the middle of the century, researchers have known that certain ceramic materials show superconductive properties when they approach a temperature near absolute zero.

Practical applications of these materials have been lacking, however, since they are characteristically very costly to make, very brittle in nature, and prohibitively expensive to cool to the required temperature of liquid hydrogen or liquid helium.

In 1986, a new class of ceramic materials was discovered which showed superconductive properties at temperatures up to 34° K. These "high temperature' superconductive (HTS) materials have generated great excitement since the projected costs of applications have dropped by orders of magnitude, and first viable products appear to be within reach.

Today, there are many HTS-based prototypes for pieces of electrical equipments, with capable manufacturing entities intimately involved. Early candidates for commercial products include Transformers, Electric Motors, Generators, Fault current Limiters, and underground Power Cables. Later in the commercialization process, replacements for overhead transmission lines are also foreseen; however, this will not be an early application.

To enhance and accelerate the prospects for early commercialization of HTS products, the Department of Energy has developed a vertically integrated program in which product oriented teams are focused on the development and implementation of HTS equipment.

As part of the "Superconductivity Partnership Initiative" (SPI), vertically integrated teams typically consist of an electric utility, a system manufacturer, an HTS wire supplier, and one or more national laboratories. Supporting these vertical teams is a Second Generation Wire Initiative, in which development teams are exploiting research breakthroughs that promise unprecedented current-carrying capabilities in high-temperature superconducting wires.

Since superconducting wire is the main component of all superconducting cables, products and systems, the price drop projected by the Second Generation technology is highly significant and important to successful commercialization.

Generator efforts in the US are behind those in Japan, which spent $75 million on HTS design and development in 1995 an 1996. This involved 16 member organizations from the electric utilities, manufacturers of electric power equipment, research organizations, manufacturers of HTS wire and tape, refrigeration and cryogenic suppliers, and independent research institutes.

Fault Current Limiters represent a new class of electric utility equipment with many attractive properties. This type of equipment may, in fact, be a market leader, since it properties appear to provide substantial potential cost savings to electric utilities as well as containing power outages.

Exciting developments have taken place in the field of underground HTS cables for transmission and distribution. In the United States, two teams are pursuing two different technical concepts, but each team is led by a powerhouse electrical cable manufacturer; Pirelli North America, and Southwire Co.

Dramatic cost and energy savings are projected when the candidate systems and products from superconducting technology are fully implemented, with incremental benefits accruing from the time of technology readiness and commercial introduction to the time of full market penetration.

When fully implemented into the electric generation and utilization sectors of our economy, superconducting technology is expected to save $8 Billion per year in retail value of presently lost electricity, lost due to transmission and distribution. An additional $8 Billion per year can be saved with the installation of superconductive transformers and electric motors. Yet another $1 Billion or so can be saved by full implementation of HTS generators.

This totals fully implemented benefits of $17 Billion per year from full implementation of HTS technology in presently envisioned equipment. Oak Ridge National laboratory (ORNL) experts and studies carried out by Energetics, Inc., indicate that HTS underground cable savings would be in the range of 125,000 kWhr per mile, per year.

At the present average rate of 6.89 cents per kWhr, this corresponds to retail level monetary savings of $8612.50 per mile per year. Savings will flow directly into reductions in taxpayer electric bills, under a competitive electricity delivery environment.

Can you tell me, what benefits have been projected for this technology between now and 2020?

Mr. Reicher. According to a recent report by Oak Ridge National Laboratory (July 1998), the annual savings in electric power costs from motors, transformers, generators and cables using high-temperature superconductors will be $564 million in 2010, $4.7 billion in 2015, and $17.6 billion in 2020. From an environmental perspective, the report states that if

high-temperature superconductors had been used throughout the US electric system in 1995, 15,386 MW in generation would not have been needed. Applying this savings to the output of coal fired plants, the report states emissions reductions would be as follows: 131 million tons of CO2; 24,232 tons of NOx; and 846,000 tons of SOx.

Mr. Forbes. Is the Administration request of $31 million adequate to meet the needs of the program?

Mr. Reicher. I believe that $31 million is adequate to meet the objectives described in our request for FY 2000. This is an entirely new field of technology with a host of unanswered questions at the basic materials level as well as at the design and process levels. Consequently, funding needs can change rapidly due to technological breakthroughs, innovations, and new discoveries. The Department will continue to request funds at levels sufficient to assure continued progress toward achieving the program's out-year goals.

STATEMENT FOR THE RECORD
BY
JAMES J. HOECKER, CHAIRMAN
FEDERAL ENERGY REGULATORY COMMISSION

BEFORE THE

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT
COMMITTEE ON APPROPRIATIONS
HOUSE OF REPRESENTATIVES

Submitted April 28, 1999

Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to summarize for you the Fiscal Year 2000 budget request for the Federal Energy Regulatory Commission.

Overview

To accomplish its mission and goals in FY 2000, the Commission's funding request is $179.9 million. This is an increase of $12.4 million (7.4 percent) over the FY 1999 appropriation. This funding level will support 1,320 full time equivalents (FTEs). The requested funding increase reflects three key factors. First, $6 million of the increase is for mandatory salary and benefits increases. Second, the request includes $2 million in one-time costs for FERC First, the Commission's reengineering initiative in response to rapid changes in the industries it regulates. The Commission anticipates that its reengineered processes will lead to annual savings in the future, and improved services for the Commission's constituents. Third,

an increase of $5 million is for essential improvements in information technology (IT). These IT initiatives will address Y2K problems and permit efficient electronic document flow into and out of the Commission, and are expected to lead to savings of $2 million per year.

The departure from traditional regulation in the natural gas and electric industries has resulted in a surge of new, complex, staff-intensive regulatory issues. Further, the environmental issues inherent in new pipeline construction and hydropower projects continue to generate public concern. The Commission's reengineering and IT initiatives will enable the Commission to provide valuable new services in dealing with these challenges. Electronic filing and document retrieval, market monitoring, more rapid Commission action on complaints and filings, and greater use of both alternative dispute resolution and consensus-supported outcomes are all expected results of the Commission's efforts. These improvements are necessary for the Commission to keep up with its regulatory responsibilities as the markets change.

Concurrent with the effort to reengineer its processes and improve IT technology, the Commission is meeting the challenge of an evolving regulatory environment with fewer human resources. Without reengineering, the Commission could meet this increased workload only with significant increases in staffing. The Commission anticipates that the efficiency benefits of reeingineering and IT initiatives may mitigate the need for increased staffing in future years and may allow the Commission to maintain the current lower level of 1,320 FTEs.

Industry Changes Challenge the Commission

The industries the Commission regulates are rapidly changing their structures, operations, and investment strategies. The Commission faces key challenges in both its economic regulation of the electric and natural gas pipeline industries and in its authorization and monitoring of natural gas and hydropower projects. On the economic side, the electric and natural gas industries are in the midst of a global evolution to greater competition, even while electric and natural gas transmission systems continue to represent essential facilities that are not themselves competitive as a general rule. The Commission must find new ways to regulate electric and natural gas transmission so as to support competition in selling natural gas and electric power and also to accommodate the growing convergence of the two industries.

On the projects side, the Commission faces growing environmental and landowner concerns that affect its work in authorizing and monitoring natural gas and hydropower projects. This is reflected in statutory and regulatory changes that increase environmental, historic preservation, and land use requirements.

Regulating Energy Markets

The Commission must develop a regulatory approach that promotes competitive markets while protecting customers and safeguarding the public. Markets for natural gas as a commodity have been competitive for some time. Electric markets are becoming much more competitive. In both industries, competition to supply the basic commodity has required a new approach to

regulating the essential transmission facilities that underpin the competitive commodity markets. For instance, the open access provided by the Order No. 636 (for natural gas) and Order No. 888 (for electric power) greatly reduced the possibility that companies might use their control of transmission facilities to limit competition in commodity markets. The continuing evolution of natural gas and electric commodity markets will require further regulatory adaptations to ensure that the basic principles of open access remain intact in a changing world.

Gas Policy Initiative. Flexible short-term natural gas markets offer prices at many points around the grid that vary rapidly with changes in supply and demand. These spot market prices for gas imply a value for gas transportation that does not depend on the traditional regulated rate. The divergence between value and regulated price of transportation, and questions raised about the effectiveness of traditional rate setting as a tool for addressing market power, led the Commission to its pending natural gas policy initiative. This initiative addresses how the Commission might maximize competition in the short-term transportation market, mitigate the exercise of residual market power, and monitor for instances of monopoly power. The initiative also aims at developing a new policy toward longer-term regulation that will complement and support competition in short-term transportation markets.

Regional Transmission Organizations (RTOs). In electricity, the need for greater regional integration of transmission operations has become ever more apparent. In recent years, the Commission has approved or conditionally approved the creation of five independent system operators (ISOs). In March 1998, the Commission began an inquiry about its policies on ISOs.

That inquiry has shown a considerable interest in alternative ways of governing transmission, including for-profit transmission entities as well as non-profit ISOs. As a result, the Commission is now exploring how to approach the more general issue of RTOs. It has also held 11 public conferences around the country to hear the views of industry, consumers, and state regulators on the need for RTOs and their appropriate roles and responsibilities.

On October 1, 1998, the Secretary of Energy delegated his authority under section 202(a) of the FPA to the Commission to divide the country into regions for transmission purposes. The Commission has since begun consultations with State commissions pursuant to section 202(a) to let State commissions to present their views on the appropriate boundaries for regional transmission organizations and other issues relating to regional transmission entities. Three public conferences with State commissioners were held in February 1999.

Finally, the Commission is currently considering whether to provide further guidance to the industry on the formation of regional transmission entities, and will likely be issuing a proposal in this regard in the spring of 1999.

Industry Structure. Competition is increasing the Commission's workload concerning mergers and divestitures. In an increasingly competitive world, companies are finding it necessary to repackage their assets by building on their strengths and reducing their vulnerabilities. Mergers can create or enhance market power by reducing the number of energy providers. The Commission must ensure that changes in ownership patterns do not create market

power problems. This involves deciding whether particular mergers are in the public interest and then monitoring for overly concentrated markets and exercises of market power by those companies.

Asset acquisition also raises important market power issues. Convergence between the gas and electric industries is leading to mergers and alliances across the two industries. Many parties are also buying and selling electric generating plants. Natural gas pipelines are spinning off their merchant and gathering functions to affiliates. And hydroelectric companies are seeking to spin off generation facilities licensed by the Commission.

Protecting Customers. While gas and electric commodity markets are or are becoming competitive, the Commission must still protect customers against exercises of market power, especially in transmission. The Commission's work in reviewing rates, terms and conditions of service for non-competitive assets is as important today as ever and, in some ways, more difficult than ever before. This more traditional work is what allows the Commission to fulfill its basic mandate to protect customers from market power. In today's world, the work of regulating services that are subject to market power is complicated by the fact that the regulation must promote competition in other parts of the industry at the same time that it ensures just and reasonable rates..

Authorizing and Monitoring Energy Projects

The Commission has a basic statutory responsibility for authorizing and monitoring certain energy projects. This responsibility includes certificating natural gas pipeline and storage projects that are economically viable and that protect the environment, as well as licensing, relicensing and monitoring sustainable hydropower projects .

Gas Pipeline Certification. Many industry observers believe that the pipeline grid must support a future industry that supplies up to 30 trillion cubic feet of natural gas nationally per year. Customers have demanded more flexible arrangements as they have become responsible for acquiring their own gas supplies. As a result, the Commission expects more applications for storage development and liquefied natural gas facilities to provide peaking capability and supply flexibility. The Commission also anticipates a significant number of applications for replacement facilities in the interest of safety as the national pipeline grid ages.

Certificating the construction of gas pipelines is becoming more complicated and contentious. Increasingly, new pipelines propose to serve markets already served by existing pipelines. In these cases, the Commission must balance the benefits of competing supplies of natural gas against environmental and potential market impacts of excess capacity. Landowners increasingly question the right of pipelines to use eminent domain when the Commission relies on evidence of market demand to establish need for the project.

Finally, the substance of many of these certificate applications involve innovative, complex proposals. Such proposals require the Commission to develop new analyses and new

techniques. In addition, these filings attract many protests and interventions, further complicating the proceedings.

Hydropower Administration. Ensuring that sustainable hydropower remains a part of the nation's energy mix is challenging, especially in the large context of rapidly evolving electric markets. Projects must be economically viable, responsive to environmental needs, and sensitive to other water use values. While hydropower's low operating costs and flexibility make it valuable in competitive generation markets, projects are capital intensive. The measures needed to bring projects into environmental and safety compliance can be costly.

Other federal and state agencies are permitted by law to impose mandatory conditions on licenses issued by the Commission. Successfully collaborating with other agencies is an important part of the Commission's hydropower program. Many upcoming relicensing actions will be for large, complex projects that affect important and regional environmental resources. The complexity of the cases increases the need for expediting procedures and calls for prefiling consultation among all the participants.

Licensing decisions, complex as they are, do not end the Commission's responsibilities. Each relicensing case requires ongoing monitoring for the life of the license. (Such monitoring was not required in the original licenses that were issued decades ago when environmental concerns were less prominent.) Issues arising after licensing can be very contentious and decisions difficult. The Commission is conditioning licenses to ensure that water resource

development and sensitive resources are protected for the life of the license, which can be up to 50 years. The Commission must impose effective mitigation measures for protecting resources. In addition, the aging population of hydropower dams requires a shift in program emphasis to monitoring and instrumentation to ensure dam public safety.

The Commission's Response to the Challenges

The challenges I have talked about today mean that responsible energy regulation is as important as ever. I have already noted new policy initiatives the Commission is undertaking in both the gas and electric industries. But to continue to serve the public well, the Commission will need to do more: it will need to evolve a form of regulation that is much more regional and collaborative, and it will need to make much better use limited resources by reengineering its work processes comprehensively. Over the past year, the Commission has begun its own transition and restructuring.

First, responsible regulation is as important as ever. Because of the emerging competitive gas and electric markets, the Commission must change its approach if it is to meet its statutory responsibilities. Rather than controlling monopolies simply by setting prices and limiting profits, effective regulation must support the growth of strong, competitive electric and gas markets, although electric transmission and natural gas pipelines retain market power. All parties need to know that the regulatory system will treat them fairly, will not tolerate abuses of market power, and will not give any player an unfair advantage over others. For some purposes,

traditional cost-of-service rate making will still be appropriate. For many other purposes, new methods will be necessary.

Both gas pipeline projects and hydropower projects can, without mitigation, significantly affect the environment and other social issues, such as land use and recreation. These issues become more important every year — especially for hydropower licenses, which extend over many years — even as competitive markets constrain the project resources available for addressing these issues. A major role of the Commission is to lead the various parties to the collaborative resolution of their legitimate, conflicting interests.

Second, regulation must become much more **regional and collaborative**. The Commission's focus must be increasingly regional. The Commission must focus on regional gas and electric power markets in addition to individual companies, and on whole river basins as well as individual projects. An increasingly regional approach is the hallmark of many recent Commission efforts.

The Commission's focus must also become more collaborative. For energy projects, greater awareness of environmental concerns requires greater collaboration between the Commission and all concerned parties. For markets, the Commission must work more closely with state public utility commissions, existing and new market institutions, standard-setting groups, and other key institutions.

The Commission has set up a new *collaborative process* to work better with the concerned agencies, nongovernmental organizations, and the public on hydropower licensing. Collaboration begins before filing, and can help to expedite processing after the application is filed.

The Commission has formed an *interagency task force* with other federal agencies (including the Departments of Interior, Commerce, Agriculture and the Environmental Protection Agency) to address issues, including how to coordinate processes across agencies and how best to use the Commission's new collaborative processes.

In 1998, I established a staff *ombudsman* position specifically to develop new methods of cooperation and consensual decision-making with other government agencies and with RTOs. Part of the ombudsman's role is to develop stronger ties between other agencies and all of the Commission's program offices.

Finally, the Commission must **comprehensively reengineer** its work processes. Beginning in December 1997, the Commission has undertaken an overall reengineering effort, *FERC First*, that will streamline and improve almost all of its work process. *FERC First* assessed the needs of the Commission's customers, the external influences affecting Commission operations, and the way work processes have operated in the past. Based on this analysis, FERC First proposed a thorough work process reengineering that is now being designed in detail and implemented. A hallmark of the *FERC First* plan is to bring together all the experts needed to

handle each work process from beginning to end. Doing this enhances staff's understanding of the changing issues they face (especially with regard to changing energy markets), enables staff to build in quality throughout the process, and eliminates the need for many layers of internal review. *FERC First* also resulted in a set of seven major initiatives to reshape the Commission's work processes.

•**Promoting Competitive Markets.** The convergence of the gas and electric industries led FERC First to recommend integrating their economic regulation. This initiative will identify ways to promote and maintain competitive markets and identify potential market problems.

•**Authorizing and Monitoring Energy Projects.** A key element of this initiative is the use of extensive collaboration among the applicants, Commission staff, other agencies, non-governmental organizations, affected landowners, and other interested members of the public. Such collaboration can resolve (as much as possible) issues arising in a proposed gas or hydropower facility application.

•**Resolving Disputes.** This initiative has already led to the integration of all the Commission's litigation function in one Office and the creation of an alternative dispute resolution (ADR) service to champion the use of less costly forms of dispute resolution.

•**Strategic Planning.** Building on its initial response to GPRA, the Commission is developing a process for strategic management. This process will articulate strategic direction, identifying

goals, and measuring results, and will identify funding and staffing levels and information technology (IT) requirements needed to realize objectives.

•**Managing Information Technology.** This initiative will set up a largely paper-free environment with electronic filing and posting of documents and automated work flow management. Planned IT improvements will reduce processing time for many workload items streamlining and automating processes throughout the Commission. The Commission's IT will also support the oversight of industry markets.

•**Developing Employees.** The Commission will align its human resources and training efforts with its strategic plan, find ways to attract, retain and develop a highly productive and versatile staff, and improve its management culture.

During FY 1999 and FY 2000, the Commission is implementing these changes and is gradually reorganizing around these concepts, without requiring additional FTEs. In late 1998, the Commission reorganized the Office of Executive Director into two Offices as specified by FERC First: the Office of Finance Accounting and Operations and the Office of Strategy and Organization Management. In March 1999, the Commission consolidated all of its litigation work into the new Office of Administrative Litigation. Other parts of the new organization will be created gradually over the next year and the overall change organization will be complete in March 2000.

Conclusion

The Commission has much to be proud of. Electric industry restructuring promises significant benefits to customers all around the country. Competitive natural gas markets have already benefitted both customers and the environment and will continue to do so. Both natural gas and hydroelectric projects are balancing the contending needs of many constituents, while providing needed pipeline infrastructure and hydroelectric resources.

Much remains to be done to ensure that markets work well and that all parties involved with infrastructure projects have a fair say in what is decided. Overall, the Commission must address a larger workload of more complicated issues more rapidly than ever before. To meet these challenges, and to ensure that the Commission can continue to meet these challenges in future years, the Commission requests funding authority in FY 2000 of $179.9 million to support a staffing level of 1,320 FTEs.

FY 2000 BUDGET REQUEST TO THE CONGRESS AND ANNUAL PERFORMANCE PLAN



FEDERAL ENERGY REGULATORY COMMISSION

FEBRUARY 1999

James J. Hoecker
Chairman

Federal Energy Regulatory Commission



Vision

Promoting Competitive Markets
Protecting Customers
Protecting the Environment
Serving and Safeguarding the Public

Mission

The Commission regulates key interstate aspects of the electric power, natural gas, oil pipeline, and hydroelectric industries. The Commission chooses regulatory approaches that foster competitive markets whenever possible, assures access to reliable service at a reasonable price, and gives full and fair consideration to environmental and community impacts in assessing the public interest of energy projects.

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BUDGET REQUEST FOR 2000

To accomplish its mission and goals in FY 2000, the Commission requests funding of $179,900,000 and 1320 FTEs. The Commission will recover its full costs of operation during FY 2000, resulting in a net appropriation of $0.

$179.9 M

The funding request of $179,900,000 is 7.8 percent higher than the reduced FY 1999 level of $167,500,000, approved by the House Appropriations Committee. It is 6.5 percent higher than the Commission's FY 1999 budget request of $168,898,000, approved by the Senate Appropriations Committee.

The requested increase is due to three major factors. First, an increase of $6 million is for mandatory salary and benefits increases of 5.5 percent. Second, the request includes $2 million in one-time costs for *FERC First*, the Commission's reengineering initiative. The Commission anticipates that its reengineered processes will lead to annual savings in the future, as well as improved services for the Commission's constituents. Third, an increase of $5 million is for essential improvements in information technology (IT). These IT initiatives will lead to annual savings of $2 million.

During FY 1998, the Commission undertook a complete reexamination of how it does business. The one-time costs included in this budget request reflect the findings of that reexamination. The Commission plans the costs of this restructuring to be temporary. It is nevertheless essential to fund this investment if the agency is to meet the needs of the industries it regulates. If the Commission had recognized the need for these reengineering and IT initiatives before making its request for FY 1999, it would have had to request a higher funding level for that year to cover these costs, and the FY 2000 proposal would not represent a significant increase over FY 1999.

The Commission's reengineering and IT initiatives will enable the Commission to provide valuable new services. These include electronic filing and document retrieval, market monitoring, more rapid Commission action on complaints and filings, and greater use of both alternative dispute resolution and consensus-supported outcomes. These and other new services are necessary for the Commission to keep up with its regulatory responsibilities as the markets change. These services support the ongoing industry restructuring that will result in billions of dollars of benefits to the economy.

1,320 FTEs

The request for 1,320 FTEs is level with current usage, and is 57 FTEs lower than in the FY 1999 budget request. The Commission requested 1,377 FTEs for both FY 1998 and 1999 to meet the regulatory challenges associated with industry restructuring and its other statutory mandates. However, in FY 1998, the need to find a new, more efficient approach to regulating the changing energy industry became clear. Seeing the possibility of long-term savings from reengineering, the Commission chose not to hire up to the 1,377 FTE level in FY 1998. Instead, it applied the salary savings to its *FERC First* and IT initiatives. In FY 1999, to begin the implementation of these

initiatives, the Commission will need to keep FTEs at 1,320 and again apply the salary savings to implementation.

By the end of FY 2000, the Commission will have implemented its reengineered processes so that it can meet its statutory mandates in line with the rapidly changing realities of the regulated industries. Rapidly changing industries mean significant increases in many aspects of the Commission's work. Without reengineering, the Commission could meet this increased workload only with significant increases in staffing. The Commission anticipates that the efficiency benefits of reengineering and IT initiatives may mitigate the need for increased staffing in future years and may allow the Commission to maintain the current lower level of 1,320 FTEs.

Full Cost Recovery

The Commission will recover the full costs of its operations through annual charges and filing fees. It will deposit the revenue into the Treasury as a direct offset to its appropriation, resulting in a net appropriation of $0.

Resources by Program
(Budget Authority Dollars in Thousands)

Program	FY 1998 Actual	FY 1999 Estimate	FY 2000 Request	% (+/-) FY 1999 to FY 2000
Electric Power				
Funding	$52,250	$52,555	$56,685	7.9%
FTEs	439	440	440	0.0%
Natural Gas and Oil Pipelines				
Funding	$64,742	$65,749	$70,522	7.3%
FTEs	514	515	515	0.0%
Hydropower				
Funding	$49,176	$49,196	$52,713	7.1%
FTEs	365	365	365	0.0%
Total Budget Authority for Operating Expenses				
Funding	$166,168	$167,500	$179,900	7.4%
FTEs	1,316	1,320	1,320	0.0%
Application of Prior Years' Authority	($4,027)	($0)	($0)	N/A
Budget Authority	$162,141	$167,500	$179,900	7.4%
Offsetting Receipts	($162,141)	($167,500)	($179,900)	N/A
Net Budget Authority	$0	$0	$0	0.0%

EXECUTIVE SUMMARY

External Changes Challenge the Commission

A year ago, the Commission prepared its first Strategic Plan and its budget for FY 1999. These efforts made clear that the Commission faces long-term challenges.

First, increasing competition in natural gas and electric power commodity markets promises to create billions of dollars of benefit to the American public. Realizing these gains depends on continued, effective regulation of the essential transmission facilities — wires and pipes — that link suppliers and customers. Traditional transmission regulation, based on cost-of-service rate making, will remain a key part of the Commission's overall regulatory strategy, but new forms of regulation will become increasingly important. These include monitoring markets, mitigating market power where it exists, and interacting with new institutions such as independent system operators (ISOs).

Second, energy projects — hydroelectric projects and gas pipeline construction — are the subject of more extensive economic and environmental scrutiny from environmentalists, landowners, state and federal agencies, and project owners operating in more competitive markets. All have major stakes in the decisions the Commission reaches. On one hand, the Commission must be more sensitive to these diverse concerns. On the other, the timeliness of decisions is becoming more important as projects attempt to meet the changing demands of the marketplace.

Changes in each industry present new budgetary challenges. For example:

- *Electric.* The Commission still has its traditional workload. In addition, the electric industry is creating new institutions that the Commission must work with to ensure development and maintenance of smoothly functioning competitive markets.
- *Natural Gas.* The Commission's efforts to respond to developing gas markets include proposals to supplement traditional cost-of-service regulation with new, more market-oriented approaches, especially for short-term markets (including maximizing competition, mitigating market power, and monitoring for undue discrimination).
- *Hydropower.* The relicensing of projects, especially larger projects affecting whole river basins, involves complex issues around environmental impacts and other resource uses. On top of this, the new license conditions that deal with these issues create an ever increasing monitoring workload.

The Commission is Meeting the Challenge

Changing the Traditional Way of Adapting. The Commission has long been successful at adapting its traditional processes and structures to meet new problems — after all, the transition to greater competition in natural gas began almost a quarter century ago. However, the cumulative weight of change in the industries is now putting extreme pressure on the Commission to do more than adapt gradually. In particular, it became clear a year ago that the Commission would require increasing staffing levels to meet its workload

if it were to maintain its existing procedures. Even with modestly increasing levels of staffing, doing all the new work required would be difficult if the Commission is to meet its statutory obligations in the new energy world. The FY 1999 budget requested staffing levels that were the same as FY 1998, and slightly above those for FY 1997.

Reengineering: *FERC First.* At the same time, the Commission realized that increasing staffing levels in the future could not be counted on. Partly in response to this basic reality, the Commission undertook a complete reexamination of all its processes during FY 1998 — the *FERC First* reengineering initiative. The result is a blueprint for changing the Commission's processes and structures during FY 1999 and FY 2000 to match the challenges it will face in the future.

Reengineering Affects the Budget

This budget request reflects the results of *FERC First* in the following ways:

It requests 57 fewer FTEs for FY 2000 than the FY 1999 budget requested. The Commission anticipates that *FERC First* reengineering efforts and its IT initiatives will allow it to meet the challenges of the future with fewer people than anticipated a year ago. The Commission's traditional approach would require much higher levels of staffing to meet its increasing challenges. However, this request is predicated on the Commission being able to make these basic investments.

It requests about $2 million for the expenses of *FERC First* itself. These are the one-time costs that will lead to long-term savings as reflected in the lower FTE request.

It requests about $5 million for information technology (IT) initiatives. These include electronic filing and work flow management, key initiatives that will let the Commission process its work in a more timely way and offer better service to all its constituents. Other IT initiatives include efforts to replace obsolete technologies, modernize critical parts of the Commission's infrastructure (such as human resources procedures), and greatly increase cost accountability. IT is likely to require further initiatives in future years because of the inherently dynamic nature of the field. However, the specific initiatives funded here will save about $2 million each year, compared with the systems now in place.

The Commission's Budget of the Future

The Commission's FY 2001 and FY 2002 budget requests will begin to reflect the positive returns and the organizational results of the Commission's internal reengineering. This will be evident in three key areas. First, the Commission's reengineering will lead to significant improvements in the Commission's performance measurement. Second, the Commission will design and implement new workload measurement systems that more accurately reflect the changing nature of its work. Finally, the budget narrative for FY 2001 will mirror the structure of the Commission's newly reengineered processes, and will identify funding and staffing requirements by the new categories. It will also provide a way to compare the new request format with the current request format by industry. The two main program

areas will be (1) work related to markets, tariffs, and rates, and (2) work related to authorizing and monitoring energy projects.

EXTERNAL CHANGES

The Commission's Regulatory Responsibilities

Economic Regulation

The Commission is obligated by statute to regulate key economic aspects of the electric, natural gas and oil industries. The law requires the Commission's economic regulatory activity because the transmission of electricity, natural gas, and oil is often a natural monopoly. There have been no changes to the Commission's basic organic statutes in the past year. Pending before Congress, however, are a number of bills that would assign the Commission new responsibilities related to electric restructuring.

Environmental, Siting, and Safety Regulation

The Commission is also charged by statute to regulate certain energy projects. This includes siting and environmental aspects of natural gas pipelines and both safety and overall usage of water resources for nonfederal hydroelectric projects. Statutory environmental requirements, along with the public's increasing interest in the environment and participation in Commission proceedings, make this aspect of the Commission's regulation as vital – and as difficult – as it has ever been.

Statutory Obligations

Energy Markets

In the electric power industry:
- Ensure just and reasonable rates for transmission and sales for resale of electric energy in interstate commerce;
- Ensure non-discrimination in rates, services, and access;
- Certify exempt wholesale generators and qualifying facilities; and
- Review proposals for corporate transactions, mergers, and issuance of securities by electric public utilities.

In the natural gas industry:
- Ensure just and reasonable rates for transportation and sales for resale of natural gas in interstate commerce; and
- Ensure non-discrimination in rates, services, and access.

In the oil pipelines industry:
- Ensure just and reasonable rates for pipeline transportation of crude oil and petroleum products in interstate commerce; and
- Ensure non-discrimination in rates, services, and access.

Energy Projects

In the natural gas industry:
- Act on proposals for construction and operation of natural gas pipelines; and
- Oversee related environmental matters.

In the hydroelectric industry:
- Act on applications for licenses for nonfederal hydroelectric projects;
- Oversee related environmental matters; and
- Ensure the safety of nonfederal hydropower projects.

Meeting the Legal Mandate

Thus, the Commission operates under two imperatives:

- Its work is mandated by law, often down to detailed legislative requirements.
- The industries it regulates are changing rapidly; old statutes must be applied to new circumstances, including a new focus on markets.

This chapter describes how changes in regulated industries affect the way the Commission must approach its work. The next chapter describes the Commission's overall strategy for addressing those changes.

Industry Changes Challenge the Commission

The industries the Commission regulates are rapidly changing their structures, operations, and investment strategies. These changes reflect a continuing evolution toward greater competition, an ongoing convergence of gas pipeline and electric power markets, and greater environmental accountability. Other government agencies, industry participants, and the public are becoming increasing involved in the Commission's activities.

One force behind these changes is support in Congress and successive administrations for expanding competition in the natural gas, oil pipeline, and electric power industries, reflected most recently by the enactment of the Energy Policy Act of 1992. Also contributing to the changes are the Commission's open access policies, which require owners of electric transmission and gas transportation systems to make their systems available to all competitors. Other changes affecting the Commission's activities include:

- **A global trend toward competition** in industries that have been traditionally viewed as monopolistic;
- **Industry innovations,** including organizational, technical, and financial improvements developed to deal better with the evolving markets; and
- **Heightened public awareness of environmental concerns,** reflected in statutory and regulatory changes that increase environmental, historic preservation, and land use requirements for the administration and relicensing of hydropower projects and the construction of natural gas pipelines.

Major Challenges in the Year 2000

Regulating Energy Markets

The challenge facing the Commission is to develop a regulatory approach that promotes competitive markets while protecting customers and serving and safeguarding the public. Natural gas markets have been competitive for some time. Electric markets are becoming much more competitive in many parts

of the country. In both industries, competition to supply the basic commodity has required a new regulatory infrastructure. Without the open access provided under the Commission's Order No. 636 (for natural gas) and Order No. 888 (for electric power), market power over transmission would have reduced competition in commodity markets greatly. Going forward, the continuing evolution of natural gas and electric commodity markets will require further regulatory adaptations to ensure that the basic principles of open access remain intact in a changing world.

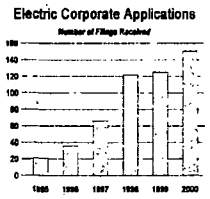
Market Functioning. Both gas and electric markets are developing rapidly. In natural gas, flexible short-term markets offer prices at many points around the grid that vary rapidly with changes in supply and demand. These spot market prices for gas imply a value for gas transportation that does not depend on the traditional regulated rate. The divergence between value and regulated price of transportation, and questions raised about the effectiveness of traditional rate setting as a tool for addressing market power, led the Commission to reexamine its approach to regulating short-term gas transportation. As part of this review, the Commission is exploring how it might:

- maximize competition in the short-term transportation market;
- mitigate the ability of firms to exercise residual market power; and
- monitor the market for instances of monopoly power or undue discrimination.

On the electric side, new market institutions are developing rapidly. The Commission is looking at ways to promote competition in regional power markets. It is encouraging pricing and operational innovations in regional market arrangements including establishing Independent System Operators (ISOs) and Power Exchanges (PXs). The Commission must ensure that competitive market structures continue to deliver just and reasonable rates.

In both natural gas and electric power, improved monitoring will be crucial. Emerging markets involve far more individual transactions than can be easily tracked in a traditional regulatory setting. They are inherently unpredictable, with unforeseen opportunities and associated issues arising as often as the entrepreneurial zeal of companies can find them. That makes it essential that the Commission monitor gas and electric markets to ensure that competition is working for the benefit of consumers, that market power is being mitigated, and that the Commission can identify any necessary regulatory adaptations. In a related effort, the Commission will explore ways to enhance market transparency so that market participants see their options more easily, can better detect market power abuses, and can use improved complaint processes to report them to the Commission. Thus, the Commission will move away from hands-on, command-and-control regulatory methods, to focus more on promoting competitive markets and keeping a vigilant watch on market operations.

Industry Structure. By law, the Commission reviews changes in ownership or control of electric power facilities. This aspect of the Commission's work



FY 1999 and FY 2000 are estimated.

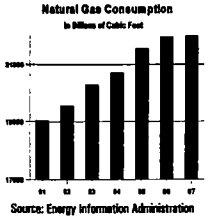
becomes even more important in an increasingly competitive world. Companies are finding it necessary to repackage their assets by building on their strengths and reducing their vulnerabilities, while the Commission must ensure that changes in ownership patterns do not create market power problems.

Both mergers and divestitures have increased since the Commission issued its open-access policies. Competition has led to significant merger activity in many industries, but mergers can create or enhance market power by reducing the number of energy providers. The Commission's challenge is first to decide whether particular mergers are in the public interest and then to monitor for overly concentrated markets and exercises of market power by those companies. Many parties are also buying and selling electric generating plants — asset acquisition can raise important market power issues. Convergence between the gas and electric industries is leading to mergers and alliances across the two industries. These raise novel issues for the Commission. Corporate changes can also lead to regulatory issues in the natural gas industry (when pipelines spin off to affiliates their merchant and gathering functions) and in the hydroelectric industry (when companies seek to spin off generation facilities that the Commission licenses).

Authorizing and Monitoring Energy Projects

The Commission has a basic statutory responsibility for authorizing and monitoring certain energy projects. Its major challenge in carrying out this responsibility is to ensure the licensing and relicensing of sustainable hydropower projects and the construction of natural gas pipeline and storage projects that are economically viable and protect the environment.

Gas Pipeline Certification. On the gas side, growing demand in New England, the Mid-Atlantic, and the Midwest will lead to more applications for major pipeline extensions and new pipelines. Many industry observers believe that the pipeline grid must support a future industry that supplies up to 30 trillion cubic feet of natural gas nationally per year. As customers have become responsible for their own gas supply acquisition, they have demanded more flexible arrangements. As a result, the Commission expects more applications for storage development and liquefied natural gas facilities to provide peaking capability and supply flexibility. As the national pipeline grid ages, the Commission anticipates a significant number of applications for replacement facilities in the interest of safety.



Source: Energy Information Administration

Increasingly, new pipelines propose to serve markets already served by existing pipelines. In these cases, the Commission must balance the benefits of competing supplies of natural gas against the environmental impacts of a project and the potential market impacts of excess capacity. Landowners increasingly question the right of pipelines to use eminent domain when the Commission relies on evidence of market demand to establish need for the project. Thus, determining project need and environmental consequences will be an increasingly complex and contentious process.

Finally, the substance of these and other filings has changed. Very few filings are now straightforward cases for which past Commission practice and precedent can guide the analysis. The innovative, complex proposals many

pipelines are presenting require a fresh look and new analytical techniques; in addition, these filings attract many protests and interventions, further complicating the proceedings.

Hydropower Administration. As electric markets grow, the challenge to the Commission's hydropower program is to ensure that sustainable hydropower remains a part of the nation's energy mix. Projects must be economically viable, responsive to environmental needs, and sensitive to other water use values. Hydropower's low operating costs and flexibility can make it valuable in competitive generation markets. But projects are capital intensive, and the measures needed to bring them into environmental and safety compliance can be costly.

Other federal and state agencies are permitted by law to impose mandatory conditions on licenses issued by the Commission. This requires extensive collaboration between the Commission and other agencies. Successfully managing this collaboration is a significant challenge for the Commission's hydropower program.

New environmental issues arise whenever projects licensed decades ago come up for license renewal. Many upcoming relicensing actions will be for large, complex projects that affect important and regional environmental resources such as fisheries, endangered species, and recreational opportunities. The complexity of the cases increases the need for expediting procedures and calls for prefiling consultation among all the participants.

Licensing decisions, complex as they are, do not end the Commission's responsibilities. Each relicensing case leads to an additional, ongoing monitoring effort throughout the life of the license. (Such monitoring was not required in the original licenses that were issued decades ago when environmental concerns were less prominent.) Issues arising after licensing can be very contentious and decisions difficult. The Commission is conditioning licenses to ensure that water resource development and sensitive resources are protected for the life of the license, which can be up to 50 years. Lines of communication established during licensing and relicensing must continue to function during the term of the license. In addition, the Commission must determine which mitigation measures work best so that it can impose those that are the most effective for protecting resources. In addition, the aging population of hydropower dams poses a challenge in terms of dam safety and public safety, requiring innovative approaches and a shift in program emphasis to monitoring and instrumentation.

The Commission's Response to the Challenge

Responsible Regulation: As Important as Ever

As the electric and gas industries become more competitive, the Commission must change its approach if it is to meet its statutory responsibilities. In the past, the Commission acted to control monopolies by setting prices and limiting profits. In the future, effective regulation must support the growth of strong, competitive electric and gas markets, even though electric transmission and natural gas pipelines retain market power. All parties need to know that the regulatory system will treat them fairly, will not tolerate

abuses of market power, and will not give any player an unfair advantage over others. For some purposes, traditional cost-of-service rate making will still be appropriate. For many other purposes, new methods will be necessary.

Both gas pipeline projects and hydropower projects can, without mitigation, significantly affect the environment and other social issues, such as land use and recreation. These issues become more important every year — especially for hydropower licenses, which extend over many years — even as competitive markets constrain the project resources available to devote to these issues. A major role of the Commission is to lead the various parties to the collaborative resolution of their legitimate, conflicting interests.

A New Approach to Regulation: Regional and Collaborative

The Commission is developing a variety of new ways to deal with specific challenges it faces. However, two themes run through most of its new approaches.

First, the Commission's focus must be increasingly regional. This is true for both markets and projects. The focus must increasingly be on regional gas and electric power markets rather than individual companies. For hydropower, the Commission must focus increasingly on whole river basins in assessing individual projects.

Second, the Commission's focus must become more collaborative. For energy projects, greater awareness of environmental concerns translates into the need for greater collaboration between the Commission and all concerned parties — other agencies, project proponents, nongovernmental organizations, landowners, Native Americans, and the public. For markets, the Commission must work more closely with state public utility commissions, with existing and new market institutions such as ISOs and PXs, with standard-setting groups such as the Commercial Practices Working Group and the Gas Industry Standards Board, and with other key institutions such as the North American Electricity Reliability Council. The Commission has undertaken the following:

- **Collaborative Process.** The Commission has set up a new collaborative process to work better with the concerned agencies, nongovernmental organizations, and the public on hydropower licensing. Collaboration begins before filing, to resolve as many issues as possible in a proposed facility application. These measures can help to expedite processing after the application is filed.

- **Interagency Task Force.** The Commission has formed an interagency task force with other federal agencies (including the Departments of Interior, Commerce, and Agriculture) to address issues arising in hydropower relicensing. This task force will address key inter-agency issues, including how to coordinate processes across agencies and how to make the best use of the Commission's new collaborative processes.

- **Ombudsman Function.** In 1998, the Commission created the function of ombudsman. The ombudsman is part of the Commission's external

affairs organization specifically charged to develop new methods of cooperation and consensual decision-making with other government agencies and also with new industry institutions such as ISOs. Part of the ombudsman role is to develop stronger ties between other agencies and all of the Commission's program offices.

INTERNAL CHANGES

The challenges facing the Commission over the next few years are substantial. To meet them, the Commission must retool the way it operates or risk being unable to respond appropriately to the changing industries it regulates. During FY 1998, the Commission staff undertook a comprehensive look at how it does business today and how it can meet the needs of tomorrow — the *FERC First* effort. The Commission staff is implementing the resulting changes during FY 1999 and FY 2000. This chapter describes several key changes that the Commission will undertake:

- *FERC First* defined *seven major process initiatives* that will change the way the Commission's work is done. These initiatives will cover most of the Commission's major work processes.

- *FERC First* proposed a *target organization* for the Commission's staff in 2000. This target organization is designed to reflect the Commission's reengineered processes. It may change slightly as the Commission develops its blueprints more fully over the next two years.

- The Commission will refine its *performance measures*. The Commission has not further developed the performance measures it proposed last year. The overall review of work processes took precedence, and performance measures are best refined during the implementation of the new processes. That refinement will occur as *FERC First* recommendations are put in place.

- The Commission will redesign its *workload measures*. Industry changes have significantly reduced the usefulness of the Commission's traditional workload measures. As part of implementing the *FERC First* initiatives, the Commission will overhaul these measures.

- The Commission will develop a *new budget format*. The Commission has traditionally divided its programs by industry (gas and oil pipelines, electric power, and hydroelectric projects). This division is increasingly misleading and impractical. It does not take into account the similarity and interconnectedness of gas and electric markets, nor the similarities between hydroelectric and gas pipeline projects' environmental and public concerns.

Together, these changes will prepare the Commission for the 21st Century and represent a comprehensive response to both the letter and the spirit of the National Performance Review of 1993 and the Government Performance and Results Act of 1993 (GPRA).

New Ways of Doing Business: *FERC First* Processes

FERC First began with a full review of the Commission's operations. The Chairman assembled a steering committee of managers and a team of 40 staff, assisted by consultants. This group assessed the external influences affecting Commission operations, reviewed the Commission's basic operations as they exist and as they should be, and conducted interviews and

focus groups with staff and constituents. This initial phase of *FERC First* resulted in a set of seven major initiatives to reshape the Commission's work processes.

Core Initiatives

Two primary initiatives reflect the core of the Commission's responsibilities.

Promoting Competitive Markets. A major focus of *FERC First* is integrating the economic regulation of the gas and electric industries. Considering the convergence of the industries, it makes sense to bring together these aspects of the Commission's responsibilities. An integrated approach will foster regulatory consistency, ease resolution of issues arising from the convergence of the two industries, and maximize the realization of economic benefits. This initiative will include a focused, periodic examination of elements critical to competitive markets and appropriate market monitoring to identify ways to promote and maintain competitive markets and to identify potential market problems. Essential to this approach will be early and continual collaboration among professional disciplines within the Commission and greater outreach, including increased coordination with market institutions and participants.

Authorizing and Monitoring Energy Projects. Both gas pipeline projects and hydropower projects must adjust to competitive markets, heightened environmental concerns and multiple jurisdictional authorities. The Commission must find the best balance among a project's economic viability, its effects on the environment, and its effects on other legitimate claims on the resources. Successful regulation of projects increasingly requires early and continual cooperation with other authorities and all interested parties.

A key element of this initiative is the use of extensive collaboration among the applicant, Commission staff, other agencies, non-governmental organizations, affected landowners, and other interested members of the public. Such collaboration is designed to resolve (as much as possible) issues arising in a proposed gas or hydropower facility application. Such collaboration may lead to the development before filing of a complete factual record for a Commission decision.

Supporting Initiatives

Several other initiatives are closely related to, and integrally support, the processes for markets and projects:

Resolving Disputes. The Commission seeks to promote early resolution of contested matters and complaints through expanded use of consensual decision-making, including alternative dispute resolution (ADR). Parties also will have opportunities to participate in pre-filing ADR to resolve or narrow the issues that would otherwise remain contested after a filing.

Building Bridges. *FERC First* identified the enhancement of two-way communication between the Commission and its constituents as a critical need in the future. Better communication will contribute to Commission decision-making, improve interested parties' understanding of Commission policies and actions, allow for long-term collaboration between staff and

outside parties, and establish an external constituent focus throughout the staff. The proactive nature of this initiative is a departure from the past; planning, staff training, and performance measurements will help ensure positive outreach.

Strategic Planning. Building on the Commission's initial response to GPRA, the Commission will develop a specific process to do strategic planning and overall performance measurement for the agency. This will take into account the broad spectrum of industry trends in developing Commission goals and objectives. Assessment of industry trends, market needs and constituent wishes will depend on analysis of industry data, guidance from the Chairman and Commissioners, and dialogue with the public and Commission staff. Along with articulating strategic direction, identifying goals, and measuring results, this process will identify necessary funding and staffing levels, Commission skill mixes, and information technology (IT) requirements to realize objectives.

Managing Information Technology. IT is one of two essential enabling tools for all of the Commission's future business. This initiative will set up a largely paper-free environment with electronic filing and posting of documents and automated work flow management. Putting these measures into place will address the need for complete, accurate, and timely information in an increasingly competitive marketplace. Planned major improvements to IT will reduce processing time for workload without statutory deadlines by streamlining and automating processes throughout the Commission.

Fixing the Year 2000 Computer Bug

The Year 2000 computer issue has been a challenge for both the Commission and its regulated industries because of the immovable deadline for ensuring Year 2000 readiness. The Commission has been addressing its own computer systems, and has a well developed implementation schedule for total readiness by January 1, 2000. The Commission is also a member of the President's Council on Year 2000 Conversion, and is the leader of the oil and natural gas sector of the Council's Energy Working Group. The Council is working with federal agencies and coordinating the outreach and sharing of information across industries such as telecommunications, banking, transportation, and energy, raising awareness and monitoring industry progress in reaching Year 2000 readiness.

The web site will serve as the entry point for electronic filing, posting, serving notifications of filings, and providing filings to interested parties. IT will make information available faster through the Commission's web site and will simplify searching for specific information within the large body of data the Commission maintains. Internal staff and external parties will have access to filings within minutes or hours rather than days. A workload processing system to be completed in FY 2000 will be linked to the Commission's Records and Information Management System and to the electronic filing. Eventually it will also be linked to a data repository, to be constructed in FY 2000 and linked soon after. The data repository will store information in a variety of formats and use powerful search tools to find specific information within multiple databases.

The Commission's IT will also support the oversight of industry markets, by enabling the monitoring of competitive markets engaging in electronic commerce. Energy companies use a web of IT and telecommunications systems to share information and coordinate delivery of energy products, and to monitor and control energy operations.. Together, these systems help define the modern marketplace.

Overall, this initiative will strengthen strategic planning, expand access to information, manage priorities, improve communications and operations, allocate resources efficiently, and improve IT skills across the Commission.

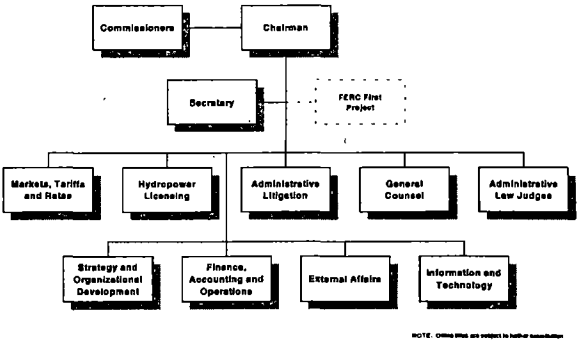
Developing Employees. An enhanced human resources capability is the second essential enabling tool for all of the Commission's future business. The Commission faces two overarching, long-term challenges to its human resources systems. First, it must shift a significant part of its work force from traditional forms of regulation to new forms more suited to markets and collaboration with other agencies and parties. Second, it must improve the productivity of all its employees by reducing its traditional reliance on management hierarchies and encouraging greater initiative from all staff members.

A key to handling the changing regulatory environment is meeting new staffing requirements. Since the Commission cannot fully foresee all issues before they arise, staff must look at circumstances, consider issues, and find solutions in a rapidly changing environment. The Commission will align its human resources and training efforts with its strategic plan and business objectives. It must adopt the processes to attract, retain and develop the highest caliber employees to support those objectives.

The Commission also must develop new forms of regulation while still using its traditional approaches. This will require improving management culture. Meeting the resulting workload with reasonable staffing levels will be impossible unless the whole staff becomes much more versatile and productive. Improving the Commission's management culture is imperative for achieving this change.

Reorganizing the Commission to Realize Benefits

FERC Organizational Structure by the Year 2000



A major aspect of the *FERC First* plan is bringing together all the experts needed to handle each work process from beginning to end. Doing this

enhances staff's understanding of emerging markets, enables staff to build in quality throughout the process, and eliminates the need for many layers of internal review. The Target 2000 organization largely follows the lines of the identified processes and optimizes skill mixes. The Commission will gradually achieve the target organization as it puts the *FERC First* initiatives into place, concluding in the first quarter of 2000.

Performance Measurement

FERC First makes clearer than ever the need for the Commission to measure the outcomes of its actions and to use this information to make management decisions. The FY 1999 Performance Plan began to develop outcome-based measures for the three sets of goals and objectives contained in the strategic plan: energy markets, energy projects and internal administration. The FY 1999 Performance Plan proposed that the Commission set up cross-agency teams to develop further the measures proposed for each area.

The onset of *FERC First* delayed the further development of outcome-based performance measures, while strengthening the overall process for performance measurement. The delay makes sense because performance measures will be a natural outcome of the detailed process review undertaken by *FERC First*. At the same time, a key *FERC First* initiative is to develop a capability to do both strategic planning and performance measurement much more rigorously than in the past.

During the coming year, the Commission will work through the *FERC First* process to develop its performance measures in the following ways:

- *Energy Markets.* The Commission will develop its capability to find and analyze market data, develop baselines, and present outcomes for as many measures as possible. It will refine its measurements as appropriate.

- *Energy Projects.* Existing proposals for performance measures reflect the inherent difficulty of measuring the balance the Commission must strike among competing interests in its energy project programs. These proposals are too vague to serve as immediate guides. The Commission will focus initial efforts in this area on hydroelectric projects, where the environmental issues are most important. It will develop a data base of all conditions included in hydro licenses and what each condition is intended to achieve. In effect, this data base will embody all the specific goals the Commission has decided to pursue in different hydropower cases. It will develop a data base of objectives realized. This will let the Commission review the overall direction of its policy, measure the degree to which it has achieved the goals it has already set, and make any necessary adjustments to license conditions. Finally, the Commission will take the lessons of its hydroelectric measurement process and consider how to measure its natural gas certificate program.

- *Administration.* The Commission will develop these proposals further, using both new management systems being developed as part of its IT initiatives and the process review undertaken by *FERC First.*

- *Human Resources.* A major strategic challenge facing the Commission today lies in more targeted hiring and training to keep its skill mix optimal. During 1999, the Commission will develop specific goals, outcomes and performance measures for its human resources programs as part of *FERC First.*

Workload Analysis

The Commission must develop new ways to measure its internal workload, just as it must develop better ways to assess the outcomes of its policies. The Commission's current workload accounting system is increasingly inadequate for its future needs, for the following reasons.

- Traditional workload categories are based mostly on traditional inputs and outputs such as the number of filings received and the number of orders issued. These measures do not easily capture the substance of much of the Commission's future workload. For example, the effort required to monitor markets is likely to be largely independent of the number of formal filings. Proactive and facilitative approaches to some issues will be specifically designed to reduce the number of formal filings and might better be judged from the number of filings avoided than the number received. Similarly, the same regulatory problem in different regions (for example, establishing regional markets) may come to the Commission as many or few formal filings. Yet work required is likely to be similar, no matter how many filings are involved.

- Current workload categories often include cases that vary greatly as to the staff time and attention necessary to process them. Some cases are straightforward and may be resolved based on precedents, while others are complex and ground-breaking, requiring vastly greater resources. However, each case is counted as one. This confounds the Commission's ability to connect workload trends with changes in resource requirements.

- Items in different workload categories require vastly different amounts of staff time and attention. The Commission has not quantified these differences well as part of its overall planning.

The *FERC First* initiatives give the Commission a rare chance to redesign its workload measurement system systematically and agency-wide. *FERC First* will make it possible (1) to redefine workload categories in ways that reflect the Commission's emerging workload and (2) to estimate the resources that should be required to address different work items. This will help the Commission tie its workload to its resource requirements and will help to clarify the likely effects of changing resource levels on overall agency performance.

By the budget request for FY 2001, the Commission expects to be able to identify the future workload categories. The Commission also anticipates that the *FERC First* process will identify reasonable baselines for the work needed to address each category. The goal is to be able to link workload levels to resource requirements by the request for FY 2002.

Future Budget Documents

The Commission's FY 2001 and FY 2002 budget requests will embody increasingly more of the Commission's internal reengineering. This will include new performance measures and new workload accounting systems as these become available.

In addition, the Commission's reengineered work processes and organizational structure reflect changes in the industries and will dictate a new orientation for future budget documents. The Commission anticipates that the budget request for FY 2001 — the narrative and requests for funding and staffing levels — will mirror the Commission's new processes, rather than the separate industries. Therefore, it will be organized around work related to:

- markets, tariffs, and rates; and
- authorizing and monitoring energy projects.

The exact makeup of these work categories will depend on final decisions during process implementation, and will incorporate the support functions. In the budget request for FY 2001, the Commission anticipates that it will identify funding and staffing requirements by the new categories. The Commission recognizes the need to be able to compare the FY 2001 budget with those for previous years. Therefore, it anticipates providing a means of comparing the new request format with the current one.

ELECTRIC POWER

Operating Expenses

(Budget Authority Dollars In Thousands)

	FY 1998 Actual	FY 1999 Estimate	FY 2000 Request
FUNDING	$52,250	$52,555	$56,665
FTEs	439	440	440

Overview

Managing the transition to competition is the most important task facing the Commission.

The electric industry is in the early stages of a restructuring that will bring the advantages of competition to the generation and sale of electricity, even while the transmission grid remains a natural monopoly. Competition promises to bring significant savings to customers throughout the Nation, thereby benefitting individuals and making American industry more competitive in world markets. The generation sector has historically accounted for about 70 percent of the costs of the industry, but customer savings will only appear if the market power inherent in transmission is controlled. Therefore, the most important task facing the Commission is to continue to regulate transmission as required by law, by adapting its regulatory strategies to support the emerging competitive market for electric power.

The electric industry has evolved substantially since enactment of the Federal Power Act of 1935 (FPA). The Commission's basic mission remains the protection of the public by ensuring that wholesale electricity customers have access to reliable service at a reasonable price. However, the means for achieving this mission have changed dramatically in recent years. The success of independent power suppliers over the past decade has shown that electric power generation is no longer a natural monopoly. Accordingly; the public is better served by competition in generation than by traditional command-and-control, cost-based regulation. At the same time, transmission and distribution remain natural monopolies. Left unregulated, companies could leverage their ownership of transmission and distribution facilities into a position of market power over generation as well.

Access to the transmission grid is the key to making competition work for wholesale electric markets.

Since the passage of the Energy Policy Act of 1992 (EPAct), the Commission has aggressively pursued policies designed to foster competition in wholesale power markets. EPAct strengthened the Commission's authority to order transmission access for wholesale transactions on a case-by-case basis, thereby opening the markets to competitive generation. And in 1996, the Commission followed the logic of the EPAct one step further. It issued Order No. 888, which requires all public utilities that own, operate, or control interstate transmission facilities to offer open access to all wholesale market participants.

Long-Term Goals Beyond FY 2000

The long-term goals of the Commission's electric power program flow directly from the first two parts of the Commission's vision statement.

The Commission will:

- Foster the growth of efficient, competitive commodity markets.
- Protect customers from abuse of market power.

Foster the Growth of Efficient, Competitive Commodity Markets. The Commission will continue to regulate transmission to support competition. Because transmission is critical to those who need access to customers, the Commission must ensure that efficient, reliable, nondiscriminatory transmission access is available for all wholesale electric suppliers and customers. This is the underpinning of future electric competition. The Commission expects that this competitive market will offer consumers more new products and many new suppliers. Additionally, as the electric industry continues this transition to competition, wholesale electricity prices should become more responsive to market conditions by reflecting changing supply and demand conditions more quickly. Wholesale electricity price differences within each trading region should narrow as competitive markets evolve.

Protect Customers from Abuse of Market Power. The electric industry has been structured as a set of local franchised monopolies for most of its history. As a result, in many parts of the country, significant concentrations of generation are in the hands of one or a few local companies. The Commission must monitor and assess whether utilities can exercise generation market power that could adversely affect wholesale electric prices in the relevant product and geographic markets. The Commission must respond appropriately and timely to market power issues in the context of market-based pricing and in reviewing the effects of mergers on competition. Market participants must have confidence that electric markets are working fairly and that they will not be subject to market power abuse.

Program Challenges

The complexity of its electric workload has grown significantly as the Commission has responded to the changes in the electric industry. This trend of increasing complexity of the electric workload is expected to continue into the future, until the restructuring efforts are complete.

The Commission is refocusing its electric regulatory efforts by shifting from setting cost-based rates for wholesale power suppliers to allowing market forces to set prices wherever possible. However, to safeguard workable competition in wholesale power markets, the Commission must ensure open, nondiscriminatory access to transmission facilities, and must monitor the market to detect instances of market abuse or failure.

The issuance of Order Nos. 888 and 889 and the orders on rehearing were merely the beginning of electric utility restructuring. Much remains to be done:

The issuance of Order Nos. 888 and 889 was only the beginning. During FY 1999 and FY 2000, much remains to be done to further the transition to a competitive industry.

- Helping design and work with fundamentally new industry institutions, such as Independent System Operators or other Regional Transmission Organizations;
- Developing new regulatory strategies to match the needs of these institutions and the evolving market;
- Addressing the remaining market power inherent in transmission in an entirely new context — competition in electric generation. The Commission's experience in natural gas shows that a new approach to regulating transmission will have many unexpected features, including developing entirely new capabilities, such as market monitoring; and
- Cooperating much more closely with state regulators and other government agencies as traditional jurisdictional lines blur.

Overall, this requires a substantial overhaul of our regulatory strategy and organization over the next few years. It also suggests that the Commission's work will focus more on regional and national market issues, developing continuing relationships with new industry institutions, and on monitoring and intervening when necessary if markets are not functioning appropriately.

Restructuring Initiatives

Comparability and Open-Access Transmission. In the open access final rule, Order No. 888, the Commission directed all public utilities that own, control, or operate interstate transmission facilities to offer service to others under the terms of the pro forma tariff, and to use the tariff for their own wholesale energy sales. Although this order was implemented in 1996, many complex rate and policy issues continue in various stages of the decision-making process and will require extensive analysis as they are processed during FY 1999 and FY 2000.

The Commission's restructuring initiatives involve a number of interwoven areas: transmission access, state restructuring initiatives, ISOs, utility reorganizations, reliability, and the potential for Federal restructuring legislation.

The Commission also continues to review compliance with the standards of conduct and the Open Access Same-Time Information System (OASIS) requirements of Order No. 889. For example, in December 1998, the Commission approved the North American Electric Reliability Council's (NERC) procedures for relieving constraints on transmission systems caused by parallel loop flows, and ordered public utilities that use those procedures to amend their *pro forma* open access tariffs accordingly. Standards of conduct and the information networks are also necessary to ensure that transmission owners and operators do not unfairly favor their own generation over competitors' generation, thereby interfering with competitive markets. A continuous monitoring, oversight and enforcement effort by the Commission, particularly the expeditious handling of complaints about transmission system operations and affiliate preferences, is necessary to ensure open, nondiscriminatory access to the nation's transmission system. This effort will consume considerable Commission resources in FY 1999 and FY 2000 as the industry adapts to changes from its historical practices.

State Restructuring Initiatives. State restructuring efforts will continue to move the industry toward more competition and retail customer choice of electric power suppliers. Nearly all of the states are actively involved in

investigating whether and how to restructure their retail electric power markets. The Commission plays a critical role in implementing state programs when they involve transmission by public utilities in interstate commerce, over which the Commission has exclusive jurisdiction.

Some restructuring proposals, such as California's, require a large commitment of Commission time and staff resources because of the sheer magnitude of the institutional changes and the large number of policy and legal calls involved. For example, when a power exchange — a centralized trading institution that receives power from various sellers and provides the power to various buyers — is proposed, the Commission must ensure that wholesale power sellers that are public utilities cannot exercise market power. Where divestiture of ownership or control of transmission assets is proposed, the Commission also must approve the disposition of transmission assets. Some of these proposals may involve innovative transmission pricing proposals. The Commission has adjusted its policies and procedures to fit the special and regional characteristics of these new institutional structures.

In addition to California, the Commission in FY 1998 facilitated moves toward retail electricity competition in a number of states, including Washington, Nevada, New York, Idaho, Pennsylvania, Rhode Island, New Hampshire, Massachusetts, and Illinois. The number of state restructuring programs will grow significantly over the next few years

Examples of RTOs are Independent System Operators (ISO), Transmission Companies (TRANSCO), Grid Companies (GRIDCO), and Wire Companies (WIRECO).

Regional Transmission Organizations (RTOs). The Commission supports the creation of RTOs to help implement industry restructuring and reduce the vertical integration of power generation and transmission. RTOs are being explored because of their potential to remedy undue discrimination in the provision of transmission service and to consider regional approaches to transmission pricing.

The move to regional institutions represents a major evolution in industry structure and is a central element in many state and regional restructuring initiatives. This move has just begun, and the Commission has had a chance to review and approve only a handful of regional proposals. When fully implemented, the Commission believes that these new institutions can resolve many issues that would otherwise consume the Commission's resources. In Order No. 888, the Commission provided guidance to the industry on how to structure one kind of RTO, Independent System Operators (ISOs), to make them work in a nondiscriminatory manner. The concept underlying ISOs is that the existing owners of transmission facilities would turn over operational control, but not ownership, of these facilities to an independent grid manager. The Commission has approved several ISOs that will operate in California, New York, New England, Texas, the Midwest, and the Mid-Atlantic. Additional ISO proposals are pending. The Commission held a public conference on April 15 and 16, 1998, to examine the future of ISOs, and held several regional conferences during FY 1998.

In September 1998, the Chairman announced the Commission's intention to complete by December 31, 1999, a generic proceeding to accelerate the establishment of RTOs in every region of the country. As part of this proceeding, the Commission will consult with the states on the criteria for

establishing RTO boundaries and on the role of the states in the formation and governance of RTOs. RTOS would encompass not just ISOs but other corporate and institutional forms of independent grid managers, including ownership of the transmission facilities.

In September 1998, the Commission secured additional authority that will help promote RTOs and the reliability of the grid. The Secretary of Energy delegated Section 202(a) of the FPA to the Commission. This section grants authority to delineate regional districts across the country to promote interconnection and coordination within and between regions.

The Commission is committed to ensuring that RTOs can operate the transmission system in a reliable, open, and nondiscriminatory manner. In the long run, RTOs should reduce litigation before the Commission. However, the creation of new regional transmission entities under new forms of ownership or control requires the resolution of many technical and legal issues to assure that the reliability of the system is maintained and statutory requirements are met. For now, RTOs will require a significant investment of Commission time and resources.

Many traditional electric utilities are auctioning off their generation assets in order to reposition themselves strategically or to comply with state mandated retail access programs.

Utility Restructuring. The open-access rule and the restructuring activities by many state commissions are leading many utilities to restructure their corporate organizations in some manner. FY 1998 saw a dramatic increase in the number of traditional electric utilities that auctioned their generation plants as a first stage toward state-mandated direct retail access. These state programs will allow the retail customer to select its power supplier and have the electricity delivered by the local transmission/distribution utility, much as retail telephone customers can now select their own long distance provider. Electric utilities also may choose to reorganize their corporate structures for a variety of reasons, including strategic alliances with other utilities, diversification, or as part of state retail choice programs. Such restructuring often involves a disposition of facilities under the FPA that requires the Commission's authorization.

The Commission continues to see a significant increase in the number and types of corporate reorganizations being proposed. For example, in addition to unprecedented numbers of mergers involving combinations of electric utilities, the Commission is receiving a number of proposals for "convergence mergers" — that is, electric utilities merging with natural gas distributors and pipelines. Convergence mergers raise many new and difficult vertical market power issues. Some ISO proposals are being made as part of proposed mergers, and others are at the direction of state retail choice initiatives. Finally, we expect that the transformation to competitive markets may also cause utilities to create separate transmission, generation, and distribution entities to replace the existing vertically integrated corporate structure. Reorganizations along functional business lines, in turn, may include further consolidations in each functional area with new regional organizations.

With respect to the effect of a merger or other corporate restructuring on competition, the Commission must be assured that no significant increase in market dominance will result from the transaction. The Commission must

also be assured that ratepayers will be protected from any negative effects of the merger. When the merger involves a registered public utility holding company, the Commission must know that the merged entity will abide by the Commission's inter-company policies designed to protect ratepayers from affiliate abuse. The Commission has decided to employ the Department of Justice/Federal Trade Commission's merger guidelines for these purposes. The Commission also examines barriers to entry of new competitors into the market. Such entry is important in mitigating adverse effects of the corporate mergers.

The Commission recognizes that merger proposals are business decisions made in response to market pressures and opportunities, and are thus entitled to timely decisions and regulatory certainty. Accordingly, the Commission in FY 1998 issued proposed streamlined merger regulations to reduce further the regulatory burden on public utilities seeking to merge, while continuing to safeguard the public interest. While this proceeding will consume considerable staff resources in the short term, it will save time and resources in the long run for the Commission and its regulated entities.

Merger applications are often contested and extremely complex. For example, competitors who view proposed business combinations as imposing greater barriers to market entry or eroding their relative market share may vigorously oppose mergers and acquisitions. One example of an extremely complex merger is the proposed combination of Central and SouthWest Corporation and American Electric Power Company, which the Commission set for hearing in November 1998. The merger would create one of the largest electric utility systems in the country. The number of corporate applications filed with the Commission, including mergers, is expected to increase seven times from FY 1995 to FY 2000. This increase, combined with the complexity of these cases resulting from the competitive dynamics of electricity markets, including cases set for investigation, has created a significant workload burden on the Commission.

As the newly opened transmission system is put to the test in supporting a competitive market for generation, it is vitally important to maintain the reliability of the electric power system.

Reliability. System reliability is critical to the success of a competitive electric industry. Currently, there is no clear federal authority to establish reliability standards for the bulk power transmission grid or to enforce such standards. Historically, regulators and industry participants have relied upon voluntary industry organizations such as NERC and its regional reliability councils to establish reliability rules and standards to maintain the security of the grid. However, compliance with those standards has been neither mandatory nor applicable to all market participants.

As the electricity market becomes highly competitive, the number of market participants and the volume of transactions that affect the operational demands on the system are expanding. This has created a situation where reliability standards need to be mandatory and enforced to protect the integrity of the bulk power system.

It is also becoming more apparent that reliability rules may have commercial impacts on competitive electric markets. The Commission has of necessity become involved in determining whether certain reliability provisions are just and reasonable terms and conditions of transmission service under the FPA.

Increasingly, the Commission is receiving complaints that reliability rules are being administered in a discriminatory way. In FY 1998, the Commission held a public conference to discuss the process it may follow, in the absence of federal legislation on reliability issues, for evaluating the effect of reliability standards on jurisdictional electric transmission service.

Federal Legislation to Restructure the Electric Utility Industry. In June 1998, the Administration submitted the Comprehensive Electricity Competition Act (CECA) to Congress. CECA provides for a number of significant changes to the electric utility industry. Some of these provisions, if enacted, could significantly affect the Commission in FY 1999, FY 2000, and beyond. For example, the retail customer choice provisions of CECA, if enacted, could significantly increase the number of restructuring and merger proposals submitted for Commission review. CECA would give the Commission authority to approve and oversee a private, self-regulating organization that develops and enforces mandatory reliability standards for electric service. It would also give the Commission explicit authority to require utilities to turn over operational control of their transmission facilities to an ISO. Other provisions of CECA would give the Commission the authority to mitigate market power when a company acquires excessive control over retail electricity markets, would repeal the Public Utility Holding Company Act of 1935 (PUHCA), and prospectively repeal the provisions in the Public Utility Regulatory Policies Act (PURPA) that require utilities to purchase power from qualifying facilities.

A number of bills were introduced by members of the House of Representatives and the Senate that also would restructure the electricity industry and expand the role of the Commission in ways similar to those in the Administration proposal.

These provisions could significantly affect the resource needs of the Commission's electric regulatory program. The Commission estimates that the provisions of the program, as currently envisioned, would require a significant increase in electric program staffing. However, future needs will depend on the final provisions of any legislation Congress eventually enacts. Because of the uncertainty, the Commission is requesting no additional resources at this time to address these potential responsibilities.

Electric Rates

As the industry changes to a more competitive market, the Commission is shifting from its reliance on traditional cost-based regulation. However, it must still ensure that market power is not abused.

Market-Based Rates. Recent entrants into wholesale electric markets include nontraditional sellers such as independent power producers and power marketers. They are usually permitted market-based rates because they lack market power in generation and transmission. The Commission may conclude there is a lack of market power where neither the new entrants nor their affiliates own transmission facilities or control significant amounts of generation. Increasingly, the Commission also is allowing some traditional public utilities and their affiliates to sell at market-based rates if they can demonstrate certain conditions. They need to show that they have mitigated generation and transmission market power, they cannot keep competitors from entering the bulk power market (through control of other inputs to the production of bulk power, such as fuel), and they are not engaged and will not engage in affiliate abuse or self-dealing.

The Commission has authorized nearly 400 power marketers to charge market-based rates.

Power marketers, both independent marketers and those affiliated with traditional utilities, have become a major category of power sellers. Power marketers usually do not produce power themselves, but buy and sell power produced by others. Thus, while they do not increase the capacity available to meet the needs of consumers, they can contribute to increased market efficiency to the benefit of ultimate consumers. Power marketers increase the Commission's workload because it must authorize their market-based rate schedules and monitor their actions in the marketplace.

The Commission also ordered a Texas utility in FY 1998 to provide open access transmission for power sales to Mexico.

The growing interest in market-based rates is key to the Commission's responsibility to protect electric power customers. Under traditional cost-based regulation, where the Commission establishes a cost-based rate for a particular public utility, the Commission requires that particular cost-based information useful to the rate-setting process be filed periodically with the Commission. Under market-based pricing, these cost-based data become less important to the Commission and may, indeed, be considered to be proprietary or commercially sensitive by the power supplier itself.

However, under market-based pricing, the Commission must still ensure that market participants do not exercise market power. The Commission will therefore need to increase its monitoring of the market for wholesale power and refine its capabilities to handle complaints of market manipulation. The Commission is already engaging in increased market surveillance. For example, the Commission put together a task force to study certain very high, short-term energy prices that occurred in the Midwest during the summer of 1998. The Commission anticipates that such market surveillance efforts will continue and will require shifting of resources from other areas.

Utilities that made large capital investments or contractual commitments in the past under a different regulatory regime with the expectation of serving customers into the future, should have a fair opportunity to recover those costs (stranded costs) if those customers leave under the new, competitive regime.

Stranded Costs. Some utility investment could go unrecovered if departing customers use their former suppliers' transmission systems to secure power elsewhere; these unrecovered investments are termed stranded costs. The opportunity to recover legitimate, prudent, and verifiable stranded costs is essential to ensure a fair and orderly transition to a market-oriented electricity industry. Utilities that made large capital investments or contractual commitments in the past under a different regulatory regime, with the expectation of serving customers into the future, should have a fair opportunity to recover those costs if those customers leave their traditional utility to purchase electricity from new, more competitive electricity suppliers. In November 1997, the Commission clarified its position on recovery of stranded costs in the case of municipalizations and municipal annexations, where customers previously served by a public utility become customers of a municipal utility instead. Many of these stranded cost requests will be contested and will require litigation to resolve complex, factual issues related to the recovery of transition costs. As competition increases, the Commission forecasts that the number of stranded cost cases will triple by FY 2000, and the Commission will need to allocate substantial resources to this area.

Auditing. The Commission will continue to expand the scope of auditing as part of monitoring, oversight, and enforcement related to developing competitive markets. Audits will target industry compliance with the Commission's rules and regulations. Oversight of competitive markets requires auditing of industry-wide practices to help the Commission foster competitive markets. Audits also focus on topical areas relating to Commission policy.

Other Issues

Power pool agreements are multi-utility agreements that often include sharing of generating capacity reserves. They sometimes provide a central means of economic dispatch, trading, and transmission of electric power.

Power Pools. Power pools require complex agreements that provide for coordinated operation to lower costs for pool members. The changes occurring in the industry, including nondiscriminatory open-access transmission, require changes to existing pooling agreements. For example, pooling agreements must ensure nondiscriminatory membership criteria and the modification or termination of unduly preferential transmission agreements. The Commission directed that revised pooling agreements, as well as joint pool-wide transmission tariffs, be filed by December 31, 1996, to comply with the provisions of Order No. 888. Many pools went beyond the requirements of Order No. 888 and, in conjunction with their compliance filings, made additional restructuring filings that raise complex issues. These issues will need to be resolved on a case-by-case basis during FY 1999 and FY 2000.

Transmission Service Requests Under FPA Section 211. Congress modified Section 211 of the FPA through the EPAct to expand the Commission's authority to compel transmitting utilities (which include nonpublic utilities under the FPA, such as municipal utilities and cooperatives) to provide transmission service. Reliance on Section 211 to obtain transmission services from jurisdictional public utilities should decline, since open-access transmission tariffs of general applicability are now on file with the Commission. Nonetheless, Section 211 will continue to provide a necessary mechanism for customers who have specialized transmission service needs or who require transmission service from nonpublic utilities that are not required to have nondiscriminatory open-access tariffs on file with the Commission.

Exempt Wholesale Generators (EWGs). The EPAct directs the Commission to determine, upon application, the EWG status of certain electric power producers/operators. EWG status exempts the facility's owners and operators from the requirements of PUHCA. EWGs will provide a significant percentage of new domestic generation requirements. Although the Commission's role in acting on EWG certification applications is largely ministerial, most EWGs located in the United States are also public utilities, and must file their wholesale power rates with the Commission. The number of rate filings and other applications by EWGs will increase as projects currently under construction begin to operate.

Power Marketing Administrations (PMAs). The Commission reviews the rates for the four federal PMAs (the assets of the fifth PMA, the Alaska Power Administration, were recently sold to non-federal entities). The approximately 130 federal hydroelectric projects comprise 21 reporting units, some of which make multiple applications with the Commission for rate

review. These reporting units may submit rate filings with the Commission as frequently as every year, but not less than once every 5 years. The frequency of such applications depends on the economics of marketing the surplus federal power and transmission services. The number of applications will remain level through FY 2000, but the complexity of the applications will increase as the PMAs respond to the new competitive environment. In addition to rate reviews, PMAs are subject to the transmission reciprocity provisions of Order No. 888. The Commission recently approved Bonneville Power Administration's reciprocity filing, and Western Area Power Administration and Southwestern Power Administration both filed reciprocity open-access tariffs with the Commission in early 1998.

The emphasis of the Commission's workload under PURPA has shifted from routine certification of generating facilities to issues related to enforcement.

Qualifying Facilities and Public Utility Regulatory Policies Act Issues. PURPA authorizes the Commission to certify small power production and cogeneration facilities as qualifying facilities (QFs) and, in certain cases, to exempt them from some Federal and state regulations. PURPA regulations require electric utilities to buy electricity from QFs at a rate that does not exceed the utility's cost of producing the electricity itself or acquiring it elsewhere (i.e., the "avoided cost").

Current PURPA issues include: (1) requests by purchasing utilities to be relieved of obligations under QF contracts that have allegedly become uneconomic, and (2) challenges to QF status by purchasing electric utilities in an effort to invalidate contracts with the QFs. The Commission expects to see the continued filing of complaints involving allegations of QF noncompliance. Other PURPA-related workload will continue at the current level over the next several years.

Interlocking Directorates. To prevent adverse effects on the public interest through self-dealing and other abuses, the FPA restricts the activities of public utility officers and directors. Careful review from the Commission on interlocking positions is ever more critical as public utilities diversify. Moreover, formation of ISOs, which may have directors who are officials of other public utilities, will raise new issues regarding interlocking directorates.

FY 1998 and First Quarter FY 1999 Achievements

The Commission's electric power program attained several major achievements in FY 1998.

Continuing Implementation of Order Nos. 888 and 889. The Commission is well into the implementation stage for Order Nos. 888 and 889. These orders require all public utilities that own, control or operate facilities used for transmission of electric energy in interstate commerce to have on file open-access, nondiscriminatory transmission tariffs, to create or participate in OASIS that will allow customers to obtain critical transmission-related information, and to implement standards of conduct that ensure the functional separation of the transmission and wholesale merchant functions within each public utility.

In November 1997, the Commission issued Order Nos. 888-B and 889-B. In Order No. 888-B, the Commission clarified its position on the recovery of stranded costs in the case of municipalizations and municipal annexations, where customers previously served by a public utility become customers of a municipal utility instead. Order No. 889-B denied all rehearing requests related to OASIS. In May 1998, the Commission issued revised standards and protocols for OASIS. These changes were designed to allow for more public access to transmission information and will foster greater integrity and confidence in the OASIS system.

Approval of Major Restructuring Initiatives. The Commission has recently approved a number of significant state and power pool restructurings that should ultimately reduce electric rates to consumers by greatly increasing their access to lower cost power. In response to a state-mandated retail access initiative in California, the three investor-owned electric utilities in that state (Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company) made a series of filings to comprehensively restructure the way companies buy and sell electricity in California. The California ISO and Power Exchange (PX) were able to successfully begin operations on April 1, 1998, as a consequence of the Commission's timely response to the numerous filings submitted by the parties.

In April 1998, the Commission approved a major East Coast electric power pool's restructuring plan, which, among other things, established an ISO and provided open-access transmission service on a pool-wide basis. The ISO plan was submitted by a group of companies comprising the Pennsylvania–New Jersey–Maryland Interconnection (PJM). The Commission approved PJM's use of single transmission rates, which are based on the costs of the transmission system where the point of delivery is located. The Commission also approved PJM's proposed locational marginal pricing for transmission congestion costs, which called for the price of transmission over constrained interfaces to be based on price differences on opposite sides of the constraint.

The Commission also approved in April 1998 a major restructuring of the New England Power Pool (NEPOOL), a major northeast power pool which consists of over 130 separate entities. The restructured pool will provide broad, region-wide service using a pool-wide tariff intended to ensure nondiscriminatory access to the regional transmission network with a postage-stamp type rate for all transactions, and employing a nonpancaked rate structure. The restructured NEPOOL includes an ISO whose primary responsibilities are to ensure system reliability, administer the NEPOOL tariff, and oversee the efficient and competitive functioning of the regional power market. Market participants will be able to buy and sell various services at bid-clearing, rather than cost-based, prices through bilateral transactions or through a regional power exchange that will be administered by the ISO. In December 1998, the Commission approved market-based rates for the New England Power Pool (NEPOOL). NEPOOL's new bid-based pricing system is a key component of the pool's restructuring.

In June 1998, the Commission approved the creation of the New York ISO, which assumed the functions of the New York Power Pool. The Commission also approved the proposals of the New York State Reliability Council to develop bulk power reliability standards, and a New York Power Exchange, which is designed to facilitate transmission open to all market participants. The Commission has deferred action on the rates, terms, and conditions of the ISO's open-access tariff and other issues.

In September 1998, the Commission conditionally approved the application of ten transmission-owning public utilities to transfer operation of their jurisdictional transmission facilities to the Midwest ISO, and conditionally accepted for filing the ISO's open access transmission tariff.

The Commission held a public conference on April 15 and 16, 1998, to examine the future of ISOs, and held several regional conferences during FY 1998. The Commission wishes to examine whether any changes to its policies that affect the development of ISOs (including improving the OASIS system and reforming transmission pricing) are appropriate to further promote competition and reliability in bulk power markets.

Reduction of Backlog. In the first phase of the *FERC First* initiative, the Commission staff interviewed a number of representatives of regulated industries, state commissions, and other interested entities. One theme common to many parties was a concern with a backlog of pending decisions. "Justice delayed is justice denied," they stated. In response, the Commission quickly embarked upon a concerted effort to reduce the backlog, especially in the areas of pending initial decisions, complaints, and orders on rehearing. The project was successful — the backlog has been virtually eliminated, and new teams and procedures have been set into place which will ensure that it does not resurface.

Reliability Round Table. In response to increasing numbers of complaints that reliability rules are being administered in a discriminatory way, the Commission held a public conference in FY 1998. It convened the conference to discuss the process it may follow, in the absence of federal legislation on reliability issues, for evaluating the effect of reliability standards on jurisdictional electric transmission service.

One reliability-related issue that has been raised by a complainant is the "tagging" of power sales transactions. On April 7, 1998, the Commission issued an order addressing NERC's requirement that information be submitted to the control area operator at the time a power sales transaction is scheduled so that the transaction can be "tagged" for reliability purposes. Petitioners had claimed that the NERC requirement required prior approval by the Commission. The Commission rejected the argument, finding that the NERC requirement is consistent with the information that the transmission tariffs already require.

Issuance of Proposed Streamlined Merger Regulations. On December 18, 1996, the Commission issued its Merger Policy Statement which revised the factors the Commission considers in determining whether a proposed merger is consistent with the public interest. In April 1998, the Commission took

The proposed streamlined merger regulations should lessen the regulatory burden on merger applicants, while safeguarding the public interest.

further steps to lessen the regulatory burden on public utilities seeking to merge with other companies by issuing proposed streamlined merger regulations designed to continue the protection of the public interest. The proposed regulations would: codify existing Commission merger policy based on the Merger Policy Statement and recent precedent-setting merger cases; provide for more descriptive filing requirements that clarify what materials the Commission requires to review proposed mergers; streamline filing requirements for mergers that do not raise competitive concerns; and reduce the industry's regulatory burden by eliminating outdated filing requirements. The Commission also announced that it would schedule a technical conference on the use of a computer simulation model which would facilitate prompt and accurate market power analysis for both applicants and Commission staff.

The Commission's renewed commitment in the 1996 policy statement to process merger applications promptly has yielded dramatic results. In FY1997, the Commission took final action on 15 merger applications, up from two the year before. These 15 actions also were five more than the number of merger applications filed that year, thus significantly reducing the backlog of these extremely resource-intensive cases. The backlog reduction continued into FY1998, when the Commission received six major merger applications and it took final action on seven.

Record Keeping Burden Reduction. The Commission issued Order No. 589 on February 5, 1998, which will reduce the public reporting burden for the electric and natural gas and oil pipeline industries by an estimated $5 million annually. The order removed the Commission's prescribed units of property listings and gave electric utilities the flexibility to develop their own property listings and corresponding fixed asset records. Electric utilities must maintain a written unit of property listing for use in accounting for additions and retirements of fixed assets and must apply the list consistently. The order also clarifies that electric utilities may use estimates when it is impractical or unduly burdensome to identify the actual cost of retired property. The increased flexibility reduces the record keeping burden on the industry and provides electric utilities with the ability to maintain records that are in line with their business needs. The order was developed in collaboration with the affected industries.

NATURAL GAS AND OIL PIPELINES

Operating Expenses

(Budget Authority Dollars in Thousands)

	FY 1998 Actual	FY 1999 Estimate	FY 2000 Request
FUNDING	$64,742	$65,749	$70,522
FTEs	514	515	515

Overview

The natural gas industry has seen dramatic changes over the last few years. It is no longer a heavily regulated industry, with the Commission authorizing all aspects of gas sales and transmission. Now competition governs commodity markets, and market forces play an important role in the Commission's regulation of the transportation of natural gas. Significant market power remains in the transportation market, however, requiring continuous regulatory oversight. There is also a need for gas transportation to mesh with competitive commodity markets. Indeed, market-friendly regulation of transportation is an essential part of the infrastructure needed to ensure the full benefit of competitive commodity markets as well as to protect customers. Thus, the Commission's essential mission is to fulfill its legal mandate to protect customers in new ways that both support and make full use of competition. The one area that has remained regulated in a traditional way is the authorization of gas pipeline construction projects. But even there, the Commission is looking at different approaches for meeting the time-sensitive needs of the competitive market while properly addressing environmental and landowner concerns.

In light of the changes in the industry, the Commission is undertaking a natural gas policy initiative to improve the efficiency, transparency, and competitiveness of short-term markets. In FY 2000, the Commission expects to complete this initiative to revamp significantly its regulation of short-term markets and to begin systematic changes in regulation of long-term gas markets. As part of this initiative, the Commission is exploring expanded use of competitive market forces in its oversight of the natural gas transportation market. The Commission expects to enhance market competition by modifying its regulations and methods to constrain market power. At the same time, the Commission would improve mitigation measures to better curtail the exercise of market power by capacity holders and would broaden the Commission's and customers' ability to decide through monitoring when residual market power is being abused. The Commission is assessing the effects of short-term markets on long-term pricing and the impact of long-

term market issues on short-term markets. The Commission will also look at all issues regarding certification of new construction.

Competition will not completely replace traditional ratemaking in all situations.

As the shape of the natural gas industry changes, the nature of the Commission's role as a regulator is also changing. The Commission will not dictate the functioning of the industry. Instead, it will ensure that a well functioning, efficient market is delivering natural gas and transportation fairly and at reasonable rates — set mostly by the marketplace — while dealing with the market power that still exists. Further, the Commission will be responsible for assuring that the gas industry can grow and meet the needs of the increasing market demand for gas by permitting pipeline construction as appropriate. The Commission must be sensitive to the need for quick construction decisions in the competitive marketplace, while facing growing landowner and environmental concerns.

The oil industry is also changing to deal with cross-energy competition among oil, gas, electricity, and coal. One aspect of the oil industry that will be prominent for the Commission in FY 2000 is the review of the indexing mechanism for setting oil pipeline transportation rates.

The Commission is revising its complaint procedures to provide timely responses to help the market.

Simultaneously, the Commission will continue to regulate those aspects of the natural gas and oil pipeline industries where competition is currently unworkable for protecting against the abuse of market power. In addition, the Commission has proposed to revise its complaint procedures to make complaint resolution faster and to ensure that the markets can work fairly and efficiently. The Commission will continue to set rates for long-term service while ensuring just and reasonable rates for consumers and addressing complaints and allegations of abuses quickly to ensure nondiscriminatory access to the national pipeline grid.

The Commission expects to respond to a continuing need to construct new pipelines or expand existing facilities to serve growing markets or to compete in existing markets. New market potential is expanding due to demand for supply alternatives. The Commission will continue the important task of balancing and protecting the competing interests of companies, individuals, organizations, and resources affected by the application of eminent domain for new and replacement construction of the natural gas pipeline infrastructure. Increased participation by landowners will require creative efforts by the Commission to address their concerns adequately.

Long-Term Goals Beyond FY 2000

The long-term goals of the natural gas and oil program support the Commission's mission. The Commission acts in the public interest to protect customers by promoting competition where possible and regulating services subject to market power where competition does not adequately exist. The Commission also acts to safeguard the environment and ensure service reliability.

Ensure that Pipeline Transportation Service Supports Efficient, Competitive Commodity Markets. Improving standardization among

The Commission will:
- Ensure that pipeline transportation service supports efficient, competitive commodity markets.
- Protect customers from excessive transportation rates and service discrimination.
- Ensure that adequate capacity and reliable, flexible service is available in the interstate natural gas transportation system.
- Ensure fair access to the oil pipeline systems for all customers under just and reasonable rates, terms, and conditions.

pipeline systems for both information and business practices results in gas moving more efficiently. Establishing fair and effective markets ensures that the parties obtain the capacity and gas they have purchased and ensures system reliability. Removing barriers to efficient secondary transportation markets is an additional method for improving commodity markets.

As competitive markets mature and the Commission adjusts its regulatory structures, customers will have more new transportation service products and a reasonable range of suppliers from which to choose. Natural gas prices will become more responsive to market conditions — that is, prices will reflect changing supply and demand conditions more clearly and more quickly. Natural gas prices within each region will converge, except to the extent that demonstrable transportation constraints exist, making it less costly, administratively, to transact business on the interstate transportation grid.

Protect Customers From Excessive Transportation Rates and Service Discrimination. As pipelines are permitted to implement more nontraditional forms of pricing and service, the Commission will monitor the industry to ensure the pipelines are not being preferential or unduly discriminatory, charging unjust and unreasonable rates, unduly exercising market power, or providing services that are inadequate or undesirable. The Commission's regulatory systems will be based on Commission monitoring and information availability to permit customer complaints that can respond to the increased pace of the market without unduly burdening market participants. The Commission will ensure that both buyers and sellers have access to competitively priced commodity markets in the national gas transportation grid and that gas pipeline rates are just and reasonable, fairly balancing the competing interests of the pipelines and their customers.

Ensure That Adequate Capacity and Reliable, Flexible Service Is Available in the Interstate Natural Gas Transportation System. Getting gas to market will require expansions in the pipeline transportation and storage grid to handle new supplies and changes in the geographic mixes of production and consumption. The Commission will encourage efficient gas pipeline construction to provide individual customers and market entrants with increased reliability of service by providing them with multiple supply and delivery options. The Commission's certification program will allow new pipeline capacity to be available to serve the market when needed. Certification of new pipelines will be timely, while fairly balancing the interests of the gas market, project sponsor, landowners, and the environment.

Ensure Fair Access to the Oil Pipeline Systems for All Customers under Just and Reasonable Rates, Terms, and Conditions. The Commission will continue to ensure fair access to the oil pipeline systems for all customers under fair terms and conditions at reasonable rates. In some cases, this can be done through allowing market-based rates where markets are competitive. In others, the Commission needs to continue regulation, while remaining flexible, for the pricing of services for new oil pipeline construction.

Program Challenges

The most significant change in the gas pipeline industry is the increase in competition to provide gas services. With this increase in competition has come an increase in the number of pipeline certificate filings and the number of unique and innovative rate filing proposals. Many of the new pipeline certificate projects are proposed to be built in congested areas, in more environmentally-sensitive areas, or in competition with existing pipelines in the same geographic area. To deal with the increasing difficulty presented by the rate filings and the more contentious proceedings for certificates, the Commission has undertaken an examination of its regulatory programs.

A Notice of Proposed Rulemaking (NOPR) issued in late summer of 1998 seeks to revise the regulation of natural gas short-term transportation market to a more market-based approach. A Notice of Inquiry (NOI) issued at the same time requests comments on options for dealing with the long-term issues facing the gas transportation industry, in light of marketplace changes and the proposed regulation changes for the short-term market. In addition, the Commission issued two NOPRs and held several technical conferences to improve the certification process, meet the need of the competitive market for timely construction decisions, address landowner concerns, and meet statutory requirements. The Commission also issued a NOPR revising its *ex parte* rules to make them more responsive to the current needs of the industry while continuing to meet the requirements of the Administrative Procedure Act. Finally, the Commission issued a NOPR proposing to revise its procedures to ensure fair, timely resolution of complaint filings.

Through *FERC First*, the Commission is further modifying its internal processes to implement case triage, to route cases quickly to the appropriate process path for speedier processing, and interdisciplinary teams, to improve coordination of some cases and eliminate layers of supervisory review. These and other changes will allow the Commission to more timely process its workload to meet the competitive needs of the marketplace while still ensuring just and reasonable rates in the noncompetitive sectors of the market. By taking these approaches, the Commission should be able to handle its increasingly complex workload without the need for additional staffing.

Rates & Services

As the Commission moves toward more light-handed regulation, with increasing reliance on market-based solutions and reduced regulatory burden on the industry, the nature of natural gas and oil pipeline filings has changed. Many of the routine filings are no longer required or are now done on a self-implementing basis. As the pipelines continue to redesign their services and rates to respond to the changing competitive environment, the resultant filings often raise issues not yet addressed by the Commission. The result is that, while the total number of rate filings is lower than in previous years, the complexity of the workload has increased dramatically. In addition, many of these new approaches are filed as part of certificate applications for new projects rather than in rate filings. Pipelines are experimenting with variations of negotiated rates, incentive rates, and market-based rates. This trend is likely to continue as pipelines devise creative approaches to a

changing and increasingly competitive market. In addition, the industry's efforts to standardize business practices in coordination with the Gas Industry Standards Board (GISB) have resulted in many, often complex filings. The Commission expects that the number of GISB filings will decline somewhat in FY 2000. However, the Commission expects an increase in filings related to the NOPR revising regulation of the short-term natural gas transportation market.

Renegotiation of expiring contracts with substantial volumes will present unique issues to the gas industry.

Capacity Turnback. While several pipelines have already faced renegotiation of a substantial amount of capacity on their systems, significant volumes of currently contracted capacity will be up for renegotiation under expiring contracts beginning in 1999 and for several years after that. The pipelines' ability to resell this capacity will affect not only recovery of their costs but the rates to shippers whose contracts are not yet eligible for renegotiation or that choose to remain on a pipeline's system. As state programs instituting retail unbundling become reality, distribution companies are not likely to require their historical levels of pipeline firm transportation quantities, and capacity turnback levels could then grow unless other shippers contract for the capacity. To date, the Commission has been able to foster settlements between the pipeline and its departing and remaining customers. As pipelines experience more capacity turnback situations with unique issues, such settlements may be more difficult to accomplish.

Kansas Ad Valorem Tax Refunds. Before the passage of the Natural Gas Policy Act of 1978, the Commission permitted natural gas producers to treat Kansas ad valorem taxes as severance taxes to be added on to the area or national prices of gas. In 1997, the Court of Appeals ruled that the Kansas ad valorem tax was not a severance tax and thus was not an appropriate add-on to the price of gas. Thus, the Kansas ad valorem taxes passed through by the pipelines to consumers of gas must be refunded with interest for gas sales dating from 1983. Since the refund requirement could present serious individual financial problems for the owners of the gas wells, the Commission stated that it would entertain individual requests for adjustment relief to alleviate the hardship. This refund program will engender many workload items for the Commission over the next five years as the refunds are made. Refund report filings will be made by the pipelines, and the producers will be filing hardship relief applications. In addition, the Commission will be contacting those producers that do not make the refunds required and seeking necessary actions to enforce the refund obligation. This program will cover a five-year period to allow for the refunds to be made over a longer period to lessen the economic burden that a one-time full refund would entail.

Standardization of Business Practices. In FY 1997, the Commission started implementing standardized business practices through the auspices of GISB. As a voluntary organization, GISB made significant progress in the standardization of business practices relating to nominations, confirmations, invoicing, and other areas. However, it also became apparent that standardization involving financial or regulatory interests would require stronger Commission involvement. Because of the often competing financial interests of segments of the industry, this process is expected to be time consuming and staff-resource intensive. The standardization effort will

continue to result in many tariff filings as natural gas pipelines carry out the standards. Many of these filings are complex and will require interpretation and analysis of waiver requests due to the unique nature of individual pipeline business operations.

Complexity of Issues. As the pipelines continue to adjust their operating terms and conditions to meet the changing needs of their shifting customer base, which now includes many more marketers and new industrial loads, the Commission expects complex tariff filings to continue. The Commission also expects tariff filings that will revise penalty provisions, supply pooling provisions, capacity awarding mechanisms such as auctions, and operating restriction requirements that the pipelines believe are necessary to maintain balance and flexibility in their systems. These types of filings are likely to be increasingly complex and often heavily protested, thus requiring significant resources for review and analysis.

Many proceedings before the Commission involve issues that are hotly contested by affected parties. The Commission uses procedures such as technical or settlement conferences and alternate dispute resolution to resolve contested issues quickly and without protracted litigation. For oil pipeline cases, the Commission's regulations require that all protested rate filings be referred to a settlement judge and that the parties enter into good faith negotiations. If these alternative procedures cannot bring resolution of the contested issues, the Commission sets the case for an administrative law trial. These proceedings permit extensive discovery by the parties and allow for at least two sets of testimony by each party. During the trial phase, staff continually attempts to encourage settlement among the parties.

The complexity that can occur with litigated gas cases is illustrated by the Tennessee Gas Pipeline Company case. This case started out as a filing to recover more than $153 million in gas supply realignment (GSR) costs incurred by Tennessee as the claimed result of its implementation of Order No. 636. After a technical conference, hearing, settlement discussions, consolidation with other GSR cost filings, and an alternative dispute resolution minitrial proceeding, the parties and staff reached a settlement. The settlement resolves a total of 34 Commission dockets and 39 D.C. Circuit Court appeals, and limits the issues to be pursued in seven additional appeals. The settlement was approved by the Commission nearly four years after the case was filed.

The Commission expects to see more of these difficult filings in cases where the parties are unable to resolve contested issues through settlement or alternative procedures.

Monitoring and Auditing of Industry Practices. The Commission will continue to expand the scope of its auditing activity as part of its continuing monitoring, oversight and enforcement effort. The auditing activities will stress the oversight of the development of competitive markets and will target industry compliance with the Commission's rules and regulations. Such oversight requires auditing of industry-wide practices to provide information for the Commission to employ in its choice of regulatory approaches to foster competitive markets. Audits include data gathering and analysis that could

result in systemic findings about the state of the industry. For example, during FY 1998 the Commission began an audit of the pipeline marketing affiliates' compliance with the Commission's standards of conduct and reporting and record keeping requirements. Audits are also effective tools to resolve material issues of fact in complaint proceedings. In the NOPR on the short-term gas market, the Commission is proposing an increased monitoring effort as an integral part of its proposed new market-oriented approach to regulating the short-term market.

Certificates

Pipeline Expansion. The pipeline industry is aggressively pursuing new markets after completing restructuring and gaining operating experience in the restructured environment. In the new competitive environment, pipelines are proposing to serve markets already served by other pipelines. Many of these proposals are vigorously contested by the competing pipelines and by landowners who question the need for the new projects. Processing these contested proposals requires significant resources. The environmental review of such projects has become more complex and time-consuming, with additional public meetings and conferences and voluminous pleadings by the various parties. The Commission must address the competing interests of affordable, reliable supply versus the environmental impact and grant of eminent domain for potentially duplicative facilities. Competing proposals are likely to increase with the coming of retail unbundling and the convergence of the electric and gas markets.

The issues the landowners raise fall into three basic categories: (1) questions concerning the need for new pipeline facilities when the project displaces service through existing facilities instead of serving new markets; (2) concerns about disruption of current rights-of-way; and (3) concerns about the environmental and economic impacts of new construction, including the expansion of rights-of-way and the use of eminent domain to take additional landowner property. These issues can become very difficult to resolve; thus, as more landowners intervene and raise their concerns, the Commission will need to expend additional resources in this area. In this regard, implementation of the Commission's *FERC First* initiatives and other collaborative approaches may enhance dispute resolution and strengthen relationships with the various constituencies.

Growing Canadian supply and U.S. demand are driving new international natural gas projects.

Increasing availability of Canadian supplies and the growing market for natural gas in the Northeast will continue to result in large construction projects. The Commission also expects that Canadian gas and oil suppliers will seek additional markets for their products in the U.S. and that producers will explore options to export gas to Canadian and Mexican markets, which may require pipeline construction. Increased competition in these markets and customers' desires for multiple, competing sources of supply will generate more Natural Gas Act (NGA) Section 3 filings and related requests for Presidential permits for importing and exporting gas and oil. The Commission will also continue to see projects related to the extensive exploration effort on the outer continental shelf and construction of pipelines to reach significant new gas supplies.

The expansion of new market potential is increasing the Commission's work related to pipeline construction.

Growing demand in the New England, Mid-Atlantic, and Midwest regions of the country will continue to lead to applications for major pipeline extensions and new pipelines to serve these regions. Meeting construction and service time frames will require analyzing contractual arrangements among parties and monitoring interconnection policies to assure that competing pipelines may obtain access to markets and that customers have choices for their gas supply needs. Processing of major construction projects will entail technical conferences and public meetings as well as the analysis of data responses, comments, protests, and other filings. Where multiple pipelines propose to construct facilities in the same area, either for the same or discrete markets, the Commission will explore options for reducing the cost and environmental impact of the facilities by encouraging joint facility construction. Significant environmental compliance work will be ongoing in FY 2000 for projects that propose construction in 1999 and 2000.

Construction Project Complexity. With the increased awareness of landowners and citizens' groups, pipelines proposed in densely populated areas result in many interveners, more organized opposition to pipeline projects, and greater scrutiny of the Commission's environmental review. Also, many of these proposals present difficult rate issues involving the use of negotiated rates, rather than the Commission's traditional cost-based rates. The Commission expects more of these difficult cases to be filed in the future.

The complexity of construction projects is illustrated by a number of competing projects proposed to serve different markets. In New England, review of several projects is complicated by overlapping markets and construction areas and by strong local opposition. At the Commission's urging, two pipelines that had proposed parallel facilities through a congested and environmentally-sensitive corridor proposed a joint pipeline that was ultimately approved by the Commission. The sheer size of two projects proposed to transport gas into Chicago has contributed to the complexity of these projects; the two projects combined involve the construction of 1,660 miles of pipeline at a cost of $2.58 billion. In addition, three large, contentious competing projects have been proposed that will transport gas from Chicago to Eastern Canada and the U.S. Northeast. All three projects have already drawn opposition from various landowner groups and other parties. In each case an environmental impact statement will be prepared. Staff has held scoping meetings and site visits, and has received hundreds and, for one project, thousands of written and verbal comments.

Review of these projects requires extensive coordination among the Commission's engineering, environmental, rate, legal, and economic staffs, as well as among the Commission and a variety of federal, state, local agencies, and the public, in particular on environmental matters.

Storage Development. The Commission expects to continue to receive applications for storage development to be used for peaking capability and supply flexibility, since customers will continue to be responsible for their own gas supply acquisition. Anticipated storage facilities include depleted gas fields, new leached-salt caverns, and liquefied natural gas (LNG) tanks. Commission review and approval of these projects, many of which will be

located near market areas, is likely to generate significant public interest regarding competition, need; and environmental impact. As a result, the Commission will hold technical conferences and public meetings before making a decision as to whether these proposals are in the public interest.

Replacement Facilities. The Commission anticipates many applications for replacement facilities as a result of the aging of the national pipeline grid. Replacing aging facilities is necessary for safe pipeline operations. A replacement project may be fairly straightforward, with the pipeline proposing to merely remove old pipe and replace it with new pipe of the same diameter in the old right-of-way. The replacement projects can become much more difficult if the pipeline proposes to replace the old pipe with new pipe of a larger diameter, or to leave the old pipe in place, seal it off, and install new parallel pipe. These types of proposals can engender minimal to significant opposition depending upon the change in the size of the pipe, the environmental disturbance caused by the construction activities, and whether additional right-of-way must be acquired. The more contested the proposal, the more resources that will be required to deal with the issues; however, engineering review and environmental review will be required for all applications.

Acquisition of Excess Capacity. The Commission expects to continue to receive filings in response to its policy allowing natural gas pipelines to acquire capacity on other pipelines under certain circumstances. Where the costs of new construction and the related environmental impact render construction uneconomic, the policy makes excess capacity on upstream or downstream pipelines attractive to markets. However, this policy is not expected to reduce construction requests where new, firm load cannot be met by capacity releases.

The Commission is exploring further changes to its pricing policy statement to provide additional rate certainty for construction projects.

Construction Cost Impact on Rates. As the gas market has become more competitive, the need for rate certainty has risen. In response to the industry's concern that the Commission's certificate process did not provide sufficient rate certainty for the pipeline applicants or their customers, the Commission issued its FY 1996 policy statement, Pricing for New and Existing Facilities Constructed by Natural Gas Pipelines. As a result, processing certificate applications includes analyzing the rate impact of the project's cost and the system benefits. This analysis determines whether the project cost may be rolled into current rates or must be incrementally priced in the next rate case. As part of the changes proposed in the NOPR on the regulation of the short-term gas market, the Commission has asked for comments on whether its rolled-in versus incremental pricing policy should be revised. Additionally, the Commission has sought comments on the necessity of any modifications to traditional cost-of-service rates to serve the future needs of the industry.

Other Construction Issues. The Commission will continue to receive certificate cases involving jurisdictional issues concerning its NGA Section 1(b) and 1(c) and Natural Gas Policy Act Section 311 authority over facilities and services. As retail unbundling accelerates and the lines between interstate and intrastate services blur, the Commission expects growing concern over the different treatment of intrastate and interstate services.

Improving the certificate process will continue to be a top priority.

The Commission will continue to improve its certificate process to meet the needs of a changing gas market. The Commission expects to focus on overhauling the certificate process to make it more efficient and less burdensome on the industry and the public. A recent proposed rulemaking would streamline the certificate regulations and clarify and update certain regulations to conform to the Commission's present policies. At the same time, the Commission will continue to ensure that it has the information to determine, according to statute, that certificate applications are in the public convenience and necessity and meet environmental requirements.

Environmental Considerations

Competing Interests. Environmental concerns play a significant role in the review of certificate construction applications. Pipelines are facing increased opposition from landowners as new projects are proposed in more heavily populated areas. When new pipelines propose to serve markets currently served by existing pipelines, the benefits of alternative supplies of natural gas must be balanced with the environmental impact of a project. Landowners increasingly question the right of pipelines to use eminent domain in cases where the need for the project is determined by the market. Also, pipelines face timing concerns based on various environmental permitting requirements. As the certificate cases become more contentious, the Commission must devise new ways to issue certificates and address the intervening parties' concerns in a timely fashion. The *FERC First* effort and the Commission's proposed rulemakings will provide new, more effective ways to address the diverse concerns, by developing collaborative processes among all affected parties and revising the *ex parte* rules to facilitate open communication.

Environmental Issues Include:
- Proposed route and alternatives
- Eminent domain
- Noise impact and mitigation
- Historic property and cultural resources
- Right-of-way restoration, revegetation
- Endangered species, wildlife protection
- Erosion control, top soil segregation

Protection of the environment remains a top consideration in the processing of certificate applications. Under the National Environmental Policy Act, the Commission will continue to perform required environmental analysis of all gas pipeline construction proposals. The purpose of this analysis is to avoid or mitigate adverse effects on water quality, vegetation and wildlife, historic and cultural resources, soils and geological resources, land use, and air and noise quality. The Commission conducts a thorough analysis of each of these areas before any certificate project can proceed.

The Commission will work to balance the thoroughness of such analysis with the need to improve processing time. To this end, the Commission will continue to pursue methods and formats to review construction applications more quickly while continuing to produce complete environmental documents. The Commission continues to encourage the use of third-party contractors and applicant-prepared environmental documents. These alternatives have reduced the resources required for this workload area, and they offer the potential for accelerating the review process. However, Commission staff resources are still required to review the contractors' work to ensure accuracy and compliance with Commission policies.

Outreach. The Commission will continue to work with other agencies. The Commission has executed Memoranda of Understanding (MOUs) with the Department of Transportation on LNG and on natural gas transportation facilities and with the Environmental Protection Agency on pipeline facilities

contaminated with polychlorinated biphenals (PCBs). MOUs with other agencies are under consideration. The Commission will also enter into agreements with other agencies and state historic preservation offices to evaluate the impact of specific natural gas facilities on cultural resources. These agreements will ensure the Commission's compliance with Section 106 of the National Historic Preservation Act.

The Commission will continue to update its training seminars on environmental compliance, environmental report preparation, and cultural and historical resource requirements. In the past, incomplete filings have impeded the environmental review process. These seminars aid applicants in preparing complete filings and significantly improve the processing of certificate filings.

The Commission's public information program on pipeline construction also enhances the review process. Informing the public of Commission processes and actions has helped to resolve problems more quickly. The public information program includes:

- notification through mailings to all landowners whose land is crossed by pipeline right-of-way and/or who may be affected by noise levels;
- public notification of local environmental scoping meetings on proposed projects;
- public notification of preconstruction site inspections conducted by the Commission staff and other agencies on controversial projects;
- easy-to-understand brochures on the Commission's certification process;
- enhanced coordination with state agencies; and
- outreach programs explaining the Commission's environmental policies.

Other Environmental Considerations. The Commission plans to continue its field compliance inspections of projects under construction. The Commission expects this work to increase substantially as the major pipelines discussed above are certificated and built. The Commission will also monitor restoration of rights-of-way on pipelines greater than two miles in length, which were built under the automatic blanket authority, and projects completed under Sections 2.55(b) and 284 of the Commission's regulations. Safety inspections of jurisdictional LNG plants will continue biennially according to the NGA and an agreement with the Department of Transportation.

While a substantial effort in the environmental area continues to be directed toward improving the current process, the Commission will undertake new initiatives as resources are available. The Commission will evaluate the effectiveness of various environmental mitigation techniques implemented by pipelines pursuant to Commission orders. This study will guide the industry and the Commission in conducting the most effective mitigation at the most economical cost. In coordination with industry groups and other

federal agencies, the Commission is exploring an electronic geographic information system (GIS) to allow the filing of digital maps, graphics, and photographs for use in environmental analysis.

Oil Pipelines

The primary goals of the Commission's oil pipeline regulatory program are to ensure that (1) shippers and consumers do not pay unjust and unreasonable transportation rates; (2) transportation services are not discriminatory; and (3) oil pipelines have appropriate levels of incentives to continue to make prudent investments in their systems.

In Order Nos. 561, 571 and 572, the Commission established a generally applicable indexing methodology that allows for greater efficiency and ease in filing rate changes and delineated three alternatives to that methodology: traditional cost-of-service rates; market-based rates; and negotiated or settlement rates.

The Commission has statutory authority over approximately 170 interstate oil pipelines with combined transportation revenues of more than $6 billion.

The three orders all became effective concurrently on January 1, 1995, in accordance with the Energy Policy Act. Since then, many pipelines have taken advantage of the new relaxed regulations when filing rate changes under the simplified indexing program and waiver requests for short-notice filings. Several pipelines have also obtained market-based rates for certain areas of their systems upon showing a lack of market power. As an integral part of the generally applicable indexing methodology, the Commission will conduct a review of the selected index after five years of experience, in 2000. This first review will examine the relationship of the annual change in the index to the actual cost changes experienced by the industry.

Like natural gas certificate and rate filings, oil pipeline filings also are becoming increasingly complex. An example of the complexity of the proposals in the oil pipeline area is a filing by Express Pipeline Partnership (Express). This was a proposal for an international pipeline from Alberta to interconnect with other crude oil pipeline systems in Wyoming. The U.S. portion of the pipeline consists of 515 miles of pipeline with a capacity of 172,000 barrels per day. In the first of its kind proposal, Express proposed preconstruction rates that differed depending upon the timing of service acquisition and the nature of the service acquired. The Commission was required to develop new policy and legal bases for its analysis of the proposal and to justify permitting these new types of rates to become effective upon construction of the pipeline. The Commission's rate, accounting, and legal staffs coordinated to review the cost study to decide the reasonableness and legality of the proposed extended term rates, depreciation schedules, and differentiation of rates among customers.

Work on formal cases involving the Trans Alaska Pipeline System has resulted in several settlements resolving numerous intricate and contentious issues. For example, a settlement on the Quality Bank case resolved issues in dispute for over nine years. These settlements, in concert with a drop in the level of pipeline throughput to below full capacity, have resulted in a more competitive atmosphere and the likelihood of less litigation on this pipeline system in the future.

However, the Commission expects to face further challenges as oil pipelines submit contentious filings designed to serve more specific market niches. Novel filings such as those made by Express are likely to become the rule rather than the exception as oil pipelines move to compete in energy markets.

The Commission will continue to encourage novel approaches for new pipeline projects. Providing timely issuance of decisions will aid in the establishment and acquisition of financing for prudent new projects such as its efforts in approving the Express Pipeline Partnership, Longhorn Partners Pipeline, and Rio Grande Pipeline Company projects.

FY 1998 and First Quarter FY 1999 Achievements

Besides processing its traditional statutory work, the Commission undertook the following significant projects.

Proposed Rule Would:
- Maximize short-term competition
- Mitigate residual market power
- Monitor for abuse of market power

Examination of Issues and Priorities for the Natural Gas Industry. In FY 1997, the Commission held a conference with industry participants that focused on the future of the industry and also on issues relating to service flexibility, pricing, pipeline capacity, and Commission procedures. As an outgrowth of this conference, the Commission launched a comprehensive review in FY 1998 of its regulatory methods, which culminated in its gas policy initiative. The Commission issued a NOPR proposing a more market-based approach to regulation of the short-term transportation market. The primary NOPR proposals include the following: removal of the rate cap for all short-term transportation services, required auctions for all short-term transportation capacity, and negotiation of terms and conditions of services. The NOPR also requested comments on possible changes to its certificate policies to ensure that needed construction without overbuilding will occur. The changes include reviewing the test used to determine the need for construction of new capacity and revising the Commission's pricing policy for new capacity. The Commission simultaneously issued a NOI requesting comments on a variety of long-term transportation issues in light of market changes and the regulatory changes proposed in the NOPR. The NOI seeks comments on whether the Commission should modify its long-term market pricing policies by moving away from traditional cost-of-service ratemaking or by modifying the current ratemaking methods.

Financial Conference. As a part of its gas industry review, the Commission held a conference on the financial outlook of the natural gas pipeline industry. The purpose of the conference was to improve its understanding of the regulated natural gas pipelines' current financial circumstances and to gain perspective on whether it appropriately recognizes the industry's financial condition in a newly competitive environment. The Commission also explored its rate of return methods and its overall ratemaking policies. The conference and comments formed the basis for a new Commission policy on rate of return and capital structure initiated in FY 1998.

Focus on the Complaint Process. After reviewing public comment on two petitions on procedural reforms to its complaint process, the Commission held a conference to provide a public forum for the parties to share their

views. The comments and the conference, along with recommendations generated by the Commission's *FERC First* effort, led the Commission to propose changes to its complaint procedures. The Commission then issued a NOPR proposing revised procedures that will ensure fair, timely resolution of complaint filings.

Implementation of Electronic Filing. Pursuant to the requirements of Order Nos. 581 and 582, the Commission received for the first time electronic filings for certain natural gas program filings during FY 1997. These filings included the Index of Customers, Discount Reports, Form Nos. 2, 2-A, and 11, and rate cases. The Commission worked with the industry to develop filing requirements to ensure proper formatting and content compatible with the pipelines' and the Commission's computer systems. As a result, the Commission developed a means for receiving these filings in electronic format and distributing the filed information to the public. The gas staff developed a system that loaded the filed data into databases for access by the public through the Commission's electronic bulletin board. During FY 1998, the Commission received more than 1,300 electronic filings. Similar numbers of electronic filings are expected in FY 1999.

Development of the Gas and Oil Web Site. Electronic filing of the rate cases and the Forms 2, 2-A, and 11 generated a need to develop a method for distribution of the electronically-filed information to the staff. Thus, the gas staff developed an intranet web site, the Office of Pipeline Regulation Intranet (OPR Web), that made the electronically-filed information, and other pertinent Commission information, orders, and data, available to staff for review and for analysis. When the Commission upgraded its Internet Web site, it moved much of the information available on the OPR Web to the Commission Web site, to allow the public additional access to electronically filed information and other Commission records.

Standardization of Industry Business Practices. With the encouragement of the Commission, GISB has adopted additional business practice standards. These include standards relating to electronic communication over the Internet, aimed at simplifying the process of transacting business across the interstate natural gas pipeline grid. In FY 1998, the Commission issued a final rule adopting Version 1.2 of the GISB standards, further simplifying business processes, and providing policy guidance for continued standardization. To implement the standards, each natural gas pipeline was required to make a tariff filing with the Commission. The Commission reviewed the filings and any comments, requiring revisions as appropriate. Most filings required at least one compliance filing in order to effect implementation. In total, we processed more than 100 GISB implementation filings. In FY 1998, the Commission also issued a final rule adopting additional GISB standards dealing with intra-day nominations and revisions to nomination and confirmation procedures. In FY 1999, the Commission issued a NOPR proposing to adopt Version 1.3 of the GISB standards. It also issued a final rule establishing a required date for pipelines to enter into operational balancing agreements with interconnecting interstate and intrastate pipelines.

Certification to Build Major Facilities. The Commission authorized many major projects, including system expansions of such pipelines as National Fuel Gas Supply Corporation, Northern Natural Gas Company, Questar Pipeline Company, Southern Natural Gas Company, Great Lakes Transmission Limited Partnership, Transwestern Pipeline Company, Transcontinental Gas Pipe Line Corporation, East Tennessee Natural Gas Company, and PG&E Gas Transmission, Northwest Corporation. The Commission approved a proposal by KN Wattenberg Transmission Limited Liability Company to construct the Front Runner Pipeline Project. This project will provide a needed transportation alternative in the Front Range area of the Rocky Mountains that will increase competition among pipelines. The Commission also approved applications by Pacific Interstate Transmission Company, Northwest Alaskan Pipeline Company, PG&E Gas Transmission, Northwest Corporation, Transwestern Pipeline Company, Northwest Pipeline Company, and Pan Alberta Gas (U.S.) Inc., which restructure natural gas sales and transportation agreements of the Alaska Natural Gas Transportation System. The new agreements will more efficiently meet new market situations.

The Commission issued certificates for new projects into the Chicago and Northeast markets for Alliance Pipeline, L.P. and Maritimes & NE Pipeline, L.L.C., respectively, and issued a preliminary determination for Vector Pipeline L.P. to move gas from Chicago toward the Northeast. The Alliance project is a major new pipeline that is part of a combined Canadian-United States pipeline project. A new 975-mile long Canadian pipeline will interconnect with the 887-mile long United States facilities. The $1.34 billion Alliance project will be a high-pressure system to transport high-Btu, high-ethane gas to Chicago.

The Commission also certificated proposals to construct new LNG facilities for Granite State Gas Transmission, Inc. and to operate existing LNG facilities for Total Peaking Services and Hopkinton LNG Corp. In addition, the Commission authorized a major salt cavern storage proposal by N.E. Hub Partners, L.P. To ensure compliance with environmental regulations, the Commission monitored pipeline construction and right-of-way restoration activities on almost 400 construction compliance trips in FY 1998.

Certification to Build Offshore Facilities. The Commission has recognized the importance of current gas production on the outer continental shelf and its potential as a source of new gas supplies. In FY 1998, the Commission acted on nine pipeline applications or requests for declaratory order on jurisdiction of facilities. Of these, eight were to develop offshore supplies in the Gulf of Mexico with deliverability of more than 900,000 MMBtu per day, and one was to develop offshore supplies in the North Atlantic with deliverability of 590,000 MMBtu per day. These offshore pipeline projects raise the issue of which statutory authority, the Natural Gas Act or the Outer Continental Shelf Lands Act, applies to the Commission's regulation of transportation from the offshore platforms to the mainland and how the Commission should exercise that authority. The Commission issued a NOI soliciting industry comments on these issues in June 1998, and will be devising a policy informed by these comments in FY 1999 for application in late 1999 and beyond.

Proposal for Research and Development Funding. The question of funding for research, development, and demonstration in the natural gas industry has been an issue since open access and competition have hampered the pipelines' ability to collect the current Gas Research Institute (GRI) surcharge. The Commission convened a public conference to explore alternatives to the current GRI funding mechanism. After the conference, the Commission issued an order extending the current GRI funding mechanism for one year, simultaneously with a NOPR to address long-term funding issues including the funding for a voluntary noncore program. In response to the NOPR, parties proposed a settlement, and early in FY 1998, the Commission referred resolution of the GRI funding mechanism to a settlement judge. A modified settlement agreement was subsequently certified and approved by the Commission in FY 1998. The settlement results in the continued funding of GRI for a core program that would provide for research and development for the general benefit of the gas-consuming public. The settlement provides for the phase-in to fully-voluntary funding by the end of its seven-year term. The Commission also analyzed GRI's program filing for 1999 and approved its program plan and budget for that year.

Record Keeping Burden Reduction. The Commission issued Order No. 589 on February 5, 1998, which will reduce the public reporting burden in total for the electric and natural gas and oil pipeline industries by an average of $5 million annually. The Order, developed as a collaborative effort with the three industries, removed the Commission's prescribed units of property listings.

HYDROPOWER

Operating Expenses

(Budget Authority Dollars in Thousands)

	FY 1998 Actual	FY 1999 Estimate	FY 2000 Request
FUNDING	$49,176	$49,196	$52,713
FTEs	365	365	365

Overview

The Commission regulates nonfederal hydropower projects that use and affect a variety of important natural resources. Electricity generated from the power of falling water is economic, renewable, available for peak demand, and without emissions — a valuable contribution to the Nation's energy mix. Hydropower regulation must provide economic, environmental, and other public benefits.

External Changes Affect Licensing and Oversight

The Commission's regulation of hydropower is changing to fit new realities and challenges. Today's hydropower projects must adjust to competitive electric markets, increasing concern for the environment, cumulative effects of hydropower projects in a river basin or region, and shared jurisdictional authorities.

Hydropower is and will continue to be a significant component of the Nation's renewable energy mix.

- Hydropower represents 98 percent of all renewables
- FERC regulates over 1,660 hydropower projects representing 50 percent of total hydropower capacity in the US.
- Hydropower is regulated to promote long-term safety and sustainable development
- Today's hydropower projects must be able to compete in rapidly changing energy markets

Competitive Electric Markets. A major impetus for change in the hydropower industry is the increasing competitiveness of the electric power markets. Applications for new hydropower projects have fallen dramatically and are expected to remain low into the next century. Electric restructuring is prompting some licensees to begin reevaluating their existing hydropower assets, and sometimes to divest themselves of hydro generating plants. Others are finding new opportunities in obtaining such assets as part of a generation portfolio. Competitive electric markets will increase pressure on all licensees to control operating and maintenance costs to ensure that the projects remain competitive.

Increasing Environmental Concerns. The public's concern about the environmental impacts of hydropower operations increases every year. This heightened concern and a host of environmental laws result in many requirements in new licenses. In its alternative licensing process and monitoring activities, the Commission is focusing on resolving many conflicts over licensing before the filing of an application and is continuing staff involvement through post-licensing. Early and sustained collaboration among diverse participants is effective in finding solutions.

Because the values and circumstances of a project may change over time, license conditions may require revisiting and modification to make sure they continue to address the intent of the license adequately. Collaborative solutions can be written into a license and implemented during the term of the license. Collaborative efforts should lead to improvements in environmental outcomes, accountability, and river basin management, and are often beneficial for licensees, resulting in less costly, equally effective measures.

Focus on River Basins and Regions. Entire river basins and regions can be affected by the operation of hydropower projects. One or more projects in a basin can have significant impacts on water quality, endangered species, public use, water supply, and other aspects of environmental quality in the river basin and beyond. Therefore, when considering impacts and determining the licensing requirements for individual projects, the Commission takes into account the impacts and operations of other projects throughout the river basin.

Shared Jurisdictional Authorities. Successful hydropower regulation requires fostering cooperative regulatory approaches, such as up-front collaboration with other agencies to resolve conflicts, accommodate varied interests, and avoid duplication of efforts. This is increasingly necessary, both because others control some significant aspects of the regulatory process, and because issues are contentious. In the end, of course, the Commission still must make most final decisions about hydropower development.

Dam Safety

Hydropower projects must continue to meet the high standards of the Commission's dynamic, state-of-the-art dam safety program and must be administered to protect the public. With almost 70 percent of Commission dams more than 50 years old and almost 10 percent more than 100 years old, the Commission must remain vigilant. A sound, comprehensive inspection and maintenance program detects and corrects small problems before they become big ones. The Commission continues to gain knowledge and develop information for the assessment of structural soundness under extreme conditions, such as flooding and earthquakes.

Through cooperative regulation, the Commission distributes responsibility for dam safety among all participants — project owners, their engineering consultants, the states, and the Commission itself. The Commission also shares its dam safety expertise with other agencies and dam safety experts worldwide.

Long-Term Goals Beyond FY 2000

The Commission has identified the following three long-term goals of the hydropower program.

Ensure that Sustainable Hydropower Resources Are Licensed for the Public's Benefit. The Commission will continue to encourage the use of alternative licensing processes that emphasize collaboration and consensus

The Commission will:

- Ensure that sustainable hydropower resources are licensed for the public's benefit.
- Ensure that the nation's existing hydropower serves multiple water resource interests.
- Ensure dam safety through inspection of facilities and operations.

decisions, reduce the length of the process, and foster good working relationships. The Commission will seek to ensure that environmental licensing conditions are effective, mitigate environmental impacts, and enhance beneficial public uses over the term of the license. Finally, the Commission will evaluate the effectiveness of license conditions over time and allow for adjustments during the life of the license.

Ensure that the Nation's Existing Hydropower Serves Multiple Water Resource Interests. The Commission is challenged to accommodate increasing public uses without diminishing key water resource values. Each time the Commission must consider an adjustment related to one resource value at a project, it must equally consider potential impacts on all resource values. Furthermore, over the life of a license, external circumstances may change unpredictably. The Commission has seen that proactive administration over the life of the license is the most successful strategy. Cooperation and flexibility in achieving the desired ends will be necessary in a more competitive environment.

Ensure Dam Safety Through Inspection of Facilities and Operations. The Commission's dam safety program will ensure that the dams under its jurisdiction are properly constructed, operated and maintained. Vigilance is particularly necessary because of the increasing number of older dams under the Commission's jurisdiction. As engineering procedures improve, the Commission must work with licensees, the engineering community, Federal Emergency Management Agency (FEMA), federal and state agencies, and localities to ensure that its safety program continues to protect the public and resources. The Commission will focus on improving cooperation and coordination among all participants, and will inspect high- and significant-hazard dams annually, to ensure that these dams will comply with safety and emergency action plan requirements.

FY 1999 and FY 2000 Program Challenges

Hydropower licensing considerations must address competitive electric markets, heightened environmental concerns, the increasing need for a regional focus, shared jurisdictional authorities, and maintaining the safety of hydro generating facilities.

Licensing and Oversight

Relicensing currently makes up a large part of the Commission's hydropower licensing workload. Between the years 2000 and 2010, more than 220 project licenses will expire. These projects represent about 22 gigawatts, or 37 percent of the total generating capacity of all licensed projects. During relicensing, particularly in recent years, hydropower issues undergo intense scrutiny, involving many participants. This process considers economics and environmental requirements.

Licenses and license amendments involving new capacity also raise these issues. In all cases, the Commission must deal with these issues using cooperative, flexible, and innovative approaches. In addition, it must follow

through with monitoring and oversight throughout the life of the license to ensure compliance with the substance and intent of the license requirements.

Following is a discussion of how the main challenges facing the Commission for FY 2000 affect the Commission's work. At the end of this section is an example — the Snake River relicensing — which illustrates several of these issues.

Competitive Electric Markets. Hydropower's future is promising. New and existing hydropower may benefit from some initiatives. Certain federal and state restructuring plans and legislative proposals would require blocks of energy to be generated from renewable sources. Also, worldwide initiatives to minimize greenhouse gases favor conventional hydropower projects.

License Transfers. Some utilities are choosing or are required to divest themselves of all generating sources, not just hydropower. As a result, the Commission is receiving more applications to transfer hydropower project licenses. For example, Niagara Mohawk Power Corporation is a licensee or exemptee for 38 jurisdictional projects scheduled to be sold in FY 1999. Before approving a transfer, the Commission reviews the proposed transferee's compliance history and scrutinizes marginal projects for potential compliance problems. The Commission will work with transferees, as necessary, to ensure they understand their responsibilities under the license or exemption.

Recent sales of hydropower projects have sparked great interest and have involved prices well above book value. Hydropower projects supply ancillary services that increase their value, especially in the case of existing, operating projects. Large licensed but unconstructed pumped storage projects are finding it hard to obtain adequate power sales contracts and the long-term financing required for these capital-intensive investments. However, the peaking capacity system benefits of pumped storage and other peaking projects appear useful in the restructured market.

Heightened Environmental Concerns. Operations from hydropower projects have the potential to affect water quality, flow regimes, fish spawning areas, and fish movement. Endangered species listings are increasing, and the Commission is receiving requests to look at effects of projects on this growing list. The Commission must ensure compliance with the Endangered Species Act, and beyond this must balance a project's economic viability and power generation with the need to protect the environment and other water values. To address these needs, the Commission will rely on increased use of the alternative licensing process and on monitoring for environmental effects.

The Commission will promote and emphasize new business practices – educating licensees and participants, greater staff involvement in identifying and resolving issues, use of applicant-prepared EAs and third-party EIS contracting, and collaborative processes – to significantly improve hydropower regulation.

Alternative Process. In licensing and relicensing, the Commission will increasingly encourage participants to work together, foster increased interagency cooperation, and facilitate consensus decisions whenever possible. The Commission is offering the participants the flexibility needed to produce a better license application that will allow for more expeditious Commission processing. In the alternative process, Commission staff must

be involved with a project from the pre-filing stages and continue its involvement right through post-authorization monitoring. All participants — including the prospective applicant, Commission staff, other agencies, non-governmental organizations, Indian tribes, affected landowners, and other interested members of the public — collaborate to resolve issues as far as possible before the application is filed. The same collaboration will be important during post-authorization.

Monitoring and Proactive Compliance Assistance. Monitoring ensures that license conditions are met. As facilities age and environmental concerns increase, the Commission's monitoring and enforcement responsibilities also increase. Additional staff resources are being allocated to post licensing administration.

Actively involving our participants in post-licensing activities achieves more positive results for everyone.

In post-licensing and administrative work, the Commission has been successfully using cooperative procedures to achieve its compliance objectives, and these efforts will increase. These procedures recognize that a competitive marketplace increases project owners' sensitivity to the costs of compliance. The Commission is helping licensees to satisfy their safety and environmental protection obligations in partnership with other agencies and participants, to minimize violations and required audits, and to reduce the need for enforcement actions. Efforts have focused on helping project owners with small projects and those with recently issued licenses and exemptions. In FY 1999 and beyond, the Commission will extend this proactive effort to all licensees and exemptees.

Monitoring for Changing Conditions. Licensing and license administration are more and more ongoing processes, rather than one-time decisions. From the point of view of the licensee, the Commission, environmentalists, or other concerned persons, conditions may change after a license is issued, to an extent that requires revisiting the license conditions to assure attainment of objectives. The Commission is reevaluating its hydropower oversight processes to confirm that the measures required in licenses have the intended outcomes. This assures participants that as times and situations change, licenses can be flexible enough to meet the requirements of the licensees and other participants. It should also facilitate licensing, since participants will know that changes can be made during the new license term.

For instance, the Commission must give increasing attention to license requirements for monitoring the development of residential property and boat docks around the reservoir and considering adjustments to land use and reservoir management plans during the term of the license. Another issue requiring monitoring is that of increasing and disputed requests to withdraw municipal water supplies from hydropower reservoirs. As the number of these applications increases and competition for limited water supplies mounts, so will the effort required to process these requests on an individual and cumulative basis.

Another monitoring issue concerns requests to examine project impacts on federally listed endangered fish and to modify project operations if appropriate. For example, salmon species listed or proposed for federal listing in California, Oregon, and Washington coastal streams could affect the

Listings or proposed listings of salmon species as endangered could impact more than 150 Commission projects in the Pacific Northwest and California.

operations of more than 150 Commission hydroelectric projects. The Commission has initiated consultation with the National Marine Fisheries Service (NMFS) to address the effects of current project operation of the large Hells Canyon Hydroelectric Project on listed salmon species. In addition, the Commission staff is working cooperatively with the NMFS, licensees, and other participants in further developing and implementing habitat conservation plans for the Columbia River that will address the effects of multiple hydropower projects on listed species.

Flexible Approaches in Alaska. In Alaska, hydropower is cheaper than diesel fuel, which requires long-distance shipping. Currently, preliminary permits exist for 10 proposed projects, many of which are likely to result in future license applications. Processing applications for proposed Alaskan projects will pose unique problems requiring flexible approaches and a substantial commitment of staff resources. Scoping meetings and project site visits will be expensive, because of the high costs associated with travel to remote locations. There will be heightened resource concerns because of Alaska's natural settings, and conducting required resource studies will be complicated by the short summer season. Presently the Commission is working with six applicants using the applicant-prepared environmental assessment (APEA) process. The Commission expects future applicants to pursue this or other pre-filing processes, and will work with them to improve the licensing process.

Focus on River Basins and Regions. When considering impacts and determining the licensing requirements for individual projects, the Commission must take into account the cumulative impacts and operations of other projects throughout the river basin.

Relicensing Larger Projects Affecting Entire River Basins. Another round of relicense applications began in FY 1997 and will continue in FY 1999 and FY 2000 — 79 filings representing 5 percent of the capacity of all licensed projects. In these three years the Commission will receive the initial filings of the larger group of 220-plus projects with licenses that expire in FY 2000 through FY 2010. The 22-gigawatt capacity of these projects is 37 percent of the total generating capacity of all hydropower projects. On average, they are 10 times larger than the projects whose licenses expired in 1993, have multiple developments, and some affect very significant environmental resources in entire river basins and regions. The larger number of participants with diverse interests and objectives will increase the difficulty of relicensing these projects. The Commission will strive to address major issues during the pre-filing process and attempt to bring the many participants together. Further, the Commission will focus on assessing the project's effects on resources in a river and its basin, and balancing interests to ensure comprehensive development.

Shared Jurisdictional Authority. The Commission is increasing efforts to work cooperatively with other agencies to balance competing interests. Licenses contain many environmental requirements developed by other agencies that are often imposed through these agencies' mandatory conditioning authority. Shared jurisdiction lengthens the time of the licensing process, and the resulting license articles add additional costs to the

The staff's involvement in relicensing projects on the Upper Menominee River, St. Lawrence River, Clark Fork River, and the Snake River demonstrate the Commission's response to the need for innovative public and agency participation.

project. These additional costs are often at odds with pressures of the competitive market to keep costs to a minimum. For all these reasons, interagency cooperation is critical in fulfilling the Commission's role and ensuring that hydropower is part of the Nation's energy future.

The Commission must provide leadership and bring participants together to resolve the difficult issues associated with projects. Traditionally, the burden of greater public and agency participation was left to prospective applicants of hydropower projects. However, the size of the projects, the scope of environmental issues, and the large number of participants are placing increasing pressure on the Commission to facilitate processing. Innovative approaches such as APEAs and third party environmental impact statements (EISs) are excellent processes to improve public and agency participation. The Commission staff has been participating actively in the pre-filing process and during administration of licenses to facilitate consultation and dialogue regarding endangered species, water quality certification, historic preservation, and other matters. Guiding licensees and other participants through such processes will require a commitment of significant staff resources over the next several years.

The Snake River relicensing, discussed below, is an example of a collaborative river basin approach to consensus decision-making, designed to resolve issues before applications are filed with the Commission. Other examples of innovative public and agency participation include the St. Lawrence-FDR Project in New York, the Cabinet Gorge-Noxon Rapids Projects in Montana, and the Lake Gaston Project in Virginia.

The Snake River Relicensing. Processing the relicense applications for Idaho Power Company projects on the Snake River is an example of how the Commission is dealing with environmental and river basin issues and using a collaborative approach. The Snake River is one of the most heavily developed basins in the west, with more than 50 percent of its 1,050 miles impounded. The main issues in the Snake River Basins are salmon restoration options and allocation of scarce water resources. Resolution of Snake River Basin issues will be a component in the recovery of Pacific Northwest salmon resources.

Idaho Power Company operates eight projects on or adjacent to the Snake River in Idaho and Oregon, spanning 360 miles, whose licenses have expired or will expire between 1997 and 2008. Four applications already have been filed. Of particular importance is the Hells Canyon Project, whose license will expire in 2005. This project, consisting of a series of three large mainstream dams and producing almost 1,200 megawatts, has blocked access to about one third of the basin by salmon, including three endangered species.

Idaho Power Company and stakeholders have developed a collaborative process to address issues associated with relicensing the Hells Canyon Project and other projects. Members of the collaborative team are diverse — including federal, state, and local agencies; Indian tribes; conservation organizations; recreational users; industrial power purchases; and the public. The team, focusing on study needs and environmental protection measures,

works together to frame public issues, resolve controversy, and identify stakeholder needs. The Commission staff is working with the team. The collaborative process has been successful in fostering a good working relationship among the participants and in reaching consensus on many issues. The Commission has conducted extensive scoping to decide how to process these eight projects, and participants have identified as significant issues water quality, fish habitat, riparian vegetation, other flow-related resources, and the cumulative effects of all eight projects.

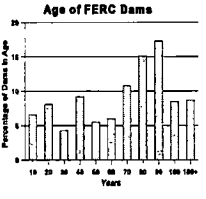
After discussion with stakeholders, the Commission staff decided to prepare a multi-project EIS for the first four projects, to include a basin-wide cumulative analysis of affected resources. However, because of the limited effects of the first four projects on anadromous fish, the Commission will defer the analysis of the cumulative effects on anadromous fish until it receives applications for some of the other expiring project licenses. Meanwhile, the Commission will begin a preliminary review of the cumulative effects on anadromous fish as it processes the first four applications, to gain an understanding of the complex issues involved.

The evaluation of project-specific and cumulative impacts in the basin will represent a significant commitment of staff resources. Complicating factors are the size of the basin, the number of projects involved, the complexity and controversy of the issues, the intense public and agency interest, past cumulative impacts, and the many competing uses and demands for limited water resources.

Dam Safety

One essential and constant element of the Commission's hydropower program is dam safety. The protection of life and property is of paramount consideration. Most important, in its inspection program, covering more than 1,600 projects and more than 2,600 dams, the Commission's regional offices conduct about 2,800 inspections every year. Other important elements include maintaining vigilance, both to meet the challenges of aging dams and to deal with changing dam ownership in the dynamic electricity market; dealing with many remediation and monitoring issues; overseeing the development and testing of emergency action plans; using cooperative regulation; and providing assistance to other federal and state agencies.

Maintaining a Vigilant and Active Dam Safety Program. Remaining vigilant is important to maintain safety as the population of jurisdictional dams ages. Vigilance is also necessary as dams change hands in the competitive electric industry.



Aging Dams. Many older dams were constructed without the knowledge of design and construction practices in use today. Older embankment dams, for example, were constructed using techniques and equipment different from those used today. As research and technology advance, new engineering theories and solutions develop. This does not imply that dams are unsafe, but rather that dams constructed today would be designed and built differently. Even with older dams, the majority are stable for most conditions, but the Commission must continually evaluate dams under extreme conditions, such as earthquakes and floods.

Competition in the Electric Power Market. The competitive market brings additional strains to dam safety. As some large utilities begin to sell their hydropower projects, the Commission must make certain that the projects are properly monitored and maintained. Through its inspection program, the Commission will be aware of changes and observe any resulting effects of these changes. These effects may require more dam safety inspections and even more communications and meetings with licensees.

Remediation and Monitoring. As the population of dams ages, the remediation phase of the Commission's dam safety program includes more monitoring.

Since 1981, 457 dams have undergone remediation; 110 more are ongoing, in full compliance with all applicable environmental regulations and safeguards.

During construction, the Commission's projects comply with all applicable federal and state environmental regulations and include appropriate environmental protection measures, such as erosion control plans and flow monitoring systems. Other dams are in stages of problem identification, solution planning, and implementation — usually a structural modification. The Commission ensures that dams satisfy the requirements of its engineering guidelines and conform to the federal guidelines for dam safety.

As dams age and undergo various stress conditions (e.g., floods and earthquakes), they are subject to different ranges of structural stress. The Commission will use monitoring and instrumentation to decide whether the condition of dams and their appurtenant facilities is changing. This procedure is the key to detecting potential problems before they become serious and deciding whether new remediation is necessary. With monitoring data available, the Commission will expect licensees and their consultants to evaluate continually the condition and performance of their projects. If the data show no significant trends or changes in project performance, then future independent consultant reports will focus on operation and maintenance to ensure timely maintenance and repairs.

An important part of the transition from remediation to monitoring for aging dams is the development of additional engineering guidelines on dam performance and monitoring for staff civil engineers, dam owners, and independent consultants. These guideline additions will include the review of dam safety analyses, along with instrumentation and monitoring data, to determine structural safety at any given time.

With lives at stake, the Commission keeps abreast of technological advances in field and laboratory investigative and analytical procedures, including innovative designs for proposed remedial modifications. The dam safety staff continually investigates new analytical methods. Keeping abreast of advancements in state-of-the-art analytical techniques and in the technology of embankment and concrete dams can add time to the process of analyzing data and recommending modifications. However, licensees have benefited from the Commission's monitoring of advances in field investigative techniques. The Commission requires licensees to use these new techniques for quality control. These efforts have typically resulted in cost savings associated with remediation and have sometimes eliminated the need for dam safety modification work.

Flood Evaluations Require New Methods. The Commission evaluates the ability of projects to withstand large floods as part of dam safety assessments. Maximum rainfall that can be expected in an area determines the magnitude of the flood the dam has to pass. Estimates of flood magnitudes derived from these values showed many projects to be inadequate. This meant that remediation would be necessary for the structures to withstand floods greater than those for which they were originally designed. The Commission is conducting site specific evaluations to avoid the possibility of unnecessary project remediation.

Liquefaction Evaluations of Dams. Liquefaction occurs when significant portions of a dam or its foundation suddenly lose strength during an earthquake, potentially affecting its ability to retain the reservoir. The Commission staff must evaluate several embankment dams to determine their ability to withstand earthquakes. The state-of-the-art methods required in these evaluations are being pursued internationally and are the subject of many technical papers and conferences throughout the world. The Commission staff must conduct extensive reviews and attend several meetings to address the critical issues.

Commission staff and its consultants are giving direction on these issues and holding periodic meetings with the licensees and their consultants. This process expedites the licensee's analysis and preempts any possible disagreement regarding the methodology or results. This procedure will also serve to develop a consistent approach in dealing with similar issues on other dams. The Commission staff is discussing these issues with other dam safety organizations, such as the Bureau of Reclamation.

Emergency Action Plans. All of the inspections, remediation, and monitoring the Commission maintains, however, cannot guarantee that emergencies will not occur. Therefore, the Commission requires the development, maintenance, and periodic testing of emergency action plans. These plans are another line of defense for the protection of life and property. They specify preplanned actions that owners must take, in coordination with state and local preparedness agencies, in case of flood, earthquake, or project facility failure. The Commission is recognized as a national leader in emergency action plans and regularly shares its expertise with many other agencies. (See the following section, FY 1998 and First Quarter FY 1999 Achievements, for further information.)

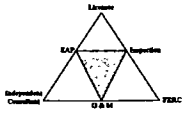
The list of identified dam safety participants is growing to include federal and state resource agencies.

Expanding Cooperative Regulation. The Commission is responsible for ensuring that licensees and exemptees build, operate, and maintain safe projects. The Commission's five regional offices conduct the inspections and are the Commission's direct link to day-to-day project operations and construction activities. They also monitor compliance with license requirements.

A fundamental philosophy of the Commission's dam safety program is cooperative regulation. The Commission distributes the responsibility for dam safety among all participants — project owners, their engineering consultants, and the Commission itself. Today, with the list of identified

participants growing to include federal and state resource agencies, the effort to include cooperative partners is also growing.

DAM SAFETY TRIAD



When the licensee, the independent consultant, and the Commission staff — known as the Dam Safety Triad — work together, with each focusing on its established area of responsibility, the necessary checks and balances are maintained. In addition, this cooperative approach results in comprehensive evaluations, while using Commission resources efficiently. The public and the environment are protected throughout the construction, operation, and maintenance of the hydro facilities.

Providing Assistance to Other Federal and State Agencies. The Commission's dam safety expertise is called upon nationally and internationally.

The Commission shares its knowledge with the community of dam safety experts to meet a broad objective of universally improving dam safety. Exchanging information is valuable to all participants and helps the Commission to refine and improve its program. The Commission is an active member of the Interagency Committee on Dam Safety (ICODS), which establishes Federal Dam Safety Guidelines for all federal agencies involved with the design, construction, operation, and regulation of dams. The ICODS provides agencies a forum and mechanisms to cooperate, share information, develop technical guidelines, discuss research needs and progress, and develop dam safety training.

The Commission shares its knowledge with a variety of other agencies, and has trained many agencies in emergency action planning. Through memoranda of understanding, the Commission helps the U.S. Department of Energy and the Nuclear Regulatory Commission meet federal dam safety guidelines by inspecting and evaluating dams under their jurisdiction.

The President recently signed legislation requiring the Commission to serve on a board of dam safety experts. These experts assist the Director of FEMA in carrying out the National Dam Safety Program and advise the Director of FEMA on institutional, managerial, technical, legislative, and policy issues affecting national dam safety. The Commission coordinates with states to conduct joint inspections, to share results of the independent consultant inspection reports, to provide emergency action plan training, and to share information.

FY 1998 and First Quarter FY 1999 Achievements

In FY 1998 and the first quarter of FY 1999, the hydropower program realized many significant achievements.

Licensing and Oversight

Interagency Task Force. To improve relations with federal and state agencies, the Commission is participating in the Interagency Task Force. It consists of five work groups: federal agency coordination; state agency coordination; *ex parte*; collaborative process; and economics. The goal of

these work groups is to improve routine communication, reduce duplication, and find practical ways to work together more efficiently.

Alternative Licensing and Relicensing Procedures. On October 29, 1997, the Commission issued Order No. 596, allowing licensees and potential license applicants to use alternative procedures, if approved by the Commission, for preparing license applications. The order promotes communication among participants for resolution of issues. Under these procedures, the pre-filing consultation process, the environmental review process, and administrative processes associated with other federal statutes, such as the Clean Water Act, will be combined. The rule also allows the Commission to manage its communication with the participants effectively through *ex parte* communications protocols.

The Commission is actively promoting and pursuing alternative licensing processes with licensees and participants to resolve disputes and significantly reduce the post-filing environmental review process.

Licensees and applicants can choose to submit an APEA or third-party contract EIS as part of their application. The first APEA process was successfully completed for the relicensing of the Sinclair Project in FY 1996. This case, in which staff completed its environmental review process in only 4 months and issued the new license in 7 months — a significant decrease in processing time — shows the potential usefulness of APEAs. Through the APEA process, the Commission anticipates that the participants can resolve all issues with a substantial reduction in the time required for environmental review after the filing of the relicense or license application. During FY 1998, the Commission continued fostering APEAs involving 34 projects. The Commission issued four licenses using the APEA process in FY 1998.

During FY 1998, the Commission continued the third-party contract EIS process for the relicensing of the New York Power Authority's 912 MW St. Lawrence-FDR Project in New York. Scoping was completed in September 1997, and depending on the status of negotiations among participants, staff may begin directing the preparation of the EIS in FY 1999.

Outreach. The Commission staff undertook a major outreach effort to provide information on alternative licensing processes and to discuss other licensing and post-licensing programs. Meetings were held in California, New York and Vermont, Alabama and Georgia, North and South Carolina, Utah and Colorado, Maine, Oregon and Washington, Michigan, Idaho and Montana, Wisconsin, and Alaska. The objective was to provide a forum for licensees, federal and state agencies, tribes, nongovernmental organizations, and the general public to get information on these programs and to ask questions and give feedback on their experiences. Outreach sessions have been very well attended. These sessions have resulted in increased understanding of and interest in the use of APEAs, third-party contracts, and other collaborative licensing processes.

The first of a series of informal regional presentations discussing the alternative licensing process and other pre- and post-licensing concerns was held in Sacramento, California, in December 1998. It was attended by federal and state agencies, industry representatives, non-governmental organizations, and the public. The objective was to help the industry and others decide whether to use the alternative process by giving everyone a thorough

understanding of the process. Discussions focused on the nuts and bolts of the process and how to sustain it.

Action on Relicenses and Post-licensing Activities. The Commission has completed action on 143 of the relicense applications for licenses that expired in 1993. The remaining 14 applications are either in settlement negotiations or awaiting state action to issue water quality certificates.

Project Enhancements. New licenses issued for the projects whose licenses expired in 1993 included many conditions to protect or improve recreation, fisheries, and wildlife. The Commission included approximately $43.5 million in recreational improvements in these licenses. These included boat ramps, canoe portages, hiking trails, and fishing access areas with fishing and parking access. In other licenses, measures were included for downstream flow augmentation, recreational boating, and fish viewing facilities.

In this group of new licenses, the Commission required minimum flows to protect sensitive fisheries and aquatic resources in approximately 80 miles of river channel that would otherwise be partially or wholly dewatered for generation flows. Additional enhancement measures have included structures for fish passage, additional vegetative cover, operational constraints, and measures to reduce fish mortality.

The Commission developed these conditions after independently evaluating the environmental impacts and consulting with and reviewing comments from resource agencies, non-governmental organizations, and the public. The Commission develops requirements often after extensively reviewing and analyzing the cumulative impacts of several projects located within a river basin. The Commission bases many license conditions on provisions of statutes — such as the Endangered Species Act and the Clean Water Act — besides the Federal Power Act and the Commission's regulations.

Handling Allegations of Noncompliance. To ensure that licensees comply with the terms and conditions of the license, the Commission aggressively pursues reported incidents of noncompliance. It directs the licensee to explain the circumstances surrounding the incident and, if necessary, provide additional information. During FY 1998, the Commission closed out more than 200 investigations into allegations of noncompliance with environmental and engineering requirements. The Commission continued to develop cooperative relationships with resource agencies and local organizations to help resolve the issues raised by these allegations.

Recreational Fisheries Report. On June 7, 1995, the President signed Executive Order 12962, directing federal agencies to "improve the quantity, function, sustainable productivity, and distribution of U.S. Aquatic resources for increased recreational fishing opportunities...." Until 1998, the Commission participated, through the Department of Energy (DOE), with the National Recreational Fisheries Council established by the order. Given the unique nature of the Commission's role in overseeing large expanses of the Nation's waterways affected by hydropower development, the

Commission developed its own plan in 1998. The plan sets forth proposals for enhancing recreational fishing opportunities at licensed facilities.

Settlement on the Edwards Project. With Commission staff assistance, parties involved in the proceedings for the relicensing of the Edwards Project in Maine and various proceedings regarding fish passage at seven upstream dams filed an offer of settlement on May 28, 1998. The settlement would provide for the transfer of the license for the Edwards Project to the State of Maine, followed by removal of the dam and all project facilities in 1999, and would resolve disputes regarding fish passage.

Decision on Platte River Projects. In July 1998, the Commission approved a comprehensive settlement and issued new licenses for Kingsley Dam and North Platte/Keystone Division Dam Projects in Nebraska. The two projects share a 150-mile reach of the Platte River and affect one of the most important migratory bird habitats in North America, providing habitats for a number of threatened or endangered species. Approval of the settlement concluded a 14-year, controversial proceeding. The settlement covers all major issues in the proceeding and is supported by all major parties, including both licensees, the US Department of the Interior, the States of Nebraska, Colorado, and Wyoming, the Platte River Whooping Crane Critical Habitat Maintenance Trust, National Audubon Society, American Rivers, Sierra Club, Nebraska Wildlife Federation, and Nebraska Water Users.

Decision on Thunder Bay Projects. In December 1998, the Commission approved a settlement and issued a new license for the Thunder Bay Project. Comprised of six developments in the Thunder Bay River Basin in Michigan, this project is a combination of two former projects with licenses that expired in 1993. Approval of the settlement covered all major issues in the proceeding and was supported by all the parties. Issues settled included project operation, impoundment water levels, compliance monitoring, fish and wildlife protection and management, bald eagle protection and management, and nuisance plant control.

Decision on the Cushman Project. In July 1998, the Commission issued a license to the City of Tacoma, Washington, to continue to operate the Cushman Project on the North Fork of the Skokomish River, resolving a 23-year-old, frequently gridlocked, relicensing proceeding. Licensing conditions required increased flows, additional recreational facilities, flood control measures, measures to improve fisheries habitat, measures to improve water quality and wildlife habitat, and measures to protect cultural resources.

Dam Safety

Safe Operations During 1998 Flooding. The unusually strong El Niño weather pattern directed a steady series of heavy and prolonged storms with substantial rainfall into the Southeastern United States. Both Alabama and Georgia suffered record flooding in several river basins. Commission projects safely passed all flows, and licensees assisted in flood warning notifications, in coordination with emergency management agencies, to populated areas downstream of the projects. In southeast Georgia, the Flint River basin, which experienced record flooding and heavy damage during the July 1994 flood, again experienced near record flood levels. Commission

staff worked closely with project personnel to coordinate spillway operations during the flood, ensuring the safe passage of flood waters and giving downstream population centers accurate emergency action notifications and flood forecasting. FEMA commended the owners of the two Commission projects on the Flint river for their cooperation during the flood.

Rapid Response Inspection Team Deployed to Milner Project. In September 1998, the licensee of the Milner Project notified the Commission's Portland Regional Office that a hazardous condition had developed at the South Milner Dam. First reports from the field indicated that dam failure was imminent. A sinkhole had developed in the crest of the dam, a vortex appeared a short distance away in the reservoir, and muddy water was being discharged from downstream drains. The project's emergency action plan had already been activated. Commission staff was in constant contact with the licensee as the Rapid Response Inspection Team was en route to the site. Commission staff gave directions that ultimately prevented the failure of the dam. Nine years earlier, the Commission's dam safety staff had required the licensee to construct several features to safeguard against possible failure of the dam during concentrated leakage incidents. Dam failure was averted because of the Commission's careful analysis, sound preparation, availability, and on-the-spot engineering judgment.

Spillway Gate Design Review and Inspection. Commission staff initiated a comprehensive design review and physical inspection of all spillway tainter gates at the Commission's high- and significant-hazard potential projects. (Hazard potential refers to the potential for loss of life or significant property damage if a dam were to fail, not to the condition of the dam.) The Commission used lessons learned from the failure of the Bureau of Reclamation's Folsom Dam tainter gate in 1995. The Folsom Gate failure demonstrated the importance of carefully inspecting for corrosion on tainter gates designed and constructed in the 1950's, and ensuring that they have acceptable maintenance and lubrication plans in place.

Sabotage Protection at Commission Dams. The Commission, along with the Army Corps of Engineers, Bureau of Reclamation, Tennessee Valley Authority (TVA), and DOE, formed the Interagency Forum on Infrastructure Protection of Hydroelectric Facilities to protect major water-retaining structures from sabotage. The forum is focusing on promoting information exchange on security issues, improving interagency communication on threat reporting, and mobilizing private sector and Government cooperation in resolving security related issues.

Electronic Dam Safety Reports. Commission staff developed procedures to submit dam safety inspection reports electronically. The reports, including digitized photographs, are now available to all parties faster, more efficiently, and at less cost.

Seismic Repair on Environmentally Sensitive Project. The Commission completed the fast-tracked seismic remediation project at two Commission dams with the successful refilling of Butt Valley Dam in November 1997. Two high hazard potential embankment dams, Lake Almanor and Butt Valley in California, were modified to withstand an earthquake loading condition.

The project, completed within 20 months of identifying the problem, was accomplished within several very sensitive environmental parameters. Commission staff conducted public meetings and coordinated extensively with many government and non-government resource agencies. This cooperative effort resulted in successfully mitigating impacts to the trophy trout fishery and endangered species, and identifying and protecting historic sites within the construction area.

Expanded Emergency Action Plan Cooperation. In response to requests from other federal and state agencies, the Commission's Emergency Action Plan Exercise Design Course for dam safety expanded its coverage to include additional agencies. The primary objective of the course is to help Commission licensees better prepare for the testing of their emergency action planning process. Many agencies, including the Bureau of Reclamation, Corps of Engineers, TVA, and FEMA, have attended the course in past years. Additional participants include licensees, the National Weather Service, the National Emergency Management Association, the Association of State Dam Safety Officials, the Association of State Floodplain Managers, and local emergency response agencies. This integrated approach will bring to the table the viewpoints of key agencies responding to potential dam emergencies, further strengthening the Commission's dam safety program. It will also greatly increase communication and understanding among licensees and local, state, and federal contacts.

Federal Dam Safety Guidelines. FEMA, with substantial contributions from Commission staff, revised and published several Dam Safety Guidelines, including Federal Guidelines for Emergency Action Plans, Inflow Design Floods, and Hazard Potential Classifications in November 1998.

Actions Taken To Improve States' Dam Safety Programs. The National Dam Safety Program Review Board reviewed the dam safety programs of all of the states. A Commission staff member is on the Board and the Commission's dam safety expertise was influential in this effort. Actions were instituted to help improve the state programs. The Board is presently preparing performance measures to evaluate improvements to dam safety programs on a national basis. Because of these actions, two states without dam safety programs developed programs, and one state, with no dam safety legislation, is developing legislation for a program. The state legislature will be considering the proposed legislation.

FY 2000 PERFORMANCE PLAN

Introduction

The Commission's Strategic Plan identified strategic goals and objectives for each of its program areas (electric power, natural gas pipelines, oil pipelines, and hydropower) and for administration. It also proposed success indicators that, if measured appropriately, would indicate how well the Commission was succeeding at meeting its goals and objectives.

The next stage is to develop performance measurements that accurately reflect the success indicators. The Commission's Performance Plan for FY 1999 noted that development of appropriate performance measures would be particularly challenging for the Commission. The challenge was attributed to three considerations:

- The complexity of developing outcome-based measures from the economic impact of the Commission's activities and the impact on issues such as environmental protection;
- The inherent infeasibleness of crafting single numerical measurements to gauge the Commission's success in balancing competing economic, environmental, and social interests; and
- The difficulty in determining which data is most useful in accounting for the nuances inherent in the Commission's judicial and legislative processes.

In response to these challenges, the Commission established agencywide committees to review the performance measurements proposed for each of the three sets of goals and objectives contained in the strategic plan. The committees met regularly to discuss possible performance indicators and sources of data. The goal of the committees was to have a comprehensive system of measurement and associated baseline data in place by the start of FY 1999.

As the committees met to discuss performance indicators, attention focused on the Commission's ongoing review of its procedures for handling gas certificate applications. It became clear that, generally speaking, the Commission's procedures for processing its workload had not kept pace with the Commission's new regulatory vision. Traditional processes dominated despite the move away from traditional, heavy-handed regulation. The *FERC First* project was a natural outgrowth of this realization.

Initially, the Commission planned to use the experience in the gas program as a prototype for possible action in the hydropower area. This traditional model, however, failed to account for the speed with which the regulatory environment and the industries are changing. *FERC First* involved a simultaneous review of all Commission processes. Further, *FERC First* examined the manner in which the Commission's organization structure contributed to its ability to process its workload.

The result of *FERC First* is a model for a new regulatory infrastructure designed to meet the needs of a modern regulatory environment. At a time when the natural gas and electric industries are converging, the Commission will consolidate the economic regulation of these industries. The Commission will also reduce the layers of internal review by gathering the experts needed to handle workload at the start of the process and allowing them to follow it to conclusion. The collaborative process necessary for environmental reviews and regulation of natural gas pipelines, liquefied natural gas terminals, and hydropower projects will also be enhanced. The Commission's organization chart will be a reflection of the goals outlined in the Commission's Strategic Plan, enhancing the Commission's ability to measure its performance in these areas. The Commission plans to complete implementation of these changes by the middle of 2000.

Change, however, rarely comes without cost. The Commission's decision to enter into the resource-intensive *FERC First* project came just as the Commission's effort to review and perfect its performance measurements gained momentum. Forty staff worked full-time on *FERC First*, with many others also participating part-time and in other ways such as focus groups. Many people who participated in the performance measurement committees found themselves assigned to *FERC First* as well. The Chairman had little choice but to postpone work on the performance measurements until *FERC First* moved into the implementation phase.

Because of *FERC First*, the Commission finds itself a minimum of 6 months behind in developing the baseline data, performance indicators, and data sources necessary to meet the challenge of the FY 1999 performance plan. The performance measurement committees have been reconstituted and are engaged in developing the mechanisms required to measure the Commission's performance in FY 1999. The development of improved measurements and performance indicators for FY 2000 have been similarly affected.

Yet *FERC First* also has the benefit of positioning the Commission to measure its performance more efficiently through realigning its infrastructure to match the Commission's goals and objectives. Other initiatives derived from *FERC First*, such as implementing a largely paper-free environment with electronic filing and posting of documents and automated work flow management, feed directly into the Commission's performance measurements.

In summary, the delay experienced by the Commission in refining its performance measurements for FY 1999 will have the long-term effect of serving the Commission as it measures its performance in FY 2000 and beyond.

Mission

The Commission regulates, in the public interest, essential interstate aspects of four of the nation's critical energy industries: electric power transmission and sales for resale, natural gas transportation and sales for resale, oil pipeline

transportation, and nonfederal hydroelectric power. The Commission ensures that the rates, terms and conditions of service for the electric, natural gas, and oil industries are just and reasonable and not unduly discriminatory or preferential, and that licensing, administration, and safety actions for the hydropower industry and other approvals for all four industries are consistent with the public interest. It administers numerous laws and regulations involving key issues, including:

In the electric industry:
- Transmission and sales for resale of electric energy in interstate commerce at just and reasonable rates;
- Certification of exempt wholesale generators and qualifying facilities; and
- Corporate transactions, mergers, and security issues of electric public utilities.

In the natural gas industry:
- Transportation and sales for resale of natural gas in interstate commerce at just and reasonable rates;
- Construction and operation of natural gas pipelines; and
- Oversight of related environmental matters.

In the oil pipelines industry:
- Transportation of crude oil and petroleum products by pipeline in interstate commerce.

In the hydroelectric industry:
- Licensing and inspection of nonfederal hydroelectric projects; and
- Oversight of related environmental matters.

Goals and Objectives

The Commission's goals and objectives fall into three broad categories:

- those for regulating energy markets;
- those for authorizing and monitoring energy projects; and
- those for Commission administration.

Regulating Energy Markets

The Commission will regulate **electric transmission and bulk power markets** to
a) foster the growth of efficient, competitive commodity markets, and
b) protect customers from abuse of market power.

The Commission will regulate **natural gas pipelines** to
a) ensure that pipeline transportation service supports efficient, competitive commodity markets, and
b) protect customers from excessive transportation rates and service discrimination.

The Commission will ensure fair access to the **oil pipeline systems** for all customers under just and reasonable rates, terms, and conditions.

Authorizing and Monitoring Energy Markets

The Commission will regulate interstate **natural gas pipelines** to ensure that adequate capacity and reliable, flexible service is available in the interstate natural gas transportation systems.

The Commission will regulate nonfederal **hydropower** projects to
a) ensure that sustainable hydropower resources are licensed for the public's benefit,
b) maintain the nation's existing hydropower development to serve all water resource interests, and
c) ensure dam safety through inspection of facilities and operations.

Commission Administration

The Commission will reduce regulatory burden by
a) reducing the processing time for docketed workload and for resolving disputes,
b) minimizing filing burden, and
c) generating better information for use by industry and the public.

Measuring Success Indicators for Regulating Energy Markets

Efficient, Competitive Markets

Customers will have more new products and a reasonable range of suppliers from which to choose in both the electric and natural gas industries. This will indicate that commodity markets are reasonably competitive as well as responsive to customer needs.

Order Nos. 636 and 888 put forward basic principles of open access and unbundling for the natural gas and electric industries. In both cases, the purpose was to increase the options of natural gas and wholesale electric customers who historically had very limited choices of natural gas and electric power suppliers. Implementation of these principles by the natural gas industry has resulted in the continuing development of new transportation services to fill the needs of customers. The electric industry is at an earlier stage of implementation, but the Commission anticipates that similar development will occur in that industry.

To provide new services, pipelines and electric utilities must file revisions to their tariffs governing their offerings. To measure the provision of new services, the Commission established an indicator in its filing tracking system for each filing that proposes to offer a new service or expand the availability of an existing service. The Commission will categorize the services that have been proposed, and explain the impact of the service on natural gas and electric customers.

Order Nos. 636 and 888 were intended to give natural gas pipeline and wholesale electric power customers the ability to choose commodity suppliers. In the case of natural gas, the Commission collects data from

pipelines on the identity of their customers. Using this data from the Index of Customers, the Commission will determine the range of pipelines being used by individual customers. This data will be supplemented with data for capacity in the secondary market through the Commission's capacity release data. Analysis of this data is expected to show that for most suppliers a range of sources is being used to provide transportation services. Open access in the electric industry is much newer. Over the next year, we will identify ways to assess the number of suppliers from which customers may choose.

One of the most important benefits of open access is to allow many companies other than electric utilities and interstate natural gas pipelines to develop and offer innovative services. While the Commission does not generally collect data directly on such third party services in either industry, it will work to develop ways to inventory the new services being offered.

Natural gas and electric power prices will become more responsive to market conditions — that is, prices will reflect changing supply and demand conditions more clearly and more quickly.

The natural gas and electric industries are both inherently subject to relatively short peaks in demand that customers cannot meet by storing the commodity onsite. (This differs from, for example, the coal industry, where many customers can ride out short-term market fluctuations using on-site storage.) As a result, a performance measurement for market responsiveness must rest on the collection and analysis of short-term (hourly, daily and weekly) natural gas and electric price information.

The Commission does not collect short-term price data for natural gas or electric power. However, several trade press publications publish price information for many points around the natural gas grid. Others have started doing so for electric power also. Each publication uses a different methodology for collecting price data, and even casual review of the data for some peak periods suggests that it is difficult to interpret the published information precisely. Nonetheless, the Commission proposes to use the trade press information for two reasons:

- **It is independently collected.** The Commission need not undertake a new data collection effort with the burden for respondents that would entail. And the performance measure will be based on information the Commission does not itself control, which is desirable.

- **It is the information that is most easily available to those who buy and sell gas and power in the market.** As a result, the quality and interpretability of the data are themselves important diagnostics about how well the market is performing.

For electric power, trade press data will be supplemented by price data from power pools when and as such data become available. Power pool price information may be more reliable than trade press reports, because it may be more comprehensive and more consistent. If so, it may become the primary data source of electric power price information where it is available. In

addition, power pool price information is likely to have both of the advantages noted above for trade press information.

The Commission has been collecting and analyzing trade press pricing information for natural gas for some time. For example, Figure 1 shows a map of the range of spot prices for 1995 and 1996 at various points around the country, while Figure 2 shows the average price of natural gas at several locations for the last few years. Similar information is now becoming available for electric power, and the Commission has begun to collect and analyze this information as well. Figure 3 shows a map of average electric prices around the country.

To analyze how responsive markets are becoming, the Commission will combine this basic price information with other indicators of market conditions. The most important of these is normally weather in consuming areas. Extreme or prolonged cold weather in key consuming areas increases natural gas demand and should lead to price increases. Similarly, unusually hot weather in the summer typically increases electric demand and should lead to price increases. Weather information is available from the National Oceanic and Atmospheric Administration.

Other key factors for natural gas include storage levels and production losses from bad weather in supply areas. For electric power, they include generating plant and transmission line outages.

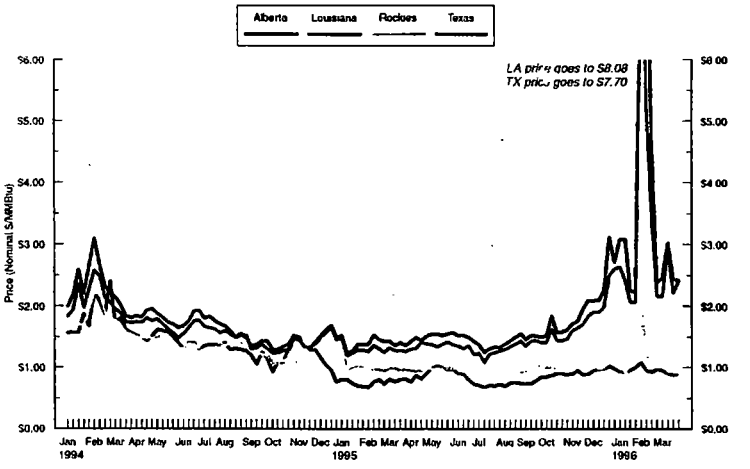
In the case of this performance measurement, the result cannot be a single quantitative measure of success. This is because in a well-functioning market, the only single measure that summarizes supply and demand forces accurately is price. Price cannot be used as a summary indicator of demand and supply here because it is precisely the responsiveness of prices to changing conditions that is at issue. Therefore, the performance indicator will necessarily be a narrative analysis of how demand and supply conditions relate to prices, supported by substantial quantitative information presented in both graphic and tabular form.

Finally, the Commission anticipates using price information to diagnose other aspects of market performance. For example, it will measure and report price volatility and pricing anomalies (cases where prices move in counter intuitive ways). The Commission's informal market tracking for natural gas suggests that both volatility and pricing anomalies can point to areas where the market is either (a) not working as well as it could or (b) working in ways that were not anticipated but are beneficial. Either way, the results are important as guides to future policy. This will likely be true for electric power also.

Natural gas prices within each trading region will tend to converge, except to the extent there are demonstrable transportation constraints or costs. Wholesale electricity price differences will also tend to narrow.

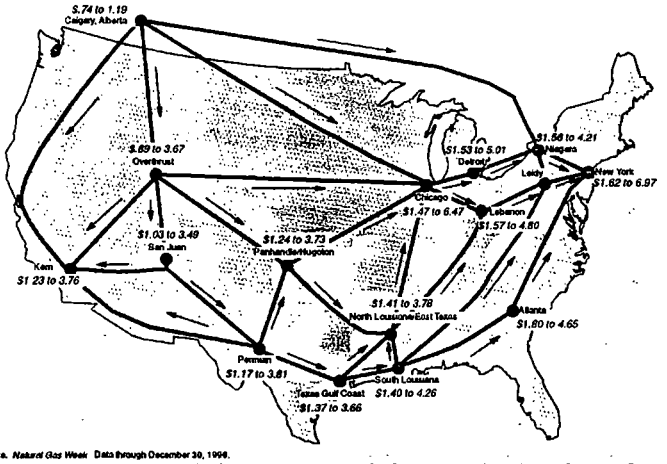
The Commission will use the trade press and power pool price information to develop its performance measurement for this success indicator also. The result will be a similar narrative explanation of what the price information shows and how it correlates with measures of transportation costs and

Figure 1.
Weekly Wellhead Prices, by Region
January 1994 - March 1996



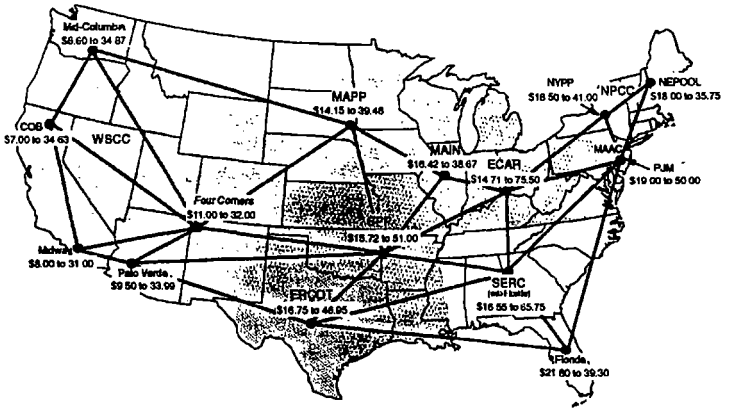
Source: *Natural Gas Intelligence* and *Natural Gas Week*. Data through March 25, 1996.

Figure 2.
Range of Average Monthly Natural Gas Spot Prices, 1995-96
Dollars per MMBtu



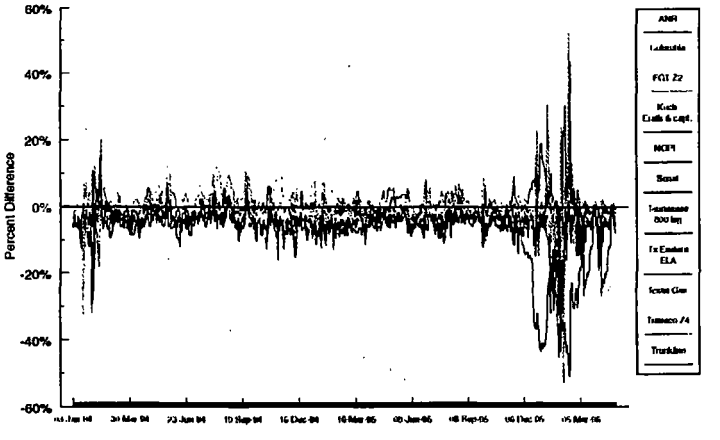
Source: *Natural Gas Week*. Data through December 30, 1996.
Notes: Monthly average prices for selected delivery points. Prices for Alberta and Niagara are for Canadian spot transactions of 12 months or less. Prices used for Detroit are from Columbia Gas at Maumee, Ohio. Spot prices reflect transactions of 31 days or less. Monthly price is the median of the prices assigned to a market center area.

Figure 3.
Range of Weekly Electricity Spot Prices, 1995-96
Dollars per MWh



Source: *Power Markets Week*. Data through December 27, 1996.
Note: Prices are index prices for on-peak electricity prepared by *Power Markets Week* based on assessments of where the bulk of destructuring occurred. The prices for NEPOOL, NYPP, PJM, ECAR, SERC, SPP, ERCOT, MAPP and MAIN are for transactions within those market areas. Mid-Columbia prices are for several points within Washington State. All other prices are for specific points.

Figure 4.
Percent Difference from Henry Hub for Daily Prices in South Louisiana Region
January 1994 - March 1996



Source: *Gas Daily*, Daily Price Survey. Data through March 29, 1996

constraints. The Commission will use interstate pipeline and electric utility transmission tariff terms, conditions, and rates that are already on file to derive measures of transportation costs. (This information may be supplemented with publicly available reports of prices for capacity in secondary gas transportation markets or power pools.) The Commission does not now have formal information on transportation constraints for natural gas (that is, when pipelines are so full that no more gas can move). It will work on developing measures in this area.

To see an example of how the Commission would use price information, consider the case of natural gas in South Louisiana, an area that is especially rich in pricing points. Within South Louisiana, the Henry Hub is the best known and most liquid market. Figure 4 shows the percentage price differences between the Henry Hub and a wide range of other pricing points reported for South Louisiana. The figure shows that:

- Major price differentials occur only when the industry is under severe strain (the same periods that showed up as price spikes in Figure 1). The peak price differentials in the figure are large, but there is no clear pattern as to which points have relatively high prices. The Commission does not yet have information that would show whether the differentials occur because transportation links between pricing points become constrained (as the success indicator would suggest) or for other reasons (which would indicate the potential for market improvements).

- Minor price differentials occur almost all the time and are probably larger than one would expect if markets were functioning as well as they could.

Over the next year, the Commission will continue to develop this success indicator by:

- creating data bases with all available pricing point information for both natural gas and electric power;

- using tariffs and other data sources to get measures of short-term transportation and transmission costs; and

- developing indicators of when transportation and transmission constraints occur and where.

It will be less costly, administratively, to transact business on the interstate natural gas transportation grid.

This is a very important success indicator. Transparent markets make it easier for customers to understand what their choices are. Markets that are easy and convenient to use lower the administrative costs for all customers using them. In both cases, the result is to lower the cost of using the market for each customer's transactions. With lower transactions costs, more customers will have access to the market, which will be especially important as more states give smaller customers the right to buy gas in the interstate market (rather than only from the local distribution company). In addition, lower transactions costs can increase the liquidity of the market.

It is also the hardest of the Commission's success indicators to measure. The Commission does not have any good information sources that would let it measure success in lowering transactions costs, nor will such information be easily collected. For example, one might propose surveying customers to obtain the information. However, it would be difficult to justify the burden of such a survey, and it is unclear how one could structure questions to get meaningful responses.

As a result, over the next year the Commission will attempt to develop options for measuring this success indicator and report on its degree of success in devising a viable measurement strategy.

Constraining Market Power

Market participants will have confidence that natural gas markets, electric markets, and oil transportation services are working fairly and that they are not subject to abuses of market power. That is:

- *Broad customer classes (not necessarily every customer) will agree that buyers and sellers have access to competitively priced commodity markets in the national gas transportation and electric transmission grids.*
- *Customers will generally agree that gas pipeline, electric transmission and oil transportation rates and services are just and reasonable, fairly balancing the competing interests of the transporting or transmitting companies and their customers.*

This success indicator refers to the Commission's success in eliminating unnecessary market power and in fairly balancing the interests of all when market power cannot be eliminated. In both cases, the best performance indicator will come from discussions with the industry and its customers.

The first part of the indicator refers to *customer perceptions* of how much competition they see. The reason for approaching the measure this way is that detailed, quantitative market power analyses are extremely difficult and expensive to perform. Even when performed, such analyses almost never tell the whole story by themselves. Non-quantified factors almost always substantially affect the degree to which observed levels of market concentration translate into the possibility of market power abuses. As a result, measuring customer perceptions is the most cost-effective way of judging the Commission's success in guaranteeing access to competitive markets where feasible.

The second indicator reflects the fact that some degree of market power is inherent in the natural gas pipeline, oil pipeline and electric transmission industries. That is why they are regulated in the first place. In controlling market power, the Commission is essentially balancing the legitimate interests of different parties. There is no direct way of quantifying how well the Commission is performing its balancing function. However, broad approval from each major industry sector would not be possible unless the Commission was succeeding in this balancing function.

In an important sense, the Commission is almost always engaged in seeking feedback on both current and potential future policies. In issuing generic proposed rulemakings, it seeks out comment from all parts of the industry affected and uses the comments to fashion its long-term policies. Recent examples of proceedings that have given the Commission widespread feedback on generic policies are proposed rules on secondary transportation markets for natural gas, alternatives to traditional cost of service rate making for interstate gas pipelines and capacity reservation tariffs for electric transmission.

There are several additional ways that the Commission might seek input from the industries on its success for these two indicators. The Commission has used two in the last few years:

- A letter requesting (voluntary) feedback on its performance sent to all major trade and interest groups affected by the Commission's electric, natural gas and oil pipeline regulation.
- A two-day technical conference on the status of regulation in the natural gas industry today.

Both approaches yielded important information about whether the Commission has made appropriate policy choices and whether its administration of the law is up to date. During the next year, the Commission will refine these two approaches and design further options for measurement that are more precisely targeted as success measures. It will then choose the most cost-effective mix of options as its measurement strategy for the future. Thus, formal technical conferences may be appropriate every few years, but too costly to hold every year.

Measuring Success Indicators for Authorizing and Monitoring Energy Projects

Adequate Natural Gas Pipeline Capacity

The Commission's certification program will allow the appropriate amount of new pipeline capacity to be available to serve the market when needed.

Certification of new pipelines will be timely, while fairly balancing the interests of the gas market, project sponsor, landowners, and the environment.

Both of these performance indicators are linked directly to the Commission's ability to process pipeline certificate cases in a fair and timely manner. In general, depending on the level of complexity and the number of opposing parties and type of opposition (e.g., landowner complaints), the Commission will act expeditiously and issue construction certificates to allow the commencement of service on the date requested by the applicant. More specifically, the Commission will seek to develop targets for the amount of time it takes to process each of several types of cases:

- Prior notice filings

- Certificate Cases where no precedential issues are present. The processing time will generally be less for unprotested filings than for protested ones.

- Cases of first impression or that have larger policy implications. The target processing times will need to take account of the fact that similar policy issues may be intertwined through a variety of cases, sometimes requiring the Commission to consider all aspects of the policy together.

- Major Certificates, generally requiring environmental impact statements or major environmental assessments. The target processing times will need to take account of the need for inter-agency consultations.

Licensing and Administering Hydropower Resources

Licensing conditions will protect and enhance beneficial public uses, both developmental and nondevelopmental.

Administration of hydropower developments will accommodate increasing public use without diminishing key water resource values.

The Commission builds environmental requirements into the conditions under which hydropower projects are licensed. These requirements are as varied and complex as the number of projects within the Commission's jurisdiction. Balance must be reached between the economic interests of the licensee and the varied interests of other interested parties. Each project is unique in its environmental considerations.

In response to the growing complexity and sensitivity of the environmental impact of hydropower projects, the Commission will develop a data base of all conditions included in hydro licenses and what each condition is intended to achieve. This data base will represent the specific goals the Commission has decided to pursue in different hydropower cases. The next steps will be to collate the overall objectives embodied in the license conditions and develop a data base of objectives realized for each project.

Once the data bases are functioning, it will take some time to develop sufficient background data to determine whether the Commission's environmental policies are yielding the desired results. The improved data collection will also lead to improved performance measurements in the environmental area. Until that point is reached, the Commission will attempt to track its environmental performance using the measurements above. In the case of the first measurement, the Commission will track: (1) the beneficial public uses that result from environmental licensing conditions; and, (2) changes in capacity data by year. In the second measurement, the Commission will rely on a number of statistical components to determine its success in this performance indicator. These include the number of recreation facilities at projects, the number of visitor days, and the number of improvements and enhancements made to facilities.

The Commission will reduce processing time under its control, particularly through the use of collaborative procedures and early involvement of staff.

The Commission will track and compare: (1) historical (post-Electric Consumers Protection Act) data on processing times and numbers and percentages of filings having settlements or using other collaborative processes; (2) processing times for Commission activities associated with applications filed in FY 1997 and in each subsequent year; and, (3) percentage of issuances — starting in FY 1997 — for projects using settlements or collaborative processes.

Dam Safety

The percentage of high- and significant-hazard dams meeting all current structural safety standards will remain uniformly high.

Progress on this success indicator will be based on a mathematical formula. To arrive at a percentage, the formula will divide the number of high- and significant-hazard dams not meeting safety standards by the total number of high- and significant hazard dams.

One hundred percent of high- and significant-hazard dams will be inspected annually.

The information for this indicator will come from the Commission's annual inspection data.

One hundred percent of high- and significant-hazard dams will comply with emergency action plan requirements.

The information for this indicator will come from the Commission's emergency action plan data.

Measuring Success Indicators For Commission Administration

Reducing Administrative Burden

To reduce administrative burden, the Commission will:

1) Reduce the processing time for docketed workload and for resolving disputes.

Delayed hydropower licensing and pipeline certification decisions can postpone the benefits of sustainable hydropower and available natural gas. While parts of the licensing and certification processes require extensive interactions with other agencies and compliance with other laws that have their own time schedules, the Commission will focus its efforts on those parts of the processes that it controls. These areas include processing systems, conflict resolution strategies, and information technology developments.

Processing Systems. The Commission is in the midst of a comprehensive review of its procedures for handling gas certificate applications. The intention is to improve the processing system by establishing achievable targets for reducing processing time. These changes will redefine how staff handles applications and will include revising employee standards to support the new procedures. Guidelines will specify how long various processes

should take for the majority of cases. By FY 1999, the Commission should be able to measure improvements in timeliness in processing certificates. After developing new procedures in the gas area, the Commission will use these as a prototype to apply as appropriate in the hydropower area.

Conflict Resolution Strategies. In hydropower licensing in particular, but also in gas certificates, the Commission will continue to develop collaborative strategies to identify issues, prevent or resolve conflicts, and build consensus. By involving staff early in the process, before applications are filed, and by fostering approaches that focus participants on cooperating and working out their differences, the Commission hopes to reduce time and costs while improving the decision-making process. The aim of early staff involvement is to prevent conflicting interests from developing into formal disputes. However, when disputes do arise between parties after the application is filed, the Commission will focus on alternative dispute resolution techniques, including technical conferences, to keep processing times to a minimum.

Information Technology Developments. Information technology development will reduce processing time for docketed workload by streamlining and automating processes throughout the Commission. The Commission is developing a major three-year strategy for a comprehensive information management system, to include electronic filing and information dissemination through the Commission's web site in FY 1999. Electronic filing, combined with electronic posting and service over the web site, will permit staff and outside parties to obtain filings within minutes or hours rather than days.

Additional improvements to internal workload processing will arise from the construction of a work flow tracking system. This system will be linked to the Commission's Records and Information Management System (RIMS), the electronic filing system, and a planned data repository that can accommodate a variety of format types. Process re-engineering will streamline business processes and permit the future work flow tracking system to function efficiently.

Information technology improvements will occur incrementally. Preparation for major enhancements will include fundamentals such as ensuring the reliability of the local area and wide area networks (LAN and WAN), implementing inclusive information technology resource management, resolving all Year 2000 compliancy issues, and comprehensive planning.

Change management and configuration management of individual computers will also contribute to improved network stability and security. A standards-based system that monitors all software releases and guarantees the Commission is in compliance with all licensing restrictions will be a major part of these management enhancements.

All Year 2000 compliancy issues will be identified and prioritized for elimination or replacement and implemented during FY 1999, in conjunction with the development of a comprehensive, flexible workload tracking and routing system. The Commission will complete construction of the work

flow tracking system during FY 1999. In addition, the planned data repository will be available to Commission staff and the public in FY 2000. As electronic filing is incorporated, the infrastructure will facilitate working directly with electronically filed documents.

2) Minimize filing burden.

The Commission will expand and standardize the use of electronic filing to ease the filing burden on the regulated industries. Electronic filing pilots via the Commission's Web Site will be in place in FY 1999. When complete, electronic filing will eliminate the cost of paper, copying, postage, and messenger services for those who file with the Commission. Developing standards for electronic filing will minimize and standardize the number of filing types, and will simplify and streamline filing requirements. Electronic service and notification of availability and receipt of filings will also contribute to reducing filing burden.

In FY 1999, standards committees — under the direction of the Chief Information Officer and the Secretary, and in consultation with the industries — will complete development of electronic filing standards. The Commission will evaluate and re-engineer processes performed by the Office of Information and Technology and complete planning for the physical infrastructure needed to implement electronic filing.

A goal of the future comprehensive information management system will be the development of a common, multi-purpose, standards-based infrastructure that accepts electronic filings and maintains all Commission data in a data repository accessible electronically by Commission staff, and eventually by the public. The system components will be flexible enough to meet a mix of needs throughout the Commission as well as the needs of industry filers and members of the public.

3) Generate better information for use by the industries.

The availability of information is a key element in moving from a heavily regulated environment to one where lighter-handed regulation and market forces combine to assure just and reasonable rates. Information technology development will make information available in a more timely manner through the Commission's web site and will facilitate searching for specific information within the large body of data the Commission maintains.

The web site will serve as the entry point for electronic filing, posting receipt of filings, serving notifications of filings to interested parties, providing filings to interested parties, and other similar activities that have traditionally required paper. Internal staff and external parties will have access to filings within minutes or hours rather than days.

A future data repository will store information in a variety of formats and use powerful search tools to locate specific information within multiple databases. All public information will be searchable by key words and by index, and privileged information could be made accessible to users through

a system of assigned passwords. The web site will also supersede the current bulletin board system that is accessed by modem.

In FY 1999, the Commission will develop and implement plans for archiving data stored on the LAN and will complete plans for the data repository, including incorporating RIMS into the data repository. In FY 1999, the public will have access to RIMS and all bulletin board information via the web site. Electronic service over the web site will be implemented in FY 1999.

Program Evaluation

The Commission is committed to accountability in its programs. For the next year, the most important task is to ensure that more specific performance measures are developed along with the quantitative information needed to support them. To do this, the Commission has established a high level working group, including the directors of five Offices: the Office of Hydropower Regulation, the Office of Pipeline Regulation, the Office of Economic Policy, the Office of Finance, Accounting Operations, and the Office of Strategy and Organizational Management. It will present quarterly progress reports to the Chairman on the status of the Commission's performance measures.

To improve accountability in the longer run, the Commission will institute ongoing assessment reviews at least annually. As part of each review, the Commission will report on how well it is meeting its goals, how and why its goals and objectives should be modified (if at all) and what changes to indicators are needed to improve how well it is measuring its performance. A top priority involves improving its information systems to provide credible measurements of key performance indicators.

APPENDIX A:

PROPOSED APPROPRIATION LANGUAGE

Proposed Appropriation Language

For necessary expenses of the Federal Energy Regulatory Commission to carry out the provisions of the Department of Energy Organization Act (42 U.S.C. 7101, et seq.), including services as authorized by 5 U.S.C. 3109, the hire of passenger motor vehicles and official reception and representation expenses (not to exceed $3,000); [$167,500,000] $179,900,000 to remain available until expended: *Provided,* That notwithstanding any other provision of law, not to exceed [$167,500,000] $179,900,000 of revenues from fees and annual charges, and other services and collections in fiscal year [1999] 2000, shall be retained and used for necessary expenses in this account, and shall remain available until expended: *Provided further,* That the sum herein appropriated from the General Fund shall be reduced as revenues are received during fiscal year [1999] 2000, so as to result in a final fiscal year [1999] 2000 appropriation from the General Fund estimated at not more than $0.

APPENDIX B:

TRADITIONAL WORKLOAD

Quantifying Commission Workload

This appendix shows the part of the Commission's workload covered by the traditional workload categories now in use. These categories have changed only minimally over the years, and are increasingly inadequate for the Commission's future needs. As part of the *FERC First* reengineering project, the Commission anticipates developing a new workload tracking system that will mirror the evolving workload mix that the Commission faces now and in the future.

Inadequacies of the Current System

Key problems with the Commission's current workload measurement system include the following:

- Current workload categories are based mostly on traditional inputs and outputs such as the number of filings received and the number of orders issued. These measures do not capture the substance of much of the Commission's present and future workload.

  For example, the effort required to monitor markets is likely to be largely independent of the number of formal filings. Proactive and facilitative approaches to some issues will be specifically designed to reduce the number of formal filings and might better be judged from the number of filings avoided than the number received. Similarly, the same regulatory problem in different regions (for example, establishing regional markets) may come to the Commission as many or few formal filings. Yet work required is likely to be similar, no matter how many filings are involved.

  As part of *FERC First*'s overall process reengineering, the Commission will design new workload categories to cover the Commission's nontraditional workload.

- Items in different workload categories require vastly different amounts of staff time and attention. For instance, many electric mergers require extensive involvement from many staff members over a period of many months, while electric power rate filings on average consume much less staff time. As part of *FERC First*'s overall process reengineering, the Commission will develop estimates of the level of effort that should be required for items within each future workload category.

- Within a particular workload category, cases sometimes vary greatly as to the staff time and attention necessary to process them. However, each case is counted as one. This confounds the Commission's ability to connect workload trends with changes in resource requirements. For example, some natural gas pipeline construction certificate cases are relatively straightforward and can be resolved quickly. Others are extremely complex and require vastly greater resources. As part of *FERC First*'s overall process reengineering, the Commission will address this problem.

Future Changes to Workload Accounting

FERC First will allow the Commission to redesign its workload measurement system systematically and agency-wide. *FERC First* will make it possible (1) to redefine workload categories in ways that reflect the Commission's emerging workload and (2) to estimate the resources that should be required to address different work items. This will help the Commission tie its workload to its resource requirements and will help to clarify the likely effects of changing resource levels on overall agency performance.

By the budget request for FY 2001, the Commission expects to be able to identify the future workload categories. The Commission also anticipates that the *FERC First* process will identify reasonable baselines for the work needed to address each category. The goal is to be able to link workload levels to resource requirements by the budget request for FY 2002.

ELECTRIC POWER WORKLOAD[1]

The following numerical report of Commission workload does not reflect many newly emerging aspects of the Commission's work that often entail high levels of complexity (e.g., utility mergers). Furthermore, the level of effort required to process workload items varies greatly among and within workload categories. Therefore, the numbers reported here do not provide a complete or accurate representation of the Commission's overall workload. The information is provided purely for consistency with workload presentations in prior year budget documents.

	FY 1997 Actual	FY 1998 Actual			FY 1999 Estimate			FY 2000 Estimate		
ELECTRIC POWER	P	R	C	P	R	C	P	R	C	P
Rate Filings	1,643	4,476	4,485	1,626	3,500	4,100	1,026	2,800	2,800	1,026
Formal Investigations	217	187	132	272	150	150	272	100	125	247
Compliance Filings	331	1,681	1,539	473	1,800	1,900	373	1,800	1,800	373
Small Power	1	156	157	0	140	140	0	140	140	0
Cogeneration	16	119	120	15	100	100	15	100	100	15
Corporate Applications	30	122	76	76	125	125	76	150	150	76
Transmission Service	24	3	3	24	3	15	12	2	7	7
Interlocking Positions	13	219	216	16	190	190	16	200	200	16
Securities	9	60	67	2	62	55	9	55	55	9
Financial Audits	62	16	13	65	4	27	42	6	15	33
Contested Accounting Cases	0	0	0	0	0	0	0	0	0	0
FA Refund Reports	4	4	5	3	4	5	2	4	5	1
Federal Rate Filings	2	11	9	4	8	6	4	8	8	4
Declaratory Orders	55	35	46	44	36	36	44	36	36	44
Complaints	44	38	35	47	51	51	47	58	58	47
Rehearings	216	367	298	285	220	220	285	220	220	285
EWG Determinations	9	90	90	9	100	100	9	100	100	9
Accounting Interpretations	1	2	3	0	0	0	0	0	0	0
Depreciation Filings	5	59	34	30	2	32	0	0	0	0
Accounting Approvals[2]	11	75	75	11	61	61	11	61	61	11

[1]Key: R = Receipts; C = Completed; P = Year-End Pending.

[2]Beginning in FY 1999, this category combines accounting approvals and interpretations.

NATURAL GAS AND OIL PIPELINES WORKLOAD

The following numerical report of Commission workload does not reflect many newly emerging aspects of the Commission's work that often entail high levels of complexity (e.g., utility mergers). Furthermore, the level of effort required to process workload items varies greatly among and within workload categories. Therefore, the numbers reported here do not provide a complete or accurate representation of the Commission's overall workload. The information is provided purely for consistency with workload presentations in prior year budget documents.

	FY 1997 Actual	FY 1998 Actual			FY 1999 Estimate			FY 2000 Estimate		
CERTIFICATES	P	R	C	P	R	C	P	R	C	P
Construction Activity	108	181	204	85	210	187	98	212	209	101
Prior Notice & Abandonments	112	456	456	112	420	420	112	400	425	87
Meetings & Conferences	0	151	151	0	151	151	0	151	151	0
Compliance Filings & Reports	51	409	421	39	383	391	41	383	400	34
Environmental Analysis	84	453	486	81	484	491	84	441	441	84
Environmental Compliance & Safety Inspections	155	1,113	1,163	105	1,000	1,000	105	1,000	1,000	105
Rehearings, Complaints & Declaratory Orders	88	95	90	93	97	99	91	98	98	91

GAS RATES	P	R	C	P	R	C	P	R	C	P
Rate Filing Activities	185	1,288	1,353	120	1,270	1,279	111	1,282	1,282	111
Intrastate Activities	18	203	47	172	159	323	8	102	102	8
Litigation, Settlements & Opinions	87	84	89	82	68	70	58	68	68	58
Meetings & Conferences	21	187	172	16	172	172	16	172	172	16
Rehearings, Complaints, etc.	141	230	239	132	273	297	108	271	295	84
Industry Analysis Functions	0	1,875	1,871	4	1,628	1,632	0	1,659	1,659	0
Accounting Actions	18	37	32	23	23	42	4	37	25	18

OIL	P	R	C	P	R	C	P	R	C	P
Oil Filings Nonformal	25	497	494	28	520	520	28	520	520	28
Oil Filings Formal	240	130	277	93	35	45	83	35	45	73
Litigation, Settlements & Opinions	242	138	282	98	43	54	85	42	54	73
Rehearings, Rulemakings, & Complaints	25	17	23	19	18	30	7	18	20	5
Meetings & Conferences	0	1,000	1,000	0	1,000	1,000	0	1,000	1,000	0
Accounting Actions	6	39	39	6	39	39	6	39	39	6

HYDROPOWER WORKLOAD

The following numerical report of Commission workload does not reflect many newly emerging aspects of the Commission's work that often entail high levels of complexity (e.g., utility mergers). Furthermore, the level of effort required to process workload items varies greatly among and within workload categories. Therefore, the numbers reported here do not provide a complete or accurate representation of the Commission's overall workload. The information is provided purely for consistency with workload presentations in prior year budget documents.

	FY 1997 Actual	FY 1998 Actual			FY 1999 Estimate			FY 2000 Estimate		
DAM SAFETY & INSPECTIONS	P	R	C	P	R	C	P	R	C	P
Operations Inspections[3]	138	1,685	1,685	138	1,565	1,585	138	1,585	1,585	138
Proficense Inspections	0	39	39	0	60	60	0	60	60	0
Construction Inspections	175	285	285	175	255	255	175	255	255	175
Exemption Inspections	100	302	302	100	350	350	100	350	350	100
Special Inspections	125	285	285	125	210	210	125	210	210	125
Engineering Evaluation & Studies	149	630	630	149	600	600	149	600	600	149
Part 12 Reviews	49	137	137	49	165	165	49	165	165	49
Dam Safety Reviews	9	18	18	9	25	25	9	25	25	9
Environmental & Public Use Insp.	0	251	251	0	300	300	0	300	300	0
EAP Tests	0	32	32	0	40	40	0	40	40	0

HYDROPOWER LICENSING	P	R	C	P	R	C	P	R	C	P
Original Licenses	70	7	14	63	10	20	53	10	20	43
Relicenses	75	21	20	78	31	30	77	20	30	67
Exemptions	1	4	2	3	3	3	3	3	3	3
Preliminary Permits	15	10	20	5	10	12	3	10	10	3
Declaratory Orders	1	1	1	1	1	1	1	1	1	1
Rehearings	78	74	55	95	58	60	93	58	60	91

[3]Includes about 50 inspections in each fiscal year for DOE and NRC.

	FY 1997 Actual		FY 1998 Actual		FY 1999 Estimate			FY 2000 Estimate		
PROJECT COMPLIANCE & ADMINISTRATION	P	R	C	P	R	C	P	R	C	P
Amendments	566	1,789	1,858	477	1,700	1,850	527	1,600	1,850	477
Jurisdiction	17	10	25	2	10	10	2	10	10	2
Federal Lands	0	59	56	3	150	150	3	150	150	3
Headwater Benefits	26	111	119	18	130	130	18	130	130	18
Compliance	121	275	325	71	250	250	71	250	250	71
Penalty	7	6	6	7	6	6	7	6	6	7
Surrenders, Transfers	16	55	34	39	75	55	59	50	55	54
Endangered Species Consultations	0	10	10	0	5	5	0	5	5	0
Abnormal Events	0	2	2	0	2	2	0	2	2	0
Compliance Audits & Assistance	0	24	24	0	24	24	0	24	24	0
Complaints	7	2	3	6	1	3	4	2	3	3
Rehearings	11	45	46	10	45	46	9	40	45	4

APPENDIX C:

OBJECT CLASS TABLE

OBJECT CLASS SUMMARY
($ in Thousands)

Obligations		FY 1998 Actual	FY 1999 Estimate	FY 2000 Request
11.9	Personnel Compensation	$92,045	$95,203	$100,156
12.1	Benefits	17,502	18,620	19,900
13.0	Benefits for Former Personnel	799	55	25
	Total, Personnel Compensation & Benefits	110,346	113,878	120,081
21.0	Travel & Transportation of Persons	1,727	2,108	2,243
22.0	Transportation of Things	38	10	10
23.1	Rental Payments to GSA	17,139	17,672	18,252
23.2	Rental Payments to Others	504	350	366
23.3	Communications, Utilities & Misc. Charges	2,432	2,896	2,829
24.0	Printing & Reproduction	2,232	2,261	2,325
25.0	Other Services	24,615	23,928	24,339
25.1	Advisory and Assistance	5,695	7,248	8,919
25.2	Non-Federal	14,972	12,918	12,155
25.3	Federal	545	726	778
25.4	Operation & Maintenance of Facilities	1,779	444	100
25.7	Operation & Maintenance of Equipment	1,624	2,592	2,387
26.0	Supplies & Materials	1,439	1,182	1,318
31.0	Equipment	5,560	3,145	8,067
41.0	Grants, Subsidies & Contributions	50	65	65
42.0	Insurance Claims & Indemnities	86	5	5
	TOTAL, OBLIGATIONS	$166,168	$167,500	$179,900
	Application of Prior Years' Budget Authority	(4,027)	0	0
	GROSS BUDGET AUTHORITY	$162,141	$167,500	$179,900
	Offsetting Receipts	(162,141)	(167,500)	(179,900)
	NET BUDGET AUTHORITY	$0	$0	$0

APPENDIX D:

STATUTORY AUTHORITY

Statutory Authorization

The Commission's primary sources of authority are the following statutes:

- Federal Power Act;
- Natural Gas Act;
- Department of Energy Organization Act;
- Energy Policy Act;
- Natural Gas Policy Act;
- Interstate Commerce Act;
- Electric Consumers Protection Act;
- Energy Security Act;
- Public Utility Regulatory Policies Act;
- Public Utility Holding Company Act;
- Pacific Northwest Electric Power Planning and Conservation Act; and
- National Environmental Policy Act.

APPENDIX E:

STRATEGIC PLAN

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FEDERAL ENERGY REGULATORY COMMISSION
STRATEGIC PLAN
FY 1997 - FY 2002

Introduction

This document is the Federal Energy Regulatory Commission's first strategic plan. The plan focuses on the most basic questions:

- What strategic role must the Commission play in each industry over the next decade?
- What are the Commission's strategic goals and objectives?
- What are reasonable success indicators for achieving these goals?
- How will the Commission measure its performance in the future?

This document serves as the basis for developing more detailed, results-oriented measures in the annual performance plans. The Commission is developing program evaluations and specific measures for general success indicators.

Congress has charged the Commission with specific but different responsibilities for each of the industries it regulates (see Table 1 on page 90 for an overview). In each industry, the Commission plays key strategic roles specifically assigned by the Congress—for example, to protect consumers through regulating rates and services. Many of the statutes setting forth the Commission's roles date to the 1930s or earlier, but the laws continue to evolve to match changing markets and technology. As a result, the Commission's roles continue to evolve also. This plan lays out the historical context of the Commission's responsibilities, as well as goals and objectives designed to capture the essence of the Commission's ongoing role in each industry. Goals for some of the industries overlap. Therefore, the goals are grouped into broad categories that often span more than one industry.

Mission

The Commission regulates, in the public interest, essential interstate aspects of four of the nation's critical energy industries: electric power transmission and sales for resale, natural gas transportation and sales for resale, oil pipeline transportation, and nonfederal hydroelectric power. The Commission ensures that the rates, terms and conditions of service for the electric power, natural gas, and oil industries are just and reasonable and not unduly discriminatory or preferential, and that licensing, administration, and safety actions for the hydropower industry and other approvals for all four industries are consistent with the public interest. It administers numerous laws and regulations involving key issues, including:

In the electric industry:
- Transmission and sales for resale of electric energy in interstate commerce;
- Certification of exempt wholesale generators and qualifying facilities; and
- Corporate transactions, mergers, and security issues of electric public utilities.

In the natural gas industry:
- Transportation and sales for resale of natural gas in interstate commerce;
- Construction and operation of natural gas pipelines; and
- Oversight of related environmental matters.

Table 1: Key Areas of Commission Jurisdiction

Type of Regulation	Electric Power	Interstate Natural Gas Pipelines	Oil Pipelines	Nonfederal Hydropower Projects
Regulation of Markets and Rates, Terms, and Conditions of Energy Services				
Transmission	Yes	Yes	Yes	No
Sales for Resale	Yes	Yes	No	No
Corporate	Yes	No	No	No
Authorizing and Monitoring				
Siting	No. Under EPAct, the Commission can order transmission service, but states site the lines and generation.	Yes. The Commission issues certificates for construction of pipelines and related facilities.	No	Yes. The Commission issues preliminary permits, licenses, exemptions, and license amendments.
Environmental	No, except for programmatic EISs for some major actions.	Yes, NEPA review and interagency consultation for pipelines to be certificated.	No	Yes, NEPA review and interagency consultation for the above authorizations, except preliminary permits.
Safety	No	No, except as part of initial certification.	No	Yes, dam and public safety.
Related Responsibilities of Other Key Agencies				
States	Retail sales, distribution, siting for transmission lines and generation, some aspects of retail transmission	Retail sales, distribution, some aspects of retail transportation, some environmental permitting	Siting	Projects that do not affect navigable waters, interstate commerce, or Federal lands or dams
Other Federal Agencies	*DOE:* reliability, PMAs *EPA:* air quality, emissions allowances *NRC:* nuclear power licenses	*DOT:* safety *DOI:* offshore waters, federal lands, endangered species, national parks *USFS:* national forests *COE:* water body crossings *Advisory Council on Historic Preservation:* cultural resources *EPA:* PCBs *National Marine Fisheries Service:* offshore fisheries	*DOT:* safety	*COE, Bureau of Reclamation, and others:* Congressionally authorized projects without private development

In the oil pipelines industry:
- Transportation of crude oil and petroleum products by pipeline in interstate commerce.

In the hydroelectric industry:
- Licensing and inspection of nonfederal hydroelectric projects; and
- Oversight of related environmental matters.

Strategic Vision

At the most basic level, the Commission is moving away from a traditional command and control approach to economic regulation, due to the evolving nature of the electric power and natural gas industries and by heightened environmental concerns surrounding construction of energy projects. The Commission will encourage restructuring in the electric industry to promote competitive commodity markets, as it has in the natural gas industry. This may tend to reduce federal regulation over the commodity portion of energy transactions, including natural gas and sales of power, but may mean a continued and even enhanced importance for federal regulation of interstate electric transmission and gas transportation grids. True open access to essential facilities is the underpinning of competitive commodity markets for both electricity and gas and requires constant adjustment to fit the changing industries.

The Commission will increase its emphasis on harmonizing its policies with those of states and other federal agencies, especially in the electric and hydropower programs, since it is clearer than ever that the different responsibilities of each of these entities have implications for all the others. Increasing convergence of energy markets, especially between gas and electricity, will require greater creativity in regulating gas transportation and electric transmission. Of necessity, economic market realities and heightened environmental requirements will also increasingly affect the hydroelectric industry.

The Commission is under some pressure to meet the needs of the industries as they become more competitive. The Commission must be flexible, quick, and innovative to meet these challenges, and will therefore continue its efforts to reallocate staff among its major areas to respond to pressing needs as they develop. As needs for regulation in the industries change, the ways of the Commission must change to respond in real time to industries and intervenors alike. These changes will include better use of electronic technology to facilitate the regulatory process, improved approaches to handle the problems of increasingly market-responsive energy industries, and improvements in environmental reviews.

Historical Perspective

Electric Power

The electric industry is in the early stages of a restructuring that will bring the advantages of competition to the generation and sale of electricity. The generation sector has historically accounted for about 70 percent of the costs of the industry. If structured well, competition promises to bring significant savings to customers throughout the nation, thereby benefiting individuals and making American industry more competitive in world markets. Managing the transition to competition is the most important task facing both this Commission and state public utility commissions around the country.

The electric industry was traditionally a set of local monopolies, regulated at first by the states to prevent abuses of monopoly power. In 1935, Congress passed the Federal Power Act (FPA), giving the Federal Power Commission (FPC, the Federal Energy Regulatory Commission's predecessor agency) the responsibility to regulate interstate aspects of the industry — that is, wholesale power sales and transmission service. The Commission's basic statutory responsibility still traces back to the FPA. The logic that governs its regulation remains the same: the public interest requires curbing abuses of market power in interstate commerce.

The electric industry has evolved substantially since 1935, and the form of the Commission's regulation has changed with it. The economies of scale that made electric power generation a natural monopoly have been almost completely exhausted, so that the public is now far better protected by a system of robust competition in generation rather than traditional regulation. At the same time, transmission and distribution remain natural monopolies. Left unregulated, companies could leverage their ownership of transmission and distribution into a position of market power over generation as well.

In 1978, Congress began introducing competitive pressure into the electric industry by enacting the Public Utility Regulatory Policies Act (PURPA). This act required utilities to buy power from a new class of non-utility generators. PURPA showed that independent generation is feasible.

Over time, it became clear that competition could lower generation costs. The biggest obstacle to competition was that incumbent utilities could often deny independent generators access to the transmission grid. In the late 1980s, the Commission began to encourage voluntary open access where possible (for instance, as a condition for approving mergers). In 1992, Congress passed the Energy Policy Act (EPAct), which authorized the Commission to order transmission access for individual wholesale transactions upon request. In 1996, the Commission issued Order No. 888, which required public utilities to offer open access to all wholesale market participants. However, under current law the Commission regulates only 67 percent of electric transmission plant in the U.S. (measured by investment in transmission plant). Increasingly, states are initiating retail access programs that may eventually extend the benefits of a competitive market to retail customers. The future of the industry is likely to entail a more competitive generation sector, supported by transmission and distribution sectors that remain subject to market power and, therefore, to regulation.

Natural Gas

In the natural gas industry, the Commission's actions over the past 15 years have supported Congressional mandates and fostered the emergence of basic competitive market institutions for the commodity. In that sense, the natural gas industry is several years ahead of the electric industry. Now the Commission's main challenge is to continue its regulation of gas transportation in ways that a) maintain existing competitive markets and b) foster a second generation of competitive market institutions that will remove some of the market impediments that remain today and lower the costs of trading.

The early history of the natural gas industry is broadly similar to that of electric power. Gas companies were initially local franchised monopolies, many of whom manufactured gas locally from coal. With the discovery of large natural gas reserves in the southwest in the early part of the century, large interstate pipelines soon became a major sector of the industry, but retained strong features of a natural monopoly. As a result, Congress passed the Natural Gas Act of 1938 (NGA), giving the FPC jurisdiction over interstate sales for resale and gas transportation. Unlike the FPA, the NGA also gave the FPC jurisdiction over the construction of new interstate pipelines, which accounts for the difference in environmental focus between the two programs today. Unlike electric generation, natural gas production has probably never been a natural monopoly. However, a Supreme Court decision in 1954 interpreted the NGA as requiring the Commission to regulate the wellhead price of natural gas sold in interstate commerce just as it did wholesale interstate power sales.

Comprehensive regulation of natural gas wellhead prices proved a failure. By the mid-1970s, there were severe gas supply shortages in the interstate market as a result of artificially low prices. During cold winters (like 1976 — 1977), these shortages translated into delivery curtailments for many customers in the north. Congress began the phased deregulation of natural gas commodity prices with the Natural Gas Policy Act of 1978 (NGPA). During the 1980s, the biggest obstacle to competitive natural gas markets was the inability of customers to gain access through the pipeline systems to competitive gas suppliers. As a result, the Commission issued a series of measures (Order Nos. 436, 500 and 636) that opened pipeline transportation to all on equal terms and that eventually resulted in interstate pipelines' relinquishing their traditional

merchant function. By 1993, the Wellhead Decontrol Act fully deregulated prices for natural gas production. However, continued regulation of the interstate pipeline grid to ensure efficient, nondiscriminatory access to transportation services at just and reasonable rates is the indispensable underpinning for competitive gas commodity markets.

Natural gas open access has been a success. Today the gas market is growing, and customers have more flexible, more reliable service than ever before. Gas supply curtailment of firm pipeline customers is a thing of the past. Prices fluctuate with market conditions, but average prices for all customer classes are lower than they were ten years ago (adjusted for inflation). The competitive revolution in natural gas has also had beneficial environmental effects. Gas is increasingly seen as a reliable, affordable fuel in comparison with other fuels such as coal and oil that tend to have higher emissions affecting the environment, especially air quality.

Oil Pipelines

In 1977, as part of creating the Department of Energy, Congress gave the Commission responsibility for regulating oil pipelines under the Interstate Commerce Act.

The Commission's role in regulating oil pipelines differs from its role in natural gas and electric power, because the petroleum industry differs significantly from the natural gas and electric power industries. The Commission has never been charged to regulate prices for either crude oil or petroleum products. Indeed, markets for these commodities have long been recognized as competitive. Barges and tankers transport much of the crude oil and refined products used in the United States. These parts of the oil transport industry are also widely recognized as competitive. In many cases, they bring competitive forces to bear on oil pipelines. Oil pipelines remain critical transporters of oil to some areas and often have market power, but they do not have the same industry-wide roles that interstate gas pipelines or the electric transmission grid have in their industries. As a result, the Commission has been able to move to lighter-handed methods of regulation in some situations.

Hydropower

Water is one of the nation's most precious resources. River systems satisfy many competing water supply and economic needs, for hydropower, irrigation, domestic and industrial uses, navigation, recreation, and preservation of environmental values. Hydropower generation represents 98 percent of the country's current renewable energy resources. The Commission has jurisdiction over about half the hydropower generation in the United States. Its job is to: (1) look at all aspects of the project proposals that come before it, including the cumulative impacts on given river systems, and consider all competing interests; (2) administer over many decades the projects and associated resource protection conditions it authorizes; and (3) ensure the safety of dams and other structures under its jurisdiction.

The Federal Water Power Act of 1920 authorized the Federal Power Commission to license hydropower projects that are best adapted to the comprehensive development of a waterway. In 1935, the Congress amended and recodified the Federal Water Power Act of 1920 as Part I of the FPA. Later legislation — various flood control and river and harbor acts, PURPA, the Electric Consumers Protection Act of 1986 (ECPA), and EPAct — broadened the Commission's responsibility for overseeing the development of water resources.

The Commission's basic legal obligations have remained much the same, even as hydropower development changed dramatically. By the 1930s, when the FPA was passed, hydropower plants (both federal and nonfederal) had grown to provide 30 percent of the nation's generating capacity and 40 percent of the electric energy. In the 1950s and 1960s, even as additional plants continued to be licensed, some existing hydropower plants were abandoned. Less expensive fossil fuels began changing the economics of energy

generation. The energy embargo of the 1970s reversed the economics and politics of hydropower, while the Energy Security Act and PURPA encouraged the use of clean, domestic resources at facilities producing less than 80 megawatts. Between 1975 and 1991, over 950 nonfederal projects came on line, a majority of them small scale.

In recent years, water issues have become more important than ever, and hydropower's national role has come under greater scrutiny. First, hydropower remains an essential national energy resource. It is domestically produced and renewable. It has very low operating costs and is often a highly flexible resource since generation can be brought on line quickly. This flexibility may be quite valuable in a competitive generation market. At the same time, new hydropower projects may be less attractive to developers. They are capital intensive (and therefore risky), and the measures needed for environmental and safety reasons can be costly.

Second, public concern about environmental issues is far greater now than even a few years ago. These issues include preserving and restoring free-flowing streams, fish populations, water quality, endangered species, and cultural and aesthetic values. The Commission granted many of the licenses that currently govern hydropower projects decades ago, before the passage of the new environmental laws. The environmental issues dealt with in these laws arise when projects come up for relicensing.

Third, other competing uses for water are important and politically sensitive. Continuing growth in both population and industries only creates greater demands for water, power, recreational resources, and resource protection. Hydropower licensing and administration have become part of a larger debate about developing sustainable energy strategies and resources.

The increasing awareness of hydropower development and the Commission's decisions have led to expanded participation of federal and state resource agencies, nongovernmental organizations, and the public in the Commission's regulatory processes. In recent legislation, Congress sought both to clarify the role of other agencies in the Commission's licensing process and to strike a better balance between the developmental and environmental values of concern to these entities. The Commission increasingly is using up front consultation and settlement procedures to resolve conflicts and accommodate the interests of these varied participants.

Commission Administration

The Commission has been working for several years to improve both the way it does business with the industries it regulates and its own internal procedures.

Although the Commission must utilize the fact-finding capabilities of administrative litigation, it has developed a number of alternatives to lengthy and costly formal hearings. It has made extensive use of technical conferences, settlements, settlement judges, and mediators in its casework. It has also made use of generic rules and blanket authorizations where possible. In addition, it has encouraged the growth of regional transmission groups in electric power and development of national standards in natural gas pipeline operations. These groups, composed of all stakeholders, can find fair solutions to potential disputes that would otherwise come to the Commission for decision. For environmental aspects of both hydropower licensing and natural gas pipelines, the Commission uses early staff involvement and prefiling meetings to identify potential areas of conflict early in the review process. It also uses technical conferences, local public meetings, and collaborative processes to promote understanding and compromise among the parties at various stages of the proceedings.

The Commission has introduced electronic filing and electronic bulletin boards. Electronic filing is already in place for many purposes, and computer systems provide access to bulletin board data, Commission documents, and information on obtaining Commission services.

While making these business improvements, the Commission has also reduced administrative staff by 14 percent between FY 1994 and FY 1997.

Strategic Goals and Objectives

A number of the Commission's responsibilities and approaches to meeting those responsibilities are similar across industries. Therefore, the Commission's goals for each industry can be grouped into several broad categories that cut across industries. These broad categories are:

- regulation of markets and rates, terms, and conditions of energy services;
- authorizing and monitoring energy projects; and
- Commission administration.

Industry goals appear below under these categories.

Regulating Energy Markets

Electric Power
The Commission will regulate electric transmission and bulk power markets to
a) foster the growth of efficient, competitive commodity markets, and
b) protect customers from excessive transmission rates and service discrimination.

Natural Gas
The Commission will regulate natural gas pipelines to
a) ensure that pipeline transportation service supports efficient, competitive commodity markets, and
b) protect customers from excessive transportation rates and service discrimination.

Oil Pipelines
The Commission will ensure fair access to the oil pipeline systems for all customers under just and reasonable rates, terms, and conditions.

Authorizing and Monitoring Energy Projects

Natural Gas
The Commission will regulate interstate natural gas pipelines to ensure that adequate capacity and reliable, flexible service is available in the interstate natural gas transportation systems.

Hydropower
The Commission will regulate nonfederal hydropower projects to
a) ensure that sustainable hydropower resources are licensed for the public's benefit,
b) maintain the nation's existing hydropower development to serve all water resource interests, and
c) ensure dam safety through inspection of facilities and operations.

Commission Administration

All Industries
The Commission will reduce regulatory burden by
a) reducing the processing time for docketed workload and for resolving disputes,
b) minimizing filing burdens, and
c) generating better information for use by industry and the public.

Relationship Between General Goals and Objectives and Annual Performance Goals

Regulating Energy Markets

Efficient, Competitive Markets

Customers will have more new products and a reasonable range of suppliers from which to choose in both the electric and natural gas industries.

The purpose of Commission policy on open access and unbundling for the natural gas and electric industries is to increase the options of customers who historically had very limited choices of natural gas and electric power suppliers. The Commission will assess whether customers have more new products and a reasonable range of suppliers from which to choose as an indication that commodity markets are reasonably competitive and responsive to customer needs.

Natural gas and electric power prices will become more responsive to market conditions — that is, prices will reflect changing supply and demand conditions more clearly and more quickly.

The natural gas and electric industries are both subject to relatively short peaks in demand that customers cannot meet by storing the commodity on-site, despite the existence of substantial off-site gas storage. (This differs from the coal industry, for example, where many customers can ride out short-term market fluctuations using on-site storage.) To analyze how responsive markets are becoming, the Commission will combine basic price information with other indicators of market conditions, such as weather in consuming areas, that will contribute to an assessment of market operations. The Commission's informal market tracking for natural gas suggests that both volatility and pricing anomalies can point to areas where the market is either not working as well as it could or working in ways that were not anticipated but are beneficial. Either way, the results are important as guides to future policy. This will likely be true for electric power also.

Natural gas prices within each trading region will tend to converge, except to the extent there are demonstrable transportation constraints or costs. Wholesale electricity price differences will also tend to narrow.

Convergence of prices within a trading region is one sign that competition is working efficiently.

It will be less costly, administratively, to transact business on the interstate natural gas transportation grid.

This is an important indicator of improved commodity markets. Transparent markets make it easier for customers to understand what their choices are. Markets that are easy and convenient to use lower the administrative costs for all customers using them. In both cases, the result is to lower the cost of using the market for each customer's transactions. With lower transactions costs, more customers will have access to the market, which will be especially important as more states give smaller customers the right to buy gas in the interstate market (rather than only from the local distribution company). In addition, lower transactions costs can increase the liquidity of the market.

Constraining Market Power

Market participants will have confidence that natural gas markets, electric markets, and oil transportation services are working efficiently and fairly and that market participants are not subject to abuses of market power. That is:

- *Broad customer classes (not necessarily every customer) will agree that buyers and sellers have access to competitively priced commodity markets in the national gas transportation and electric transmission grids.*

- *Customers will generally agree that gas pipeline, electric transmission and oil transportation rates and services are just and reasonable, fairly balancing the competing interests of the transporting or transmitting companies and their customers.*

This indicator refers to the Commission's success in eliminating unnecessary market power and in fairly balancing the interests of all parties when market power cannot be eliminated. In both cases, the best performance indicator will come from discussions with the industry and its customers.

The first part of the indicator refers to *customer perceptions* of how much competition they see. The reason for approaching the measure this way is that detailed, quantitative market power analyses are extremely difficult and expensive to perform. Even when performed, such analyses almost never tell the whole story by themselves. Non-quantified factors almost always substantially affect the degree to which observed levels of market concentration translate into the possibility of market power abuses. As a result, measuring customer perceptions is the most cost-effective way of judging the Commission's success in guaranteeing access to competitive markets where feasible.

The second part of the indicator reflects the fact that some degree of market power is inherent in the natural gas pipeline, oil pipeline and electric transmission industries. That is why they are regulated in the first place. In controlling market power, the Commission balances the legitimate interests of different parties. There is no direct way of quantifying how well the Commission is performing its balancing function. However, broad approval from each major industry sector and the ability of each to operate profitably would not be possible unless the Commission was succeeding in this balancing function.

Authorizing and Monitoring Energy Projects

Adequate Natural Gas Pipeline Capacity

The Commission's certification program will allow the appropriate amount of new pipeline capacity to be available to serve the market when needed.

This measure is meant to ensure that adequate capacity and reliable, flexible services are available in the interstate natural gas transmission system, while considering the need to ensure that there are no undue cost shifts or cross subsidization.

Certification of new pipelines will be timely, while fairly balancing the interests of the gas market, project sponsor, landowners, and the environment.

The Commission must be able to process pipeline certificate cases in a fair and timely manner. In general, depending on the level of complexity and the number of opposing parties and type of opposition (e.g., landowner complaints), the Commission will act expeditiously and issue construction certificates to allow the commencement of service in accordance with the general plans of the applicant.

Licensing and Administering Hydropower Resources

Licensing conditions will protect and enhance beneficial public uses, both developmental and nondevelopmental.

Tracking the beneficial public uses that result from licensing conditions and changes in capacity will indicate that sustainable hydropower resources are being licensed for the public's benefit.

Administration of hydropower developments will accommodate increasing public use without diminishing key water resource values.

Tracking the number of recreation facilities at projects, the number of visitor days, and the number of improvements and enhancements made to facilities will indicate that existing hydropower development is serving all water resource interests.

The Commission will reduce processing time under its control, particularly through the use of collaborative procedures and early involvement of staff.

Timely issuances that take into account the interests of all involved entities will help ensure that the Commission's licensing program serves the public interest, taking into account all water resource interests.

Dam Safety

The percentage of high- and significant-hazard dams meeting all current structural safety standards will remain uniformly high.

The Commission's dam safety program must ensure consistently high safety standards at high and significant hazard dams to maintain the lowest probability of failure.

One hundred percent of high- and significant-hazard dams will be inspected annually.

Through inspections the Commission identifies safety problems at projects before they lead to dam failure or jeopardize public safety.

One hundred percent of high- and significant-hazard dams will comply with emergency action plan requirements.

Timely and effective emergency planning and recurrent monitoring should reduce or eliminate any potential threat to life or property.

Commission Administration

To reduce administrative burden, the Commission will:

- *reduce the processing time for docketed workload and for resolving disputes;*
- *minimize filing burden; and*
- *generate better information for use by the industries.*

The Commission will hold a series of symposia during FY 1998, dealing with issues such as expedited complaint procedures, electronic filing, certificate reforms, hydropower relicensing, and the Internet. Participants in the symposia will include key policy makers and technicians from industry, government, and academe, in addition to the Commission's management and staff. Through this process the Commission will develop measurements to gauge progress toward its administrative goals.

Means and Strategies: Regulatory Actions and Adaptations

Electric Power

The Commission's goals for the electric industry reflect the rapid changes in that industry. The Commission's statutory obligations remain the same: to administer the laws and regulations involving issues of transmission and sales for resale of electric energy in interstate commerce, certification of exempt wholesale generators and qualifying facilities, and corporate transactions such as mergers and security issues of electric public utilities. Looking forward, to fulfil this mandate for an industry that is changing as much as the electric industry is changing, the Commission will need to play important new roles:

- Regulating interstate transmission to support competitive generation. Although transmission accounts for only 7 percent of overall investment in the industry, it is critical to generation suppliers who need access to customers. It is the Commission's job to ensure that efficient, reliable, nondiscriminatory access is available for all electric suppliers and customers. This is the underpinning of future competition in generation.

- Addressing market power. The electric industry has been structured as a set of local franchised monopolies for most of its history. As a result, there are significant concentrations of generation in the hands of one or a few local companies in many parts of the country. The Commission will monitor utilities and assess whether they can exercise generation market power that could adversely affect wholesale electric prices in the relevant product and geographic markets. The Commission must respond appropriately to market power issues in the context of market-based pricing and in reviewing the effects of mergers on competition.

- Encouraging efficient wholesale commodity markets. To achieve the benefits of competition, electric markets must function well. The Commission will encourage market structures that allow quick, reliable, flexible trading (a key to capturing the most trade benefits) and have low transaction costs (a key to getting useful access for smaller players).

Addressing External Factors

- Working effectively with states to harmonize regional reforms. Many aspects of the electric industry are regulated at the state level, including both retail sales and distribution services. As more states opt to give retail customers access to the power markets, the result will be unified, regional bulk power markets. However, since most of the electric industry's assets are under the jurisdiction of the states, coordination between the states and the Commission in the restructuring of the industry is critical to realizing the goal of efficient, competitive markets. The Commission will work with states to come up with cooperative solutions to the jurisdictional issues raised by the change.

- Working with other agencies to harmonize regulatory programs. The policies of several other federal agencies have important implications for the future of the electric industry. For example, the Department of Energy has important responsibilities in ensuring the reliability of the electric grid, and EPA's emissions responsibilities will inevitably affect the electric industry. The policies of these agencies are critical to realizing the goal of efficient, competitive markets.

Natural Gas

The Commission's goals for the natural gas industry reflect that industry's continuing change. The Commission's statutory obligations remain the same: to administer the laws and regulations involving the transportation and sales for resale of natural gas in interstate commerce, the construction and operation of natural gas pipelines, and the oversight of related environmental matters. To fulfil this mandate for an

industry that is changing as much as the natural gas industry is continuing to change, the Commission will need to play important new roles. It must:

- Ensure that open access under the Order No. 636 regulations continues to work as intended.
- Encourage efficient gas pipeline construction. Getting gas to market will require expansions in the pipeline transportation and storage grid to handle new supplies and changes in the geographic mixes of production and consumption.
- Take advantage of competition in transportation. It appears possible that some transportation services can be subject to at least some greater competition than seemed likely a few years ago. The Commission will look for ways to take advantage of such competition as a tool to assure just and reasonable rates without reducing protection against the abuse of market power in transportation.
- Encourage improved commodity markets. Natural gas commodity markets can be made to work better by:
  - continuing efforts to improve standardization among pipeline systems for both information and business practices so that gas can be moved more efficiently;
  - ensuring fair and effective short-term markets to assure that the parties obtain the capacity and gas they have purchased and to ensure system reliability; and
  - removing barriers to efficient secondary transportation markets.
- Develop regulatory systems based on Commission monitoring and customer complaints that can respond to the increased pace of the market without unduly burdening market participants.

Addressing External Factors

- Work with states to address market and regulatory issues that arise as states adopt retail unbundling for local distribution companies. State policies on retail unbundling can affect the Commission's goal of ensuring efficient, competitive commodity markets.
- Coordinate with other federal agencies, state agencies, and the public when preparing environmental reviews. Coordination with other entities that have interests in pipeline projects often requires public notices, meetings, and comment periods, and is a factor in the processing time for the Commission's reviews.

The Commission must encourage the industry to solve these and other problems as they arise in the continuing evolution of the gas commodity market. Put differently, the Commission must regulate transportation in a way that fosters the growth of a second generation of gas markets that are more flexible, more responsive to customer needs, and less costly to use.

Oil Pipelines

To meet its goal for the oil pipeline industry, the Commission's role remains to ensure fair access to the oil pipeline systems for all customers under fair terms and conditions at reasonable rates. In some cases, the Commission can do this by allowing market-based rates where markets are competitive. In others, the Commission needs to continue regulation, while remaining flexible, for the pricing of services for new oil pipeline construction.

Hydropower

Despite the changes in the hydropower industry, the Commission's statutory obligations remain the same: to license and inspect nonfederal hydroelectric projects and to oversee related environmental matters. To meet its goals for the changing hydropower industry, the Commission is adapting its regulation to new realities — heightened environmental sensitivity, decision-making responsibilities shared with other authorities, and a new competitive marketplace. This means evolving approaches to regulation that include:

- Ensuring that regulation balances competing demands for limited water resources. The Commission's mandate to foster comprehensive plans of development while considering the overall effect of proposed hydropower development on rivers and river systems changes as society's demands upon water resources change. The Commission will seek to maintain the benefits of hydropower generation while enhancing environmental values and other beneficial uses of water.

- Maintaining vigilance over project operations. The Commission has ongoing responsibilities to ensure that balancing water uses and protecting sensitive resources continues over the life of a project. License conditions are only as effective as the Commission's ability to work with its licensees to ensure they are met. Thus, administering a license over its life — when external circumstances may change unpredictably — is an essential feature of the Commission's regulation. But its administration cannot be heavy-handed. Cooperation and flexibility in achieving the desired ends will be necessary in a more competitive environment.

- Explaining the Commission's hydropower program to new participants. The competitive market may bring new business entities into the industry (just as PURPA attracted new entrepreneurs to develop small-scale hydropower). The Commission will integrate these new entities into its processes and accommodate their concerns and needs as it does for all others.

- Protecting life and property by ensuring the safety of dams and other structures. Here too, the Commission's regulation will evolve. The inventory of dams under the Commission's jurisdiction is aging; many dams are quite old, so vigilance is a necessity. Engineering procedures are improving. The Commission will work with licensees, the engineering community, and the localities where projects are located to ensure that its safety program continues to match the state of the art as it develops.

Addressing External Factors

- Coordinating Commission activities with those of other interested authorities. Although the Commission is charged with making final decisions on actions before it, many other entities have legitimate, recognized interests in the outcome of its cases. These other authorities include federal and state land and resource management agencies, fish and wildlife agencies, water quality agencies, Native American tribes, a variety of nongovernment organizations, and the public. The timing of actions by these other authorities will affect Commission processing times and the degree to which hydropower resources can be developed or sustained.

- Meeting competitive conditions. Although competitive changes are now occurring in the electric marketplace, the final impacts of those changes on sustainable hydropower are not yet known. The Commission will have to assess competition's effects on hydropower development and operation, and in some cases use flexible approaches to accommodate market-driven changes.

- Maintaining the benefits of hydropower regulation in the face of changing scientific and public attitudes. Because hydropower projects operate over many decades, the Commission must be sensitive to long term effects of these changes on resources protected by its licenses.

Commission Administration

Continued change will take advantage of improved information and automation technologies as well as respond to the needs of changing industries. To meet its goals over the next 5 years, the Commission will continue its administrative reforms involving:

- Expediting decisions where practicable, while considering the due process rights of others. Delay of good decisions almost inevitably means delay of benefits for consumers. As the regulated industries become more subject to competitive forces, timing becomes ever more important for companies as well as for consumers. Many of the proposals now coming before the Commission are extremely time-sensitive, because they represent market opportunities that can easily disappear if delayed. Examples include many new gas pipeline construction proposals. In some cases, delay can mean disruption. A proposed electric merger, for example, can bring many other intra-corporate changes to a stop until it is resolved. Delayed licensing and relicensing decisions can postpone the realization of generation, environmental, and safety benefits.

- Developing new procedures for surgical, reactive intervention in markets. Competition is the best customer protection when it is available. The Commission must develop ways to intervene in markets only to the extent needed to correct particular problems. This means monitoring markets rather than trying to manage them, reacting to problems as they arise (for example, through complaints), and taking remedial action that has as little effect on well-functioning parts of the market as possible.

- Improving regulatory certainty. All of the industries the commission regulates are capital-intensive and therefore involve substantial risk. As natural gas and electric power commodity markets become more competitive, both regulated companies and their customers see the underlying risk in the form of changing market prices. It becomes ever more important to ensure that both regulated companies and their customers can count on stable, timely regulatory treatment. If regulation is uncertain, the result would be to add risk to products and markets and therefore to add costs.

- Controlling regulatory costs. Good regulation provides substantial benefits to customers but inevitably involves costs. The Commission has an obligation to ensure that the costs are reasonable in relation to the benefits produced. The Commission will continue to discipline its own costs. For example, it must reduce its overhead costs for administration and the costs of treating similar issues in similar cases. Moreover, the Commission's own cost is only a fraction of the burden that industries incur, since companies pay for the legal and technical expertise needed to bring their cases to the Commission. In controlling regulatory costs, the Commission must be sensitive to these costs also.

- Improving communication and cooperation. Up front staff involvement, technical conferences, public meetings, and collaborative procedures are essential tools for avoiding needless confrontation, shortening processing, and maintaining litigation at appropriate and reasonable levels in all program areas. These efforts are particularly important in gas pipeline construction and hydropower licensing, which typically raise contentious issues that require balancing strong competing interests.

- Taking advantage of new technology, especially for information. The Commission will continue to automate internal processes and make its computerized information more easily accessible to the public and more pertinent to the needs of the changing industries. Of particular importance, the Commission must make all public information available electronically and will work with the natural gas and electric industries to make market-monitoring information available while preserving commercial confidentiality as appropriate.

External Factors

These plans are based on current legislation and the current technological state of the industry. If either of these should change significantly, the Commission would need to change its plans. While the Commission cannot anticipate specific changes in either legislation or technology, the electric industry (especially) is in the midst of a transition that could lead to changes in both. For example, several proposals now before the Congress would lead to a significant further restructuring of the industry nationwide. Similarly, distributed generation may become more economically viable. If it does, it would change some of the Commission's basic assumptions about what parts of the industry can be competitive and in what ways.

Other external factors that can influence the Commission's success in meeting its goals are noted in the section, "Means and Strategies: Regulatory Actions and Adaptations."

Program Evaluation

The Commission is committed to accountability in its programs. For the next year, the most important task is to ensure that specific performance measures are developed along with the quantitative information needed to support them. To do this, the Commission will establish a high level working group, chaired by the Deputy Chief Financial Officer. The working group will include one member from each of five Offices: the Office of General Counsel, the Office of Hydropower Regulation, the Office of Pipeline Regulation, the Office of Electric Power Regulation and the Office of Economic Policy. It will present quarterly progress reports to the Chairman on the status of the Commission's performance measures.

To improve accountability in the longer run, the Commission will institute ongoing assessment reviews at least annually. As part of each review, the Commission will report on how well it is meeting its goals, how and why its goals and objectives should be modified (if at all) and what changes to indicators are needed to improve how well it is measuring its performance. A top priority involves improving its information systems to provide credible measurements of key performance indicators.

RESPONSES TO QUESTIONS FROM CHAIRMAN PACKARD

MANAGEMENT REVIEW INITIATIVES

Mr. Packard. What progress have you made in reforming Commission operations pursuant to the "FERC First" management review initiative which you began in February of 1998? What additional changes do you expect in the future?

Mr. Hoecker. FERC First is the Commission's management response to rapid changes in the industries it regulates and a program to bring efficiency, market-responsiveness, and customer service to its operations. FERC First is reengineering almost all of the agency's key processes based on public input to ensure that the Commission can meet the challenges it now faces. The challenges underlying this historic work include changes taking place in regulated industries, such as growing competition and environmental sensitivities, as well as the continuing likelihood of budget constraints requiring more efficient management. The Commission has also reexamined its mission and developed a statement of vision and supporting values that will guide the agency. The ambitious scope of FERC First will entail substantial work until early 2000, but more than half of the work has already been completed.

After conducting extensive surveys and analysis, including constituent focus groups and interviews, FERC First made recommendations in six major areas of the Commission's work in order to achieve substantial benefits to those we regulate. These are: Promoting Competitive Markets; Authorizing and Monitoring Energy Projects; Resolving Disputes; Planning Strategically (including Building Bridges to the Outside); Developing Employees; and Managing Information Technology.

The FERC First process has been very inclusive and its initiatives are aimed at meeting budget objectives and the requirements of the Government Performance and Results Act (GPRA). In the first stage of the effort over 700 staff and more than 300 outside representatives took part in focus groups. Over 250 people participated in one-on-one interviews and over 500 people responded to surveys, including industry leaders.

Based on extended study under FERC First, the Commission has developed a new organizational structure, called the Target 2000 organization, to implement the changes resulting from our examination of the major areas of the FERC First initiative. Late last year, the Commission established two new offices: the Office of Strategy and Organizational Management and the Office of Finance, Accounting and Operations. This month the Commission established a new Dispute Resolution Service, and consolidated its litigation staff into a new Office of Administrative Litigation. Later this year, we will combine major portions of our current offices of Electric Power Regulation, Pipeline Regulation, Economic Policy and the former Office of the Chief

Accountant to form a new Office of Markets, Tariffs and Rates. The creation of the new consolidated office is designed to gain efficiencies by structuring processes along functional lines and to track the convergence of energy industries.

It is important to understand that the major gains we anticipate in efficiency will come not just from reorganizing offices but from developing a more effective staff skill mix through planning and hiring, improving and accelerating processes, and by shrinking the ranks of middle management where possible.

Interdisciplinary FERC First teams will continue to work on the six major areas that comprise the FERC First initiative between now and March of 2000. During this time, the teams will make a series of recommendations on new processes, changes within offices, and associated performance measures under GPRA.

Mr. Packard. What has been the cost of the "FERC First" project to date and what additional expenditures are estimated for the remainder of FY 1999 and the out years?

Mr. Hoecker. The estimated total cost of the FERC First initiative for fiscal years 1998 through 2000 is $11.5 million. The FERC First project began in February of 1998 and is estimated to be completed by early FY 2000.

The following is a breakout, by fiscal year, of FERC First costs:

Supply/Service	Actual FY 1998 Costs	Estimated FY 1999 Costs	Estimated FY 2000 Costs
Contract Support - Business Process Reengineering	$1.4M	$2.8M	$.7M
Contract Support - Information Technology Requirements	.4M	3.4M	2.4M
Implementation	.1M	.3M	0
Totals	$1.9M	$6.5M	$3.1M

(The amounts associated with IT include substantial Y2K, electronic filing, and other non-FERC First costs which would have been incurred even without reengineering. These items are being executed under the same contracts as those in place for FERC however.)

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Mr. Packard. When will this initiative be completed? When will we see benefits in terms of lower budget requests to Congress and reduced staff requirements? What specific cost savings can be attributed to "FERC First" initiatives?

Mr. Hoecker. With the exception of some phases of electronic filing, work on the FERC First initiatives is scheduled to be complete in March of 2000. However, we are already beginning to reap the benefits of FERC First. As reflected in our current budget submittal, our staffing level has declined by 57 over the past two years, even in the face of growing caseload in many areas. Going forward, we anticipate that we will be able to reduce personnel costs (after inflation adjustments) by hiring more strategically, improving our overall skill mix, and lowering our average grade. Our administrative reforms and information technology (IT) improvements are yielding savings now and are likely to impact the Commission's budget fully beginning in FY 2001.

One key element in our overall program of keeping our budgets under control is the introduction of a program of "managing to budget." By the end of 1999, we intend to have the accounting systems in place to let all managers at the Commission manage to specified overall budgets. By the beginning of FY 2001, we plan to introduce the practice of managing to budget throughout the Commission. We believe that this system will significantly change management incentives and lead to greater budget discipline for many years to come. These benefits should begin to be visible by the FY 2001 budget submission. Finally, the FY 2000 budget includes a peak period expenditure for IT programs, partly related to final implementation of FERC First. We expect to see IT costs decline significantly in FY 2001 and the out years.

FERC First also will provide very important benefits to the Commission, regulated industry and its customers. Virtually all of the initiatives will benefit the Commission itself. Electronic filing will allow us to implement the electronic processing and tracking of work at the Commission, so-called "automated workflow." When this system is combined with the elimination of multiple handoffs of work among redundant or duplicative decision points, simplification of the review process, and other general process improvements, we will see faster and more efficient processing at the Commission. Enhanced and more clearly defined workforce competencies will result in lower turnover in critical areas and an increased ability to transfer current employees into jobs as they develop and to share resources across different industries and organizations. These benefits should result in lower employee costs in future budgets. Indeed, there are some immediate savings that we already see developing. As reflected in our current budget submittal, our staffing level has decreased by 57 over the past two years.

Today we are doing more with less and FERC First will allow us to utilize our resources more efficiently in the future.

We have also made it possible for our regulated industries and other customers who need information from the Commission to gain ready access to that information by making our Regulatory Information Management System (RIMS) and Commission Issuance Posting System (CIPS) available on our website. This ease of access to vital information has been enormously popular, with tremendous savings in time and money. Further implementation of the Manage Information Technology initiative of FERC First will include the capability of filing and officially corresponding with the Commission in an electronic format. We will begin implementation of electronic filing in October of this year, with the final pieces slated for implementation in FY 2000. With electronic filing our customers will see significant savings resulting from a lower filing burden and quicker and easier access to information. Finally, improving the availability and use of electronic regulatory information (both internally and externally) will result in improved customer service and fewer contractor resources for paper handling. A significant byproduct of the IT effort will be the elimination of our mainframe computer and its Y2K compliance problems. These savings will begin next fiscal year as reflected in our budget submittal.

The Resolving Disputes initiative envisions improved time frames for processing complaints and greater use of alternative dispute resolution (ADR) techniques in lieu of lengthy and costly litigation, as well as improvements in the formal litigation process. As mentioned earlier, implementation of that initiative began this month, with the establishment of a new Dispute Resolution service and consolidation of litigation staff into a new Office of Administrative Litigation. In addition, the Commission completed work on and issued a rule that will greatly expedite the processing of complaints. This work already completed, when combined with the additional ADR and formal litigation process improvements scheduled for implementation this fall, will be a tremendous benefit to the public we serve.

Major cost savings to our customers, and ultimately the ratepayers, will be realized through the implementation of the Promote Competitive Markets and Authorize and Monitor Energy Projects initiatives, currently scheduled for completion in the first quarter of next year.

In sum, these initiatives envision faster and more efficient regulatory decisions for docketed casework. In the large and dynamic markets the Commission oversees, faster Commission decisions have the potential to save billions of dollars for industry and consumers. These benefits will result from the implementation of streamlined processes, combined with an increased emphasis on managing more effectively and

strategically, monitoring markets and enhancing competition, and relying on collaborative processes and alternative dispute resolution techniques. Further development and emphasis on employee competencies, mentoring, and evaluation through our Developing Employees initiative, will result in a more effective workforce.

ENVIRONMENTAL REVIEW OFFICES

Mr. Packard. Why does FERC have separate environmental offices for each of its program areas? Doesn't it make sense to administer the environmental review function under a single office?

Mr. Hoecker. As the FERC First process recognized early on, administration of the Commission's work will be more efficient if organized and conducted along functional lines. For that reason, we have studied all the ways in which we can simplify the Commission staff's structure and management to obtain scale economies and better resource utilization. Not surprisingly, we learned that the choices were not always easy, especially in the area you identify.

The Commission now examines environmental issues in both its hydropower and natural gas programs. As part of the FERC First process, the Commission is considering various options for organizing its energy project work in the future. The choice of options will seek to achieve three key goals: 1) to gain as many efficiencies as possible through more flexible staffing and appropriately consistent policies between the two areas; 2) to avoid a fragmentation of the gas certificate process for new natural gas pipelines (which includes both environmental and other components); and, 3) to serve the particular needs of the natural gas and hydropower industries.

The National Environmental Policy Act requires generally similar reviews for the natural gas and hydro industries, but the Natural Gas Act and the Federal Power Act require a different approach to the process in two ways. The Federal Power Act, unlike the Natural Gas Act, allows Federal fish and wildlife agencies and land management agencies to stipulate mandatory environmental protection measures. It also requires the Commission to establish a record documenting the reasons for not including environmental measures recommended by Federal and state fish and wildlife agencies. These additional requirements make the overall environmental review process for hydropower significantly more complex than for natural gas pipelines.

The FERC First Steering Committee and I are currently engaged in analyzing and deciding whether the formation of a "projects" office makes the most sense administratively.

INFORMATION TECHNOLOGY IMPROVEMENTS

Mr. Packard. Your FY 2000 budget request states that the Commission is requesting an increase of $5 million for essential improvements in information technology leading to an annual saving of $2 million. Please describe these IT improvements in more detail. When will we begin to see the savings?

Mr. Hoecker. The Commission's FY 2000 budget request includes the funding to create state-of-the-art information systems that will improve the efficiency and timeliness of the Commission's work. This initiative will be centered on implementation of electronic filing; document management which includes tracking, distribution, storage and retrieval; and electronic information dissemination. Electronic filing, combined with electronic posting and service over the web site, will permit staff and outside parties to obtain filings within minutes or hours rather than days. The construction of a work flow tracking system will be linked to the Commission's Records and Information Management System, the electronic filing system, and a planned data repository that can accommodate a variety of format types. The Commission's contemporaneous re-engineering efforts will streamline business processes and permit the future workflow tracking system to function even more efficiently. These improvements will make it possible to minimize paper processing and will facilitate the monitoring of the industries and markets that we regulate. In addition, the Commission will be implementing a new financial system to include general ledger, purchasing, and accounts payable modules. This financial system will provide managers with improved financial tools to assist in forecasting and executing their operating budgets.

The Commission will realize savings from the implementation of its comprehensive information management system starting in FY 2000. Savings will be derived from elimination of the mainframe and movement to a client server environment, as well as a reduction in paper handling and data storage and retrieval costs through implementation of electronic filing.

I want to emphasize that it is important to develop IT and business process solutions at the same time. The FERC First program is unique in trying to leverage the benefits of its IT investments in this way.

NATURAL GAS AND ELECTRIC POWER PROGRAM BUDGETS

Mr. Packard. You have continued to request more funds for your natural gas and electric power regulation activities even though these industries have become increasingly competitive as a result of market developments as well as administrative and legislative regulatory oversight? When can we expect to see

lower budget requests in response to the deregulation that is taking place in these industries?

Mr. Hoecker. The Commission seeks to encourage the benefits of competition wherever possible. At the same time, the Commission must act to protect customers who have few or no choices because energy markets are not yet competitive in many instances. In those situations, the Commission will continue cost-of-service rate making and other traditional regulatory activities. One area that will continue to be regulated in the traditional way, for example, is the authorization of new gas pipeline construction. New market potential -- an outgrowth of deregulation of the natural gas commodity -- is a driving force behind the natural gas industry's aggressive development of new projects.

In the electric industry, open access transmission resulting from implementation of the Energy Policy Act of 1992 and the Commission's Order No. 888 has resulted in greater competition in the bulk power market, but has also presented new challenges relating to the regulation of transmission monopolies. The dynamic nature of competitive markets almost ensures that new, complex issues will arise. For example, our electric filings have increased eight-fold since 1993. Competition and related electric issues will continue to be a significant amount of the Commission's workload for the foreseeable future.

YEAR 2000 SOFTWARE PROBLEM

Mr. Packard. What is the current outlook for FERC's response to the so-called "Year 2000 Software Problem?" What is FERC's role with respect to ensuring the natural gas and electric power industries are prepared for this challenge? Are these industries prepared to move into the new millennium without significant disruptions in their operations?

Mr. Hoecker. The Year 2000 conversion problem affects both internal FERC operations and industries that are regulated by the Commission. FERC has completed its inventory and testing phases and is on-schedule for remediating or replacing all affected systems. FERC does not have any mission-critical systems. All but one of the computer systems operated by FERC are scheduled to be compliant by October 1. The remaining system is scheduled to be compliant by December 1. Data contained within FERC's one non-compliant computer interface with the public (remote public access) is being migrated to FERC's website, which is Year 2000 compliant.

The Year 2000 presents an unusual challenge for FERC, as a regulatory agency, because the Commission does not exercise direct authority over these kinds of internal operations within regulated energy companies. FERC regulates rates, terms and

conditions for certain services offered by electric utilities, natural gas pipeline companies, and oil pipeline companies. The Commission's role is primarily to act as a facilitator and advocate, not regulator, on the Year 2000 matter.

FERC has been an active participant in the President's Council on Year 2000 Conversion, where I serve as leader of the oil and gas sector working group. The working group has sponsored an industry-wide survey of the Year 2000 readiness of the oil and natural gas sector. Survey results were published in September 1998, and January 1999, and the working group is currently conducting yet another exploration of industry readiness. The results are scheduled to be made public in June and again in October 1999. Survey results have been presented at public technical conferences held at FERC and can be accessed via the FERC website <www.ferc.fed.us>.

FERC also facilitated the formation of the Tri-Industry Working Group, which represents the oil and gas, electric power, and telecommunications sectors. The Tri-Industry Working Group has since evolved into the Inter-Industry Contingency Planning Task Force, with the addition of the transportation sector. This group explores the interdependence of computer systems in these key industries.

The oil and natural gas industries are working together to actively and aggressively address the Year 2000 challenges. They have identified potential Y2K problems, and although there may be some minor disruption which may impact consumers minimally, they are confident of their ability to ensure that the supply of natural gas and petroleum-based products is uninterrupted. Complex contingency plans, which are part of normal operating procedures, are being reviewed to incorporate any Y2K challenges.

In the end, energy industry participants have the responsibility for addressing this problem. Nevertheless, the Commission has an important role in raising awareness of the issue.

ADMINISTRATION'S COMPREHENSIVE ELECTRICITY COMPETITION PLAN

Mr. Packard. What changes are contemplated for FERC in the Administration's comprehensive energy proposal? Do you support these initiatives?

Mr. Hoecker. There are a number of important changes that would directly and significantly affect FERC. Let me highlight some of the key changes.

The Administration's proposal would: expand FERC's authority to regulate the transmission facilities of non-public utilities such as the federal power systems and municipal and

rural cooperative systems; clarify FERC authority to require transmitting utilities to turn over operational control of their transmission facilities to independent transmission system operators if appropriate to promote competitive markets and efficient and reliable operation of the transmission grid; and authorize FERC to approve the formation of, and oversee, an organization that would prescribe and enforce mandatory reliability standards.

The Administration's proposal would provide for review of mergers of electric utility holding companies and mergers of generation-only companies, and would require FERC to consider effects of mergers on retail markets. It also would authorize the Commission to require and act on plans to remedy market power in bulk power markets.

I support the underlying concepts of the above proposals because they would remove, or would allow FERC to remove, remaining impediments to fully competitive bulk power markets. In particular, giving FERC authority to apply non-discriminatory open access transmission rules to all transmission facilities (including those of Federal transmission-owning utilities), together with clarifying FERC authority to order transmitting utilities to turn over operational control of their transmission facilities to independent regional transmission system operators, will permit the seamless transmission grid necessary to support a fully competitive wholesale power market, remove inefficiencies in the operation of the market, and better secure for customers nationwide the significant benefits that flow from such competition.

In addition, the Administration's proposal would repeal the Public Utility Holding Company Act of 1935, but give FERC and state regulators greater access to the books and records of public utility holding companies as well as their non-public utility affiliates. This is a widely-accepted consumer protection measure that should survive the Act. It would also repeal the mandatory purchase requirement of section 210 of the Public Utility Regulatory Policies Act of 1978. These amendments would not give the Commission additional responsibilities but would generally reflect progressive steps in the evolution of competitive markets.

PUBLIC POWER REFORMS

Mr. Packard. Public power reforms are of great interest to the Subcommittee. What has FERC done to ensure that TVA and the Federal Power Marketing Administrations participate in a new era of competition in the electric power industry? Are there barriers to their participation that FERC or the Administration or Congress could help overcome?

Mr. Hoecker. The Commission has limited authority over such entities (which are not public utilities as defined by the FPA). The Commission can act in a limited manner, on a case-by-case basis, in response to individual requests for transmission service from those entities under section 211 of the Federal Power Act. Requests that certain power marketing administrations (PMAs) provide transmission service under section 211 are pending before the Commission, and the Commission previously ordered the Tennessee Valley Authority (TVA) to provide transmission services to a customer in response to a request under section 211.

In its Order No. 888 open access rulemaking, the Commission strongly encouraged these and other non-public utilities that own facilities used for transmission in interstate commerce to offer open access transmission services through voluntary reciprocity tariffs. To date, the Commission has accepted reciprocity tariffs submitted by the Bonneville Power Administration (BPA) and the Southwestern Power Administration. The Western Area Power Administration's proposed reciprocity open access tariff is pending before the Commission. The Southeastern Power Administration does not own any transmission. The Tennessee Valley Authority (TVA) has not submitted a reciprocity tariff.

Congress should give the Commission broader authority to require that all transmission owners, including the PMAs and TVA, offer the same non-discriminatory transmission services that public utilities (i.e., primarily investor owned utilities) are required to provide. In this regard, I would note that the Administration's Comprehensive Electricity Competition Act would expand the applicability of the Federal Power Act to the PMAs and TVA. I support this proposal.

CONSUMER IMPACT OF ELECTRIC POWER INDUSTRY RESTRUCTURING

Mr. Packard. What has been the impact to date on consumer prices of FERC Order No. 888 and what is the outlook for the future in a restructured competitive electricity market?

Mr. Hoecker. Prices of electric power paid by consumers have fallen slightly since Order No. 888. According to EIA data, the average retail cost per kWh was 6.7 cents in 1998 and 6.8 cents in 1997, compared to 6.9 cents in 1996 when Order No. 888 was issued. In the two years since Order No. 888, average prices to consumers in areas where ISOs have formed (California and the Northeast) have fallen by 0.4 cents from 1997 to 1998, while average prices in other areas have remained the same.

Consumer price decreases have not been more dramatic for a number of reasons. First, even though wholesale power markets have developed rapidly since Order No. 888 was issued, the overall electricity market is still evolving. Market prices have become more visible and reflect far more transactions than they

did in 1996. Today, prices in different regions of the nation are monitored and reported by trade publications and the Internet, and OASIS allows fast and uniform access to data on transmission availability. Prices are reported at regional clearing points such as the California-Oregon border, the Entergy hub, or the PJM pool. While a large number of market institutions have developed, more are needed. Regional transmission organizations could help to bridge some of the gaps that remain in price transparency and transmission availability.

Second, market participants are still learning. Market participants have learned a great deal about trading power in a competitive marketplace. Trading and risk management tools are evolving. But the transition from regulation to competition takes time. Tools that work well in other markets do not work the same way when applied to highly volatile electric power systems. Electricity markets will continue to mature by adapting risk management tools to fit the specific needs of the industry.

Third, electricity markets are not fully competitive. While wholesale markets are open to competition, most retail markets continue to be regulated. Because electricity markets are not fully unbundled, signals to build new capacity are not getting through. Uncertainty about the extent and pace of deregulation has led to inactivity in the building of new generation and transmission projects. Additional developments in market institutions will be needed to complete the road to fully competitive electricity markets.

The outlook for consumer prices in a restructured competitive electricity market is optimistic. In its 1997 report, Electricity Pricing in a Competitive Environment, EIA estimates that the average price of electric power will fall by 6-24% over the next ten years. Prices to end users could fall from 6.1-6.3 cents per kWh to 5.3-5.5 cents under EIA's most aggressive competitive scenario. EIA notes the volatility of electric power prices and key uncertainties which will need to be resolved, such as: the timing of restructuring, stranded cost recovery, power plant performance or improvement, the pricing of transmission, distribution and ancillary services, reserve margin requirements and the cost of reliability, and consumer response to new pricing options.

I would also note that the analysis which accompanies the Administrations's newly-released Comprehensive Electricity Competition Act estimates that the savings from fully competitive retail and wholesale electric power markets could be up to $20 billion per year, which is about 15% of 1997 industry revenue.

The ultimate consumer impact of restructuring in states which currently enjoy low-cost power is difficult to predict. Producers and consumers will split the cost savings, but

regulators and other policy mechanisms will play a role in the outcome. According to EIA, currently low-cost regions may experience price increases, while residential or rural customers face many of the same issues seen in other regulated industries, such as telecommunications. However, states have choices about how to restructure, and the status of specific classes of consumer varies greatly. Cost-of-service regulation has not guaranteed low consumer prices, and choices made in the transition to competitive markets may be as important as market forces in determining consumer impacts.

One factor that is likely to significantly affect the impact of competition on low cost power states is whether regional institutions such as RTOs are developed in the region. Utilities that now have low cost generation will help assure having access to future low cost generation plants by participating in an RTO. New low-cost generation plants are more likely to be attracted to regions with a well-functioning regional market governed by an RTO. In other words, a state that is low-cost today may not be low-cost tomorrow without an RTO in its area.

REGIONAL TRANSMISSION ORGANIZATIONS

Mr. Packard. Describe the Commission's current initiatives to continue the work of restructuring the electric power industry which began with Order No. 888 in April of 1996. Specifically, please discuss what you are doing to promote the formation of regional transmission organizations (RTOs) to solve problems that have become apparent since the issuance of Order No. 888. What is your legal authority to mandate participation in RTOs? Do you need additional authority?

Mr. Hoecker. Since Order No. 888, the Commission has issued orders approving or conditionally approving applications to create five independent system operators (ISOs). The Commission is considering whether to establish further generic policy or requirements in this area. To inform this consideration, the Commission, in 1998 and 1999, held a total of 11 public conferences in 9 different cities across the country to hear the views of industry, consumers, and state regulators with respect to the need for regional transmission organizations (RTOs) and their appropriate roles and responsibilities.

In Docket No. PL98-5-000, the Commission initiated an inquiry in March 1998 pertaining to its policies on ISOs and as a result held eight public conferences and received numerous written comments. It became apparent during these conferences that in addition to non-profit ISOs, which had been the model for regional transmission entities to that time, there were also advocates of for-profit transmission entities and other forms of organization that might achieve the same benefits.

With respect to statutory authority, the Commission has independent authority under sections 205 and 206 of the FPA to remedy undue discrimination in the provision of interstate transmission services by public utilities. This statutory authority formed the basis of our open access requirement in Order No. 888, just as similar Natural Gas Act powers enabled the Commission to order interstate pipelines to open up in favor of market competition. Grid regionalization focuses on remedying similar problems. The statute is not express about either RTOs or open access, however. Sections 205 and 206 do not, in any case, extend to transmission services offered by Federal, municipal, or most cooperatively-owned utilities. Given questions about the extent of the Commission's legal authority to mandate participation in regional transmission entities, it would be beneficial for the Congress to clarify the Commission's authority to order utilities to participate in such entities. The Administration's proposed Comprehensive Electricity Competition Act, in section 304, would provide the Commission with such authority.

Moreover, on October 1, 1998, the Secretary of Energy delegated his authority under section 202(a) of the FPA to the Commission. On November 24, 1998, the Commission gave notice in Docket No. RM99-2-000 of its intent to initiate a consultation process with State commissions pursuant to section 202(a). The purpose of the consultations was to afford State commissions an opportunity to present their views with respect to appropriate boundaries for regional transmission organizations and other issues relating to regional transmission entities. Three public conferences with State commissioners were held in February 1999. The Commission is currently considering whether to provide further guidance to the industry on the formation of regional transmission entities and will likely be issuing a proposal in this regard in the spring of 1999.

Section 202(a) of the FPA authorizes and directs the Commission "to divide the country into regional districts for the voluntary interconnection and coordination of facilities for the generation, transmission, and sale of electric energy." The purpose of this division into regional districts is for "assuring an abundant supply of electric energy throughout the United States with the greatest possible economy and with regard to the proper utilization and conservation of natural resources." Section 202(a) states that it is "the duty of the Commission to promote and encourage such interconnection and coordination within each such district and between such districts."

RELIABILITY OF THE ELECTRIC POWER GRID

Mr. Packard. What is FERC's role in ensuring the reliability of the electric power grid? Where should primary

responsibility for this function reside? Should the Commission be given more authority in this area?

Mr. Hoecker. Historically, FERC has had a limited role in ensuring the reliability of the electric power grid. FERC's only specific authority related to reliability is in section 202(g) of the FPA. Under section 202(g), the Commission must require by rule that public utilities, "in order to insure continuity of service to customers," report expected shortages of electric energy or capacity, submit contingency plans for such shortages and accommodate such shortages in a way that gives due consideration to public health, safety and welfare, without undue prejudice or disadvantage. The Commission has adopted these rules. (See 18 C.F.R. Part 294.)

The increasing diversity of and competition within the power business has made it far less clear who is accountable for system security. Consequently, as new standards for ensuring transmission reliability are developed and applied, the Commission is being asked to ensure they are reasonable and not adverse to particular commercial interests.

Recently, under section 205 of the FPA, the Commission accepted on an experimental basis a reliability management system proposed by the Western Systems Coordinating Council (WSCC), one of ten regional reliability councils in the country. While the Commission has accepted the WSCC's reliability criteria, it has done so only to the extent needed to fulfill its traditional role of ensuring that the rates, terms and conditions of jurisdictional service, as distinct from the reliability criteria, satisfy FPA requirements. FERC will also resolve disputes about violations of these criteria.

In addition, on December 16, 1998, the Commission acted on a reliability procedure established by NERC and concluded that NERC's Transmission Loading Relief (TLR) procedures are generally consistent with or superior to the pro forma tariff adopted in Order No. 888. However, the Commission also identified areas where further efforts were needed by the industry, and asked the industry to identify generation redispatch solutions for congestion management and address parallel flows associated with native load transactions and network service in the TLR procedures.

I believe that the development of reliability criteria should continue to be the primary responsibility of the industry in the first instance, with all segments of the industry represented in the process. However, to make certain that the system continues to function at a high level of reliability, Congress should make compliance with reliability standards mandatory. In that connection, a Federal regulatory agency should oversee the industry standard development process, should

review reliability standards to determine that they are adequate to preserve reliability and will not result in discrimination, and should ensure fair enforcement. That regulatory entity could defer as appropriate to the technical judgments of a properly constituted and diverse private reliability standards organization. The Administration's proposal is consistent with these policy goals.

Mr. Packard. I understand that the office of the Department of Energy's Assistant Secretary for Energy Efficiency and Renewable Energy is conducting R&D studies on electric reliability? Is FERC involved in this effort? Shouldn't you be working with DOE or at least conducting your own R&D studies if you're going to assume greater responsibility in this area?

Mr. Hoecker. You may be referring to a program undertaken by DOE's Office of Power Technologies. The Commission is not actively participating in this program. However, DOE does generally inform us about its transmission reliability research. We intend to review DOE's R&D reliability program reports as they are issued.

The Commission does little or no technology R&D work of its own. It is an independent regulatory agency, not a technology agency, and has no funding to contract for such work and no major capability to conduct it in-house. We are satisfied that DOE is the appropriate agency to conduct transmission reliability R&D technology studies and expect that DOE will continue to keep us informed.

ELECTRICITY PRICE SPIKES

Mr. Packard. What steps has the Commission taken to prevent a recurrence of the severe price spikes in the electric power market such as occurred in the Midwest last summer?

Mr. Hoecker. Since the Midwest electric price spike of June 1998, the Commission and its staff have taken substantial action to identify the causes of the price spike and to reduce the possibility that a similar event would recur. First, in July 1998, I established a FERC staff team to determine the causes for the price event. In September 1998, the team staff issued its report. The staff report noted that the price spike was an extraordinarily high, but rather narrow and short-lived, increase in wholesale spot market prices. According to the report, the conditions that led to the price spike did not compromise the reliability of the electric transmission grid.

The staff report concluded that a combination of factors caused the price spike, including:

- An above-average amount of generating capacity was not available in the Midwest due to planned and unplanned outages, including weather-related damage.
- Unseasonably hot temperatures over a broad area increased demand to near-record levels.
- Transmission constraints reduced the ability of utilities to move power.
- The market's information systems did not provide clear, current short-term prices.
- Defaults on power sales contracts temporarily led parties to seek more short-term supplies than usual.
- Market participants lacked experience in dealing with the conditions listed above.

The report found that the particular combination of events that led to the magnitude of the June 1998 price spike was unlikely to recur, although the industry can expect wholesale prices to rise and fall with the dynamics of supply and demand. At the same time, the report identified long term trends, such the substantial growth in the Midwest's peak summer loads for electricity, without any significant addition of new generating capacity, that contributed to the conditions that caused the price spike.

The report recommended that the Commission, state regulatory agencies, the North American Electric Reliability Council (NERC) and the electric industry work together to ensure that markets function efficiently and fairly and make available sufficient information regarding transmission and generating capacity. It noted that independent regional entities that operate and plan transmission systems could help wholesale markets function more efficiently, and suggested that the electric industry and its regulators examine how to improve the operation of markets.

While prices have fluctuated as the factors that drive the market change, no significant price spikes have occurred since last summer. I continue to believe that the particular combination of factors leading to the 1998 price spikes is not likely to recur, in part because the industry's experience with competitive wholesale power markets is increasing and because market participants have a strong incentive to learn how to protect themselves from a convergence of events similar to those that led to the price spike. At the same time, it appears that some of the long-term factors (such as continued projected increases in the Midwest's peak summer demand without corresponding improvements to generating or transmission capacity in certain regions) that contributed to the price spike have not

substantially changed since last summer. Thus, I cannot rule out the possibility of future pricing abnormalities in the Midwest.

As a result, since last summer, the Commission has taken several actions that are consistent with the staff report's recommendations to prevent or ameliorate conditions that might lead to price spikes:

- The Commission has approved the market design for the independent system operator (ISO) in New England and improved the operation of other ISOs, such as the PJM Interconnection and the California ISO. The Commission also approved the Midwest and New York ISOs (although they will not be in operation during the summer of 1999).

- The Commission took action to improve the workings of the transmission market, such as: (1) increasing the amount of information available to transmission customers through OASIS; and (2) accepting NERC's Transmission Loading Relief procedures for alleviating transmission capacity constraints and directing further market responsive refinements to those procedures. These actions are intended to make the transmission market more efficient.

- The Commission approved market-based rates for sales of energy and ancillary services that are scheduled to be in effect during the summer of 1999 in important regions -- California, PJM and New England. Permitting sales prices to rise and fall with the market will attract more marketers and, eventually, more generators to these areas. The increased competition, coupled with the market monitoring the Commission required as a condition of approving market-based rates, should tend to reduce wholesale prices.

- I recently announced the establishment of a staff team to monitor market conditions during the coming summer and to communicate with key players including state regulators, transmission providers, and NERC. The purpose of this team is to evaluate the maturing wholesale power market and help the Commission and others understand and be prepared to deal with emerging market conditions.

MERGER REVIEW POLICY

Mr. Packard. How successful has the Commission's policy for reviewing utility merger applications been in terms of the time it takes to process such applications and ensuring that mergers do not lead to market dominance which blocks competition by raising barriers to entry by new companies?

Mr. Hoecker. Over two years ago, the Commission made a commitment to act expeditiously on merger cases. We have lived up to that commitment.

In December 1996, the Commission issued a Merger Policy Statement in which we reformed our merger criteria. We incorporated new analytic capabilities to reflect the new competitive energy markets. Because unnecessary regulatory delay can prevent prudent business decisions from going forward, the Commission announced its intention in the Merger Policy Statement to take action on mergers within 150 days of receiving a complete application. By sharpening our focus on competitive issues and addressing the potential for a merger to create or enhance market power or barriers to entry, the Merger Policy Statement provided a road map for prompt Commission consideration of corporate restructuring proposals.

Since we issued our Merger Policy Statement, the Commission's record in processing mergers has been exemplary. We received 23 new major merger applications and acted on 18 of them (the other five have arrived just recently). We set only three of these 18 cases for hearing -- primarily because of disputed issues of fact related to the mergers' impact on competition. We approved the other 15 applications in less than the 150-day target, sometimes subject to conditions needed to mitigate potential market power. (We also took final action in 1997 on the 9 merger cases that had been filed prior to the issuance of the Merger Policy Statement; thus in the 28 months since the Merger Policy Statement issued, we acted on 27 merger cases in all.) When a transaction provides little concern about potential effects on competition, ratepayers and regulation, the Commission approves the proposed merger shortly after receipt of public comment. For example, the recent merger of CalEnergy Company Inc. and MidAmerican Energy Holdings Company was authorized 93 days after the merger application was filed and just 30 days after comments from affected parties were received.

The Commission examines carefully the effects of a proposed merger on competition. Frequently, we have attached conditions to our approval of mergers or otherwise considered commitments by the merger applicants in order to mitigate potential market power. Examples include: certain requirements governing natural gas transportation by an affiliate for in-house and competitors' generation in the San Diego Gas & Electric-Enova merger; a commitment to turn control of transmission over to an independent system operator in the Louisville Gas & Electric-Kentucky Utilities merger; a commitment to provide third parties with access to certain constrained transmission facilities in the Interstate Power-Wisconsin Power & Light merger; and a commitment to relinquish control over the output of a generating plant in the Allegheny Energy-Duquesne merger. Our success in processing merger applications in a timely fashion has not come at the

expense of our remaining vigilant against the exercise of market power and the creation of barriers that block entry to new energy suppliers.

ALTERNATIVE LICENSING PROCESS FOR HYDRO PROJECTS

Mr. Packard. The National Hydropower Association expressed concern in the past that the collaborative process encouraged by the Commission's Alternative Licensing Procedure for hydroelectric power projects would be of limited use since consensus is reached in few projects. How successful has this initiative been in streamlining and improving your hydro licensing process?

Mr. Hoecker. The Commission's Order No. 596, issued on October 29, 1997, provided for an alternative licensing process (ALP) in which pre-filing consultation and the environmental review process are combined. The ALP was designed to improve communication between affected entities and to be flexible and tailored to the facts and circumstances of the proceeding. The ALP includes the preparation of a draft environmental assessment by either the applicant or by a third-party contractor. The applicant's draft environmental assessment and the license application are then filed with the Commission for processing.

Commission staff have several goals for the ALP:

1) to accelerate NEPA review and other licensing requirements by providing oversight to the applicant who prepares a draft environmental assessment during the prefiling consultation period;

2) to facilitate a process whereby the draft environmental assessment fully evaluates and balances the interests of the stakeholders involved; and

3) to expedite the licensing process.

The alternative licensing process has proven to be very effective and is being used increasingly. During the years 1995 to 1998, there were 8 project applications out of 47 (17%) that used the ALP. In 1999, we expect 14 out of 46 (30%) project applications to use the ALP, and another 15 out of 39 (38%) are expected to use the ALP through the year 2003.

To date, 62 projects are implementing the ALP. Forty-nine involve relicenses, 11 involve original licenses, and 2 are for amendments to existing licenses. We are aware of 20 other projects that are considering using the process.

We have issued licenses for 5 projects--2 original licenses and 3 relicenses -- using the ALP. In these cases, it took from

less than 7 months to 1 year to act on relicense applications, and the original licenses took from 1 year to 18 months to complete. By comparison, it took an average of 3.5 years to process the "class of 1993" relicense applications that followed the traditional approach.

The early returns indicate that the alternative licensing process is a success, resulting in faster and less contentious license issuances.

DAM SAFETY

Mr. Packard. FERC is responsible for the safety of dams associated with the hydropower projects it licenses. I understand that other federal agencies also have dam safety responsibilities. Would it make sense to combine the federal government's dam safety responsibilities in one agency?

Mr. Hoecker. There are other federal agencies with dam safety responsibilities. There are important differences, however, in each agency's dam safety responsibilities which lead to distinctions in the functions of each agency's dam safety program. The Commission, through licensing actions, authorizes non-federal hydroelectric projects. The licensees must not only ensure the safe construction and operation of licensed projects, but must operate their projects in compliance with license requirements. It is our responsibility to ensure that licensees carry out their responsibilities and comply with license requirements. On the other hand, the other Federal agencies, such as the Bureau of Reclamation (Bureau), the Corps of Engineers (Corps), and the Tennessee Valley Authority, plan, design, construct, own, operate and maintain their dams for various federally-authorized purposes. The Department of Energy (DOE) and Nuclear Regulatory Commission (NRC) are responsible for a small number of dams at DOE facilities and NRC-regulated facilities.

All the agencies are members of the Interagency Committee on Dam Safety (ICODS), which is chaired by the Director of the Federal Emergency Management Agency. ICODS was formed to establish Federal Dam Safety Guidelines for all federal agencies involved with the design, construction, operation, and regulation of dams. The formation of the ICODS was reiterated in the National Dam Safety Program (P.L. 104-303) signed into law on October 12, 1996, by President Clinton. The Commission plays an active and guiding role. I want to emphasize that the Commission has an internationally recognized and widely respected and emulated dam safety program. We are truly leaders in this field.

The National Dam Safety Program Act of 1996 required the Director of the Federal Emergency Management Agency (FEMA), along with State dam safety agencies and the National Dam Safety Review

Board (Review Board), to establish and maintain a coordinated national dam safety program. Among other things, this program provides a method for cooperation and coordination with State and Federal governmental entities. The National Dam Safety Program did not preempt any of the Commission's authorities, but appropriately complements the Commission's Dam Safety Program by providing a high-level forum for interagency exchange of information and ideas.

The success of this multi-agency coordination does not call for combining the federal dam safety responsibilities into one agency. Efficiencies have already been achieved between DOE, NRC, and the Commission, in that the Commission staff now provides inspections and dam safety oversight of dams through Memoranda of Agreement. Independent Federal dam safety programs allow for the independent testing of new investigative techniques and methods of analysis.

The dam safety responsibilities of the Commission's field offices include both the monitoring of dam safety requirements and non-dam safety license compliance matters. If dam safety were not supervised by the Commission's staff, the Commission would still need field representatives to do other license-related inspections. This would not necessarily be efficient or effective.

Federal agencies working both individually, and jointly, on dam safety achieve dual benefits, without redundancy of work. The Federal agencies maintain individual dam safety programs, customized to their unique responsibilities, while also enjoying the benefits from the association with other federal dam safety programs, and FEMA, through the Review Board and ICODS.

Mr. Packard. How safe are the dams under FERC's jurisdiction? Have there been any significant safety problems during the past year?

Mr. Hoecker. The safety record at dams under our jurisdiction has been excellent. There have been no dam failures causing loss of life or significant property damage. The Commission has an aggressive dam safety program for protecting people who live downstream from FERC-jurisdictional dams. The careful inspection of dams and the staff's analytical review of dams work together to achieve dam safety. Since 1981, over 450 dam safety modifications have been completed under the Commission's ongoing supervision.

Since many projects licensed by the Commission are older structures (more than two-thirds are over 50 years old), adequate maintenance and monitoring of the performance of the structures is extremely important. During the past year it has been recognized that, along with the aging dams, various

mechanical components, such as spillway gates, require more attention and maintenance. Regulatory restrictions on some components in lubricants compound the difficulty in keeping the gates in good working order. Therefore, priority is given to maintenance so today's maintenance problems do not become tomorrow's dam safety problems.

El Nino weather effects have caused severe flooding in many areas of the United States. Commission projects safely passed all flows. Emergency Action Plans (EAPs) implemented at Commission projects during the flood events assisted in downstream notifications to communities affected by the flooding. EAPs, which are required at most Commission projects, include provisions for downstream notifications during high flow events even though there is no danger to the structures. These notifications assist communities in carrying out early warnings and safe evacuations. Our EAP training courses include coordination and discussions with local emergency agencies and Federal emergency response agencies, like the National Weather Service and flood forecast centers.

We encountered one potentially-significant safety problem last year. The licensee for the Milner Project in Idaho notified the Commission's Portland Regional Office that a hazardous condition had developed at the South Milner Dam. First reports from the field indicated that dam failure was imminent. A sinkhole had developed in the crest of the dam, a vortex appeared a short distance away in the reservoir, and muddy water was being discharged from downstream drains. The project's emergency action plan had already been activated. Commission staff was in constant contact with the licensee, while en route to the site. Commission staff gave directions that ultimately prevented the failure of the dam. Nine years earlier, our dam safety staff had foreseen the possibility of such an occurrence, and required the licensee to construct several features to safeguard against possible failure of the dam during concentrated leakage incidents. Dam failure was averted because of the Commission staff's careful analysis, sound preparation, availability, and on-the-spot engineering judgement.

CONSUMER IMPACT OF NATURAL GAS INDUSTRY RESTRUCTURING

Mr. Packard. What has been the impact on residential consumers and small businesses of the Commission initiatives to restructure the natural gas industry?

Mr. Hoecker. Order No. 636, issued in 1992, continued the process begun in 1985 (Order No. 436) of providing buyers of natural gas the ability to deal directly with numerous producers and gas merchant pipelines. This open access has had a profound effect on the gas market and has led to lower gas prices,

especially for those groups who have had the most direct access to sellers of gas.

Open access has led to the development of "market hubs" (locations where numerous buyers and sellers trade gas freely) and what people in the industry call "gas-on-gas" competition. In the past, gas prices generally followed oil prices either up or down. With the advent of open access, gas prices have been uncoupled from oil prices and generally were considerably lower than oil prices through 1995. Gas prices also tend to be less volatile than they were historically. Bringing many buyers and sellers together at "market hubs" has increased competition and has led to more competitive prices. Coupled with wellhead decontrol, open access has placed continuous downward pressure on delivered gas prices.

Average real gas prices (i.e., adjusted for inflation) have declined for all customers since the advent of open access. Although almost all expert forecasters predicted substantial increases in gas prices between 1984 and November 1995, wellhead prices actually declined by 53 percent, city-gate prices by 43 percent, commercial prices by 27 percent, and residential prices by 19 percent. In the two years between the implementation of Order No. 636 (November 1993) and the end of 1995, these prices fell by 24 percent at the wellhead, 16 percent at the city gate, 6 percent for commercial customers and 3 percent for residential customers. Commercial and residential prices include the cost of the local distribution systems, which accounts for more than half the delivered price of gas.

AD VALOREM TAX REFUNDS BY KANSAS NATURAL GAS PRODUCERS

Mr. Packard. Section 2316 of the Senate-passed version of H.R. 1141, the FY 1999 Emergency Supplemental Appropriations Act, would add the following new section to the Natural Gas Policy Act:

> SEC. 603. LIABILITY OF CERTAIN NATURAL GAS PRODUCERS. If the Commission orders any refund of any rate or charge made, demanded, or received for reimbursement of State ad valorem taxes in connection with the sale of natural gas before 1989, the refund shall be ordered to be made without interest or penalty of any kind.

What are your views on this provision?

Mr. Hoecker. This legislation would have the effect of modifying the outcome of FERC orders implementing the opinion of the D.C. Circuit holding that "[p]roducers are liable to refund all Kansas ad valorem taxes collected with respect to production after October 1983."

I neither support nor oppose congressional action on this proposed legislative change.

I offer only the following observations:

(1) The Commission's orders in this case have not imposed penalties.

(2) As a general matter, appropriate interest on refund obligations is provided for by the Commission's regulations and is consistent with a policy of full compensation for the time value of money. The Commission's orders in this case provided for waiver relief (from principal plus interest) in cases of hardship. The proposed legislation would provide relief to all producers -- both large and small -- regardless of hardship.

(3) The intended effect of the proposed legislation with respect to refunds that have already been made is not clear. It could be interpreted as invalidating the requirement in the Commission's December 1993 order that the producers' 1988 refunds include interest, or that the interest component of those refunds already made under the more recent orders would need to be recouped from customers. In other words, producers might request that the Commission provide a means for producers to recover interest they paid pursuant to the Commission's December 1993 order, as well as interest paid pursuant to the more recent Commission orders implementing the D.C. Circuit's Public Service decision.

PROPRIETARY AND NON-PROPRIETARY RECEIPTS

Mr. Packard. Please provide charts showing proprietary and non-proprietary receipts for FYs 1997 and 1998 and estimates for FYs 1999 and 2000. Please show authority, recipients and identify amounts and the names of the various funds. Also, please include a brief description of each of the types of receipts.

Mr. Hoecker. The information on receipts is shown in the chart that follows:

ACCOUNTS, RECIPIENTS, AND RECEIPT AMOUNTS IN THOUSANDS

RECEIPT TYPE	ACCOUNT NAME	AUTHORITY	RECIPIENT	FY 1997	FY 1998	FY 1999 Est.	FY 2000 Est.	BRIEF DESCRIPTION
Annual Charges	Fees and Charges, FERC, DOE	Omnibus Budget Reconciliation Act of 1986 (OBRA) and Federal Power Act (FPA)	Offsets FERC Appropriation	187,409	165,615	192,787[1]	205,000[1]	Annual charges paid by the regulated industries to recover costs of administering FERC's programs. Costs are prorated to the hydropower, electric power, natural gas, and oil pipelines industries based on recorded use of time by FERC staff. Charges to the hydropower industry include other agencies' costs of helping to administer Part I of the FPA. Costs prorated to each industry are apportioned to individual companies based on volumes of electricity or natural gas sold or transported, revenues of oil pipeline companies, or capacity and generation of hydropower projects.
US Dams	Fees and Charges, FERC, DOE	FPA	Offsets FERC Appropriation	2,818	2,995	3,000	3,000	Annual charges paid by hydropower licensees whose projects use dams owned by the US government.

[1]As no better data is yet available, we used the estimates shown in the FY 2000 Budget of the U.S. Government.

RECEIPT TYPE	ACCOUNT NAME	AUTHOR-ITY	RECIPIENT	FY 1997	FY 1998	FY 1999 Est.	FY 2000 Est.	BRIEF DESCRIPTION
	FERC Collections Made on Behalf of Other Federal Agencies		Department of Army, Corps of Engineers	2,818	2,995	3,000	3,000	
Headwater Benefits	FERC Collections made on Behalf of Other Federal Agencies	FPA	Department of the Interior, Bureau of Reclamation	1,872	2,518	2,000	2,000	Annual charges paid by hydropower licensees whose projects benefit from upstream dams owned by the US government.
			Department of Army, Corps of Engineers	5,241	8,298	4,000	4,000	
US Lands	FERC Collections made on Behalf of Other Federal Agencies	FPA	Department of the Interior, Bureau of Reclamation	3,630	3,795	4,000	4,000	Charges paid by hydropower licensees whose projects make use of US-owned lands.
	Payments to States		Individual States	2,722	2,846	3,000	3,000	
	Fees and Charges, FERC, DOE		Offsets FERC appropriation	908	949	1,000	1,000	
Indian Lands	Indian Lands	FPA	Specific Indian Tribes	1	1	0	0	Charges paid by hydropower licensees whose projects make use of lands on Indian reservations.

RECEIPT TYPE	ACCOUNT NAME	AUTHOR-ITY	RECIPIENT	FY 1997	FY 1998	FY 1999 Est.	FY 2000 Est.	BRIEF DESCRIPTION
Filing Fees	Fees and Charges, FERC, DOE	Independent Offices Appropriation Act	Offsets FERC appropriation	949	849	1,000	1,000	Fees paid by those filing for Commission services when the filer is not an entity that pays annual charges. Fees are based on the Commission's average cost of performing the service.
FOIA	Fees and Charges, FERC, DOE	Freedom of Information Act (FOIA)	Offsets FERC appropriation	255	1,892	0	0	Payments for FOIA requests.
Interest, Penalties, Admin. Charges	Miscellaneous Receipts Returned to Treasury	Federal Debt Collection Act	US Treasury	47	34	0	0	Payments for delinquencies, handling costs.
Civil Penalties	Miscellaneous Receipts Returned to Treasury	Federal Civil Penalties Inflation Adjustment Act of 1990, and Debt Collection Improvement Act of 1996	US Treasury	874	4,609	0	0	Payments for fines for violations of FERC orders or regulations.

Note: FERC's appropriation is offset by the types of receipts indicated. However, once the offsets reach the level of the annual appropriation, additional receipts of those types will go to the U.S. Treasury's general fund.

STATEMENT FOR THE RECORD

BY THE

UNITED STATES NUCLEAR REGULATORY COMMISSION

TO THE

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT

COMMITTEE ON APPROPRIATIONS

UNITED STATES HOUSE OF REPRESENTATIVES

CONCERNING

THE FISCAL YEAR 2000 BUDGET FOR THE

UNITED STATES NUCLEAR REGULATORY COMMISSION

SUBMITTED BY

SHIRLEY ANN JACKSON

CHAIRMAN

SUBMITTED: March 26, 1999

U.S. NUCLEAR REGULATORY COMMISSION

FISCAL YEAR 2000 BUDGET TESTIMONY

Introduction

Mr. Chairman and members of the Committee, the Nuclear Regulatory Commission (NRC) is pleased to have the opportunity to submit its budget request for Fiscal Year (FY) 2000. In doing so, we are pleased to present to you the ongoing NRC efforts designed to increase our efficiency and effectiveness in nuclear safety regulation.

Summary

The highest NRC priority is to fulfill our fundamental mission of ensuring the adequate protection of public health and safety. Our main focus in FY 2000 will be to achieve, as outcomes of our regulatory program: maintaining safety; reducing unnecessary regulatory burden; maintaining public confidence; and increasing our operational effectiveness and efficiency. Congressional and stakeholder interest has served to reinforce, accelerate, and expand efforts we currently have underway to review and to improve our regulatory programs, and to pursue further change to achieve these four outcomes.

The NRC is improving its internal efficiency and effectiveness, streamlining its operations, and consolidating its functions. We have begun changing our regulations to be more risk-informed, and making other improvements to the reactor and materials programs. We are making improvements in other areas, including license transfers, dry cask storage, decommissioning, uranium recovery, and fuel cycle facility licensing. We have streamlined our hearing process for license renewals and license transfers, and are considering broader changes. We are

consolidating and streamlining the NRC organizations and operations. We also have integrated the Performance Plan and Budget to link agency performance goals, strategies, performance measures, and resources, consistent with the Government Performance and Results Act.

Significant Accomplishments

In testimony last summer, the Commission described a broad range of proposed improvements to our regulatory programs. Examples of the substantial progress we have made since that time include the following:

- Developing a comprehensive revision to the NRC reactor assessment, inspection, and enforcement programs;
- Establishing and adhering to an aggressive schedule for processing the Calvert Cliffs and Oconee license renewal applications;
- Issuing the Final Design Approval for the Westinghouse AP600 reactor design;
- Issuing guidance for streamlining NRC adjudicatory proceedings;
- Initiating and completing a rulemaking to establish informal legislative-style hearing procedures in license transfer cases;
- Achieving established milestones on the Three Mile Island Unit 1 license transfer application;
- Enhancing the timeliness of our reviews for reactor license amendments for improved Standard Technical Specifications ;
- Issuing Safety Evaluation Reports allowing risk-informed graded quality assurance, in-service testing, revised technical specifications, and in-service inspection at certain licensee facilities;

- Facilitating safe power up-rates at reactor facilities–since the beginning of the up-rate program, these small, cost-beneficial up-rates have resulted in a net power up-rate of 2300 megawatts electric across the spectrum of all our licensees, the equivalent of two new large reactor power plants coming online;
- Reducing unnecessary NRC and licensee burdens associated with low-level enforcement issues, while retaining those features essential to the oversight of licensee performance;
- Approving the issuance of proposed regulations for medical use and high-level waste disposal that adopt a risk-informed, performance-based approach;
- Determining, in a timely fashion, that the proposed privatization of the U.S. Enrichment Corporation met regulatory requirements;
- Achieving established milestones for the reviews of several dual-purpose spent fuel cask designs, including issuing a final Certificate of Compliance for one design, and a draft Safety Evaluation Report and draft Certificate of Compliance for another;
- Realigning the three major NRC program offices and eliminating the Office for Analysis and Evaluation of Operational Data (AEOD);
- Reducing the number of NRC managers, improving organizational efficiency, and reducing our overall staffing and resource requirements; and
- Achieving Year 2000 readiness in NRC information systems, 54 days ahead of schedule.

Planning, Budgeting, and Performance Management Implementation

As part of our efforts to ensure the effectiveness and efficiency of agency operations, the NRC has implemented the Planning, Budgeting, and Performance Management (PBPM) process. In my March 1997 testimony, I reported that we had just initiated this system and that it was

designed (1) to establish a sensible, reliable process for defining agency goals; (2) to develop cost-effective strategies for achieving those goals; (3) to determine the resources needed to implement strategic direction; and (4) to measure and assess our progress and overall performance. Since that time, we have expanded our use of this process as the dynamic core of our planning framework, with the inherent flexibility to respond to emerging changes, but in a manner that will ensure the durability of current regulatory reforms.

The NRC has continued to make significant progress in implementing the PBPM process. Revisions to the NRC Strategic Plan (currently under review) and the development of the FY 2000 Performance Plan were the initial PBPM efforts. The integrated FY 2000 budget request/FY 2000 Performance Plan reflects the continued evolution of this process, and integrates the NRC Strategic Plan, Performance Plan, and associated resources required to achieve the goals and planned accomplishments contained in these policy documents. A recent evaluation of the NRC's PBPM process conducted by a consultant (Arthur Andersen) found that the process is sound and that it has improved our integrated planning process.

We are continuing to refine the implementation of the PBPM process in order to strengthen the linkage between our performance goals, strategies, and resource requirements in the FY 2001 budget. A review of the initial NRC Strategic Plan (FY 1997-FY 2002) was conducted during the fall of 1998. As a result of that review, the agency is refining further the revised Strategic Plan to reflect fully the regulatory reform efforts underway. This systematic review of the desired outcomes and specific measurements for success was initiated with the Office of Nuclear Reactor Regulation, aided once again by the Arthur Andersen consulting firm. The same disciplined review, also aided by Arthur Andersen, is underway in the Office of Nuclear

Regulatory Research and the Office of Nuclear Material Safety and Safeguards. The results of these efforts are expected to identify performance goals, strategies, and those key activities which contribute most to meeting our goals. They will be incorporated into revisions to the Strategic Plan, which will be released for stakeholder comment. We also expect that this effort will move the NRC into a leadership role in becoming a "results-oriented" government organization, a path that we have taken since implementing our Strategic Assessment and Rebaselining efforts, and that conforms fully with the Government Performance and Results Act.

Progress on Streamlining the Organization

As part of the NRC effort to be more effective and efficient and to reduce supervisory overhead, the Commission is realigning its major program offices.

- The Office of Nuclear Reactor Regulation (NRR) is reducing from seven divisions to five, resulting in a net reduction of 15 managerial and supervisory positions. This realignment establishes reporting lines that are consistent with major NRR program functions: inspection, performance assessment, license renewal, and licensing.
- The Office of Nuclear Regulatory Research (RES) is going from 12 branches to 7, eliminating 14 supervisory positions.
- The Office of Nuclear Material Safety and Safeguards (NMSS), despite growing program requirements, is eliminating 10 supervisory positions.
- The Office for Analysis and Evaluation of Operational Data (AEOD) has been eliminated and its functions transferred to other agency offices. These functions (event assessment, incident response, incident investigation, technical training, the review of generic requirements, and backfit program oversight) are being integrated with similar

work in other NRC offices. The AEOD realignment reduces overhead by approximately 10 FTE, and we expect these synergies to improve effectiveness.

Other headquarters and regional offices will transition to new organizational structures by the end of the fiscal year. In total, these realignments will result in the elimination of 88 managerial and supervisory positions.

The Commission has made notable progress in improving the NRC staff-to-manager ratio. When this effort was initiated in September 1993, the NRC had slightly over 700 managers and supervisors. That number has steadily declined, and the realignments described above will reduce it to 330 by the end of FY 1999. Based on the NRC staffing levels in the President's FY 1999 budget, we will achieve the stated Commission goal of an 8:1 staff-to-manager ratio.

We also have decreased the overall number of NRC employees, expressed in terms of full-time equivalent (FTE) staff years, from 2985 in FY 1998 to 2896 in FY 1999. Through the NRC use of buyouts, early retirements, and attrition, we project that actual staffing levels will continue to decrease to approximately 2835 by the end of this fiscal year. This pace of controlled staff reductions will allow us to achieve FY 1999 and 2000 staffing level targets without compromising critical mission requirements. The NRC FY 2000 budget request of $471.4 million and 2810 FTE, recently submitted to Congress, will provide the necessary resources to continue the timely implementation of the important regulatory changes discussed in this testimony, while continuing to ensure the fulfillment of our public health and safety mission. Based on the operational and regulatory program efficiencies achieved and anticipated, our FY 2000 budget reduces the NRC staff by 175 FTE compared with FY 1998.

FY 2000 Budget Request Highlights

The Commission is committed to completing and institutionalizing change in a manner that will ensure long-term NRC effectiveness. In part, we are ensuring continuity through key rulemakings and Commission policy decisions that will guide future actions. In the larger sense, we are altering the culture of the NRC and providing long-term stability by incorporating these changes into our planning framework, which is built around our six-year Strategic Plan, our annual budgets and Performance Plans, and our dynamic Planning, Budgeting, and Performance Management process.

The NRC's budget for FY 2000 is $471,400,000, including $465,400,000 for its Salaries and Expenses Appropriation, and $6,000,000 for the Inspector General Appropriation. The NRC continues to recognize the high priority on reducing Federal spending emphasized by the Administration. This budget, when adjusted for inflation, represents the lowest budget in the history of the NRC -- a 25 percent reduction in real terms since 1993. Additionally in FY 2000, the agency staffing level will be the lowest in more than 20 years, down 600 FTE or 17 percent since 1993. In spite of the constrained fiscal environment, this budget fully supports the NRC ability to fulfill our fundamental health and safety mission, while continuing the most comprehensive reform effort in the history of the agency. A budget summary is located in Appendix (1).

The resources for the **Nuclear Reactor Safety Arena** support a comprehensive oversight program including reactor inspection activities and reactor licensing activities for 103 operating reactors and a limited confirmatory safety research program in FY 2000. The reactor oversight

program will continue to bear a strong relationship to facility performance. However, we expect that these programs will change as a result of our on-going reevaluation of the reactor regulatory program. In anticipation of these changes, a reduction in the reactor inspection and event assessment/incident response activities has been included in the budget estimates. The budget includes funding for the review of two new reactor license renewal applications in FY 2000.

The **Nuclear Materials Safety Arena** supports an increase primarily from costs associated with preparation and review of the Atomic Vapor Laser Isotope Separation (AVLIS) license application, development and implementation of the new NRC general license registration program, initiation of research into the development and demonstration of risk assessment methods for dry cask storage, and enhanced efforts to develop the technical basis for performance criteria of dry storage casks under seismic loading conditions. The increase is partially offset by decreases that result from the anticipated completion of a significant portion of the backlog of applications for spent fuel storage and transport cask designs and spent fuel storage facilities, and completion of the rulemaking on the medical use of byproduct material in FY 1999.

The **Nuclear Waste Safety Arena** supports an increase primarily in the NRC high-level waste repository program activities, and ongoing decommissioning activities to work off the licensing backlog, to complete the Standard Review Plan for decommissioning, and to support an increased level of rulemaking activity. The increase is partially offset by a reduction in the number of inspections to be conducted at uranium recovery facilities.

The **International Nuclear Safety Support Arena** reflects a change in how the funds are obtained. For FY 1999, the NRC renegotiated its reimbursable agreements with the Agency for International Development (AID) to recover NRC FTE costs for providing nuclear safety assistance to the countries of the Former Soviet Union (FSU). In FY 2000, the NRC will include the AID-related FTE costs for support of FSU and Central and Eastern European countries within the general fund portion of the requested appropriation.

The **Management and Support Arena** supports a decrease primarily based on agency-wide program reductions and efficiencies. Funding also decreases in information technology and management, as investments in the design and start-up of the Agency-Wide Document Access and Management System (ADAMS) and the agency-wide integrated financial and resource management system (STARFIRE) are completed.

User Fees

The Omnibus Budget Reconciliation Act of 1990 currently requires the NRC to collect approximately 100 percent of its budget (less the appropriations from the Nuclear Waste Fund) from user fees. This requirement expires at the end of FY 1999 and reverts to 33 percent. The President's budget includes a legislative proposal to extend the requirement for 100 percent fee recovery through FY 2004. Another legislative proposal will permit the NRC to charge other Federal agencies Part 170 inspection and licensing fees, thereby helping to mitigate some of the fairness and equity concerns expressed by the NRC, the Congress, and NRC licensees.

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Summary of Program Activities by Arena

Nuclear Reactor Safety

In the Nuclear Reactor Safety Arena, maintaining the safety of 103 operating nuclear power reactors remains our highest priority, as it relates to ensuring adequate protection of public health and safety. In this context, the Commission intends to reinforce, accelerate, and expand efforts to improve NRC efficiency and effectiveness, to streamline our operations, and to consolidate our functions where appropriate. We are committed to making these improvements without compromising our mission of protecting public health and safety and the environment. We also are committed to the goal of using risk information and risk analysis as part of a policy framework that applies to all phases of our nuclear regulatory oversight, including licensing, inspection, assessment, enforcement, and rulemaking.

Risk-Informed, Performance-Based Regulation

The Commission is overhauling the NRC regulatory approach to become more risk-informed and performance-based; to enhance our safety focus; to eliminate unnecessary regulatory burden; and to improve the effectiveness, efficiency, predictability, and transparency of our processes, all undergirded by the need to maintain public confidence in what we do. Recent accomplishments demonstrate both an acceleration of existing efforts and the launching of new initiatives. We have increased stakeholder involvement, refined NRC internal practices, completed NRC pilot programs, and laid the foundation for risk-informing NRC reactor regulations over the longer term.

The Commission has increased substantially the involvement of the nuclear power industry, public interest groups, States, and other stakeholders through public meetings, extended workshops, and the solicitation of public comments through the Federal Register and the Internet. Stakeholder input customarily has played an important part in the formulation of NRC policies--for example, in the development of the 1995 Commission policy statement on Probabilistic Risk Assessment (PRA), and in the subsequent formulation and initial use of NRC guidance on risk-informed regulation. More recently, stakeholder interactions have become even more integral to the development of options for Commission consideration on risk-informed revisions to reactor regulations and proposed improvements to NRC reactor oversight processes. The Commission believes that this increased interaction will be of substantial benefit by ensuring a mutual understanding of technical and safety issues, stimulating a healthy dialogue among all participants, promoting wider acceptance of our programs, and highlighting areas for additional research.

Reactor Performance Assessment, Inspection, and Enforcement (The Oversight Process)

As previously stated, the Commission is taking a more risk-informed and performance-based approach in the oversight of nuclear reactors. We have made considerable progress in identifying necessary changes to the assessment, inspection, and enforcement processes to improve their objectivity; to make them more understandable, predictable, and risk-informed; and to focus on aspects of performance that have the greatest impact on safe plant operation. These efforts have been guided, in part, by four outcome goals used as "filters" to evaluate, prioritize, and sunset activities. Each activity is examined to see how it: (1) maintains public safety; (2) eliminates unnecessary NRC and licensee burden; (3) enhances public confidence; and (4) increases NRC internal effectiveness and efficiency.

The NRC staff has proposed to the Commission a new power reactor assessment framework, which builds upon the cornerstones of licensee performance that must be monitored to ensure that nuclear power reactor operations do not pose unacceptable risks to the public. The cornerstones support the NRC mission by ensuring that: (1) initiating events are reduced; (2) mitigation systems are available, reliable, and capable of performing their intended functions; (3) barriers are sufficient to limit the release of radioactivity; (4) adequate emergency preparedness functions are maintained; (5) licensees have implemented adequate programs to protect the public and workers from radiation; and (6) security measures are in place to protect against radiological sabotage. As part of the assessment framework, the NRC staff has identified performance indicators, performance indicator thresholds, and risk-informed inspections that would supplement and verify the validity of the performance indicator data.

This assessment framework provides a natural basis for a risk-informed baseline inspection program, one that identifies the minimum level of inspection required, regardless of licensee performance, to ensure adequate NRC oversight and independent assessment of licensee performance. Developed using a risk-informed approach, the proposed baseline inspection program includes a comprehensive list of inspectable areas within each cornerstone of the assessment framework.

The Commission expects that the Enforcement Policy will be changed and integrated with the risk-informed inspection and assessment processes. These changes should include an expanded policy supplement with violation examples that reflect more accurately the risk significance of potential violations in each topical area.

As currently proposed, the oversight process will integrate assessment of the performance indicators with the results of the risk-informed baseline inspections. This integration will allow the NRC to make objective and predictable conclusions regarding licensee safety performance and to communicate these results effectively to the licensees and to the public. The process includes specific thresholds–tied to the cornerstones of safety–that will trigger commensurate licensee and/or NRC action if they are exceeded.

We have developed these new processes through a series of stakeholder meetings with extensive and constructive dialogue. Although the exact detailed form of the final process is still under development, these broad-scale changes to reactor oversight clearly will result in several direct benefits:

- Increased objectivity by relying on performance indicators, where possible, and the risk-informed baseline inspection program, to provide the basis for determining performance, and by using risk-informed thresholds to determine expected regulatory and licensee response;
- Increased clarity by relating inspection information and performance indicators more clearly to their impact on overall safety performance;
- Enhanced clarity and the elimination of many current redundancies and inefficiencies by using a single, integrated assessment process;
- More direct consideration of risk insights in the new risk-informed baseline inspection program, as well as in the performance indicator thresholds;
- More timely action when declining safety performance is observed, so that appropriate licensee and NRC actions can be taken before performance degrades unacceptably;

- Reduction in unnecessary inspection and enforcement burden, so that licensees and the NRC can focus resources on those aspects of the plant that have the greatest effect on safety; and
- Enhanced public understanding of NRC assessments of licensee performance, further strengthened through annual local public meetings.

We have made considerable progress in FY 1999 in reshaping these NRC regulatory programs. Pilot programs are scheduled to begin in June 1999. Our intent is to make major process changes incrementally, to allow testing and adjustment during piloting and implementation. Much of the work that remains in FY 1999 and FY 2000 relates to bench-marking, conducting pilots, developing procedures, and training the NRC staff in the new processes.

Enforcement Program Changes

In parallel with these long-term improvements to the oversight process, the NRC has made several short-term changes to its enforcement program to reduce unnecessary NRC and licensee burden. On July 27, 1998, we issued enforcement guidance to clarify our existing Enforcement Policy. The changes ensure that: (1) licensees are given appropriate credit for identifying and correcting violations; (2) NRC and licensee resources are not expended on violations that do not warrant formal citations; (3) written responses to Notices of Violation are not required when necessary information already is docketed elsewhere; and (4) cases involving multiple examples of the same violation are treated consistently. The agency-wide implementation of this guidance has resulted in a significant reduction in the number of low-level (Severity Level IV) violations, particularly in the number of violations requiring a written licensee response.

On January 22, 1999, the Commission approved a change to the Enforcement Policy that will expand the use of non-cited violations. The change was published in the Federal Register February 9, 1999, and became effective March 11, 1999. Except in limited circumstances, individual Severity Level IV violations now will not be cited, so long as they have been entered into the licensee corrective action program. Accordingly, the NRC inspection program will place more emphasis on assessing the effectiveness of licensee corrective action programs. This is consistent with the thrust of the risk-informed inspection process described earlier.

Reactor Licensing

As part of our commitment to risk-informed regulation, we have changed internal NRC operating practices. This has included providing additional guidance, training, and management attention to ensure that risk-informed licensing actions are given the appropriate priority. The completion of numerous plant-specific risk-informed licensing reviews in FY 1999 has helped to reduce historical backlogs and to sharpen the focus on safety while reducing unnecessary regulatory burden. Two examples are:

- Extending the allowed outage times for some systems without adverse effects on plant risk when certain precautions are taken; and
- Reducing in-plant inspection requirements for boiling water reactor vessel welds by as much as 50 percent.

In practical terms, these changes substantially reduce occupational radiation exposure, plant operational costs, and unnecessary shutdowns while maintaining public safety.

Risk-informed pilot programs in the area of reactor licensing have been completed through the NRC review of prototypical license amendment applications. We have approved pilot applications in three areas: (1) graded quality assurance, (2) in-service testing of pumps and valves, and (3) in-service inspection of important reactor plant piping. In each of these applications, our consideration of risk information provided a strong basis for a graded treatment of the regulated activities at certain licensee facilities, which allows both the NRC and licensees to focus resources on equipment and activities with the greatest risk significance.

These pilots have demonstrated that the implementation of the risk-informed programs can be accomplished without a significant change in risk, and that an acceptable level of quality and safety will be maintained. Lessons learned from the pilots will be used to improve future applications and NRC review processes in FY 2000.

The Commission is considering a proposal to redefine, in a broad-based manner, plant equipment needing special treatment in such areas as quality assurance, environmental qualification, operational controls, and engineering code requirements. The Commission also is considering a recommendation to "risk-inform" the complete body of regulations that apply to operating and decommissioned power reactors. In addition, we are facilitating the adoption of a risk-informed regulatory approach by making infrastructure changes through staffing and training, additional revisions to guidance documents, and the development of improved probabilistic risk assessment (PRA) methods.

In October 1998, the Commission published for public comment proposed revisions to 10 CFR 50.59. Under this regulation, licensees are allowed to make certain changes to their facilities

without prior NRC approval. The revisions to the rule are intended to clarify NRC requirements that govern the change process, to improve the effectiveness of the process, and to reduce unnecessary NRC and licensee burden. The Commission currently is considering key issues associated with this rulemaking. In parallel with these efforts, the NRC staff is exploring with the nuclear power industry and other stakeholders alternative approaches to resolve the issues. The NRC staff expects to complete a final rule package for Commission review and approval within a few months.

Another NRC initiative is the development of guidance on updating final safety analysis reports (FSARs). The updated FSAR is used in routine safety analyses performed by the NRC, the licensee, and other interested parties. The Nuclear Energy Institute (NEI), with significant input from the NRC, has developed a guidance document that outlines a voluntary process for removing unnecessary detail from the FSAR, thereby simplifying both the FSAR and the updating process. We currently are considering a proposed regulatory guide that endorses this NEI document. Earlier this month, that proposal was published in the Federal Register for public comment. The Commission considers the progress made to date in this area a significant regulatory success, because the NRC and many of its stakeholders worked closely in developing guidance which both maintains safety and eliminates unnecessary NRC and licensee burden.

The NRC has improved the timeliness of reviews for converting power reactor licenses to improved standard technical specifications. This conversion improves consistency in interpreting and applying these requirements. In total, licensees for approximately 89 reactors have decided to convert to the new technical specifications, which licensees have projected will

save from $150,000 to over $1,000,000 annually per site. To date, applications to convert have been received from 57 units, of which 45 units have been given approval, 19 since July 1998. We expect to issue approvals for an additional 8 units during the remainder of FY 1999, which will eliminate the large backlog of applications under review over the last two years. Work on applications will continue through FY 2000.

Reactor License Renewal

Establishing a stable, predictable, and timely license renewal process is a top NRC priority. The Commission has issued a policy statement laying out its expectations for a focused review of license renewal applications, built upon our license renewal regulations. To date, all milestones for the license renewal reviews have been met. Using case-specific orders, the Commission has established an aggressive adjudicatory schedule for reviewing the Calvert Cliffs and Oconee applications. Revised goals, including hearing targets, are to complete the license renewal process in 30-36 months. We also have prepared procedures to control the reviews and to resolve generic renewal issues. NRC management meets monthly with the applicants to monitor progress and the resources expended, and to resolve renewal issues.

For the Calvert Cliffs application, the draft environmental impact statement was issued in February 1999, and the initial safety evaluation report was completed on schedule this month. Last December, the Commission denied an appeal from the petitioner on the Calvert Cliffs application and affirmed the Licensing Board denial of a request for hearing. The petitioner has sought judicial review. In the absence of a hearing, the NRC anticipates completing its review and a Commission decision on the Calvert Cliffs renewal application by May 2000, 25 months after it was submitted and well ahead of our schedular goals.

Regarding the Oconee application, the licensee responses to NRC requests for additional information have been completed. Last December, the Licensing Board denied a request for hearing from the petitioner on the Oconee renewal application. The petitioner has appealed this ruling to the Commission. Overall, the NRC anticipates completing its review and issuing a Commission decision on the Oconee renewal application no later than December 2000.

We also understand that we will receive the next license renewal application in December 1999 from Entergy for their Arkansas Nuclear One plants. Other applications may follow quickly, and we have asked for sufficient resources in our FY 2000 budget to handle the anticipated new applications. Lessons learned from the initial reviews may help to streamline later reviews even further.

License Transfers and Adjudicatory Processes

The Commission has issued a final rule to establish an informal streamlined hearing process for license transfers. Under this newly-adopted rule (Subpart M to 10 CFR Part 2), the Commission expects to complete informal hearings and issue final decisions on most license transfer applications within about 6-8 months of when the application is filed.

The NRC has completed final Standard Review Plans (SRPs) for antitrust and financial qualifications reviews, and a draft SRP for foreign ownership issues. SRPs document the process and criteria to be used by the NRC staff in performing its reviews, which improves the focus, effectiveness, predictability, timeliness, and efficiency of the process. During the coming months, the NRC expects to complete timely reviews of license transfer requests from Three Mile Island Unit 1 and the Pilgrim station.

The Commission currently is considering options for a more comprehensive streamlining of its adjudicatory processes. Concurrently, the Commission has been monitoring closely its adjudicatory tribunals to ensure appropriate adherence to the substantive and schedular provisions of the Commission Rules of Practice.

Reactor Safety Research

The NRC research program continues to contribute in a significant way to our success in achieving performance goals in the reactor arena. Research efforts are underway to resolve important safety issues such as the pressure locking of motor operated valves, which could result in a safety problem if key valves failed when called upon to perform a safety function. The program also facilitates NRC support for industry initiatives and contributes to the reduction of unnecessary burden. For example, working cooperatively with the American Society of Mechanical Engineers (ASME), NRC-sponsored research established the technical bases for changing the basic fracture toughness curves for determining nuclear plant pressure temperature limits. This provided a significant burden reduction for the majority of operating plants.

In addition, current research is re-evaluating pressurized thermal shock for reactor pressure vessels (RPV). Work in this area has shown significant potential for reduction of unnecessary burden through technical advancements in materials assessment, fracture mechanics, and non-destructive evaluation. The research program also is enhancing our understanding of new nuclear technologies such as the development of analytical tools and criteria to review licensee proposals to increase fuel burn-up which could provide economic advantages to the nuclear industry, without increasing the risk to the public health and safety. Our research also is

supporting the framework for moving to a more risk-informed, performance based regulatory approach through pioneering work in probabilistic risk assessment. Building on previous successes such as risk-informing reactor piping inspection processes, we are focusing our research efforts on identifying additional programs to be risk-informed and providing the technical bases for making such changes.

Nuclear Materials Safety

In a manner similar to initiatives evolving in the reactor safety arena, we are enhancing our regulatory programs for nuclear materials safety. The NRC and Agreement States regulate more than 20,000 specific users of radioactive materials in medical, academic, industrial, and commercial applications, in addition to more than 100,000 general licensees. Thirty States currently are Agreement States. Ohio is likely to become an Agreement State later this year, and Oklahoma and Pennsylvania are expected to become Agreement States in FY 2000. Our testimony highlights some of the many and diverse program improvements underway in the nuclear materials arena.

Spent Fuel Storage

The NRC has made progress in its review of dual-purpose cask systems for spent fuel storage and transportation. By December 2000, we anticipate that all six of the storage reviews in process and two of the transportation reviews should be completed. We recently issued certificates for two spent fuel transportation cask designs, and completed the review of one spent fuel storage cask design.

The NRC issued a license to the DOE for the TMI-2 fuel debris storage facility at the DOE Idaho Operations Office (DOE-ID) earlier this month. We also anticipate licensing two independent spent fuel storage installations, at Rancho Seco and Trojan, prior to the end of 1999. Additionally, we anticipate completion of the technical and environmental reviews for licensing the Private Fuel Storage facility located on the Skull Valley Band of Goshute Indian Reservation in Utah by September 2000, with hearing completion around October 2001. We also anticipate receiving an application from the Owl Creek Energy Project in the first quarter of FY 2000 for a privately-owned, away-from-reactor, independent spent fuel storage installation to be located in Fremont County, Wyoming.

In addition to the DOE-ID TMI-2 fuel debris storage facility, the NRC has several other DOE-related projects involving spent fuel storage and management. We expect to transfer the Fort St. Vrain independent spent fuel storage installation license to the DOE-ID in FY 1999, possibly as early as April. The NRC staff also is reviewing several topical reports from the DOE. The first report, which should be completed in October 1999, concerns the non-site-specific central interim storage facility. The NRC review will cover the design and the safety considerations associated with facility operation, and could be referenced in any subsequent DOE application for a centralized interim storage facility. The second topical report concerns the dry transfer system. The NRC review of this report, which should be completed in January 2000, will cover the technical feasibility of performing cask-to-cask transfers of individual spent fuel bundles without returning the fuel to a spent fuel pool. The NRC also is reviewing the DOE report on actinide burnup credit. Approval of this report would result in cost savings through increased capacities of storage casks and shipping packages, and reduced radiological and non-radiological risk through a reduction in the number of shipments needed. Finally, at the request

of the DOE, we are assisting in the oversight of the routes and packages used in the national program to return spent fuel from foreign research reactors to the U.S.

In this arena also, the NRC has undertaken initiatives to improve efficiency, effectiveness, and timeliness while assuring safety. We have initiated process changes to enhance and focus technical reviews, to develop guidance for those reviews, to reduce the time-frame for storage cask certification rulemakings, to enhance our reviews based on lessons learned, to ensure consistency in licensee change processes, and to improve communication with internal and external stakeholders through meetings, conferences, workshops, and routine use of the NRC Internet web-site.

Medical Regulation

The NRC staff is reviewing public comments on our proposed revisions to the medical use regulations in 10 CFR Part 35. The revision of Part 35 will achieve several specific improvements in the medical use regulatory program. These improvements would make the rule more performance-based and would focus the regulations on medical procedures that pose the highest risk, from a radiation safety aspect, with a corresponding decrease in the oversight and regulatory burden for lower risk activities. The proposed revision of the Medical Policy Statement and a proposed revision to Part 35 were published in the Federal Register for public comment on August 13, 1998. We expect to complete this rulemaking by the end of June 1999, although an extension currently is under Commission review.

The revisions to Part 35 are being developed using an enhanced participatory process, which is intended to develop a final rule that will be accepted broadly, and includes participation by

several medical professional organizations, the Organization of Agreement States, the Conference of Radiation Control Program Directors, the NRC Advisory Committee on the Medical Use of Isotopes, and other stakeholders. We have solicited early public input through Federal Register notices, public meetings with medical professional societies and boards, open meetings of the groups developing the revised policy statement and rule language, public workshops, and Internet postings of relevant background documents.

Atomic Vapor Laser Isotope Separation (AVLIS)

The NRC continues preparations to review an application from the U.S. Enrichment Corporation (USEC) for a facility that would employ a new enrichment technology. The Atomic Vapor Laser Isotope Separation (AVLIS) license submittal schedule has been delayed by the USEC, and currently is projected for submission to the NRC for review no earlier than March 2000. A Standard Review Plan (SRP) is under development by NRC staff that will provide useful criteria to the license applicant and the NRC license reviewers. A draft SRP was issued for public comment in March 1999. Although the revised schedule is dependent upon certain key assumptions (including success in the demonstration efforts), the NRC is performing preliminary reviews of certain AVLIS information that is independent of site selection, to facilitate meeting the proposed 18-month licensing schedule.

Mixed Oxide Fuel (MOX)

In accordance with the regulatory oversight responsibility for mixed oxide (MOX) fuel assigned to the NRC in the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 (Public Law 105-261), the Commission has initiated preparatory activities for the licensing of a MOX fuel fabrication facility and subsequent irradiation of the fuel in commercial reactors.

The Commission notes that the NRC FY 2000 budget request did not include resources to conduct work related to the DOE MOX fuel program because, at that time, the NRC had planned to continue to carry out such work through its reimbursable agreement with the DOE. However, because Public Law 105-261 subsequently gave the NRC the authority to license a MOX facility, this work will be considered a part of the NRC mission. As a result, the NRC must use its appropriated funds to carry out this effort, and cannot continue its reimbursable agreement with the DOE. The NRC believes that it can re-program $650K in requested FY 2000 general fund appropriations from its planned work to participate in the pilot programs on the external regulation of the DOE, since the DOE has indicated they do not plan to continue such activities. This amended use of FY 2000 general fund resources, if approved by the Congress, would provide adequate resources to keep pace with the DOE program on MOX fuel.

These resources will be used to meet with the MOX applicant and to review topical programs related to the license application, such as safeguard, criticality, and quality assurance, including early issues related to environmental review. We are developing a Standard Review Plan (SRP) for the MOX facility that will provide criteria useful to a potential license applicant and to NRC reviewers. A license application is anticipated in November 2000, and, given current projections for the licensing review (including the completion of an environmental impact analysis), we would expect final licensing to occur in FY 2003. We also are assessing whether any aspects of MOX fuel irradiation might require research to support the licensing action.

External Regulation of the Department of Energy (DOE)

The Commission recognizes the position of the Secretary of Energy in his recent letter to Congress, withdrawing support for external regulation of DOE facilities by the NRC (based

primarily on DOE cost considerations, with which the NRC does not necessarily agree). However, based on the preliminary results of the pilot projects and our observations to date, the Commission continues to believe that the NRC could regulate substantial portions of DOE in a manner that would be cost-effective and relatively straightforward, and that would accomplish the objectives of external regulation. The cost to the DOE could be minimized–and could even result in a net savings–by reducing the level of DOE oversight to a level consistent with a corporate oversight model. We believe that a fourth pilot addressing an entire DOE site, such as at Oak Ridge or Pacific Northwest National Laboratory, could help to resolve the remaining cost uncertainties. Therefore, notwithstanding the position of the Secretary of Energy, the Commission will review the results of the pilot projects and make an independent decision regarding the objectives of the Pilot Program.

Hanford Tank Waste Remediation System Program

The NRC continues to assist the DOE on its Hanford Tank Waste Remediation System (TWRS) program. In conjunction with this effort, we have recruited highly competent staff with waste solidification and vitrification expertise and experience; gained extensive understanding of the DOE plans for removal and vitrification of the radioactive and highly toxic wastes from the underground storage tanks; and developed a licensing Standard Review Plan and regulatory basis for the possible future NRC licensing of the DOE Hanford TWRS activities.

Nuclear Waste Safety

The NRC has launched similar initiatives to improve the effectiveness and efficiency of our regulatory programs in the nuclear waste safety arena. The NRC continues to progress in its reviews and pre-licensing consultation under existing law related to the DOE program to develop

a high-level radioactive waste repository. The Commission firmly believes that a permanent geologic repository is the appropriate mechanism for the nation ultimately to manage spent fuel and other high-level radioactive waste (HLW). In accordance with the statutory direction in the Nuclear Waste Policy Act and the Energy Policy Act of 1992, the NRC, before licensing a repository, must consult extensively with the DOE to develop a regulatory framework, to evaluate the adequacy of the DOE site characterization and waste form, and ultimately, to determine whether the NRC can authorize repository construction, receipt of waste, and final repository closure. The NRC is making similar progress in its programs for nuclear facility decommissioning, uranium recovery, and low-level waste management.

High-Level Waste - Yucca Mountain Status and Key Issues

In FY 2000, the NRC will finalize a performance-based regulatory framework by issuing 10 CFR Part 63. Part 63 would apply solely to the proposed Yucca Mountain repository. The proposed Part 63, which we published for public comment on February 22, 1999, establishes licensing criteria to evaluate the performance of the repository system at Yucca Mountain, Nevada. Upon issuance of the final Environmental Protection Agency (EPA) standard for Yucca Mountain, or in the event of new legislation affecting HLW management, we expect to promulgate conforming amendments to Part 63.

In parallel with the development of Part 63, the NRC continues to develop a Yucca Mountain review plan and to resolve key technical issues to prepare for reviewing the DOE license application expected in 2002. These activities aid in the ongoing review of the DOE draft license application and provide guidance to the DOE on what is needed for a complete and high quality application. To that end, we will continue to evaluate the implementation of the DOE quality

assurance program. We expect to complete our review of the DOE draft Environmental Impact Statement (EIS) for the Yucca Mountain site in FY 2000.

Viability Assessment

In late December 1998 we received and began our review of the DOE December 1998 Viability Assessment (VA). The Commission held two public briefings on the VA in March 1999, in which information and recommendations were presented by the NRC staff, the NRC Advisory Committee on Nuclear Waste, the Nuclear Waste Technical Review Board, officials from the State of Nevada, affected units of local governments, and representatives of Native American tribes. The Commission recently received the results of the NRC staff review of the VA, and will be providing comments to the DOE in the near future. The principal objectives of the NRC review are to assess the DOE program in preparing a high-quality application, to highlight significant information deficiencies, and to identify any major concerns with the DOE test plan, design concepts, or total system performance assessment. We define "major concerns" as those that might result in an incomplete or unacceptable license application.

These objectives are consistent with NRC responsibilities for preliminary consultation under the Nuclear Waste Policy Act, as amended. I am pleased to report that the NRC staff has identified no major concerns with many important aspects of the VA. We believe this can be attributed, in part, to the frequent, open interactions the NRC staff has maintained with the DOE over the past year in preparing the VA. During these public interactions, the DOE has furnished substantial information to our staff in advance of the VA release, which has facilitated our review. We are confident that the DOE recognizes many of the areas in which additional work is needed prior to licensing. In particular, we have identified persistent quality assurance deficiencies, and the

DOE agrees that it must give increased attention to the implementation of its quality assurance program. The NRC staff will continue to present specific issues to the Commission as they are identified during review.

Decommissioning Program

Decommissioning involves removing radioactive contamination in buildings, equipment, groundwater, and soils to such levels that a facility can be released for either unrestricted or restricted use. The NRC is continuing to encourage timely cleanup of approximately 40 material and fuel cycle facility sites through the implementation of its Site Decommissioning Management Plan (SDMP). The NRC expects to remove at least three sites from the SDMP list in FY 1999 and FY 2000. The NRC also will continue to oversee the decommissioning of 19 commercial power reactors and hundreds of other licensed facilities. The NRC monitors licensee actions to store or to dismantle and decontaminate the facilities in a safe manner while maintaining the licensed configuration of the facility and managing the use of decommissioning funds as described in the regulations. The NRC will continue to enhance the decommissioning program to add stability, predictability, and efficiency to the process by incorporating additional experience into rules and guidance documents.

In FY 1999, the NRC initiated a rulemaking process to promulgate a dose-based regulation for clearance of solid materials with low levels of radioactive contamination. The rulemaking process will include facilitated public meetings to obtain early stakeholder input on major issues and to assist in drafting any proposed rule language. We will complete the public workshops in FY 1999 and analysis of stakeholder views in FY 2000. In parallel with these activities, we will

continue the development of the technical basis, draft environmental impact statement, draft regulatory analysis, and draft regulatory guidance to accompany the proposed rule.

In FY 2000, the NRC will issue decommissioning guidance to provide an overall framework for dose assessment and decision-making at sites undergoing decommissioning. We will continue development of a Standard Review Plan for decommissioning, to facilitate the NRC staff review of licensee submittals in a manner that is timely, efficient, consistent, and ensures the protection of public health and safety. In addition, we will continue a pilot study during FY 2000 to facilitate the decommissioning of five materials sites. Based on this experience, recommendations will be made to streamline the decommissioning submittal and review process.

International Nuclear Safety Support

The NRC carries out a small but vital program of international nuclear safety activities that supports United States domestic and foreign policy interests in the safe, secure, and environmentally acceptable use of nuclear materials, energy, and in nuclear non-proliferation. This program ensures, through active participation in mutually beneficial bilateral and other international efforts, that the NRC supports the U.S. policy of strengthening nuclear regulatory regimes abroad and fostering a global nuclear safety culture, as well as ensuring the security of strategic special nuclear material.

The United States is the largest exporter of nuclear commodities and technology in the world. Of the approximately 430 nuclear power reactors operating worldwide, approximately 320 are operating outside of the United States. Of this 320, around 60 to 65 percent are based on or are derived from U.S. technology. The United States also is a major supplier of nuclear fuel,

equipment, maintenance, technical expertise, and other services needed to support operation of these facilities.

Cooperation with foreign countries in the area of nuclear safety provides a considerably larger operational experience base than exists in the United States alone. As one aspect of this cooperation, the NRC maintains extensive research agreements with organizations in many foreign countries. This cooperative approach makes good economic sense–through pooling of increasingly scarce resources–and recognizes the inherently international character of the nuclear business. This economical resolution of safety issues leads to benefits for the U.S. nuclear power industry, and also aids considerably in the prevention of nuclear accidents in countries with weak or embryonic nuclear safety cultures.

Export Licensing and Non-Proliferation Activities

The NRC reviews and takes action on approximately 75 to 100 import and export license applications per year. In addition, the NRC actively participates in international export control such as the Nuclear Suppliers Group and the Zangger Committee, to ensure that export policies are consistent among nuclear supplier states. The NRC also helps the U.S. to meet its obligations under Article IV of the Nuclear Non-Proliferation Treaty, including support for bilateral and International Atomic Energy Agency (IAEA) sponsored exchanges of equipment, materials, and scientific and technological information on the peaceful uses of nuclear energy. Within the limits of available resources, the NRC also provides technical assistance to U.S. policy makers in connection with (1) the U.S.-Russia agreement to make permanent the cessation of plutonium production for nuclear weapons; (2) the U.S.-Russia-IAEA Trilateral Verification Initiative on excess weapons material; (3) the process of making decisions on how to dispose of excess

plutonium; and (4) the Fissile Material Cut-Off Treaty. Finally, the NRC is working closely with the Executive Branch to facilitate the effective implementation of the Strengthened Safeguards System of the IAEA.

As another non-proliferation priority, the NRC, together with the Departments of State (DOS) and Energy (DOE), continues to work closely with government organizations in Russia, Ukraine, and Kazakhstan to guard against the diversion of fissionable materials. A key activity has been to assist these governments in developing adequate materials protection, control, and accounting regulations and licensing and inspection procedures, and in acquiring relevant technology. The NRC coordinates with Russian, Kazakh, and Ukrainian regulators, and with the Russian government at the highest levels, to help develop the necessary statutory framework to provide national regulatory bodies with the requisite authority and access to protect their nuclear materials properly.

Bilateral and Multilateral Activities

Since the demise of the Soviet Union, particular emphasis has been placed by the United States and the international community on addressing both nuclear safety and nuclear materials safeguards concerns in the countries of FSU and in central and eastern European countries (CEE). The NRC strongly supports these efforts, and has focused its role primarily on strengthening the nuclear regulatory authorities of these countries. We conduct programs (funded primarily through the U.S. Agency for International Development (AID), DOD, and DOE) to train regulators from FSU and CEE on the creation and/or strengthening of their regulatory capabilities. We continue to see positive results from our assistance efforts with the Russian, Ukrainian, Kazakh, Armenian, Czech, Slovak, Lithuanian, Bulgarian, and Hungarian regulators.

Much of this success can be attributed to their own willingness and desire to enhance their nuclear safety and regulatory infrastructure, and their growing expertise in the application of Western safety and safeguards review tools.

Vice-Presidential Commissions

Two examples of high-level Commission opportunities to focus on nuclear safety with top U.S. and foreign government officials are the U.S.-Russian Joint Commission on Economic and Technological Cooperation, chaired by Vice President Gore and Russian Prime Minister Primakov (GPC), and the U.S.-South African Binational Commission (BNC), chaired by Vice President Gore and South African Deputy President Thabo Mbeki. Both commissions have achieved measurable results in enhancing nuclear safety, and we look forward to continued cooperative efforts in this area.

International Safety Conventions

The NRC has worked extensively in the development of the Convention on Nuclear Safety (CNS)—the first instrument to address directly the safety of nuclear power plants worldwide. This Convention obliges contracting parties to establish and maintain proper legislative and regulatory frameworks to govern safety. Just this week, the Senate Foreign Relations Committee favorably reported a resolution on this Convention, and transmitted it to the full Senate for a floor vote. If the U.S. becomes a Party, the Commission will be required to implement several of its major elements, including preparation of a national report and participation in preparatory, organizational, and review meetings.

International conventions on waste management and liability also have been negotiated, as integral parts of U.S. efforts to enhance global nuclear safety . These conventions are undergoing Executive Branch review and likely will be forwarded by the President to the Senate for its advice and consent to ratification in calendar year 1999.

Management and Support Arena

As stated earlier, our FY 2000 budget request supports a decrease in the area of management and support, primarily based on agency-wide program reductions and efficiencies, with additional decreases due to the completion of milestones in information technology and management. A particular area of emphasis, which I will cover in more detail, is our effort to resolve Year 2000 computer issues.

Year 2000 Implementation

All 88 of our internal mission-critical, business-essential and non-critical systems have been examined and, as needed, fixed with regard to the Year 2000 (Y2K) problem. This work was accomplished almost two months ahead of the OMB-established milestone, and well under budget.

As part of this effort, we analyzed and identified embedded chip systems at the NRC and made necessary upgrades or replacements to make them Y2K compliant. We also worked with our data exchange partners and repaired, validated, and implemented those systems requiring changes.

All work necessary to ensure that 100 percent of our telecommunications infrastructure is compliant or not affected by Year 2000 issues has been completed. Our telecommunications service providers have stated that they are compliant or will be compliant by mid-1999.

The one NRC mission-critical system that is directly linked to operating nuclear power plants is our Emergency Response Data System (ERDS). This application performs the communication and data transmission functions that provide near real-time data to NRC incident response personnel during declared emergencies. We have verified that this system has been made Y2K compliant and that the interface of the system with licensed facilities is functional.

Externally, the NRC is working with nuclear power plants and our other licensees to ensure Y2K readiness for those systems needed to operate and shut down plants safely, recognizing the importance of ensuring electrical grid reliability and the safety and security of radioactive materials. For both power reactor licensees and fuel facility licensees, the NRC has required reports on Y2K readiness by July 1, 1999. If readiness has not been achieved by that date, the licensee report should describe the actions that will be taken to achieve readiness and their schedule. The July 1, 1999 response deadline provides sufficient time for the NRC to take any further plant-specific action it may determine to be necessary.

Additionally, based on the results of our audits, we have concluded that licensee management oversight of the Y2K readiness programs generally has been aggressive and is contributing to the success of nuclear facility Y2K readiness efforts. Nonetheless, the NRC resident inspectors assigned to power reactor sites will be reviewing licensee Y2K programs to ensure that all facilities are taking appropriate actions. Licensees are devoting the necessary resources to

their programs to meet their readiness schedules. At a recent February 11, 1999 Commission meeting on the Year 2000 issue, the Nuclear Energy Institute (NEI) informed the Commission that all 66 power reactor sites will carry out audits of their Year 2000 readiness activities. Specifically, NEI stated that 54 sites have completed internal Year 2000 quality assurance audits, 33 sites have completed cross utility audits, and 43 sites have completed third party audits. The continued sharing of work and information through owners groups and utility alliances is aiding in proper Y2K readiness program implementation.

Continuing Challenges

Although we have made substantial progress in redesigning our regulatory programs, much work remains in making these programs more effective and efficient. Our efforts are far from complete. In addition, we recognize that new challenges surely will arise as we revamp our programs and take nuclear regulation into the 21st Century. These continuing and future challenges include:

- We are examining the effectiveness and integrity of our petition processes through which members of the public seek NRC action to ensure compliance with requirements and adequate protection of the public health and safety;
- We are reviewing carefully the NRC treatment of allegations involving harassment and intimidation at the Millstone nuclear power plants (including a specific review of certain Millstone harassment and intimidation cases), which we expect to lead to broader-based enhancements to NRC enforcement and investigation functions; and

- In a manner similar to the ongoing revisions to 10 CFR Part 35 discussed earlier, we are revising our fuel cycle facility regulations in 10 CFR Part 70, to make them more risk-informed and performance-based, and to ensure that the regulatory burden is commensurate with the health and safety benefits of these regulations.
- We are continuing to examine our license transfer process and related issues such as foreign ownership, antitrust, and financial qualifications, to ensure that the NRC has a sound regulatory framework to ensure safety and to support our licensees as the electric industry proceeds with deregulation and increasing competition.

Conclusion

Over the past few years, we have made substantial progress in improving our regulatory programs, and we have accelerated that progress in the past year. Our interactions with this Subcommittee have contributed to this success, and we welcome your continued constructive oversight. With sufficient resources, strong leadership, and broad support, we plan to continue our efforts to enhance the effectiveness and efficiency of the NRC by pursuing the paths that already have been charted. The Commission fully expects that new areas will continue to arise, requiring attention and additional effort. As with current areas of reform, we will continue to ensure stakeholder involvement in the change process. We believe that we have laid the groundwork not only for significant short-term adjustments, but for enduring improvements to the NRC regulatory paradigm, institutionalized and stabilized through incorporation into our performance-based planning process.

FY 2000 BUDGET SUMMARY

(in thousands)

Program	FY 1998	FY 1999	FY 2000
Nuclear Reactor Safety	224,009	210,350	210,043
Nuclear Materials Safety	61,724	61,708	63,881
Nuclear Waste Safety	32,635	38,742	42,143
International Nuclear Safety Support	5,102	3,931	4,840
Management and Support	148,530	150,269	144,493
Subtotal (S&E)	472,000	465,000	465,400
Inspector General ($K)	4,800	4,800	6,000
Total (NRC)	476,800	469,800	471,400

Appendix (1)

STATEMENT FOR THE RECORD

BY

THE OFFICE OF THE INSPECTOR GENERAL
UNITED STATES NUCLEAR REGULATORY COMMISSION

TO

THE SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT
COMMITTEE ON APPROPRIATIONS
UNITED STATED HOUSE OF REPRESENTATIVES

CONCERNING
THE FISCAL YEAR 2000 BUDGET
FOR
THE OFFICE OF THE INSPECTOR GENERAL

SUBMITTED BY

HUBERT T. BELL
INSPECTOR GENERAL

MARCH 26, 1999

I am pleased to present my budget to this committee for Fiscal Year (FY) 2000 and to report on the activities of the Office of the Inspector General (OIG) for the past year. To accomplish the mission of the Inspector General, I am requesting $6.0 million and 44 FTEs.

The mission of the Nuclear Regulatory Commission (NRC) is to ensure that civilian uses of nuclear materials in the United States are carried out in a manner that adequately protects public health and safety, the environment, and national security. In response, to assist the NRC, the OIG independently and objectively conducts audits and investigations relating to NRC programs and operations for the purpose of promoting economy, efficiency, and effectiveness or preventing and detecting fraud, waste and abuse in NRC programs and operations. In addition, my office continues its proactive role of reviewing proposed legislation, regulations, regulatory policies, and directives and provides comments, as appropriate, regarding any identified significant concerns.

Budget History

In FY 1996, the OIG experienced significant staff attrition which resulted in an increase in carryover fund balances. In response, the OIG reduced its budget request for FY 1998 to $4.8 million intending to augment its annual appropriation with carryover funds to support necessary operational activities, such as the annual audit of NRC's financial statements. However, this level of appropriated funding was recognized then, and now, as insufficient to meet the actual costs of conducting essential OIG programs on an ongoing basis. In recognition of this, the OIG tried unsuccessfully in FY 1999 to restore adequate base funding. In FY 2000, available carryover funds will be insufficient to bridge this funding gap to meet program needs. Without the requested increase in OIG's FY 2000 budget, my office will not be able to provide adequate

oversight coverage of NRC's high-risk programs. The current FY 1999 budget level of $4.8 million would only meet salary and benefits costs in FY 2000.

My budget request of $6.0 million includes funding for salaries and benefits adjustments and $960,000 in contract support funding for audit and investigative program activities previously funded by carryover funds. The requested contract support funding includes $410,000 to procure the audit services of a private-sector contractor to perform, with OIG oversight, the annual audit of the NRC's financial statements, as prescribed by the Chief Financial Officers (CFO) Act; and $125,000 to acquire the specialized skills of subject matter experts to address ad hoc audit and investigative technical requirements. In addition, in prior years NRC's Salaries and Expenses appropriation funded all OIG's information technology (IT) requirements. For FY 2000, the cost responsibility for specific OIG IT requirements must now be born by my office. As a result, this budget request includes $375,000 for OIG office-specific IT requirements to include system development and enhancements; adaptive and corrective maintenance; operation of existing database systems; and the acquisition of office-specific hardware and software. The remaining $50,000 supports such program requirements as training, publication of OIG's semiannual reports, and deputation provisions.

OIG Activities

During the past year, my office reviewed agency programs and operations, conducted investigations and event inquiries, and reviewed legislative and regulatory proposals. Some of our most significant activities occurred in the nuclear reactor safety and management and support programs. My office received 307 allegations of wrongdoing, that resulted in 89 investigative cases and 3 event inquiries being opened. During the same period, my staff

issued 15 audit and special evaluation reports, and closed 98 investigations and 5 event inquiries. I have completed Integrity Awareness briefings with various Headquarters components and an updated version of "The OIG at NRC" was distributed to NRC employees. This pamphlet contains current information about the OIG organization and its policies and procedures. In addition to describing the OIG mission and functions, I have used the production of this pamphlet as an opportunity to discuss policy direction and initiatives for the purpose of fostering an atmosphere of trust and openness between the OIG and NRC employees.

The principal operational processes employed by my office include criminal and civil investigations of fraud and abuse, financial and management audits, program evaluations and event inquiries, legislative reviews and management support. To perform these activities, the OIG employs auditors, management analysts, criminal investigators, investigative analysts, an attorney and various support personnel. The OIG also uses private sector contractors for the conduct of its CFO audit work and quality assurance reviews of its investigative program. Audit quality assurance is accomplished through applying internal policy and procedures to our audit work and through peer reviews by other OIGs.

I would now like to turn to specific work being undertaken in audits and investigations.

Audit Program

My staff continued to conduct high priority performance and financial audits and also performed a limited number of special evaluations. Performance audits identify ways the agency can improve its management and oversight of key programmatic and administrative functions necessary to carry out the agency's mission. Special evaluations are accelerated, pro-active

efforts to provide NRC management with OIG observations on significant issues. The centerpiece of our financial audit work is the annual audit of the agency's financial statements, which is required by the CFO Act. During FY 1998 and likewise FY 1999, a private sector contractor for audit services was secured to perform, with OIG oversight, this annual audit. The agency has received an unqualified opinion for the past five years.

To plan and conduct the activities of our audit program, we solicit the views of agency managers, Congress, private industry and the public. This approach helps ensure that the most significant issues are considered. It also fosters a high degree of managerial cooperation and agreement on key issues, which has resulted in timely actions to improve agency operations. During the past year, OIG concentrated its efforts primarily in three key areas: (1) reactor regulations and programs, (2) administration and information technology, and (3) financial management.

We issued 15 audit reports that contained recommendations or suggestions for improving the economy, efficiency, and effectiveness of various NRC operations. The agency agreed to take corrective action to address all of the audit recommendations and suggestions made. The following examples show the type of proactive approach my audit staff has taken to work constructively with NRC management to correct and improve programs.

Of particular note has been OIG's periodic assessment of NRC's program to address the Year 2000 (Y2k) computer concern. As you know, the Y2k issue has garnered significant attention from Congress, the Office of Management and Budget (OMB), the General Accounting Office (GAO), and others. As a result, my office initiated two follow up surveys to an earlier special

evaluation conducted in June 1997 concerning the NRC's progress on the issue to help ensure that the agency will meet its established goals. Because the time left to complete Y2k programs is rapidly diminishing, my audit staff worked closely with agency officials to ensure that licensees' efforts are adequate to protect public health and safety. Additionally, we worked with NRC staff to ensure the adequacy and accuracy of NRC's progress reporting and contingency planning for its mission-critical and other systems. Rather than completing the work before reporting to NRC management through a formal document, my staff focused on providing information and suggestions to agency officials as quickly as possible through meetings.

In the external licensee arena, OIG audit staff engaged in an active information exchange with the responsible NRC programs as well as with the Atomic Energy Control Board of Canada, Senator Bennett's Y2k Committee, and the Rx2000 Solutions Institute. We provided suggestions in a number of areas, including concerns associated with some licensees' plans to test some systems during plant outage schedules. This licensee action stood to delay NRC's audits well into the 1999 calendar year. As a result, those plants would not be able to make use of relevant audit results. In another example, we found that, due to the number and variety of licensees, a far more aggressive approach by NRC was needed. Based on our participation in one of the Rx2000 Solutions Institute meetings, we became aware of the problems that exist with vendor certifications and embedded chips. Our contacts led to officials of the Institute participating in a hearing conducted by Senator Bennett's committee.

In the financial arena, working with NRC financial managers, as well as OMB and GAO, we were able to arrive at an unqualified opinion on NRC's FY 1998 financial statement. The originally planned duration of the audit was extended whereby the CFO could develop needed information

which effectively redressed potential weaknesses. This departure from our normal process of auditing and then reporting the results allowed my staff, with the assistance of our independent financial contractor, to interact with agency officials in ensuring the agency met its fiduciary requirements under the law. This effort was done in the spirit of cooperation to resolve potential deficiencies, rather than in a confrontational approach which would not have ensured a satisfactory result.

One final example typifies another type of special evaluation that OIG conducts. Given the many significant changes NRC has underway, the skills of a private sector company were acquired to conduct a survey of NRC's entire workforce to measure the agency's organizational safety culture and climate. The results allowed the OIG to better determine which areas and programs required greater focus. As such, the survey results provided considerable insights in determining which jobs would be placed in our Annual Plan for FY 1999. Moreover, the survey established an overall benchmark against which the OIG can, in later years, re-survey the agency and reevaluate the NRC's safety culture and climate.

Investigative Program

I would now like to discuss our investigative program. It is responsible for conducting: investigations of violations of law or misconduct by NRC employees and contractors, allegations of irregularities or abuse involving agency programs and operations; and event inquiries, which examine the cause of critical events, rather than individual misconduct.

During the past fiscal year, 11 cases were referred to the Department of Justice for consideration of criminal prosecution, but in all cases was declined. These cases included a

high level official who misused government vehicles and drivers and an employee who received incorrect payments for telephone calls and a gainsharing award. Based upon OIG investigations, there were 25 administrative actions consisting of terminations, suspensions and demotions that were taken against NRC employees found guilty of wrongdoing.

I would like to briefly discuss some of the more significant investigative efforts during the past fiscal year and the impact they had on agency operations. In one Event Inquiry, the OIG looked into public concerns regarding the accuracy of an NRC report entitled "Independent Safety Assessment of Maine Yankee Atomic Power Station (MYAPS)." The NRC staff report contained findings which indicated that MYAPS had significant items of noncompliance with NRC regulations and its licensing and design bases. However, the NRC inspection team concluded that the plant was considered adequate for safe operation. The concerned public believed the conclusion that the plant was safe for operation was contradicted by the report findings of noncompliance.

The OIG inquiry found that: (1) the NRC inspection team considered the balance of the strengths and weaknesses of the safety systems to conclude that the plant was in general conformance with its licensing and design bases; (2) the inspection team took into account the plant's defense-in-depth when it concluded that the plant posed no undue risk to public health and safety and was safe to operate; (3) phrases in the report such as "undue risk" and "adequate protection" were used to describe the NRC's standard of protecting public health and safety; however, the terms are not clearly defined by the NRC; and (4) the NRC inspection effort resulted in additional reviews of the plant by the licensee and enhancement of its self-assessment process.

Another OIG Event Inquiry looked into information received from several current and former licensee employees at Millstone. The employees alleged potential wrongdoing on the part of NRC staff and a consulting firm tasked with independent, third-party oversight of Millstone's Employee Concerns Program (ECP). The third-party oversight for the licensee's ECP was ordered by the NRC in October 1996, due to agency concerns about past failures in the licensee management's processes and procedures to effectively handle safety issues raised by its employees.

The licensee employees alleged that a team member from the consulting firm inappropriately became personally and substantially involved in the resolution of the complaints between the licensee and several of its current and former employees. It was further alleged that NRC staff failed to provide sufficient regulation of the consulting firm's activities and allowed it to exceed its oversight role.

OIG determined that the consulting firm did become substantially involved in resolving personnel disputes between the licensee employees and plant management. Licensee employees who lacked confidence in Millstone's ECP raised concerns directly to the consulting firm. Similarly, the firm provided guidance and recommendations to the licensee management on resolving specific employee complaints. However, OIG concluded that the firm's actions were allowed by the NRC Order establishing the oversight program and the NRC-approved Oversight Plan. OIG also found that NRC staff was aware of the firm's activities through discussions at meetings, reviews of documentation, onsite observation and monitoring of the firm's activities, and NRC team evaluations. The NRC staff considered the consulting firm's involvement with the licensee regarding employee concern matters to be appropriate.

A recent Event Inquiry completed by the OIG was based on a request from members of the Connecticut Congressional delegation. In this inquiry, OIG reviewed the process and specific conclusions contained in ten investigations conducted by the NRC Office of Investigations (OI). The investigations dealt with complaints of harassment and intimidation for whistleblowing activities by former employees at Millstone that resulted from a January 11, 1996, layoff at the plant. The OIG inquiry looked into two concerns by the Congressional delegation regarding the NRC staff's investigation and subsequent enforcement action stemming from the allegations of harassment and intimidation.

Among other findings, the OIG determined that during a December 1997 NRC enforcement panel, a decision was made to proceed with an enforcement action against the Millstone licensee for a Severity Level 1 violation of 10 CFR, Part 50.7 (Employee Protection) in connection with the results of an OI harassment and intimidation investigation. The NRC Commission was subsequently briefed on the proposed action. However, the NRC staff did not proceed with the planned enforcement action. In June 1998, the NRC staff conducted a second enforcement panel on the same OI investigation. Although there was no new investigative information developed on the case since the December meeting, the panel closed the matter without any enforcement action. OIG could find no written record of the reasons supporting the change in position.

Further, OIG found that in letters to a number of the allegers, they were informed by NRC Region I staff that even though the NRC did not conduct an investigation into their allegations, their claims of harassment and intimidation were not substantiated. Because the NRC did not

conduct investigations into these allegations, OIG determined that the NRC staff had insufficient information on which to base this conclusion.

Regulatory Review

Finally, I would like to address the results of our legislative and regulatory review initiatives. The Inspector General Act, 5 U.S.C. App. 3, Section 4(a)(2), requires the OIG to review existing and proposed legislation and regulations and to make recommendations concerning the impact of such legislation or regulations on the economy and efficiency of programs and operations administered by the agency. During 1998, we reviewed more than 400 documents including bills introduced by Congress, proposed regulations, Commission papers, and numerous management directives and other regulatory or policy documents originating within NRC. This work resulted in a variety of substantive and procedural recommendations to NRC management.

Two commentaries written during this period reflected our concern with a recurring issue, that is, the importance of the Designated Agency Ethics Official (DAEO). The Ethics in Government Act, 5 U.S.C. App. 5, is implemented in Title 5 of the Code of Federal Regulations (CFR). This statute, and its implementing regulations, directs the oversight of ethics regulations in the executive branch. Part 2635.203 of 5 CFR describes the role and duties of the DAEO within the agency. DAEO responsibilities focus on management and coordination of the agency's ethics program. Specific duties include reviewing financial disclosure reports, initiating and maintaining ethical education and training programs and monitoring administrative actions and sanctions. The most critical aspect of this function is the development and provision of counseling as part of a program of formal advice available to all agency employees on ethics and standards of conduct issues. Imparting consistent advice to employees, and making known the availability of

this guidance is essential to assuring compliance with ethics statutes and regulations. The NRC Ethics Program has been highly rated in audits, and recognized with awards, from the Office of Government Ethics.

However, in two recent Management Directives, the guidance to employees on ethics issues failed to identify the DAEO as the appropriate source of advice. Management Directive 13.4, "Transportation Management" provides important and relevant instruction on the limitations on authorized use of government vehicles. The initial draft directive omitted reference to the DAEO as the proper office from which to seek advice on standards of conduct issues which are recurrent in this area. In the draft version of Management Directive 3.23, "Mail Management," employees were erroneously directed to obtain advice from their supervisors on the often complex question of permissible use of penalty mail for outside professional activities. The OIG commentary urged revision of the directive to assure that employees were aware of the availability of the DAEO as the proper authority to determine whether an outside activity qualified as professionally related, and entitled to support by use of penalty mail.

Conclusion

A key aspect of the mission of the Inspector General is to proactively pursue the elimination of fraud and abuse in agency programs and operations. The OIG shares in the NRC's responsibility to provide adequate assurance to the public for the protection of its health and safety in the commercial use of nuclear materials and in the operation of nuclear facilities. This budget request will provide for my office the necessary resources to adequately assess and report on NRC's efforts to ensure that its safety-related programs are operating effectively.

This concludes my report to you on our activities and achievements during the past year. We look forward to continuing our work with the agency to assist in carrying out NRC's important health and safety mission.

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VOLUME-15

BUDGET ESTIMATES AND PERFORMANCE PLAN **FISCAL YEAR 2000**

February 1999
U.S. Nuclear Regulatory Commission

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FY 2000 BUDGET SUMMARY

(Dollar amounts in tables represent thousands of dollars ($K). In text, whole dollar amounts are used. Staff numbers represent full-time equivalents (FTE).)

FUNDS: The NRC's FY 2000 budget request is $471,400,000. This is an increase of $1,600,000 above that for FY 1999.

FTEs: The NRC's FY 2000 budget request is 2,810 FTE which includes 6 reimbursable business-like FTE. This is a decrease of 86 FTE below the FY 1999 level.

TOTAL NRC BUDGET AUTHORITY BY APPROPRIATIONS

NRC Appropriation	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Salaries and Expenses (S&E) ($K)				
Salaries and Expenses	472,000	465,000	465,400	400
Offsetting Fees Receipts	450,000	444,800	442,400	-2,400
Net Appropriated--S&E	[2]22,000	20,200	23,000	2,800
Office of the Inspector General (OIG) ($K)				
Inspector General	4,800	4,800	6,000	1,200
Offsetting Fees Receipts	4,800	4,800	6,000	1,200
Net Appropriated--OIG	0	0	0	0
Total Net Appropriated--NRC	[2]22,000	20,200	23,000	2,800

[1]Net Appropriation - S&E ($K)	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate
Nuclear Waste Fund	15,000	17,000	19,150
Nuclear Waste Fund transfer	4,000	0	0
General Fund	3,000	3,200	3,850

[2]Funding for FY 1998 includes $4.0 million from the DOE Nuclear Waste Fund, originally intended to license a multi-purpose canister design, that was transferred from the Department of Energy (DOE) on August 26, 1998. These funds were originally deleted by a line item veto but transferred as a result of the ruling by the Supreme Court that the line item veto was unconstitutional.

FY 2000 BUDGET SUMMARY

SUMMARY OF BUDGET AUTHORITY BY FUNCTION				
NRC Appropriation	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Salaries and Expenses (S&E) ($K)				
Salaries and Benefits	269,701	266,802	278,396	11,594
Contract Support	188,074	184,776	173,740	-11,036
Travel	14,225	13,422	13,264	-158
Total (S&E)	472,000	465,000	465,400	400
Office of the Inspector General (OIG) ($K)				
Salaries and Benefits	4,200	4,400	4,800	400
Contract Support	360	160	960	800
Travel	240	240	240	0
Total (OIG)	4,800	4,800	6,000	1,200
Total NRC Appropriation ($K)				
Salaries and Benefits	273,901	271,202	283,196	11,994
Contract Support	188,434	184,936	174,700	-10,236
Travel	14,465	13,662	13,504	-158
Total (NRC)	476,800	469,800	471,400	1,600

FY 2000 BUDGET SUMMARY

SUMMARY OF BUDGET AUTHORITY AND STAFFING BY STRATEGIC ARENA				
Summary	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Strategic Arena ($K)				
Nuclear Reactor Safety	224,009	210,350	210,043	-307
Nuclear Materials Safety	61,724	61,708	63,881	2,173
Nuclear Waste Safety	32,635	38,742	42,143	3,401
International Nuclear Safety Support	5,102	3,931	4,840	909
Management and Support	148,530	150,269	144,493	-5,776
Subtotal (S&E)	472,000	465,000	465,400	400
Inspector General ($K)	4,800	4,800	6,000	1,200
Total (NRC)	476,800	469,800	471,400	1,600
Staffing (FTE) by Strategic Arena				
Nuclear Reactor Safety	1,586	1,487	1,431	-56
Nuclear Materials Safety	482	479	464	-15
Nuclear Waste Safety	163	191	195	4
International Nuclear Safety Support	47	35	41	6
Management and Support	656	645	629	-16
Subtotal (S&E)	2,934	2,837	2,760	-77
Inspector General	43	44	44	0
Total (NRC)	2,977	2,881	2,804	-77
Reimbursable Business-Like FTE	8	15	6	-9
Total FTE Ceiling	2,985	2,896	2,810	-86

HIGHLIGHTS OF THE NRC FY 2000 BUDGET REQUEST

The NRC budget request for FY 2000 is $471,400,000 and 2,804 FTE, including $465,400,000 and 2,760 FTE for Salaries and Expenses, and $6,000,000 and 44 FTE for the Inspector General. The NRC continues to recognize the high priority on reducing Federal spending emphasized by the Administration. This budget request, when adjusted for inflation, represents the lowest budget request in the history of the NRC -- a 25 percent reduction in real terms since 1993-- and the FTE request is the lowest in more than 20 years -- down 600 FTE or 17 percent since 1993. In spite of the constrained fiscal environment, this budget request fully supports the agency's fundamental health and safety mission, while continuing the most comprehensive reform effort in the history of the agency.

The Planning, Budgeting and Performance Management (PBPM) Process

A critical element in the agency's continuing effort to improve overall performance has been the application of business-like principles to achieve sound management results, consistent with the requirement of the Government Performance and Results Act. The NRC is implementing an integrated and disciplined system to improve the agency's processes for planning, budgeting and performance management (PBPM). This system was designed to establish a sensible, reliable process for defining agency goals, develop cost effective strategies to achieve those goals, determine the resources needed to implement this strategic direction, and measure and assess the agency's progress.

The NRC has continued to make significant progress in implementing the PBPM process. Revisions to the NRC Strategic Plan, currently under review, and the development of the FY 2000 Performance Plan, were the initial PBPM efforts. The integrated FY 2000 budget request/FY 2000 Performance Plan reflects the continued evolution of this process. The FY 2000 budget request reflects the continued evolution of this system, and integrates the NRC Strategic Plan, Performance Plan and associated resources required to achieve the goals and planned accomplishments contained in these policy documents. A recent evaluation of the NRC's PBPM process conducted by a consultant found that the process is sound and that it has improved our integrated planning process.

We are continuing to refine the implementation of the PBPM process in order to strengthen the linkage between our performance goals, strategies and resource requirements in the FY 2001 budget. A review of the agency's initial Strategic Plan (FY 1997-FY 2002) was conducted during the fall of 1998. As a result of that review, the agency is further refining the revised strategic plan to fully reflect the regulatory reform efforts underway. This systematic review of the desired outcomes and specific measurements for success was initiated with the Office of Nuclear Reactor Regulation, aided by a consultant. The same disciplined review, also aided by a consultant, is underway in the Office of Nuclear Regulatory Research

and the Office of Nuclear Material Safety and Safeguards. The results of these efforts are expected to identify performance goals, strategies, and those key activities which contribute most to meeting our goals, and will be incorporated into revisions to the strategic plan released for stakeholder comment. We also expect this effort will move the NRC to a leadership role in becoming an "outcome based" organization within the Government, a path that we have taken since implementing our Strategic Assessment and Rebaselining efforts and that remains at the foundation of the Government Performance and Results Act.

Strategic Arenas

As part of revisions to the NRC Strategic Plan and FY 1999 Performance Plan, the number of strategic arenas for focusing the NRC's strategies for achieving its vision and mission was reduced from seven to the following four:

- Nuclear Reactor Safety
- Nuclear Materials Safety
- Nuclear Waste Safety
- International Nuclear Safety Support

The Common Defense and Security and International Involvement, Public Confidence, and Excellence strategic arenas have been eliminated. The performance goals identified in the FY 1999 Performance Plan associated with these arenas have been incorporated into the remaining arenas. The management goals and strategies cut across all NRC regulatory and support activities and are designed to build an environment conducive to accomplishing the agency's goals and mission.

Budget Request

Formulation of the budget request placed great emphasis on achieving program efficiencies across all programs and reducing funding for management and support activities. Funding for Salaries and Benefits (S&B) comprises 60 percent of the NRC request for Salaries and Expenses. The FY 2000 request for S&B of $278,396,000 represents an increase of $11,594,000 over FY 1999, in spite of a reduction of 77 FTE from the FY 1999 level. The impact of the proposed 4.4 percent pay raise in FY 2000 (vs. the baseline assumption of 3 percent in FY 2000) increased the S&B requirement $4,100,000. Funding for Contract Support activities is $173,740,000, a reduction of $11,036,000 from FY 1999. The request for travel funding is $13,264,000, down slightly from the FY 1999 level.

The FY 2000 budget reflects 100 percent recovery of new budget authority from fees. The streamlining activities within the agency, as well as regulatory reform efforts underway within the Nuclear Reactor Safety arena, result in a continuing decline in total fees assessed on the

nuclear power industry. Total fees estimated in FY 2000 are $448,400,000, a reduction of $1,200,000 from the FY 1999 total. The NRC budget request in FY 2000 of $471,400,000 includes $19,150,000 for High-Level Waste activities, $3,250,000 for review of Department of Energy external regulation and privatization activities, and $600,000 for AID-related work associated with Former Soviet Union (FSU) and Central Eastern European (CEE) countries. The NRC requests the budget be financed as follows: $448,400,000 from user fees, $19,150,000 from the Nuclear Waste fund, and $3,850,000 from the General fund.

The budget request details the funding required to support the people and activities required the NRC to accomplish its mission. Funding for program activities in the Nuclear Reactor Safety arena is reduced $4,977,000 in Contract Support and 56 FTE. These reductions are primarily in anticipation of savings to be achieved based on transitioning the NRC regulatory regime to the more risk-informed and other actions to reduce unnecessary burden. The overall goal of this adjustment is to enhance safety decisionmaking, improve efficiency, and reduce resources devoted to issues with low safety significance. Funding for program activities in the Nuclear Materials Safety arena includes resources for the review of the AVLIS license application, development and implementation of NRC's new general license registration program, and efforts related to dry cask storage of spent fuel. Funding in the Nuclear Waste Safety arena includes increases in the High-Level Waste Regulation and Regulation of Decommissioning programs, reflecting increased workload requirements in these areas. Funding for the International Nuclear Safety Support arena is increased, reflecting inclusion of the NRC FTE costs for providing nuclear safety assistance to the countries of the former Soviet Union and Central and Eastern Europe. Funding for Management and Support is reduced significantly, reflecting the agency-wide program reductions and efficiencies gained in the budget. Of note, funding for information technology and management is decreased significantly, as the benefit of investments in the agency-wide document access and management system (ADAMS) and the agency-wide integrated financial and resource management system (STARFIRE) are realized.

EXPLANATION OF RESOURCE CHANGES

Nuclear Reactor Safety

FY 2000 Change from FY 1999 ..... -$307,000

The funding included in the Nuclear Reactor Safety arena supports a reactor inspection program and reactor licensing activities for 103 operating reactors in FY 1999 and 102 in FY 2000 (based on historical trends). The reactor licensing and inspection program will continue to bear a strong relationship to facility performance. However, it is expected that these programs will change as a result of the agency's on-going reevaluation of its reactor

regulatory program. In anticipation of these changes, a general reduction in the reactor inspection and event assessment/incident response programs has been included in the budget estimates. The specific changes and their specific effect will be determined over the next several months.

The budget includes funding for the review of two new reactor license renewal applications in FY 2000 and preparation for additional new applications in FY 2001. Of the $56,318,000 in the research program, $48,806,000 is focused on reactor safety research. Resources for functions such as reactor incident response and operational experience evaluation are also included in this arena.

Funding is also included to accelerate the agency's move to a more risk-informed regulatory regime. Indeed, the Commission has increased funding in rulemaking in anticipation of a major effort in FY 2000 to eliminate unnecessary or duplicative reactor regulations. A small increase in FTE is also included in FY 1999 and FY 2000 to be able to perform new rulemakings that may be needed as the agency transitions to a more risk-informed regulatory framework. These resources will also be applied to the acceleration of cost-beneficial regulatory actions decommissioning plants. Further, the Commission has sustained resources in reactor licensing to reduce the size of the licensing action inventory to a historic low of 700 actions by the end of FY 2000. To fund higher priority research, the nuclear reactor research budget was reduced in the following areas: human factors and organizational performance; severe accidents, containment integrity and structural aging, and structural and civil engineering.

In terms of savings, the most significant change in the Nuclear Reactor Safety arena is the reduction of 56 FTE in FY 2000 which reflects savings in the reactor inspection and reactor performance assessment programs, the consolidation of event assessment functions, the implementation of a new performance assessment process in FY 2000, and reductions in the scope of the nuclear reactor research program.

Nuclear Materials Safety

FY 2000 Change from FY 1999 ..... $2,173,000

The resource increase in FY 2000 results primarily from costs associated with preparation and review of the Advanced Vapor Laser Isotope Separation (AVLIS) license application, development and implementation of NRC's new general license registration program, initiation of research in methods development and demonstration of dry cask storage risk assessment, and enhanced efforts to develop the technical basis for performance criteria of dry storage casks under seismic loading conditions. The increase is partially offset by decreases that result from the anticipated completion of a significant portion of the backlog of applications for

spent fuel storage and transport cask designs and spent fuel storage facilities, and completion of the rulemaking on the medical use of byproduct material in FY 1999.

Nuclear Waste Safety

FY 2000 Change from FY 1999 ..... $3,401,000

The resource increase in FY 2000 results primarily from NRC's high-level waste repository program activities, and ongoing decommissioning activities, including the increase in the number of reactors in the decommissioning process. The increase is partially offset by a reduction in the number of inspections to be conducted at uranium recovery facilities, and the completion of modeling to support regulatory guidance on decommissioning.

International Nuclear Safety Support

FY 2000 Change from FY 1999 ..... $909,000

The resource change in FY 2000 does not represent an increase in the amount of funds for this arena, but rather how the funds are obtained. For FY 1999, NRC renegotiated its reimbursable agreements with the Agency International Development to recover NRC's FTE costs for providing nuclear safety assistance to the countries of the former Soviet Union (FSU). In FY 2000, the NRC will include the AID-related FTE costs for support of FSU and Central and Eastern Europe countries within the general fund portion of the requested appropriation.

Management and Support

FY 2000 Change from FY 1999 ..... -$5,776,000

The resource decrease in FY 2000 is primarily based upon agency-wide program reductions and efficiencies gained in the budget. Funding also decreases in information technology and management as investments in the agency-wide document access and management system (ADAMS) and the agency-wide integrated financial and resource management system (STARFIRE) are completed.

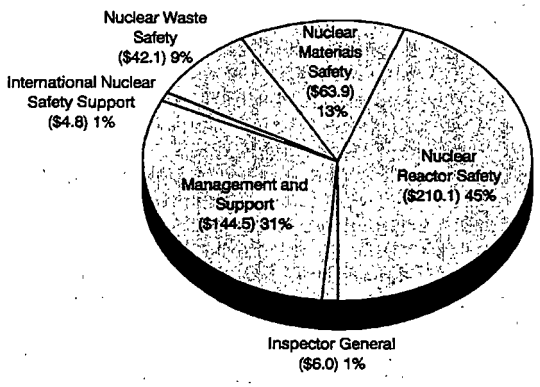
Office of the Inspector General

FY 2000 Change from FY 1999 ..... $1,200,000

The resource increase in FY 2000 stems from a recognition that after FY 1999, OIG carryover funds will be insufficient to restore OIG base-funding to a level at which OIG can carry out its essential programs. Contract support requirements were previously funded in prior years

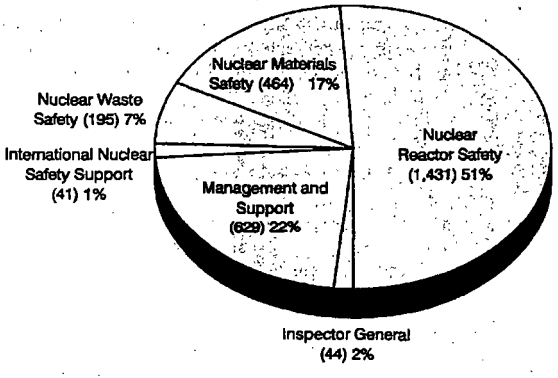
using OIG carryover funds. These requirements include the procurement of private sector contractors to perform the annual audit of the NRC's financial statements and provide technical investigative and audit support; as well as, procuring the services of other government audit agencies contract audits. In prior years, the NRC Salaries and Expenses appropriation funded OIG's information technology. The FY 2000 budget request includes new funding for OIG office-specific information technology requirements.

DISTRIBUTION OF NRC BUDGET AUTHORITY BY STRATEGIC ARENA



FY 2000 ($471.4 MILLION)

DISTRIBUTION OF NRC STAFF BY STRATEGIC ARENA



FY 2000 (TOTAL STAFF 2,810 FTEs)*

* Includes 6 reimbursable business-like FTEs

Note: Percentages are rounded to the nearest whole number.

APPROPRIATIONS LANGUAGE

Proposed FY 2000 Appropriations Legislation

The proposed appropriations legislation is as follows:

Salaries and Expenses

For necessary expenses of the Commission in carrying out the purposes of the Energy Reorganization Act of 1974, as amended, and the Atomic Energy Act of 1954, as amended, including official representation expenses (not to exceed $15,000), $465,400,000, to remain available until expended: Provided, That of the amount appropriated herein, $19,150,000 shall be derived from the Nuclear Waste Fund: Provided further, That revenues from licensing fees, inspection services, and other services and collections estimated at $442,400,000 in fiscal year 2000 shall be retained and used for necessary salaries and expenses in this account, notwithstanding 31 U.S.C. 3302, and shall remain available until expended: Provided further, That $3,850,000 of the funds herein appropriated for regulatory reviews and other assistance provided to the Department of Energy and other Federal agencies shall be excluded from license fee revenues, notwithstanding 42 U.S.C. 2214: Provided further, that the sum herein appropriated shall be reduced by the amount of revenues received during fiscal year 2000 so as to result in a final fiscal year 2000 appropriation estimated at not more than $23,000,000.

Office of the Inspector General

For necessary expenses of the Office of the Inspector General in carrying out the provisions of the Inspector General Act of 1978, as amended, $6,000,000 to remain available until expended: Provided, That the sum herein appropriated shall be reduced by the amount of revenues received during fiscal year 2000 so as to result in a final fiscal year 2000 appropriation estimated at not more than $0.

Analysis of Proposed FY 2000 Appropriations Legislation

The analysis of the proposed appropriations legislation is as follows:

Salaries and Expenses

1. FOR NECESSARY EXPENSES OF THE COMMISSION IN CARRYING OUT THE PURPOSES OF THE ENERGY REORGANIZATION ACT OF 1974, AS AMENDED, AND THE ATOMIC ENERGY ACT OF 1954, AS AMENDED:

   42 U.S.C. 5841 et seq.

   The NRC was established by the Energy Reorganization Act of 1974, as amended (42 U.S.C. 5801 et seq.). This act abolished the Atomic Energy Commission and transferred to the NRC all the licensing and related regulatory functions of the Atomic Energy Commission. These functions included those of the Atomic Safety and Licensing Board Panel and the Advisory Committee on Reactor Safeguards; responsibilities for licensing and regulating nuclear facilities and materials; and conducting research for the purpose of confirmatory assessment related to licensing, regulation, and other activities, including research related to nuclear material safety and regulation under the provisions of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.).

2. INCLUDING OFFICIAL REPRESENTATION EXPENSES:

   47 Comp. Gen. 657

   43 Comp. Gen. 305

   This language is required because of the established rule restricting an agency from charging appropriations with the cost of official representation unless the appropriations involved are specifically available therefor. Congress has appropriated funds for official representation expenses to the NRC and NRC's predecessor, the Atomic Energy Commission, each year since FY 1950.

3. TO REMAIN AVAILABLE UNTIL EXPENDED:

31 U.S.C. 1301

31 U.S.C. 1301 provides that no regular, annual appropriation shall be construed to be permanent or available continuously unless the appropriation expressly provides that it is available after the fiscal year covered by the law in which it appears.

4. SHALL BE DERIVED FROM THE NUCLEAR WASTE FUND:

42 U.S.C. 10131(b)(4)

42 U.S.C. 10222(a)(4)

42 U.S.C. 10131(b)(4) provides for the establishment of a Nuclear Waste Fund to ensure that the costs of carrying out activities relating to the disposal of high-level radioactive waste and spent nuclear fuel will be borne by the persons responsible for generating such waste and spent fuel.

42 U.S.C. 10222(a)(4) provides that the amounts paid by generators or owners of these materials into the fund shall be reviewed annually to determine if any fee adjustment is needed to ensure full cost recovery.

42 U.S.C. 10134

42 U.S.C. 10133

42 U.S.C. 10134 specifically requires the NRC to license a repository for the disposal of high-level radioactive waste and spent nuclear fuel and sets forth certain licensing procedures. 42 U.S.C. 10133 also assigns review responsibilities to the NRC in the steps leading to submission of the license application. Thus, the Nuclear Waste Policy Act of 1982, as amended, establishes NRC's responsibility throughout the repository siting process, culminating in the requirement for NRC licensing as a prerequisite to construction and operation of the repository.

42 U.S.C. 10222(d)

42 U.S.C. 10222(d) specifies that expenditures from the Nuclear Waste Fund can be used for purposes of radioactive waste disposal activities, including identification,

development, licensing, construction, operation, decommissioning, and post-decommissioning maintenance and monitoring of any repository constructed under the Nuclear Waste Policy Act of 1982, and administrative costs of the high-level radioactive waste disposal program.

5. REVENUES FROM LICENSING FEES, INSPECTIONS SERVICES, AND OTHER SERVICES AND COLLECTIONS SHALL BE RETAINED AND USED FOR NECESSARY SALARIES AND EXPENSES IN THIS ACCOUNT, NOTWITHSTANDING 31 U.S.C. 3302, AND SHALL REMAIN AVAILABLE UNTIL EXPENDED:

31 U.S.C. 9701

The NRC is authorized under Title V of the Independent Offices Appropriation Act of 1952 to collect license fees. Pursuant to 31 U.S.C. 9701, any person who receives a service or thing of value from the Commission shall pay fees to cover the NRC's cost in providing such service or thing of value.

42 U.S.C. 2213

42 U.S.C. 2214

Pursuant to 42 U.S.C. 2213, the NRC is required to assess and collect annual charges from persons licensed by the Commission. Except for the holder of any license for a federally owned research reactor used primarily for educational training and academic research purposes, 42 U.S.C. 2214 requires the Commission to assess and collect annual charges from persons licensed by the Commission, and the aggregate amount of such charges must equal an amount that approximates 100 percent of the Commission's budget authority, less any amount appropriated to the Commission from the Nuclear Waste Fund and the amount of fees collected under the Independent Offices Appropriation Act of 1952 (31 U.S.C. 9701), for each year of FY 1991 through FY 1999.

The 100 percent fee recovery requirement was to revert to 33 percent at the end of FY 1998, however it was extended for one fiscal year in the agency's FY 1999 appropriation legislation. Consistent with the Administration's policy, the NRC will submit proposed authorization legislation for FY 2000 that would extend the 100 percent fee collection through FY 2004.

31 U.S.C. 3302

The NRC is required to deposit all revenues collected to miscellaneous receipts of the Treasury unless specifically authorized by an appropriation to retain and use such revenue.

6. FUNDS HEREIN APPROPRIATED FOR REGULATORY REVIEWS AND OTHER ASSISTANCE PROVIDED TO THE DEPARTMENT OF ENERGY AND OTHER FEDERAL AGENCIES SHALL BE EXCLUDED FROM LICENSE FEE REVENUES, NOTWITHSTANDING 42 U.S.C. 2214:

42 U.S.C. 2214

42 U.S.C. 2214 requires the Commission to assess and collect annual charges from persons licensed by the Commission that approximate 100 percent of the Commission's budget authority, less any amount appropriated to the Commission from the Nuclear Waste Fund and the amount of fees collected pursuant to 31 U.S.C. 9701 (the Independent Offices Appropriation Act of 1952), for each year of FY 1991 through FY 1999.

31 U.S.C. 9701

Under the Independent Offices Appropriation Act of 1952, 31 U.S.C. 9701, the NRC is not authorized to charge fees to DOE or other Federal agencies for these activities. Rather than having the NRC recover these costs by assessing fees to its licensees under its 100 percent cost recovery requirement, the costs of these consultation and review activities would be derived from appropriated funds.

31 U.S.C. 1535 et seq.

33 Comp. Gen. 27

The Economy Act, 31 U.S.C. 1535 et seq., permits a Federal agency to perform work or services for another Federal agency on a reimbursable basis. A Federal agency may not be reimbursed for rendering services to another Federal agency if the services are required by law in carrying out the normal functions of the performing agency and for which appropriations are specifically provided.

The NRC performs the following types of activities for DOE and other Federal agencies for which it cannot directly charge the benefiting Federal agency license fees under 42 U.S.C. 2214:

a. Review of applications for the issuance of new licenses or approvals. Under the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, as amended, the NRC performs these functions to provide licenses, certificates of compliance, and other approvals to other Federal agencies.

b. Consultation and safety review activities for other Federal agencies that the NRC is not statutorily required to perform. Examples of such activities follow:

- NRC is providing support to assist DOE in establishing a regulatory program, consistent with NRC's regulatory approach, for the Hanford Tank Waste Remediation System (TWRS) privatization program which is a DOE effort to solidify the radioactive wastes presently stored in large underground tanks at the DOE Richland site. NRC is also providing support in the technical review of DOE's TWRS privatization program contractor's submittals.

- At DOE's request, the NRC is providing assistance in assessing and resolving technical and licensing issues with respect to DOE's possible acquisition of commercial light water reactors, or acquisition of irradiation services from commercial light water reactors, for the production of tritium.

- A pilot program was established in FY 1998 to determine the feasibility of NRC regulatory oversight of DOE nuclear facilities and to support a decision on whether to seek legislation to authorize NRC regulation of DOE nuclear facilities. DOE is principally responsible for conducting of the pilot evaluations, while NRC is performing a substantial supporting role. NRC and DOE continue to interact in the selection of additional pilot sites and discussion of implementation issues.

- NRC is currently providing nuclear safety related assistance to the countries of the former Soviet Union and Central and Eastern Europe. NRC's FY 1999 assistance activities are being supported by funds provided by the United States Agency for International Development (USAID). For FY 2000, USAID is expected to provide continuing

contract support and travel funding, with NRC staff costs funded from NRC's General Fund appropriation.

7. THE SUM HEREIN APPROPRIATED SHALL BE REDUCED BY THE AMOUNT OF REVENUES RECEIVED:

42 U.S.C. 2214

The total fees to be collected in FY 2000 are to approximate 100 percent of the Commission's budget authority. Pursuant to 42 U.S.C. 2214, the aggregate amount of the annual charges collected from all licensees shall equal an amount that approximates 100 percent of the budget authority of the Commission in the fiscal year in which such charges are collected, less any amount appropriated to the Commission from the Nuclear Waste Fund and the amount of fees collected under the Independent Offices Appropriation Act of 1952 (31 U.S.C. 9701), for each year of FY 1991 through FY 1999.

The 100 percent fee recovery requirement was to revert to 33 percent at the end of FY 1998, however, it was extended for one fiscal year in the agency's FY 1999 appropriation legislation. The NRC will submit proposed authorization legislation for FY 2000 that would extend the 100 percent fee collection through FY 2004.

Office of the Inspector General

8. FOR NECESSARY EXPENSES OF THE OFFICE OF THE INSPECTOR GENERAL IN CARRYING OUT THE PROVISIONS OF THE INSPECTOR GENERAL ACT OF 1978, AS AMENDED:

Public Law 95-452, 5 U.S.C. app., as amended by Public Law 100-504

Public Law 100-504 amended Public Law 95-452 to establish the Office of the Inspector General within the NRC effective April 17, 1989, and to require the establishment of a separate appropriation account to fund the Office of the Inspector General.

9. TO REMAIN AVAILABLE UNTIL EXPENDED:

31 U.S.C. 1301

31 U.S.C. 1301 provides that no regular, annual appropriation shall be construed to be permanent or available continuously unless the appropriation expressly provides that it is available after the fiscal year covered by the law in which it appears.

10. THE SUM HEREIN APPROPRIATED SHALL BE REDUCED BY THE AMOUNT OF REVENUES RECEIVED DURING FISCAL YEAR 2000 SO AS TO RESULT IN A FINAL FISCAL YEAR 2000 APPROPRIATION ESTIMATED AT NOT MORE THAN 0.

31 U.S.C. 9701

The NRC is authorized under Title V of the Independent Offices Appropriation Act of 1952 to collect license fees. Pursuant to 31 U.S.C. 9701, any person who receives a service or thing of value from the Commission shall pay fees to cover the NRC's cost in providing such service or thing of value.

42 U.S.C. 2213

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Pursuant to 42 U.S.C. 2213, the NRC is required to assess and collect annual charges from persons licensed by the Commission. Except for the holder of any license for a Federally owned research reactor used primarily for educational training and academic research purposes, 42 U.S.C. 2214 requires the Commission to assess and collect annual charges from persons licensed by the Commission and the aggregate amount of such charges shall equal an amount that approximates 100 percent of the Commission's budget authority, less any amount appropriated to the Commission from the Nuclear Waste Fund and the amount of fees collected under the Independent Offices Appropriation Act of 1952 (31 U.S.C. 9701), for each year of FY 1991 through FY 1999.

The 100 percent fee recovery requirement was to revert to 33 percent at the end of FY 1998, however, it was extended for one fiscal year in the agency's FY 1999 appropriation legislation. Consistent with the Administration's policy, the NRC will submit proposed authorization legislation for FY 2000 that would extend the 100 percent fee collection through FY 2004.

31 U.S.C. 3302

The NRC is required to deposit all revenues collected to miscellaneous receipts of the Treasury unless specifically authorized by an appropriation to retain and use such revenue.

FY 2000 PERFORMANCE PLAN

OVERVIEW

2

Like many organizations, both public and private, the Nuclear Regulatory Commission (NRC) is facing a rapidly changing environment as it prepares to enter the 21st century.

- Restructuring and economic deregulation of the electric utility industry are introducing new challenges to the NRC regulatory environment.
- Public interest in the safe operation of nuclear power plants and facilities, use of nuclear materials, and management of nuclear waste remains high.
- Technology and other societal trends are changing the characteristics of the NRC workforce and the way that NRC does its work.

During FY 1998, the NRC was the subject of a number of external reviews, some of them sharply critical, from Congressional appropriations and authorization committees, the General Accounting Office (GAO), and other stakeholders. These critiques implied over-regulation from some, and the demand for stronger NRC oversight from others. The agency views this as a useful opportunity to review the effectiveness of improvements already put in place, to examine NRC initiatives already started, to accelerate or adjust those initiatives, and to address newly identified issues. In response to these reviews, the NRC supports an acceleration of its transition to a risk-informed and, where appropriate, performance-based approach to regulation. The NRC has also initiated a number of performance assessments to address areas where additional enhancements are required and is near completion of a full-scope, integrated review of all reactor-related assessment processes. The agency is actively seeking interaction with stakeholders for feedback and suggestions for improving performance, and is committed to accelerating change, where appropriate and necessary, and to working with various stakeholders to facilitate improvements to the NRC regulatory framework.

These conditions and the current intense scrutiny being applied to the NRC hold many challenges and opportunities. Some of these challenges are already known to the agency, but others cannot be anticipated today. For example, the full affects of State's implementation of electric utility deregulation is not fully known. To respond effectively to these challenges, the NRC has established a clear strategic direction that will enable the NRC to carry out its mission and achieve the results expected by its primary customers--the American public. The Commission believes that this mission must be the foundation for making decisions about what activities the agency should perform. Thus, the Commission's programmatic decisions will not be fee-driven but will be based on their contributions to public health and safety.

BACKGROUND

The NRC's strategic plan (NUREG-1614, Vol. 1, September 1997) establishes a strategic framework that will guide future decisionmaking and will help the NRC continue to meet its responsibility for protecting public health and safety, promoting the common defense and security, and protecting the environment. The development of the agency's strategic plan, and its associated strategic goals, was based on a 2-year strategic assessment and rebaselining initiative (1995-1997). This internal effort was initiated by the Commission to provide a solid, reliable foundation on which to base a strategic framework for future decisionmaking, in addition to supporting the NRC implementation of the Government Performance and Results Act (GPRA) and other Congressional and Administration initiatives. It has provided the foundation and the strategic direction for the development of the FY 1999 and FY 2000 performance plans, the internal program-level operating plans, and for initiatives in response to the external criticism described in the Overview. The development of performance goals, in support of the strategic goals, was based on the review and assessment of existing data collected by the agency and of available historical data of actual performance.

In the Fall of 1997, the agency implemented a disciplined, integrated Planning, Budgeting and Performance Management process establishing the framework to transition to a results-oriented environment, and for day-to-day management and decisionmaking. This process, implemented with the FY 2000 budget cycle, sets the operational framework for the agency to strategically manage its programs and operations. An initial step in implementing the Planning, Budgeting, and Performance Management process involved a review of the FY 1997-FY 2002 Strategic Plan. This review, together with the GAO assessment and Congressional scoring of the agency's FY 1999 Performance Plan, has prompted the agency to consider modifications to the strategic plan. The performance plan and budget request reflect two of the changes under consideration. The number of strategic arenas is reduced from seven to four and the number of output measures by half, to provide a more focused and meaningful basis for evaluating NRC performance. These changes reflect a revised strategic alignment that more accurately reflects the integrated nature of the agency's efforts, and its program structure and operations. The agency anticipates a more extended review process and expects a final strategic plan to be available in the future.

To date, the agency has made significant progress in implementing the Planning, Budgeting, and Performance Management (PBPM) Process. As the result of this progress and of two specific assessments conducted by the agency--an assessment of the PBPM process by an independent consultant, and the Office of Nuclear Reactor Regulation's (NRR) self-assessment of its programs and operations (supported by an independent consultant)--the agency is

working toward further refinement and more direct linkages between its goals, operations, and budget resources. The PBPM assessment concluded that the process is sound and that it provides definition and improvements to our processes. The effort associated with NRR is on-going and, as a result of current progress and meaningful application to other areas of the agency, is being implemented in the Office of Nuclear Regulatory Research and the Office of Nuclear Material Safety and Safeguards (for the High-Level Waste program). The results of this effort will be integrated into the FY 2001 PBPM process, including the review and revision of the agency's strategic plan, the development of appropriate performance goals, and the development of appropriate budget resources to support these goals. Other offices and arena integration will be further developed for the FY 2002 PBPM process.

The agency's FY 2000 budget request to Congress and the FY 2000 performance plan have been integrated into a single document based on the need to provide the necessary linkage between the goals and strategies presented in the strategic plan, the programs and performance measures included in the performance plan, and the resources requested in the budget. This submission includes a summary of key elements of the NRC's strategic plan including the impact of changes currently under consideration. The budget request is presented for each strategic goal and arena, and performance goals and strategies and targets are identified for both fiscal years 1999 and 2000. Output measures and targets are also identified for both fiscal years 1999 and 2000 for each program within a strategic arena as well as baseline data for FY 1998, where available. The FY 1998 data are provided as a generic "snapshot in time" and do not reflect performance as a result of specific program output targets. Agency efforts to develop specific output targets for its programs began in FY 1998 to further the agency's development and implementation of GPRA, and are reflected in FY 1999 and FY 2000. Therefore, FY 1998 output data reflect efforts completed during that year, independent of established targets. Some agency offices established specific organizational targets, but these targets reflected only organizational planning and not specific targets to which the agency was managed. The FY 1999 and FY 2000 targets, were developed within a performance-oriented framework using the disciplined rigor of the PBPM process; these indicate the agency's efforts to establish performance-based targets, relative to overall agency performance and resource allocation. A performance plan appendix contains additional information on the agency's plans for the verification and validation of performance measures, cross cutting functions with other government agencies, the planning and budgeting process this year and other organization elements, current initiatives to improve agency efficiency, and key external factors affecting performance.[1]

[1] No significant contribution was made to the preparation of the performance plan by any non-Federal entity.

Within six months after the close of FY 1999, the NRC will submit to the President and the Congress its first report on program performance. This performance report will review the success of the agency in achieving the performance goals established for FY 1999 and included in this performance plan. Where those goals have been achieved, the underlying assumptions and strategies will be examined to ensure that continued applicability is warranted in the future. If any of the FY 1999 performance goals are not met, the agency will conduct a thorough analysis of why it did not meet the goal and the actions necessary to meet the goal in the future. One result of this analysis will be the documentation of plans and schedules for achieving the established performance goal. If the analysis should indicate that the performance goal is impractical or infeasible, the performance report will document why that is the case and what action is recommended.

Key to the NRC's regulatory framework is the concept of a risk-informed and, as appropriate, performance-based approach to regulation, which focuses NRC and licensee resources on the most safety significant issues while providing flexibility in how licensees meet NRC requirements. Such a framework will allow the NRC to assess, with reasonable assurance, whether or not adverse impacts to public health and safety and the environment are likely to occur. As such, the implementation of this approach strengthens the agency's ability to achieve its performance goals and mission. Several programs have been initiated in the nuclear reactor safety and nuclear materials safety arenas utilizing risk-informed and, where appropriate, performance-based approaches to regulation. To facilitate this application to the NRC's regulatory framework the agency has initiated an aggressive program to provide related training to technical staff and managers throughout the agency. The NRC will continue to identify additional opportunities to utilize this approach, and as the agency moves in this direction and gains more experience, the result will be improved decisionmaking, enhanced efficiency and effectiveness, a better focus of the agency's regulatory resources on the most risk-significant aspects of the NRC's regulation, and reduced unnecessary regulatory burden on licensees.

Regulations

The NRC has not identified any economically significant rules as defined in Section 3(f)(1) of Executive Order 12866, "Regulatory Planning and Review" (September 30, 1993), that are intended to be proposed or promulgated during FY 2000.

Proposed Legislation

The NRC has not identified any legislation necessary for the agency to achieve its performance goals for FY 2000. The agency is, however, developing a proposed legislative package. With the anticipated application from USEC for the AVLIS uranium enrichment process expected mid FY 2000, the NRC is also considering including in the package, legislation that would modify the inflexible approach to hearings in Section 193 of the Atomic Energy Act. The NRC is considering legislative proposals that would modify sections 103.d and 104.d of the Atomic Energy Act to allow foreign ownership and control of utilization facilities, provided that such arrangements would not be inimical to the common defense and security of the United States or health and safety of the public. The agency also supports those aspects of the President's electric utility restructuring legislation applicable to the NRC, particularly the elimination of duplicative NRC antitrust reviews in licensing proceedings.

NRC'S STRATEGIC PLAN

This section summarizes the key elements of the NRC's strategic plan including modifications currently under consideration, as a prelude to discussion of the agency's FY 2000 performance goals. The significant agency program output measures which support those goals are discussed in the FY 2000 budget request. The full text of the NRC's September 1997 strategic plan is available from the U.S. Government Printing Office (NUREG-1614, Vol. 1, September 1997) or it can be viewed and downloaded from the NRC's home page on the Internet [http://www.nrc.gov]. A revised strategic plan to support the FY 2000 Performance Plan and the FY 2000 budget, is under development.

NRC's Mission

The Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, as amended, establish the basic regulatory mission of the Nuclear Regulatory Commission.

The NRC's mission is to regulate the Nation's civilian use of byproduct, source, and special nuclear materials to ensure adequate protection of public health and safety, to promote the common defense and security, and to protect the environment.

NRC's Vision

In implementing its mission, the NRC's actions enable the Nation to safely and efficiently use nuclear materials. The NRC's actions should be such that the public, those it regulates, and other stakeholders in the national and international nuclear community have the utmost respect for and confidence in the NRC.

NRC's Strategic Goals

The NRC has developed goals consistent with its mission. These strategic goals are supported by performance goals, which represent outcomes the NRC plans to achieve over the period covered by the NRC's strategic plan.

The NRC will conduct an efficient regulatory program that allows the Nation to use nuclear materials for civilian[2] purposes in a safe manner to protect the environment by working to achieve the following strategic goals:

- Prevent radiation-related[3] deaths and illnesses and protect the environment in the use of civilian nuclear reactors (Nuclear Reactor Safety).

- Prevent radiation-related deaths and illnesses, protect the environment, and safeguard special nuclear material and facilities in the civilian use of source, byproduct, and special nuclear materials (Nuclear Materials Safety).

- Prevent adverse impacts to the current and future public health and safety and the environment, as a result of uranium recovery, facility decommissioning, clean-up of contaminated sites, and disposal of radioactive wastes (Nuclear Waste Safety).

- Support U.S. national interests in the safe and secure use of nuclear materials and in nuclear non-proliferation (International Nuclear Safety Support).

The safe and secure use of nuclear materials for civilian purposes is the responsibility of NRC licensees and Agreement State licensees, and the regulatory oversight of licensees is the responsibility of the NRC and the Agreement States. Thus, achieving these goals requires the collective efforts of the NRC, the Agreement States, and their licensees. The NRC's regulatory program is designed to ensure that the activities proposed and conducted by its licensees comply with the NRC's regulatory framework and are conducted safely. The NRC through its Office of State Programs provides for cooperation, oversight, technical assistance, and liaison with States, local governments, Indian tribes, and interstate organizations. The NRC works with Agreement States in a cooperative manner to establish and maintain adequate and compatible regulatory programs. The NRC coordinates with other Federal agencies that have missions that overlap in scope with the NRC's mission, and also maintains a level of international involvement that supports broad U.S. national interests and the NRC's domestic mission. These collective efforts strengthen the NRC's ability to achieve its goals and mission to ensure the protection of public health and safety and the environment.

[2] As used in this plan, "civilian" uses or activities refer to those commercial and other uses of nuclear materials and facilities, including certain military activities (such as at hospitals and high-level waste disposal), required by the Atomic Energy Act to be licensed and otherwise regulated by the NRC.

[3] The term "radiation-related" as used in this document may be interpreted to include other hazards associated with the production and use of radioactive materials such as potential chemical hazards related to fuel processing.

NRC Management Goals and Strategies

The NRC has developed the following five overarching management goals in the strategic plan currently under development:

- Achieve excellence by effectively and efficiently carrying out the NRC regulatory and support functions.
- Inspire public confidence by providing the public, those the NRC regulates, and other stakeholders in the national and international community with clear and accurate information about, and a meaningful role in, the NRC regulatory program.
- Sustain a high-performing, diverse workforce.
- Apply information technology to streamline processes, improve information delivery, and support scientific computing and information needs.
- Employ innovative and sound business practices.

These management goals, and their supporting strategies, cut across all of NRC regulatory and corporate activities and are designed to build an environment conducive to accomplishing the agency's strategic goals, mission, and vision. The strategies define the means by which the NRC will conduct business to ensure success in the implementation of the strategic plan, the performance plan, and the accomplishment of the agency's mission.

RELATIONSHIP TO STRATEGIC PLAN AND STRATEGIC ARENAS

The NRC's performance plan is directly linked to the NRC's strategic plan currently under development. To facilitate the correlation between the performance plan and the strategic plan, the performance plan is organized into the same four strategic arenas, as follows:

- Nuclear Reactor Safety
- Nuclear Materials Safety
- Nuclear Waste Safety
- International Nuclear Safety Support

For each strategic arena in the performance plan, the following information is provided:

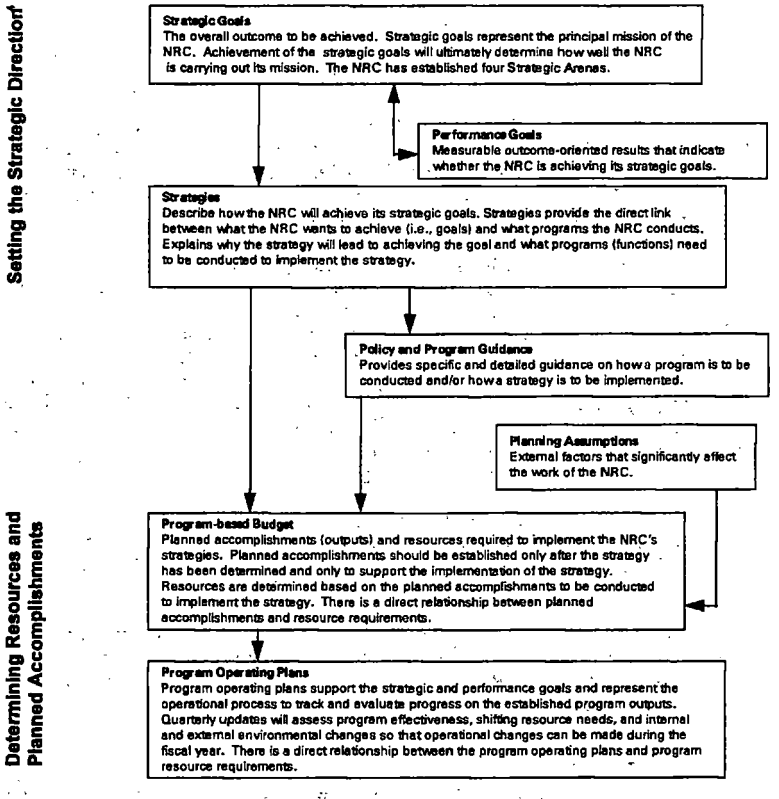
- the strategic goal from the strategic plan,
- a brief introduction to the arena,
- the performance goals for measuring results in FY 2000 toward meeting the strategic goals,
- the strategies the NRC will utilize to ensure that the agency achieves the strategic goal, and
- the relationship of the agency's programs, and their associated resources, to the strategic plan strategies.

The significant agency programs, their resources, and associated program output measures and targets, which support the strategies to achieve the agency's goals, are reflected in the FY 2000 budget request.

RELATIONSHIP TO THE BUDGET

The **strategic goals** (such as, "prevent radiation-related deaths") represent the agency's principal mission and the overall outcome the NRC wants to achieve. The **performance goals** (such as, "zero civilian nuclear reactor accidents") are direct or surrogate measures that provide independent, measurable, outcome-oriented results indicating whether the NRC is achieving its strategic goals. The **strategies** describe how the NRC will achieve its strategic goals and provide the direct link between what the NRC wants to achieve (i.e., strategic goals) and what programs the NRC conducts. The **programs** and **output measures and targets** to support the implementation of the strategies, and their associated resources, are reflected in the FY 2000 budget request. Resources are determined based on the programs to be conducted, including their associated planned outputs, to implement the strategies. The budget supports the direct relationship between the outputs and resource requirements, as well as the relationship between the outputs, programs, strategies, and goals. This linkage is visually represented in the schematic on the following page.

STRATEGIC PLANNING AND RELATIONSHIP TO THE BUDGET



[4] Strategic goals, performance goals, and strategies constitute the NRC's Strategic Plan. Discussion of the strategic arenas and their associated strategies, outputs, and resource requirements constitute the proposed budget.

NUCLEAR REACTOR SAFETY

STRATEGIC GOAL

Prevent radiation-related deaths and illnesses and protect the environment in the use of civilian nuclear reactors.

DESCRIPTION OF STRATEGIC ARENA

3

A major part of the NRC's mission is to ensure that its licensees[5] safely design, construct, and operate civilian nuclear reactor facilities. The NRC regulates 103 civilian nuclear power reactors that are licensed to operate and another 19 that are undergoing decommissioning. The Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, as amended, provide the foundation for regulating the Nation's civilian nuclear power industry.

The Nuclear Reactor Safety strategic arena encompasses all NRC efforts to ensure that civilian nuclear power reactor facilities, as well as non-power reactors, are operated in a manner that adequately protects public health and safety and the environment, and protects against radiological sabotage and theft or diversion of special nuclear materials. These efforts include reactor licensing; operator licensing; financial assurance; inspection; performance assessment; identification and resolution of safety issues; reactor regulatory research; regulation development; operating experience evaluation; incident investigation; threat assessment; emergency response; investigation of alleged wrongdoing by licensees, applicants, contractors, or vendors; imposition of enforcement sanctions for violations of NRC requirements; and reactor technical and regulatory training.

These efforts are conducted primarily by the Office of Nuclear Reactor Regulation and the Office of Nuclear Regulatory Research, with the assistance and coordination of the NRC Office of Enforcement, the Office of Investigations, the Office of the General Counsel, and the Atomic Safety and Licensing Board Panel.

The NRC has an ongoing effort, with the support of an independent consulting firm, to evaluate the current output measures in the Nuclear Reactor Safety strategic arena. As a result of this initiative, the NRC may revise one or more of the existing output measures, with the intent of strengthening the linkages to the agency's strategic plan.

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[5] "Licensees," as used in this plan, include persons required to be licensed (as defined in Section 11s of the Atomic Energy Act) as well as, where appropriate, applicants for licenses; certificate holders and applicants for certificates; contractors (including suppliers and consultants), subcontractors, and vendors of licensees or certificate holders; and all other persons subject to the NRC's jurisdiction.

NUCLEAR REACTOR SAFETY

The NRC has been moving and will continue to move toward making the entire NRC regulatory framework more risk-informed (so that areas of highest risk receive the greatest focus) and, where appropriate, more performance-based (i.e., more results-oriented and more open to allowing licensee flexibility in how to meet NRC regulatory requirements). The overall goal of this adjustment in regulatory approach is to enhance safety decisionmaking, improve efficiency, and reduce resources devoted to issues with low safety significance.

The Nuclear Reactor Safety strategic arena comprises the following 13 programs: Reactor Licensing; Reactor License Renewal; Reactor Inspection; Reactor Performance Assessment; Reactor Incident Response; Reactor Operational Experience Evaluation; Reactor Technical Training; Reactor Enforcement Actions; Reactor Investigations; Reactor and Plant Performance Research; Reactor Materials and Component Behavior Research; Reactor Legal Advice; and Reactor Adjudication. The contract support funds are allocated for work done by the U.S. Department of Energy (DOE) contractors, commercial contractors, small business entities, nonprofit organizations (e.g., universities and foundations), and grantees.

As discussed in the Reactor Licensing program, a major information technology system, the Reactor Program System (RPS), is being developed to provide for the effective and efficient integration and analysis of information associated with nuclear reactor regulation programs. This is discussed in the Reactor Licensing Program section.

MEASURING RESULTS – PERFORMANCE GOALS

The NRC has established the following performance goals for measuring results in achieving its Nuclear Reactor Safety strategic goal to prevent radiation-related deaths and illnesses and protect the environment in the use of civilian nuclear reactors. In developing these goals, a careful review and analysis of existing performance data was performed. Although targets for performance were not established until FY 1998, FY 1997 performance, where available, is provided. FY 1998 performance, where available, is also provided. These data provide a firm baseline for the development of future performance targets and the assessment of performance.

1.	**Zero civilian nuclear reactor accidents.** As used in this context, a "nuclear reactor accident" is defined in the NRC Severe Accident Policy Statement (50FR32138, August 8, 1995) as those accidents which result in substantial damage to the reactor core, whether or not serious offsite consequences occur. The **performance indicator** is the number of severe reactor accidents annually. The **data** to support this indicator are collected through reports from industry pursuant to 10 CFR Parts 50.72 and 50.73, and would be further described in the USNRC annual Abnormal Occurrence Report to Congress.[6]

The **FY 2000 target** is **zero**. The **FY 1999 target** is **zero**.
FY 1998 Performance: **Zero** civilian nuclear reactor accidents were identified in FY 1998.
FY 1997 Performance: **Zero** civilian nuclear reactor accidents were identified in FY 1997.

1.a.	**Maintain a low frequency of events that could lead to a nuclear reactor accident.** The **performance indicator** is the annual number of events from the population of plants that could result in a 1/1,000 (10^{-3}) or greater probability of leading to a nuclear reactor accident. The **data** to support this indicator are currently developed through the Accident Sequence Precursor program[7] and reflected in the annual report, "Precursors to Potential Severe Core Damage Accidents" (NUREG-4674).

The **FY 2000 target** is for no more than one such event to occur in the United States.
The **FY 1999 target** is for no more than one such event to occur in the United States.
FY 1998 Performance: Final analyses of all events in this period may not be completed until approximately one year after the end of the fiscal year. Performance for FY 1998, therefore, will be reported when the final analyses are completed.
FY 1997 Performance: **Zero** events were identified in FY 1997 that had a 1/1000 (10^{-3}) or greater probability of leading to a nuclear reactor accident.

[6] The NRC is required by Section 208 of the Energy Reorganization Act of 1974 to report abnormal occurrences to the Congress. The report, titled "Report to Congress on Abnormal Occurrences" (NUREG-0090) is submitted to Congress annually. In the context of the Act, an abnormal occurrence is an unscheduled incident or event that the Commission determines to be significant from the standpoint of public health or safety.

[7] The Accident Sequence Precursor (ASP) program involves the systematic review and evaluation of operational events or conditions that have occurred at licensed U.S. civilian nuclear power reactors. The ASP program identifies and categorizes precursors that could lead to accident sequences with a potential to cause severe damage to a reactor's core.

2.	**Zero deaths resulting from radiation or radioactivity releases from civilian nuclear reactors.** This measure addresses actual deaths resulting from acute radiation exposure. The **performance indicator** is the number of deaths annually. The **data** to support this indicator are currently collected through reports from industry pursuant to 10 CFR Parts 20, 50.72, and 50.73, and would be further described in the USNRC annual Abnormal Occurrence Report to Congress.

The **FY 2000 target** is **zero**. The **FY 1999 target** is **zero**.
FY 1998 Performance: Preliminary data indicate that there were **zero** deaths due to radiation or radioactivity releases from civilian nuclear reactors in FY 1998.
FY 1997 Performance: Zero deaths due to radiation or radioactivity releases from civilian nuclear reactors were identified in FY 1997.

2.a.	**Zero significant radiation exposures resulting from civilian nuclear reactors.** As used in this context, "significant radiation exposures" are those exposures that meet the NRC criteria for reporting abnormal occurrences to Congress. This goal encompasses both workers and the general population. (See Appendix I, FY 2000 Performance Plan, Item. I.A.) The **performance indicator** is the number of significant radiation exposures annually. The **data** to support this indicator are currently collected through reports from industry pursuant to 10 CFR Parts 20, 50.72, and 50.73, and would be further described in the USNRC annual Abnormal Occurrence Report to Congress.

The **FY 2000 target** is **zero**. The **FY 1999 target** is **zero**.
FY 1998 Performance: Preliminary data indicate that there were **zero** significant radiation exposures due to civilian nuclear reactors in FY 1998.
FY 1997 Performance: Zero significant radiation exposures due to civilian nuclear reactors identified in FY 1997.

3.	**No substantiated breakdown of physical protection that significantly weakens protection against radiological sabotage, or theft or diversion of special nuclear materials.** The **performance indicator** is the number of substantiated breakdowns of physical protection at nuclear power reactors annually. (See Appendix I, FY 2000 Performance Plan, Item I.C.4.) The **data** to support this indicator are currently collected in the Sequence Coding and Search System. (See Appendix I.)

The **FY 2000 target** is **zero**. The **FY 1999 target** is **zero**.
FY 1998 Performance: Preliminary data indicate that there were **zero** substantiated breakdowns of physical protection or material control in FY 1998.
FY 1997 Performance: Zero substantiated breakdowns of physical protection or material control were identified in FY 1997.

4.	**Zero offsite releases of radioactive material from civilian nuclear reactors that have the potential to cause a serious adverse impact on the environment.** **The performance indicator is the number of offsite releases annually which meet the NRC criteria for reporting abnormal occurrences to Congress. (See Appendix I, FY 2000 Performance Plan, Item I.B.1.) The data to support this indicator are currently collected through reports from industry pursuant to 10 CFR Parts 20, 50.72, and 50.73, and entered in the Sequence Coding and Search System. (See Appendix I.)**

The **FY 2000 target** is **zero.** The **FY 1999 target** is **zero.**
FY 1998 Performance: Preliminary data indicate that there were **zero** offsite releases in FY 1998.
FY 1997 Performance: **Zero** offsite releases were identified in FY 1997.

4.a.	**No increase in the number of offsite releases of radioactive material from civilian nuclear reactors that exceed the limits specified in 10 CFR Part 20.2203.** **The performance indicator is the number of offsite releases per year in excess of 10 CFR Part 20 limits. The data to support this indicator are currently collected through reports from industry pursuant to 10 CFR Part 20, and entered in the Sequence Coding and Search System. (See Appendix I, FY 2000 Performance Plan.)**

The **FY 2000 target** is that the five-year average (FY 1996-2000) will not exceed **three** per year. The **FY 1999 target** is that the five-year average (FY 1995-1999) will not exceed **three** per year.
FY 1998 Performance: Preliminary data indicate the NRC five-year average is **0.8** per year.
FY 1997 Performance: The NRC five-year average for FY 1997 is **0.6** per year.

5.	**Environmental impacts are considered through the National Environmental Policy Act (NEPA) process before regulatory action is taken.** **The performance indicator is the number of environmental impacts identified and substantiated each year by external sources which were not identified as part of the NRC's NEPA process.**

The **FY 2000 target** is zero. The **FY 1999 target** is zero.
FY 1998 Performance: Data for this measure will be reviewed in FY 1998 and will be reported for FY 1999.
FY 1997 Performance: Data are not available.

NUCLEAR REACTOR SAFETY

STRATEGIES

1. The NRC will maintain and further develop the capability to provide timely and independent technical bases for its regulatory decisions.

2. The NRC will maintain and improve its regulatory framework[8] and incrementally use risk-informed and, where appropriate, less prescriptive, performance-based[9] approaches. In doing this, the NRC will eliminate unnecessary or duplicative regulations in the primarily deterministic, prescriptive framework currently in place.

3. The NRC will authorize the siting, design, construction, and operation of civilian nuclear reactor facilities only after the NRC has determined that these proposed activities are consistent with the regulatory framework.[8]

4. The NRC will ensure that licensees understand and carry out their primary responsibility for conducting activities consistent with the regulatory framework.[8]

5. The NRC will be prepared to respond to incidents and emergencies involving potential radiological consequences.

6. The NRC will ensure that civilian nuclear reactor experience is evaluated, communicated to stakeholders, and used to improve the regulatory framework and its implementation.

7. The NRC will place a high priority on the review of applications for renewal of existing civilian nuclear reactor licenses and for the review of license transfer amendments. The NRC will also place a high priority on reducing the backlog of licensing actions to a historic low for the agency.

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[8] The regulatory framework is rules and regulations that ensure adequate protection of public health and safety.

[9] A risk-informed approach to regulatory decisionmaking considers the insights from risk assessment together with other factors to focus licensee and regulatory attention on issues consistent with their importance to public health and safety. A performance-based approach establishes criteria for licensee performance and provides flexibility as to how these criteria are met. These definitions are currently under review by the Commission.

NUCLEAR REACTOR SAFETY

The following table depicts the relationship of the Nuclear Reactor Safety programs to the arena strategies identified above. The required resources are developed on the basis of the programs and functions necessary to implement the strategies. Detailed information on the resources, programs, and their associated output measures is provided in the Nuclear Reactor Safety arena of the FY 2000 budget request. FY 1998 baseline data for the FY 1999 and FY 2000 output measure targets are provided, where available.

FY 2000 NUCLEAR REACTOR SAFETY ARENA PROGRAM LINK TO ARENA STRATEGIES

LINKS TO ARENA STRATEGIES	STRATEGIES						
FY 2000 PROGRAMS ($210,043K, 1,431 FTE)	1	2	3	4	5	6	7
Reactor Licensing ($56,404K, 445 FTE)		X	X			X	
Reactor License Renewal ($7,763K, 54 FTE)							X
Reactor Inspection ($65,771K, 601 FTE)				X			
Reactor Performance Assessment ($5,694K, 51 FTE)				X			
Reactor Incident Response ($4,758K, 24 FTE)					X		
Reactor Operational Experience Evaluation ($6,387K, 28 FTE)						X	
Reactor Technical Training ($5,406K, 24 FTE)	X						
Reactor Enforcement Actions ($2,056K, 19 FTE)				X			
Reactor Investigations ($3,779K, 31 FTE)				X			
Reactor and Plant Performance Research ($30,237K, 93 FTE)	X		X				
Reactor Materials and Component Behavior Research ($18,569K, 34 FTE)	X						
Reactor Legal Advice ($2,330K, 21 FTE)		X	X	X			X
Reactor Adjudication ($889K, 6 FTE)			X				

BUDGET AUTHORITY BY FUNCTION AND BY PROGRAM
FULL-TIME EQUIVALENT EMPLOYMENT BY PROGRAM

(Dollar amounts in tables represent thousands of dollars ($K). In text, whole dollar amounts are used. Staff numbers represent full-time equivalents (FTEs).)

Total FY 2000 Estimate $210,043,000

Summary	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Function ($K)				
Salaries and Benefits	150,254	143,581	148,356	4,775
Contract Support	64,882	58,162	53,185	-4,977
Travel	8,873	8,607	8,502	-105
Total	224,009	210,350	210,043	-307
Budget Authority by Program ($K)				
Reactor Licensing	58,639	53,172	56,404	3,232
Reactor License Renewal	3,700	6,394	7,763	1,369
Reactor Inspection	70,367	64,411	65,771	1,360
Reactor Performance Assessment	6,919	6,344	5,694	-650
Reactor Incident Response	6,175	4,876	4,758	-118
Reactor Operational Experience Evaluation	8,342	6,757	6,387	-370
Reactor Technical Training	6,499	6,242	5,406	-836
Reactor Enforcement Actions	996	1,914	2,056	142
Reactor Investigations	3,462	3,796	3,779	-17
Reactor and Plant Performance Research	33,975	34,019	30,237	-3,782
Reactor Materials and Component Behavior Research	21,523	19,440	18,569	-871
Reactor Legal Advice	2,235	2,026	2,330	304
Reactor Adjudication	1,177	959	889	-70
Total	224,009	210,350	210,043	-307

NUCLEAR REACTOR SAFETY

Summary	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Full-Time Equivalent Employment by Program				
Reactor Licensing	511	449	445	-4
Reactor License Renewal	28	50	54	4
Reactor Inspection	672	622	601	-21
Reactor Performance Assessment	69	62	51	-11
Reactor Incident Response	33	28	24	-4
Reactor Operational Experience Evaluation	35	34	28	-6
Reactor Technical Training	28	26	24	-2
Reactor Enforcement Actions	10	19	19	0
Reactor Investigations	30	33	31	-2
Reactor and Plant Performance Research	102	103	93	-10
Reactor Materials and Component Behavior Research	37	35	34	-1
Reactor Legal Advice	22	19	21	2
Reactor Adjudication	9	7	6	-1
Total	1,586	1,487	1,431	-56

EXPLANATION OF RESOURCE CHANGES BY PROGRAM

Reactor Licensing. The resource increase in FY 2000 is required to complete other licensing tasks and reduce the inventory of licensing actions to a historical low by the end of FY 2000, as well as to perform new rulemakings that may be needed to transition to a more risk-informed regulatory framework. This resource increase is partially offset by decreases resulting from issuance of formal updates to the improved Standard Technical Specification NUREGs, consolidation of events evaluation activities, and reduced overhead consistent with NRC's streamlining plans.

Reactor License Renewal. The resource increase in FY 2000 is required to conduct reviews of license renewal applications and to develop the associated regulatory framework.

Reactor Inspection. The resource increase in FY 2000 is associated with increased personnel costs, pay raises, within-grade increases, and benefits cost increases. The programmatic decrease in FY 2000 reflects the decreased operating reactor workload and expected improved plant performance; efficiencies to be gained from improving the inspection process; the deployment of the Reactor Program System; and reduced overhead consistent with NRC's streamlining plans, which are partially offset by an increase in staff to conduct followup activities to speed resolution of allegations.

Reactor Performance Assessment. The resource decrease in FY 2000 reflects the continued implementation of process improvements in the reactor licensee performance assessment process. During FY 1999 and FY 2000, the staff will work to develop and implement improvements to the assessment process to make it more risk informed, efficient, and effective by combining the best attributes of the staff's integrated review of assessment processes, industry proposals on the regulatory oversight process, and staff efforts designed to develop risk-informed performance indicators. During FY 1999 and FY 2000, the NRC will transition from the current processes (Systematic Assessment of Licensee Performance, Plant Performance Reviews, and Senior Management Meetings) to a single integrated process.

Reactor Incident Response. The resource decrease in FY 2000 reflects reducing the capabilities and maintenance of the Operations Center Information Management System, reducing support for input to the NRC's daily status report (Morning Report), lengthening the update cycle for computer codes supporting dose assessment, eliminating incident response support to the NRC web page, canceling support for the response computer system, and reducing the technical training for State responders. These decreases are partially offset by an increase in resources for the Emergency Telecommunications System due to the expected loss of the Federal Telecommunications System (FTS) support.

Reactor Operational Experience Evaluation. The resource decrease in FY 2000 reflects reductions in accident sequence precursor events, system reliability studies, efficiencies derived from consolidating reactor event assessment, and a reduction in generic nuclear reactor event studies. These decreases are partially offset by increases in risk studies, and development of risk-based performance indicators and risk databases.

Reactor Technical Training. The resource decrease in FY 2000 reflects long-term yearly savings in Technical Training Center rent and simulator operational support from disposal of the BWR/6 simulator, reduction or elimination of selected technical training courses, reductions in simulator support, and fewer contracted courses.

Reactor Enforcement Actions. There are no significant resource changes in FY 2000. The resource increase in FY 1999 will be used to transition to the revised enforcement policy that the Commission is currently in the process of developing to reduce the unnecessary burdens associated with responding to non-risk-significant violations and incorporate clear risk-informed guidance in the treatment of escalated violations.

Reactor Investigations. The resource decrease in FY 2000 is primarily based upon the efficiencies achieved through streamlining the investigative process. This decrease is offset by increased personnel costs (pay raises, within-grade increases, and benefits cost increases). The resource increase in FY 1999 is primarily needed to expand the office's role in harassment and intimidation cases and to provide continuity in staff for anticipated losses based upon the extensive training requirement for new agents.

Reactor and Plant Performance Research. The resource decrease in FY 2000 reflects a number of resource shifts and programmatic reduction decisions. Decreases to the program reflect completion of work on electro-magnetic interference/radio-frequency interference (EMI/RFI) effects on digital instrumentation and control (I&C); cancellation of updates to the VICTORIA code; reduced SCDAP/RELAP maintenance; completion of the work on direct containment heating; completion of individual plant examination/individual plant external event examination (IPE/IPEEE) reviews; cancellation of a third demonstration of the improved reliability model, ATHEANA; delaying development and assessment of a human performance model for one year; termination of the Behavior-Oriented Fitness for Duty effort; termination of the Shutdown Risk effort; efficiencies derived from consolidating event assessment; eliminating all contractor support for new generic safety issue prioritization and resolution; general information technology; and reducing travel. Work on assessing management and organization influences on plant performance is canceled.

Reactor Materials and Component Behavior Research. The resource decrease in FY 2000 reflects reducing the effort on environmentally assisted cracking, eliminating an assessment of degraded structures and components, and eliminating anticipatory work on the assessment of natural hazards to nuclear power plants.

Reactor Legal Advice. The resource increase in FY 2000 is required for the workload associated with license renewal applications and with electric industry restructuring and deregulation.

Reactor Adjudication. The resource decrease in FY 2000 is primarily based upon expected efficiencies in the Atomic Safety and Licensing Board Panel's operations, including use of available technology.

JUSTIFICATION OF PROGRAM REQUESTS

Reactor Licensing

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Licensing actions completed per year. (FY 1998: 1,425 licensing actions completed.)	1,670 actions, including conversions to improved Standard Technical Specifications.	1,800 actions, including conversions to improved Standard Technical Specifications.
Size of licensing action inventory. (FY 1998: 1,113 actions.)	1,000 actions or less.	700 actions or less.
Age of licensing action inventory. (FY 1998: 66 percent of inventory 1 year old or less; 86 percent 2 years old or less; 95 percent 3 years old or less.)	80 percent of inventory 1 year old or less; 95 percent 2 years old or less; all actions 3 years old or less.	95 percent of inventory should be 1 year old or less; all actions 2 years old or less.
Other licensing tasks completed per year. (FY 1998: 1,006 other licensing tasks completed.)	800.	925.
Number of operator licensing examinations administered. (FY 1998: 413 initial operator licensing examinations administered; 393 generic fundamentals examinations administered.)	Meet licensee demand estimated at 400 initial operator licensing examinations and 400 generic fundamentals examinations.	Meet licensee demand estimated at 400 initial operator licensing examinations and 400 generic fundamentals examinations.
Reactor Program System will develop demonstrable returns on investment to the agency.	No significant deviations (as defined by Clinger-Cohen Act of 1996).	No significant deviations (as defined by Clinger-Cohen Act of 1996).

The reactor licensing program ensures that operating facilities maintain adequate levels of protection of public health and safety in the daily operation and throughout the life of the plant, until decommissioning. This safety oversight includes assurances that facilities are adequately designed, properly constructed and correctly maintained, and that trained and qualified operating and technical support personnel can prevent or cope with accidents or other threats to public health and safety.

Each operating site is assigned a project manager having as a primary responsibility maintaining the nuclear power reactor license and serving as the headquarters point of contact with licensees, other NRC staff, and the public on safety matters concerning specific plants. This includes coordinating complex technical reviews, evaluating overall licensee performance, assisting the regions in developing and implementing inspection plans, consulting with State and local officials, and replying to public and Congressional inquiries.

Operating license requirements frequently need to be changed as a result of routine activities, technical advances, or unexpected events at power plants. A detailed technical review of applications from licensees for amendments to their operating licenses, such as technical specification changes, modification of license conditions, and exemption and relief requests, are necessary to ensure that the operational safety of the plant is not compromised. These licensing actions require NRC approval before the licensee can implement the requested action. Without such approval, the licensee cannot make the changes requested and, in some cases, may be required to shut down the plant if operation is not feasible under the current license conditions.

In FY 2000, the NRC expects to complete approximately 1,800 licensing actions, including initiatives involving risk informed regulation and conversions to improved Standard Technical Specifications. The licensing action inventory at the end of FY 2000 will be at a historic low of 700. The age of the licensing action inventory will be reduced so that 95 percent of the licensing actions in the inventory are one year old or less, and all actions are no more than two years old.

Another major licensing action effort will result from licensees' applications to increase their power ratings. At the end of FY 1998, approximately 48 power uprate licensing actions had been completed, resulting in an increase in the available electric generating capacity in the United States of about 2300 megawatts--which is equivalent to building two new 1150 MW electric plants--with minimal plant modification and minimal impact on plant safety. Three power-uprates are scheduled for completion in FY 1999 and we expect about three power-uprate applications each fiscal year.

The NRC will improve the effectiveness of its licensing process by reviewing and approving topical or generic reports submitted by licensees, vendor/owner groups, and other parties. These reports deal with safety issues and cost-beneficial changes common to a set of plants. The NRC will review the more safety-significant reports in FY 2000. In addition, topical reports that involve cost-beneficial actions and have a licensee sponsor will be given higher review priority.

NRC review is also required on issues that do not result in an amendment of the operating license. These reviews are considered "other licensing tasks." These other licensing tasks include (1) responding to petitions from the public requesting action pursuant to 10 CFR Part 2.206 or (2) evaluating information received from individual licensees in response to requests for information (e.g., generic letters and bulletins) or as required by regulation or license conditions as part of the NRC's responsibility for reviewing the safety of the operating licensed facilities (e.g., final safety evaluation report updates, 10 CFR Part 50.59 reports, and changes to quality assurance, safeguards, and emergency preparedness plans). The NRC expects to complete approximately 925 other licensing tasks in FY 2000 and reduce the inventory, with the goal that the number of other licensing tasks per operating reactor at the end of FY 2000 is less than the average at the end of the preceding fiscal year.

The NRC provides the overall management, quality assurance, and plant to plant consistency of improved Standard Technical Specifications (iSTS), generic effort and lessons learned as a result of iSTS conversions, all generic efforts to improve technical specifications to make them more operator oriented, and a focus on the more safety-significant requirements. In FY 1999, the NRC will issue Revision 2 to the iSTS, compiling approved changes in a formal update to the documentation. In FY 2000, the staff will continue to maintain the iSTS and review further changes as necessary.

The NRC must license all personnel authorized to operate power reactors. Initial examinations are administered by the NRC to ensure that operating plants are staffed by qualified personnel. NRC also examines candidates for new operator licenses on generic fundamentals to measure the candidates' knowledge of reactor theory, plant components, and thermodynamics. In FY 2000, the NRC will administer approximately 400 initial operator licensing examinations and 400 generic fundamentals examinations nationwide.

The NRC continues to endorse the Training Accreditation Program managed by the Institute of Nuclear Power Operations (INPO). The NRC intends to observe discussions of representatives from INPO accreditation teams and from the utilities before the National Nuclear Accrediting Board.

Policy and technical activities are conducted to assess the policy and safety significance of potentially generic regulatory issues as they emerge. Action plans are used, when appropriate, for issues that are complex, safety significant, or that have significant policy implications such as issues like implementation of probabilistic risk assessment (PRA), 10 CFR Part 50.59, FSAR and commitment management, utility deregulation, and Maine Yankee lessons-learned.

The NRC develops regulations and regulatory guidance applicable to reactor licensees. The NRC will develop and complete approximately six rulemakings per year in FY 1999 and FY 2000 that pertain to operating reactors. Milestones for completing rulemakings are established in the semiannual NRC Rulemaking Activity Plan. Among the priority rulemakings identified for completion during this period are the following: a change to 10 CFR 50.59 (Changes, tests, and experiments) to provide clarity and flexibility in the existing requirements; a revision to event-reporting requirements to reduce the reporting burden associated with events of little or no risk significance; a rule regarding the use of potassium iodide as a protective measure for the general public after a severe reactor accident; a change as a result of a rulemaking petition concerning burden reduction for Quality Assurance Program change control; a rule change to allow an operating power reactor licensee to voluntarily amend the facility design basis to use revised source terms in design-basis accident radiological analyses and a revision to the maintenance rule. A small increase in FTE is also included in FY 1999 and FY 2000 to be able to perform new rulemakings that may be needed as the agency transitions to a more risk-informed regulatory framework. These resources will also be applied to the acceleration of cost-beneficial regulatory actions in the Nuclear Waste Safety area for power reactor licensees in the decommissioning phase, such as rulemakings for emergency planning, safeguards, and financial protection for shutdown plants.

The NRC continually monitors and assesses the performance of nuclear power plant licensees to verify that plants are operated safely, and continually analyzes operational data to identify safety issues and potential degradations in performance. In FY 2000, prompt technical screening and assessments of approximately 5,000 nuclear reactor event reports and other incoming data will result in approximately 400 items that require followup. Followup can also result from technical assessments of potential generic safety questions, from licensee reports of defects and/or noncompliance, or from allegations. The NRC manages and tracks potential generic safety questions until they are resolved and documented in agency databases for future reference. If the NRC determines that a potential safety concern exists, corrective action is recommended and prompt operating experience feedback is provided to licensees or vendors. Approximately 80 of these generic communications are expected to be issued in FY 2000.

The standardization of nuclear power plant designs can increase the safety, reliability, and availability of nuclear power plants to ensure that certified standard designs, when properly

sited and constructed, will adequately protect public health and safety. The NRC completed its detailed technical review of the Westinghouse advanced passive pressurized-water reactor design (AP600) and issued the final design approval in late FY 1998. Followup activities concerning AP600 design certification rulemaking that will certify that the AP600 design as an appendix to 10 CFR Part 52 will start in early FY 1999 upon receipt of required information from the vendor and are scheduled to be completed in FY 2000.

The NRC is responsible for licensing, inspecting, and decommissioning smaller non-power reactors that are designed and used for research and testing in such areas as physics, chemistry, biology, medicine, and materials sciences, and for training individuals for nuclear-related careers in the power industry, national defense, research, and education. During FY 2000, the NRC will conduct inspections as well as reviews of licensing actions and other licensing tasks for approximately 52 licensed non-power reactors.

In addition to licensing and inspecting the non-power facilities, the NRC must license all personnel authorized to operate the non-power reactors. During FY 2000, the NRC will administer initial examinations for new reactor operators and requalification examinations to ensure that the approximately 300 non-power reactor operators are qualified to perform their duties.

The NRC will continue to proceed in two phases with the development of the Reactor Program System (RPS). The RPS is being developed to provide for the effective and efficient integration and analysis of information associated with nuclear reactor regulation programs. The RPS will provide reactor inspection and licensing information that can be used to improve NRC's ability to better monitor plant performance characteristics, effectively compare plant performance, and better identify early causes for concern. The licensing and other planning portions will be completed in FY 1999 and deployed by late FY 1999. Development of the remaining portion, including interfaces with other agency systems, will follow.

Reactor License Renewal

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Completion of license renewal application reviews. (FY 1998: Major milestones completed.)	Complete those major milestones scheduled in FY 1999 in accordance with the Commission-approved schedules in order to support completion of license renewal applications within 36 months from receipt of the application to a Commission decision.	Complete those major milestones scheduled in FY 2000 in accordance with the Commission-approved schedules in order to support completion of license renewal applications within 36 months from receipt of the application to a Commission decision.

The reactor license renewal program evaluates applications to renew current power reactor licenses beyond their expiration dates, evaluates the effects of aging on materials and safety-related systems, structures, and components, ensures that the safety-related plant systems and components perform their required intended functions in accordance with their current licensing basis for the period of extended operation, and establishes the technical requirements and regulatory framework for renewal of power plant licenses. The NRC will continue to conduct technical and environmental reviews of the Calvert Cliffs and Oconee license renewal applications. The staff review for Calvert Cliffs is scheduled to be completed in November 1999 and for Oconee in February 2000. Dates for final agency action on these applications will depend on the timing of adjudicatory hearings, if required. In each case, the Commission has issued a case-specific order to the Atomic Safety and Licensing Board Panel (ASLBP) to ensure that prompt, fair hearings are conducted. Resources are included to support two additional license renewal applications expected in FY 2000. The reviews of generic technical reports supporting the renewal applications, as well as prospective applications for Westinghouse and General Electric reactors, will continue, along with the resolution of technical issues that can improve the guidance in the regulatory guides, standard review plans, industry guides, and staff positions implementing 10 CFR Part 51 and Part 54. The NRC expects that these reviews, in conjunction with the experience gained from the Oconee and Calvert Cliffs reviews, will result in process enhancements that will improve the timeliness of license renewal application reviews.

Reactor Inspection

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Number of plants for which core inspection program is completed during the fiscal year. (FY 1998: Completed at all reactors.)	All operating reactors.	All operating reactors.
Average time to complete reviews of allegations. (FY 1998: Average time to complete reviews 122 days.)	180 days.	180 days.

The reactor inspection program is designed to ensure, through selective examinations, that the licensee identifies and resolves safety issues before they affect safe plant operations. This program is audit-oriented to verify that relevant activities are being properly conducted and equipment properly maintained to ensure safety operations. The inspection program comprises three major elements: core inspections, plant-specific inspections, and generic safety issue inspections.

The core inspections are performed at all operating reactors and focus on licensee performance in the areas of plant operations, maintenance, engineering, plant support (which includes security, radiation protection, and emergency preparedness), and licensee effectiveness in identifying, resolving, and preventing problems. Resident inspectors carry out the major part of the core inspection program and participate in regional initiative and generic safety issue inspections. Their primary job is to observe, evaluate, and report on the adequacy of licensee nuclear safety activities, concentrating on day-to-day licensee operational and event followup activities, and licensee activities and processes that are important to safety and reliability.

Plant-specific regional initiative inspections are performed as needed to followup on operational events and safety issues, and to further investigate the root causes and corrective actions related to inspection findings. In general, the level of regional initiative inspection performed at each site is a function of that site's performance. NRC inspectors also respond to allegations of safety and safeguards violations at nuclear facilities and provide technical support to investigative personnel.

Generic issue inspections are one-time inspections that address areas of emerging safety concern or areas requiring increased emphasis because of recurring problems. These inspections are required to be performed at all operating reactors, at a particular type of reactor facility, or at designated reactors. Previously conducted generic issue inspections include team inspections of maintenance, emergency operating procedures, and electrical distribution and service water systems.

The NRC plans to spend an annual average of approximately 2,300 hours in direct onsite inspection activities at each reactor in FY 2000. The NRC has reduced the total direct onsite inspection hours (from 2,550 hours in FY 1996 and FY 1997) based on operating experience in recent years that shows overall performance at reactors has been improving. This overall average is used to plan resource allocations for the inspection program. Actual hours expended for individual units are adjusted on the basis of licensee performance. For example, the core inspection and generic safety issue inspections constitute (at least) an adequate level of inspection at plants that have demonstrated superior performance. To ensure that resources are allocated effectively to enhance reactor safety, significant flexibility exists to conduct additional inspections of safety problems and of plants that require special attention.

During FY 1999, the staff is working to develop and implement a more risk-informed, efficient, and effective baseline core inspection program. By risk-informed, it is meant that the scope of the inspection program will be defined primarily by those areas that are significant from a risk perspective, and inspection methods used to assess these areas will take advantage of both generic and plant-specific risk insights. While resource reductions are anticipated from this effort, it is too early to quantify savings.

The NRC also conducts approximately 35 reactor operator licensing requalification program inspections each year to evaluate licensee examination and training programs and to improve operational safety through early identification and correction of programmatic weaknesses. Vendor/contractor inspections are also conducted. These inspections are reactive in nature and determine whether suppliers of materials, components, and services used in nuclear power plants are complying with NRC requirements. These inspections improve reactor safety by (1) ensuring that root causes of reported vendor-related problems are identified and that suitable corrective actions are developed and implemented, (2) informing the nuclear industry of substandard, suspected counterfeit, or fraudulently-marketed vendor products, and (3) ensuring that fraudulently-marketed products are traced to their source.

NUCLEAR REACTOR SAFETY

Reactor Performance Assessment

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Timeliness of assessments conducted and reports issued. (FY 1998: 45 reports issued and meetings conducted; four did not meet the target.)	All assessment reports issued and meetings with licensees held within 60 days of the end of the assessment cycle.	All assessment reports issued and meetings with licensees held within 60 days of the end of the assessment cycle.
Plant performance review. (FY 1998: 2 reviews per site conducted.)	Conduct 2 reviews per site.	Conduct 2 reviews per site.
Senior management meetings. (FY 1998: 2 meetings conducted.)	Conduct an annual meeting.	Conduct an annual meeting.

The NRC conducts an integrated assessment of licensee performance through collecting and assessing inspection and operational data on each power reactor site. This program provides for ongoing and annual reviews of agency observations and findings on the safety performance of operating reactor facilities. Assessing reactor performance also includes integrating lessons learned, overseeing the implementation of corrective actions, and systematically reexamining reactor oversight activities and continually evaluating and developing the program.

The assessment process will be used to develop the NRC's conclusions regarding a licensee's safety performance and to identify agency actions to ensure licensees address performance weaknesses. The assessment process will provide a vehicle to clearly communicate with licensee management and the public on plant performance from a safety and risk perspective. In addition, the NRC will use assessment results in allocating reactor inspection resources at specific plants.

During FY 1999 and FY 2000, the NRC will transition from the current processes, which include the Systematic Assessment of Licensee Performance (which has been suspended by the Commission), Plant Performance Reviews, and Senior Management Meetings into a single integrated process. As part of this transition, the NRC will change the conduct of the Senior Management Meeting from two meetings per year to an annual meting beginning in FY 1999.

In FY 2000, the NRC will continue to collect and assess inspection and operational data on each power reactor site, and use the assessment process to (1) conduct an integrated assessment of licensee's safety performance, (2) identify agency actions to ensure that licensees address performance weaknesses, (3) clearly communicate the results of the assessment and planned actions to licensees and the public, and (4) assist NRC management in allocating resources used to inspect and assess licensee performance.

Reactor Incident Response

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Emergency Response Performance Index (ERPI).	90 percent.	90 percent.
Definition: Index provides the single overall measure of the degree to which the agency believes it is ready to respond to an emergency situation. It serves as a method for measuring disparate activities that comprise the elements of the incident response program. It will be determined by averaging the degree of satisfaction of the following program functions: Response Organization Staffing, Response Facility Availability, Communications Reliability, Response Organization Training, 24-Hour Notification Point, Timeliness of Activation Decision, and Timeliness of Activation. If the overall index falls below or approaches its target value of 90 percent, management will determine what is contributing most to the decline and conduct appropriate corrective measures based on this review.		

Reactor incident response activities are conducted to maintain incident and accident investigation programs to ensure that safety-significant operational events involving nuclear power reactors are investigated in a timely, systematic, and technically sound manner and that information is obtained on the causes of the events so that NRC can take timely and effective corrective actions.

Emergency response activities are also conducted to ensure NRC is prepared to carry out its role in a radiological emergency at NRC-licensed nuclear reactor facilities, licensee responses are consistent with licensee responsibilities and NRC responses are coordinated with other Federal response activities and State and local governments. This also includes support of response tools, including an emergency telecommunications system, the Emergency Response Data System, and the Operations Center Information Management System.

During FY 2000, the Incident Investigation Program (IIP) will be maintained in a high state of readiness to establish and support an Incident Investigation Team (IIT) at any time. The Incident Investigation Manual (NUREG-1303), which provides formal guidance on the conduct of IITs, will be revised if necessary, to address investigation and programmatic deficiencies,

if any. IIT rosters will be revised as needed. IITs will be established and supported, and findings will be documented as staff followup actions. Also in FY 2000, independent reviews will be conducted for actions assigned from previous IITs and will be published in the NRC's Annual Report.

In FY 2000, the NRC will continue to provide oversight and interaction to maintain high Headquarters Operations Center (HOC) reliability and facility availability. The emergency response program will continue to be updated on the basis of lessons learned. The on-call response coordination team member position will be continuously staffed to initiate the call-out process when the HOC is activated. Response team readiness will be maintained. The staff will continue its interfaces with other Federal agencies involved in radiological incident response. The NRC will respond to new initiatives while maintaining its role in the principal Federal response plans (Federal Response Plan, Federal Radiological Emergency Response Plan, and National Contingency Plan). The NRC's incident response staff will participate in exercises, drills, major organizational meetings, and training sessions with State coordination as a focus. The training provided will be conducted in the most expeditious way possible.

During FY 2000, the HOC will be continuously staffed by Headquarters Operations Officers. They will take initial notifications of events and will document reported events for further review within the agency. During non-working hours (for other NRC staff), they will take allegation and materials event reports and will screen any initial reports for the decisionmaking process to activate the agency's emergency response.

The NRC's Regional Incident Response Program will also be maintained at a high level of readiness at all times during FY 2000. To accomplish this, the NRC's regional offices will train response personnel as required to maintain technical and administrative skills, participate periodically in drills and exercises, maintain response equipment in a state of operational readiness, maintain response procedures current, and implement program improvements resulting from lessons learned. The regions will designate sufficient staff to participate as response team members to implement program objectives, keeping in mind program efficiencies. In addition, the regions will continually evaluate ways to improve response through upgrades to equipment, resources, and facilities. The regions will interface with NRC headquarters, other Federal agencies, licensees, and State and local governments in order to maintain a high level of cooperation necessary for response to emergencies.

Reactor Operational Experience Evaluation

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Operational Experience Evaluation Performance Index.	90 percent.	90 percent.
Definition: Index provides the single overall measure of the timeliness and thoroughness of reactor operational experience evaluation and the risk associated with that experience. It serves as a method for measuring disparate activities that comprise the elements of the reactor operational experience evaluation program. The index is an average value calculated by combining the following program functions: Accident Sequence Precursor program, System Reliability studies, Risk-Based Performance Indicators, Reliability and Availability Data system, Sequence Coding and Search system, Common Cause Failure Data system, Senior Management Meeting Support, and case studies and evaluations of Safety Significant Issues. A decline in the index value would alert management to potential programmatic problems that would be examined to determine the root cause, and corrective actions would be taken on the basis of the results of this review.		
During FY 1999, this output measure will be reevaluated and appropriate changes made as a result of recent operational and organizational changes related to this function.		

The NRC collects, analyzes, and disseminates a wide range of power reactor operating experience data, including information on foreign reactor operating experience applicable to domestic nuclear power plants. This comprehensive review identifies two to three significant plant-specific or generic safety issues per year involving components, systems, system interactions, and human performance for in-depth evaluation. Results, findings, and recommendations of these evaluations are widely disseminated to the NRC staff, to industry, and to the public. Events that are significant from the standpoint of public health and safety are reported to the Commission with the recommendation that they be reported to Congress as abnormal occurrences (AOs). Such reactor AOs have declined from an average of approximately 9 per year in the mid-1980s to an average of approximately two per year over the past 5 years.

Operational data are collected, independently analyzed, and disseminated to communicate the important safety lessons drawn from operational experience. The emphasis has historically been focused on generic safety issues identified through the review of a broad range of data, including domestic and foreign reports of operating events. Long-term, in-depth studies of such safety concerns will continue in FY 2000. However, additional emphasis is being placed upon the assessment of plant-specific performance in support of the NRC's integrated reactor performance assessment process, and the collection and assessment of risk and reliability data to gather risk insights into both plant-specific and industry-wide safety performance. In

addition, the NRC has begun a new initiative to assess the effectiveness and efficiency of agency programs aimed at enhancing regulatory effectiveness, which will continue through FY 2000.

In FY 2000, the independent review of domestic and foreign nuclear power plant operating experience will continue. Safety-significant issues will be identified and studied to determine the root causes and corrective actions. This will include studies of components, systems, and human performance.

During FY 2000, the NRC's integrated reactor performance assessment process will continue to include the production of performance trend plots, financial variable trend plots, and performance indicator data. The analysis of these data will help identify plants with potential problems, and will be instrumental in the detailed review of the operational experience of selected plants.

The assessment of risk and reliability data will continue in FY 2000 to include the Accident Sequence Precursor program, which is being expanded to include Level 2/3 models and low-power/shutdown models; the evaluation of the reliability of important safety systems; the development of risk-based performance indicators; the development and/or maintenance of risk databases, including the Accident Sequence Precursor, Common-Cause Failure, Loss of Offsite Power, and Initiating Events databases; and the conduct of risk studies as directed.

During FY 2000, as part of the NRC program to enhance regulatory effectiveness, the NRC will continue to develop a process and identify candidate issues for improving the effectiveness and efficiency of rules, standards, regulatory guidance, and their application.

In FY 2000, the Committee To Review Generic Requirements (CRGR) will continue to maintain responsibility for the review of all proposed new generic requirements and NRC staff positions to be implemented by the licensees of operating power reactors. CRGR will continue to receive about 30–40 items per year for review and will hold 12–14 meetings for that purpose. NRC staff will provide support for planning, conducting, and documenting CRGR reviews on these items and for monitoring plant-specific backfitting activities. The CRGR Chairman and/or NRC support staff will continue to meet with the Nuclear Utility Backfitting and Reform Group (NUBARG) for feedback on generic backfit implementation by NRC via an estimated one to two meetings. The NRC will continue the conduct of training and audits in conjunction with program and regional office implementation of generic backfitting, at an estimated two to three training/audit sessions per year, and will also provide support for up to two operating facility site visits by CRGR to discuss generic backfitting activities and processes.

Reactor Technical Training

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Numbers and types of reactor technical training courses offered. (FY 1998: 100 percent of cumulative needs met.)	Numbers and types of courses offered will meet 90 percent of cumulative needs identified by offices and regions in semiannual needs surveys.	Numbers and types of courses offered will meet 90 percent of cumulative needs identified by offices and regions in semiannual needs surveys.

Reactor technical training is conducted to ensure that NRC staff possesses the requisite knowledge, skills, and abilities and competencies to accomplish the mission of the agency. Under this activity, technical training is provided for formal NRC staff qualification, development, and training programs in support of the reactor program. The NRC will continue to maintain the Technical Training Center (TTC) and manage the technical training program for NRC staff. Curriculum areas in support of the training program will be maintained in reactor technology, probabilistic risk assessment, engineering support, radiation protection, security and safeguards, and regulatory skills to provide the technical and regulatory foundation to support staff decisions in the regulatory oversight process. Technical training will continue to be provided using the principles of the systems approach to training, which is a standard, multiphase program that includes needs analysis, program design and development, implementation of training, and program evaluation.

Required core, specialized, and refresher reactor technical training is developed, implemented, and maintained in support of the qualification of NRC personnel with defined qualification, development, and training programs. In FY 2000, the reactor technical training program will continue to include approximately 60 reactor technology courses and 85 courses in specialized technical training areas. A spectrum of reactor technology training will be provided for the General Electric, Westinghouse, Combustion Engineering, and Babcock and Wilcox reactor designs to meet the agency's highest priority needs, including an integrated series of classroom and simulator courses for NRC staff. Technical training of regulatory personnel from other countries to assist in the development of knowledge of nuclear technology and regulatory skills will be provided on a "space available" basis. In FY 2000, the NRC will provide 90 percent of the numbers and types of courses as required by the offices and regions.

During FY 2000, initial reactor technology training and refresher training will continue to be provided to NRC inspectors, reactor operator license examiners, and other staff in formal

qualification or development programs. In addition, technical training will be available for NRC technical managers. Training of headquarters and regional reactor inspectors, operator license examiners, and headquarters operations officers on vendor-specific plant designs, operation, and emergency operating procedures, and technical issues will continue. Major curriculum adjustments to best satisfy the highest priority regional and program office training needs will be implemented as necessary.

Reactive training needs are addressed in reactor technical training curriculum areas as identified by job and task analyses and agency management through forums such as the training focus groups, division director counterpart meetings, and senior management meetings. The NRC will provide technical training to support special staff development programs. During this period, a limited amount of technical training will be provided in specialized areas to supplement the initial training provided to technical staff of a particular category. This training provides selected technical staff with specific expertise in areas for which all technical staff does not require the expertise.

New and expanded regulatory and technical training will be developed and implemented during FY 2000, as necessary, in areas identified by program offices and regions. This includes new training courses to support the regulatory oversight process improvements, agency-wide probabilistic risk assessment implementation plan, and new training determined to be necessary by technical training needs surveys. In addition, reactor concepts training will be provided for employee orientation.

Technical training for the NRC staff is highly dependent on the full-scope simulators, classroom information technology systems, and office technology systems at the TTC. In order to maintain an efficient, effective technical training program which meets identified agency needs, these information technology systems must be maintained and updated as necessary.

In FY 2000, full-scope training simulators will continue to be maintained at the TTC to support NRC initial qualification and refresher programs. This includes maintaining the operability, reliability, and performance of the simulator hardware and software and maintaining and updating the infrastructure for simulation equipment. Performance of NRC full-scope simulators will continue to be updated to the extent practicable to meet NRC reactor technology training needs. Five simulators are currently located at the Technical Training Center, modeling the following designs: the GE-BWR/4, the GE-BWR/6, the Westinghouse, the CE, and B&W. When the GE-BWR/4 simulator was acquired and made operational, the baseline BWR training program was shifted from the GE-BWR/6 to the GE-BWR/4 design.

The remaining four simulators will continue to support essential training in each of the four major U.S. reactor vendor designs.

Reactor Enforcement Actions

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Timeliness in completing enforcement actions. (FY 1998: Enforcement case average of 67.1 days for 90 percent of cases. Enforcement case average of 80.6 days for 100 percent of cases.)	90 percent of reactor enforcement cases will average 90 days or less. 100 percent of reactor enforcement cases will average 120 days, or less. The measuring period starts on the latest of the following dates: (1) inspection exit, for non-OI cases, (2) the date of the OI memorandum forwarding the OI investigation to the staff, for OI cases, (3) the date that the Department of Justice says NRC may proceed, for cases referred to the DOJ, or (4) the date of the Department of Labor decision that is the basis for the action.	90 percent of reactor enforcement cases will average 90 days or less. 100 percent of reactor enforcement cases will average 120 days, or less. The measuring period starts on the latest of the following dates: (1) inspection exit, for non-OI cases, (2) the date of the OI memorandum forwarding the OI investigation to the staff, for OI cases, (3) the date that the Department of Justice says NRC may proceed, for cases referred to the DOJ, or (4) the date of the Department of Labor decision that is the basis for the action.

The NRC's enforcement program is used as a deterrent to emphasize the importance of compliance with requirements and to encourage prompt identification and comprehensive correction of violations. The basic enforcement sanctions are notices of violations, civil monetary penalties, and various enforcement orders. The nature and extent of the enforcement action taken by the NRC reflect the seriousness of the violation involved.

The NRC expects to consider approximately 200-400 potentially escalated reactor enforcement actions in FY 2000. The Commission is in the process of revising its enforcement policy as to non-escalated actions and will be evaluating the use of risk information in escalated enforcement actions. As the number and types of enforcement actions taken in any period of time are a function of the number of licensees and the licensees' performance, it is difficult to predict future activity levels. However, previous enforcement activity has been as follows:

Reactor Enforcement				
Fiscal Year	Actions Considered	Resulting Civil Penalties	Notices of Violation Without Civil Penalty	Orders Issued
1996[1]	280	50[2]	38	4
1997	397	71	41	10
1998	464	44	34	14

[1] Reflects a change in the threshold for considering escalated actions.

[2] The information for FY 1996 was based on enforcement actions issued to licensees. Because an enforcement case or enforcement action can include more than one escalated enforcement item or issue, FY 1997 data are based on accounting for escalated enforcement items. Therefore, for consistency, data for FY 1996 have been adjusted to reflect this method of accounting.

The NRC also monitors discrimination actions filed with the U.S. Department of Labor under Section 211 of the Energy Reorganization Act and develops enforcement actions where there are properly supported findings of discrimination, either from the Office of Investigations or from the Department of Labor adjudications.

Reactor Investigations

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Timeliness in completing investigations. (FY 1998: Complete cases, on average, in 6.3 months; 7.9 percent of cases open for more than 12 months.)	Complete cases, on average, in 9 months, or less. Maintain the average number of cases within the active case inventory for more than 12 months, at 9 percent, or less.	Complete cases, on average, in 9 months, or less. Maintain the average number of cases within the active case inventory for more than 12 months, at 9 percent, or less.

The NRC investigates allegations of wrongdoing by NRC reactor licensees, and others within its regulatory jurisdiction. All findings and conclusions that result from investigations are sent to the appropriate program office, the Office of Enforcement, and the Office of the General Counsel for review of the issues involved and a determination as to whether enforcement action is warranted. Investigations that substantiate criminal violations concerning NRC licensees and others within the NRC's regulatory jurisdiction are referred to the U.S. Department of Justice. In FY 2000 the NRC anticipates investigating an inventory of approximately 265-285 cases and that 175-195 reactor cases will be closed. In addition to

managing its own caseload, the NRC works closely with other investigative agencies and organizations to ensure the timely exchange of information of mutual interest.

Reactor and Plant Performance Research

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Technical bases for safety and regulatory guidance and decisionmaking.	Issue 23 research products that respond to high- and medium-priority needs from the Commission and NRC's licensing organizations. Develop, maintain, or improve 6 engineering codes/models for use by RES and licensing organizations for regulatory analyses/decisionmaking. Key improvements include the consolidation of codes to reduce maintenance costs and the development of a Graphical User Interface to increase user productivity.	Issue 24 research products that respond to high- and medium-priority needs from the Commission and NRC's licensing organizations. Develop, maintain, or improve 6 engineering codes/models for use by RES and licensing organizations for regulatory analyses/decisionmaking. Key improvements include the consolidation of codes to reduce maintenance costs and the development of a Graphical User Interface to increase user productivity.
Definition: Research products are typically reports containing experimental or analytical results that form the technical basis for regulations, regulatory guides, new methods, the resolution of generic safety issues, and regulatory decisionmaking.		

The NRC conducts reactor and plant performance research to provide an in-depth examination and understanding of operating experience and plant transients experienced by the nuclear industry, including evaluations of overall plant risk; understand and provide a technical basis for acceptance of operator/control-system designs considering effects on human and total systems performance; gain an understanding of ways to prevent and mitigate the consequences of severe core damage or core-melt accidents in nuclear power reactors; and provide support for the development of revised reactor-related regulations, policy statements, and regulatory guides that incorporate research results and lessons learned from operating experience. Also, complex technical issues continue to arise that apply, in common, to large numbers of reactors and nuclear-related facilities. Solutions to such "generic issues" must be developed for the class of applicable reactors or facilities to assure continuing safety, and to determine if the costs of implementation can be justified in comparison to the corresponding benefit. The NRC

conducts numerous programs of cooperative research with both international and domestic organizations.

Thermal-Hydraulics and Reactor Physics--Understanding safety-significant abnormal operations and plant transients experienced by the nuclear industry is an important element in the NRC's continuing efforts to maintain an adequate margin of safety. Analysis of these operating events requires information on the processes of heat transfer and fluid flow (the thermal-hydraulic response) of the reactor coolant system over the range of plant transients and accidents that could occur. These events include design-basis accidents (required to be analyzed in license applications), non-design-basis events such as multiple-system or multiple-component failures, common mode failures, and operator errors that have been revealed through probabilistic risk assessments and operating experience.

Research is being conducted to provide validated methods to evaluate design-basis accidents, the safety implications of actual operating events and hypothetical transient scenarios determined to be major contributors to risk as shown by probabilistic risk assessments and earlier operating events. This work is focused on integrating experimental data and associated calculations into a firm technical basis to support regulatory actions such as modifications to plant technical specifications, reviews of accident management plans, or remedial actions in response to operating events. The principal products of this research are analytical tools (computer codes) used to understand and predict the plant response to deviations from normal operating conditions. The capability of the computer codes to predict plant response with an acceptable uncertainty is improved by validating the codes using (1) basic experiments to derive empirical formulas for determining coolant system behavior under postulated transients; (2) separate-effect experiments to evaluate the code predictions for a single, complex component; and (3) integral system experiments to evaluate the code predictions for a complete reactor system.

The use of complex computer codes is a major part of the NRC's independent capability for analyzing technical information pertaining to reactor safety. This ability is provided by a group of computer codes that model thermal-hydraulic and reactor physics phenomena that occur in reactor systems.

To maintain a high level of expertise in thermal-hydraulics and reactor safety, it is essential for the NRC to continuously improve its capability to analyze plant transients, and maintain key researchers in the areas of reactor safety codes, two-phase flow, and reactor physics. These improvements are necessary because the NRC's plant transient thermal-hydraulics codes were initially developed in the 1970s for main frame computers and were focused on large break loss-of-coolant accident (LOCA). Over the past 20 years, these codes have grown to

codes with more complex physics and an almost impenetrable, inconsistent, nonmodular, nonstandard, and nonportable database. Maintaining and running the existing codes is labor intensive and has consequently required many skilled people at four different contractors with little opportunity to consolidate the available talent base. Although these codes have provided useful analyses, they are becoming obsolete and are difficult to use and maintain; they are not robust, and they do not employ the latest technology in two-phase flow, numerical methods, and code architecture. Furthermore, maintaining several codes that embody many of the same characteristics and diverge only on a few models designed to address specific safety issues is not cost effective. The current advances in software engineering, data distribution, expert systems and graphical user interfaces, machine intelligence, and knowledge of thermal-hydraulic phenomena enable us to consolidate the NRC transient analysis capabilities into a single code without adversely impacting the existing capabilities.

Over the past 20 years, applications were made and incidents occurred with regularity in operating plants that required an independent analysis by the NRC. It was common that these events challenged the existing thermal hydraulic (T/H) codes beyond their design capabilities and the NRC was forced to use these codes outside their original design objectives and performed ad hoc improvements and developments to meet the "new" analysis requirements. The current suite of NRC T/H codes cannot handle some of the important issues that the agency is presently facing or will be facing in the near future, e.g., support for power rate increase, use of mixed-oxide (MOX) fuel. Without an improved capability, the NRC may, in some cases, either have to accept an applicant's submittal without performing its own independent evaluation, apply conservative factors to compensate for our lack of knowledge, request industry to do more research, or deny an applicant's request. The principal objective of the Thermal Hydraulics and Reactor Physics research program is to improve and maintain adequate technical expertise for NRC to independently assess applicant/licensee submittals and to analyze operating events and safety issues. These codes embody much of the NRC's knowledge about thermal hydraulics and reactor physics and are essential to maintaining a strong and effective regulatory program. For the NRC to effectively regulate applicants and licensees, it must remain cognizant of the complex issues associated with plant performance under normal and accident conditions.

Cooperative international research programs (e.g., CAMP) are utilized to best advantage to assist in this effort.

The thermal-hydraulic computer-code effort responds to (1) Commission direction to build and maintain a cadre of thermal-hydraulic experts to assist NRC in carrying on its regulatory function, (2) user need requests from NRR to maintain an assessed version of RELAP5, TRAC-P, and TRAC-B for AP600 and operating plants, and (3) historical trends in uncovering

and correcting code deficiencies. The effort needed to develop an improved state-of-the-art computer code is based upon historical data related to previous efforts related to code development/improvements.

To upgrade NRC's thermal-hydraulic analysis capability and to reduce the cost of maintaining that capability, the multiple codes and research are being consolidated and work is planned as described in the Five Year Thermal-Hydraulic Research Plan. Activities related to the consolidation of the NRC thermal-hydraulic codes are interrelated. Delays in any of these activities will result in expending additional resources to maintain existing codes for a longer period of time at a considerable expense to the NRC.

In FY 2000, the NRC will complete the consolidation efforts to incorporate TRAC-B models and 3-D neutronic capabilities, PARCS, developed by Purdue University into the modernized TRAC-P, which will be renamed TRAC-M.

In FY 2000, the NRC will continue administering the CAMP program.

During FY 2000, the NRC will continue to maintain the RELAP5, the TRAC-B, and the TRAC-P while assessing the consolidated TRAC-M code. The reduced level of effort to maintain these codes reflects the improvements made to them in FY 1998-FY 1999. In FY 2001, the TRAC-M code will replace TRAC-B and TRAC-P, and will include 3D neutronic capability. In FY 2000, the NRC will continue to develop two-phase flow models for computational fluid dynamics codes to model multiphase systems. In addition, efforts will continue to develop and maintain the Graphical User Interface (GUI).

In FY 2000, the NRC will start to assess the modernized/modularized TRAC-P code using AP600 small-break LOCA (SBLOCA) data to identify TRAC-M modeling needs to incorporate the RELAP5 SBLOCA capabilities into the consolidated TRAC code. In FY 2001, these models will be implemented in the consolidated TRAC-M code. In FY 2000-FY 2001, separate and integral test data will be used for the assessment of the consolidated TRAC-M code that incorporated the RELAP5 capabilities.

In FY 2000, experiments will be performed at the integral test facilities at Purdue University, Oregon State University, and the University of Maryland to develop the data needed to assess the consolidated code at the different stages of the consolidation. Approximately eight tests per year will be performed in each facility. Separate effect testing at Purdue University, Oregon State University, and the University of California at Los Angeles will continue data needed to improve the physical modeling in the consolidated code.

Fuel Behavior--The principal objective of the fuel behavior research program is to maintain adequate technical expertise for the NRC to carry out its responsibilities. This includes maintaining an independent analysis capability and supporting development or modification of licensing criteria. To accomplish this, analytical tools must be kept up to date for new fuel designs and operating conditions. Until recently, the NRC fuel performance codes for steady-state (FRAPCON) and transient (FRAPTRAN) analyses did not include models that account for high burnup. Likewise, the NRC criteria for evaluating cladding integrity at high burnup under accident conditions may not be correct. Efforts are underway to update the codes and obtain experimental data to modify the regulatory criteria (mainly through international cooperation). Cooperative international research programs are utilized to best advantage, and work is coordinated with industry groups and DOE when possible.

In FY 2000, the NRC will participate in and evaluate data from the French Cabri test reactor sodium loop and the Japanese Nuclear Safety Research Reactor (NSRR) test programs.

In FY 2000, the NRC will perform tests on high-burnup fuel and cladding at Argonne National Laboratory. Tests will simulate LOCA to allow assessment of current criteria at high burnup, and other tests will measure material properties needed for analysis.

In FY 2000, the NRC will continue to assess fuel performance and update mechanical properties data used in NRC fuel codes.

In FY 2000, the NRC will continue participation in the Halden fuels program to obtain data for code modifications for higher burnups and for MOX fuel.

Advanced Instrumentation and Controls--This work develops the technical basis for regulatory guidelines and criteria to evaluate the qualifications of instrumentation and control (I&C) hardware quality and completeness of software used in safety systems and for the interface between the plant and the human users along with guidelines on the environmental qualification of digital equipment. Utilities are adapting digital I&C technology into nuclear power plants (NPPs) and advanced designs. It is expected that as experience is accrued in NPPs, this trend is likely to continue and could increase. This effort addresses advanced I&C systems being applied to both current and advanced plants and covers hardware qualifications, human-system interfaces, software quality, digital system reliability and total systems considerations. Support for the advanced I&C and human factors aspects of the Organization for Economic Cooperation and Development (OECD) Halden Reactor Project is included. Review guidance will be completed for protection of I&C systems against moisture, high temperature, humidity, radiation, smoke, and lightning, as well as for software quality and the human issues associated with display navigation.

In FY 2000, the NRC will continue with international cooperative research at the OECD Halden Reactor Project.

In FY 2000, the NRC will continue the development of technical basis for digital system performance and reliability.

In FY 2000, the NRC will continue the development of a regulatory guide to address the threat to advanced I&C in safety critical systems due to lightning, smoke, and other environmental stresses.

In FY 2000, the NRC will continue work on Revision 2, NUREG-0700 for review of digital technology concerning human-system interfaces to address issues not included in Revision 1 (e.g., alarms).

Human Factors and Organizational Performance--Experience has shown that most safety-related events reported at nuclear facilities involve human performance. To reduce human errors, and thereby reduce the risk to the public from the accidental release of radioactive material, the NRC needs to (1) understand the root causes of human error during reactor operations and maintenance and (2) complete technical basis reports in the area of overtime usage. Research results will be used to identify, systematically prioritize, and suggest solutions to human performance issues in the maintenance and operation of nuclear facilities during normal, abnormal, and emergency situations.

In FY 2000, the NRC will publish guidance on credit for operator actions and resolve Generic Issue B-17, *Criteria for Safety-Related Operator Actions,* and publish Regulatory Guide 1.8 on power plant personnel qualification and training.

In FY 2000, the NRC will continue the update to Human Performance Investigation Process, and continue the development of the technical basis on the use of overtime in the nuclear industry.

Severe Accident Risk--Severe accidents represent the largest potential threat to public health and safety as a result of a significant accidental release of radioactive fission products to the environment. NRC efforts are directed toward reducing the risk associated with severe accidents at nuclear power plants by requiring design and operating strategies to prevent or ameliorate their consequences. The NRC accomplishes this by (1) improving fundamental understanding of dominant severe accident phenomena, (2) identifying and evaluating strategies to prevent and/or mitigate the consequences of severe accidents, (3) developing

analytical methods and tools to analyze the consequences and risks associated with severe accidents, and (4) determining whether severe accident research results warrant revisions to NRC regulations or policies. Results of these efforts will be applied in staff implementation of the Commission's severe accident, safety goals, and backfit policies. Development of risk-informed regulation is also a principal beneficiary of severe accident phenomenological and analytical methods expertise.

During FY 2000, the NRC will provide support for maintaining essential skills and facilities for severe accident codes. Code development, assessment and maintenance activities will continue during this period within the minimum level for code support. Other activities will be directed toward supporting efforts in risk-informed regulatory initiatives.

During FY 2000, the NRC will also continue to participate in selected international cooperative programs (PHEBUS, RASPLAV, and FARO/KROTOS) to maintain essential skills and expertise in key phenomenological areas. In addition, a cooperative program on lower head failure at Sandia National Laboratory (SNL) may be concluded. International cooperative research programs are directed toward obtaining improved prototype data for code assessments and to resolving remaining fundamental severe accident safety issues (i.e., in-vessel retention of molten core material and steam explosions).

During FY 2000, the NRC will continue to organize and conduct the Cooperative Severe Accident Research Program (CSARP) with our international partners (15 countries).

In FY 2000, the NRC will complete the OECD RASPLAV program directed toward gaining an understanding of in-vessel natural circulation behavior of a molten core. This understanding is essential to be able to determine under what conditions a molten core can be retained in-vessel.

In FY 2000, the NRC will complete its effort to benchmark the CONTAIN code (currently a detailed best-estimate severe accident containment code) for use as a licensing code to replace the current containment design-basis analysis codes (e.g. CONTEMPT, COMPARE) used by the NRC.

Reactor Probabilistic Risk Analysis--The NRC will continue to undertake a number of activities intended to increase the consideration of risk significance in its decision processes through the effective use of risk-informed technologies such as probabilistic risk assessment (PRA). Research is needed to support the development of guidance and methods to be used by the staff to ensure uniform, comprehensive application of PRA methods in resolving reactor licensing issues and related rulemakings. Guidance also needs to be developed and issued to

the industry regarding methods, data, and information that the NRC will consider acceptable to support actions that utilize PRA analysis. The NRC, in conjunction with industry-sponsored pilot programs, is developing this guidance in the form of regulatory guides and standard review plan sections in specific areas. The NRC, in conjunction with professional organizations, is also developing consensus industry standards on PRA quality.

PRA methods must be improved to support risk-informed regulation. Certain areas have been identified in which large uncertainties remain in the ability to model phenomena and quantify risk, thus leaving critical gaps in the quantification of overall plant risk and the ability to comprehensively apply risk-informed regulation. Research will result in new or improved methods for PRA analysis in the areas of low-power and shutdown accident risk, human reliability risk analysis, fire risk, plant aging risk, and digital instrumentation and control risk. The NRC will evaluate actual risks encountered during the shutdown condition, including consideration of implementation of the maintenance rule while shut down; capitalize on industry and international initiatives, including the Electric Power Research Institute (EPRI) effort in this area; encourage industry to take the lead in coordinating efforts to manage shutdown risk; and provide shutdown risk inputs for Accident Sequence Precursor (ASP) analyses. In addition, to facilitate risk analysis, NRC has developed computer codes (SAPHIRE) to model plant-specific systems and allow analysis of plant changes and sensitivities.

In FY 2000, the NRC will implement standards for PRA.

During FY 2000, the NRC will initiate development of new application-specific regulatory guides or update existing guides in response to industry and program office needs for risk-informed regulation.

The NRC will continue to organize and conduct an international cooperative PRA research program in FY 2000.

During FY 2000, the NRC will continue the development and improvement of human reliability and fire risk analysis methods. These methods will be completed in FY 2001.

During FY 2000, the NRC will continue work on the effect of quality assurance practices on risk estimates and aging risk.

During FY 2000, the NRC will continue to work with the Nuclear Energy Institute on its risk-informed pilot programs assessing risk vs. cost and regulatory requirements.

During FY 2000, the NRC will continue development and expansion of accident sequence precursor models, completing development in FY 2001.

During FY 2000, the NRC will continue the maintenance of SAPHIRE and MACCS and provide technical support to program offices.

During FY 2000, the NRC will initiate work on risk associated with digital I&C and software.

IPE/IPEEE Reviews--The Commission's severe accident policy calls for the examination of accidents initiated by individual plant susceptibilities to (1) severe accidents (i.e., the Individual Plant Examination (IPE) program) and (2) severe external events such as earthquakes (i.e., the IPE External Event Examination (IPEEE) program), as well as the identification and evaluation of potential improvements. The NRC will analyze the information from the review of licensee IPE submittals to determine if regulatory followup actions are appropriate. The NRC will continue reviewing licensee IPEEE reports and collecting and interpreting the supporting data for more general perspectives and use in the agency's risk-informed regulation activities.

The NRC will complete essentially all IPEEE reviews and staff evaluation reports by December 1999 and insights report (draft insights report by March 2000 and final insights report by July 2000), and will conduct a public workshop on IPEEE insights in FY 2000.

Reactor Radiation Dosimetry and Health Effects Research--This work involves developing the technical basis for reactor regulations and standards to minimize the adverse consequences of exposure to ionizing radiation from licensed reactor activities. New methods and models for estimating health risk take into account the age and gender-specific aspects of exposed individuals, are based upon revised radionuclide deposition and distribution biokinetics, and relate mortality and morbidity estimates to U.S. decennial life tables. The need to verify and validate assumptions in these models used to develop biokinetic and dose assessment models is paramount.

The NRC will continue to support international efforts in the area of health effects research, through ongoing studies being coordinated by the Joint Coordinating Committee for Radiation Effects Research and the National Council on Radiation Protection and Measurements (NCRP) as well as the collection and analysis of occupational exposure records as part to the Radiation Exposure Information Reporting System (REIRS) for FY 2000.

In FY 2000, the NRC will provide support for the development of the technical basis for reactor radiation protection related regulations and regulatory guidance, including updates to Part 20.

For FY 2000, the results of international health effects studies will be used to determine whether changes in NRC's radiation protection standards are warranted. The results of these international health effects studies will be used to improve the early recognition of acute radiation syndrome after exposure to radiation and to validate or modify risk assessment models (and parameters used in these models) as contained in NUREG/CR-4214 and NUREG/CR-5351. Revised models will be incorporated into revisions of these reports.

For FY 2000, the recommendations developed by the National Council on Radiation Protection and Measurements (NCRP) will be used by the NRC in the development of updated radiation safety regulations. For FY 2000, the information developed through the OECD Nuclear Energy Agency's Information System on Occupational Exposure (ISOE) will be used by program offices in evaluating ALARA programs.

During FY 2000, the NRC will collect occupational radiation exposure data from licensees through the REIRS program and will provide these data to NRC program offices to evaluate licensees' performance.

For FY 2000, the NRC will support the development of and revision of regulatory guides not accompanying a reactor-related rulemaking action; conduct systematic evaluations of reactor regulations and regulatory guidance to identify generic deficiencies, which, taking into consideration risk and other relevant information, merit correction; conduct program assessments and implement results; and seek input from its internal and external stakeholders, as appropriate in conducting these program assessments.

Generic Safety Issue Resolution--Generic safety issues involve safety concerns that may affect the design, construction, or operation of all, several, or a class of reactors or facilities and may have potential for safety improvements and issuance of new or revised requirements or guidance. As appropriate, resolutions of generic safety issues are transmitted to the industry through issuance of generic letters, information notices, or rule changes. Implementation procedures for resolving generic safety issues are occasionally developed in conjunction with organizations such as the Nuclear Energy Institute and nuclear plant owners groups.

This effort includes codes and standards activities related to OMB circular A-119, "Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities." It also includes prioritization, resolution, and

documentation of generic safety issues for reactor and materials issues for NRC; and, maintenance of the repository for generic safety issue documentation and the agency-wide tracking system, including Generic Issue Management Control System (GIMCS), for reactor and materials issues for NRC. Reactor-based generic safety issues continue to be identified at the rate of about two each year. Resources necessary for disposition of any single generic issue vary widely, depending on the availability of background data for evaluation of incident frequency and estimated consequences, inherent risk, possible remedial measures, and cost to NRC and industry for implementation. The newness of the materials issues will present additional uncertainty relative to their prioritization and tracking. A reasonable, historically based cost estimate for prioritization and resolution of a generic issue is in the $200,000 to $300,000 range per year, and can continue for two to three years, depending on the complexity of the issue and the factors noted above. Task order contracts are used for detailed event analysis, risk analysis, and cost-benefit studies; resolution and closeout packages are always developed by the staff.

In FY 2000, in order to reduce the backlog of unprioritized/unresolved generic safety issues (GSIs), the NRC will prioritize one new GSI per year; reprioritize, using updated information, one to two GSIs per year, which were previously prioritized as LOW or DROP; resolve one to two GSIs per year and continue tracking of GSIs through the GIMCS and NUREG-0933 (which presents a methodology to evaluate issues based upon risk).

In FY 2000, the NRC will continue participation in American Society of Mechanical Engineers (ASME) Code or standards writing activities, including membership on two committees of Section III of the ASME Boiler and Pressure Vessel Code, support to Section III and Main Boiler and Pressure Vessel meetings, membership on four committees under the ASME Operation and Maintenance committee and support to the NRC Operation and Maintenance Committee member at Operation and Maintenance Main committee meetings, membership on one committee under the Nuclear Quality Assurance Committee. As a part of its participation, to the extent possible within the context of its specific committee activity, the NRC will identify specific areas where revisions to Section III of the ASME Boiler and Pressure Vessel Code, Operation and Maintenance Code or NQA-1 could be used to provide new, or replace or supplement, regulatory requirements or guidelines and assure the related NRC position is reflected in any input provided to committees relative to the preparation or voting action on scope/need statements for identified code or standard revisions.

In FY 2000, the NRC will implement a plan that is responsive to OMB Circular A-119 and directed toward the effective, efficient, and consistent use of industry codes, standards, and guides important to safety, including stakeholder meetings to discuss improvement in the process for endorsing codes and standards, and potential areas for development of codes and

standards or industry guides. This plan will (1) streamline and simplify the NRC's internal process for endorsing codes and standards; (2) make appropriate use of all available codes, standards, and guides; and (3) identify areas in which new codes, standards, or guides are needed. In FY 1999 preparatory work, the NRC will review other relevant Federal agency practices, will continue high-level NRC liaison with standards-developing organizations, and will develop the plan.

Technical Information Exchange--This effort consists of two primary components: support provided to the Radiation Safety Information Computational Center (RSICC) at the Oak Ridge National Laboratory (ORNL) and conducting the annual NRC-sponsored Water Reactor Safety Information Meeting. RSICC, a specialized information analysis center authorized to collect, analyze, maintain, and distribute computer software and data sets in the areas of radiation transport and safety, serves as a repository for computer software sponsored by the NRC. The Center also publishes documents announcing the energy-related codes and maintains foreign information exchange arrangements that assist in making NRC's codes available to the public here and abroad. The Water Reactor Safety Information Meeting is a world-class research meeting that showcases domestic and international water reactor research results. Between 300 and 400 people attend annually from domestic and foreign organizations. Research papers are presented highlighting current topics of interest.

In FY 2000, the RSICC will manage and control the dissemination of software and data compilations developed under NRC sponsorship. RSICC will store and archive the software, disseminate the software in accordance with NRC guidelines, and serve as a software information center to support NRC offices, NRC contractors, and the public.

In FY 2000, the NRC will hold its annual Water Reactor Safety Information Meeting to share research results, and their safety/regulatory significance, among the worldwide research community and with representatives from industry and the general public.

In FY 2000, the NRC will continue its technical lecture series to broaden the technical staff's perspectives and to stimulate thought through exposure to new and innovative technical approaches or analyses.

NUCLEAR REACTOR SAFETY

Reactor Materials and Component Behavior Research

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Technical bases for safety and regulatory guidance and decisionmaking.	Issue 16 research products that respond to high- and medium-priority needs from the Commission and NRC's licensing organizations. Develop, maintain, or improve 2 engineering codes/models for use by RES and licensing organizations for regulatory analyses/decisionmaking.	Issue 16 research products that respond to high- and medium-priority needs from the Commission and NRC's licensing organizations. Develop, maintain, or improve 2 engineering codes/models for use by RES and licensing organizations for regulatory analyses/decisionmaking.
Definition: Research products are typically reports containing experimental or analytical results that form the technical basis for regulations, regulatory guides, new methods, the resolution of generic safety issues, and regulatory decisionmaking.		

The integrity of key passive and active components in a nuclear reactor system must be maintained to ensure that control rods can be inserted to shut down the chain reaction, that there is no blockage of the coolant flow needed to remove heat and ensure no fuel damage, and to maintain adequate levels of cooling water in the reactor. Aging affects virtually all active and passive components in a nuclear reactor system. It stems from exposure to reactor operating temperatures, irradiation environments, the water coolant (both primary and secondary systems), cyclic operation (fatigue), and general wear. However, the specific aging-related degradation mechanisms of components can be difficult to identify, and their effects may be difficult to quantify. Thus, research is needed to provide the data and analysis tools necessary to identify, quantify, and regulate the effects of aging in operating nuclear power plants as well as provide a sound technical basis for making license renewal decisions.

To ensure the public health and safety, the structures, systems, and components of nuclear power plants are designed and sited to withstand operational and accidental loads, including both internally initiated loads and loads imposed by severe external phenomena such as earthquakes, high winds, and floods. This program deals with the assessment of adequate safety margins for existing facilities by evaluating the effectiveness of inspection procedures and by evaluating the effects of degradation on margins. The program also addresses needs for development/improvement of regulatory acceptance criteria for site and design suitability. The assessment of the safety implications of siting and aging will be used as the basis for

ensuring continued safe operation and making decisions on extending reactor operation beyond the original license period of 40 years. The NRC Reactor Materials and Components Behavior research program is focused on seven areas: (1) reactor vessel integrity, (2) environmentally assisted cracking, (3) nondestructive examination procedures and techniques, (4) steam generator integrity, (5) mechanical/electrical components and piping, (6) containment integrity and structural aging, and (7) structural and civil engineering.

Reactor Vessel Integrity--The reactor pressure vessel is susceptible to several forms of degradation; reactor irradiation embrittlement is the most important. Since issues of reactor pressure vessel embrittlement can effectively limit the useful life of a nuclear power plant, the variability in chemistry and mechanical properties of reactor pressure vessel materials is being evaluated and methods for mitigating the embrittlement have been sought. The research involves experimental and analytical efforts addressing embrittlement, thermal annealing, and reactor pressure vessel integrity evaluation methods. The research includes strong emphasis on understanding the controlling factors so that empirical databases can be confidently employed to evaluate plant-specific conditions, and on experimental validation of the analysis methods and predictive models. Research will provide improved and more reliable methods for assessing irradiation effects on reactor pressure vessel steels and fracture behavior of embrittled reactor pressure vessel materials. This information is required to ensure reactor pressure vessel integrity, establish appropriate margins for integrity assessments, and assess proposed revisions to plant operating limits.

During FY 2000, the NRC will perform statistical and mechanistic analyses of plant embrittlement data, and complete the technical basis for a revision to Regulatory Guide 1.99. Issues to be addressed include variability in elemental constituents such as copper, nickel, and phosphorus, mechanistic synergisms in high-copper/high-nickel materials, and treatment of surveillance data.

In FY 2000, the NRC will develop and complete the technical basis for a revision to 10 CFR Part 50.61 (fracture toughness requirements for protection against pressurized thermal shock events) and will develop and complete the technical basis for determination of the need for a revision to Regulatory Guide 1.154, "Format and Content of Plant-Specific Pressurized Thermal Shock Safety Analysis Reports for Pressurized Water Reactors". These efforts will involve application of state-of-the-art advances in fracture mechanics and finite element modeling. During FY 2000, the NRC will put the new regulatory guide on neutron dosimetry and transport calculations in final form.

During FY 2000, university expertise to evaluate the mechanisms of reactor pressure vessel embrittlement due to neutron irradiation will be used; during the same period, the NRC will

participate in codes and standards (American Society of Mechanical Engineers (ASME) and American Society for Testing and Materials (ASTM)) activities related to fracture mechanics, flaw evaluation, and component integrity; and will continue international cooperative activities on reactor vessel integrity including participation in the network on evaluation of steel components (NESC) large-scale-test evaluations, International Atomic Energy Agency (IAEA) specialists meetings, and the Committee for Safety of Nuclear Installations international comparative assessment studies.

Environmentally Assisted Cracking--As reactors age and reactor components approach their end of life, environmentally assisted cracking (e.g., effects of water coolant, temperature, irradiation level, etc.) continues to be a problem in components critical to safety. This research will provide independent data and analysis tools to support regulatory evaluations of cracking and environmentally assisted degradation in operating reactors, and to support evaluations of license renewal applications. The work will specifically address cracking and other forms of environmentally assisted degradation in primary pressure boundary materials, reactor internals, and other piping and pressure retaining components. The work performed under this effort has previously been focused on boiling water reactors (BWRs) due to the presence of a more aggressive electrochemical environment. However, as plants continue to age and vessels and internals accumulate more radiation damage, environmentally assisted degradation is expected to become a more significant issue for pressurized water reactors (PWRs).

In FY 2000, the NRC will continue the assessment of crack growth models of degraded reactor components including the development of test data to validate the models, and in FY 2001, will complete and publish a comprehensive evaluation of the model(s) for predicting crack growth in typical reactor materials.

In FY 2000, the NRC will continue the evaluation of materials and components obtained from operating plants to validate models and will complete the evaluation in FY 2001.

During FY 2000, the NRC will participate in codes and standards activities related to environmental degradation, qualification and quantification of crack initiation and growth, and repair/mitigation, and will continue international cooperative activity on environmentally assisted cracking to include evaluation of inspection intervals, crack initiation and growth, and repair and mitigation strategies.

In FY 2000, the NRC will continue the testing of test reactor irradiated materials at typical PWR fluences.

Non-destructive Examination Procedures and Techniques--NRC regulations require licensees to perform inservice inspections (ISIs) of specific components during the plant lifetime. The NRC needs to ensure that significant flaws in important components are characterized so as to be able to independently evaluate the effectiveness of existing licensee ISI programs. Research will be conducted to evaluate the reliability and accuracy of existing ISI programs for detecting and sizing flaws in components; assess techniques for inspecting difficult inspection areas; assess the implementation of risk-ranking concepts in the development of ISI programs; evaluate improvements in ISI programs; assess methods for incorporating the results of ISI of working vessels into a general methodology to predict flaw size and density distribution for use in pressurized thermal shock analysis; and provide technical support and consultation on general ISI issues. As a part of the NRC's policy on risk-informed regulation, activities are underway to review risk-informed inservice inspection of piping and components at selected pilot plants. The results of this work will contribute to evaluations of the structural integrity of operating reactor components, and programs to manage aging degradation during renewal periods.

In FY 2000, the NRC will publish an interim update and, in FY 2001, publish a final update to flaw distributions for use in probabilistic fracture evaluations for reactor pressure vessel welds.

In FY 2000, the NRC will continue to evaluate pressure vessel weld samples for validation of non-destructive examination (NDE) reliability and effectiveness, and in FY 2001, will document the results with respect to NDE reliability and efficiency.

In FY 2000, the NRC will continue an international cooperative agreement on NDE effectiveness and reliability.

Steam Generator Integrity--The tubing inside pressurized-water reactor steam generators constitutes more than 50 percent of the primary pressure boundary surface and is an important barrier to the release of fission products to the environment. Steam generator tubing has been susceptible to several types of degradation that have changed over time. Denting and wastage were prevalent in the 1970s, but stress corrosion cracking and intergranular attack are the dominant forms today. The continuing evolution in types of degradation, and its severity, has created a situation in which the models used to predict tube integrity are not always appropriate for current applications. Further, the degradation is difficult to detect and characterize (e.g., to determine its depth and length) even using state-of-the-art inspection techniques. The NRC is developing performance-based regulatory guidance for use when assessing the integrity of steam generator tubes. This regulatory guidance is intended to permit licensees to develop and implement programs that can address plant-specific

degradation as it evolves. However, research is needed to support implementation of certain aspects of the regulatory guide. Research will provide independent data, methods, predictive models, and criteria to evaluate licensee programs designed to meet the performance criteria of the guide. The research will address any new forms of steam generator tube degradation that may develop, inspection capabilities, degradation processes, leak and rupture analysis methods, metallurgical assessments, and pressure tests of service-degraded tubes. The research is designed to support regulatory evaluations of steam generator tube degradation, both for operating plants and for license renewal considerations.

In FY 2000, the NRC will complete the validation of advanced eddy current and other NDE methods and imaging procedures for inservice inspection of steam generator tubes.

During FY 2000, the NRC will participate in codes and standards activities related to steam generator tube degradation, inspection and assessment of structural integrity (ASME and ASTM); and will continue international cooperation on steam generator tube integrity, including characterization of degradation modes, evaluation of NDE effectiveness, and structural integrity testing and analysis.

In FY 2000, the NRC will initiate development of an integrated, mechanistically based model for predicting failure, rupture, and total leak rate from inservice inspection results of a given generator under normal operating, accident, and severe accident loadings that build on results from the other tasks.

Mechanical/Electrical Components and Piping--As plants age, the integrity and reliability of electrical and mechanical components and piping can be challenged by age-related degradation. The NRC needs techniques and data to provide an independent basis for evaluating emerging issues and licensee programs for addressing those issues. This research will involve experimental and analytical assessments of the effects of aging degradation on mechanical components (pumps and valves), electrical cable systems, and piping. The research on mechanical components will be applicable in assessments of operating plant issues, such as changes to inservice test intervals and the use of condition monitoring equipment in determining component integrity, to the evaluation of license renewal applications and advanced designs, and to the long-term confirmation of regulatory decisions made regarding license renewal. The research on cable systems will be applicable to continued demonstration of environmental qualification during the current license term, assessments of the effectiveness of condition monitoring techniques in demonstrating loss-of-coolant accident (LOCA) survivability, and renewed license considerations. The research on piping will provide the technical basis for regulatory guidance on implementing leak-before-break concepts for operating plants and advanced designs, particularly for relatively small-diameter piping.

In FY 2000, the NRC will complete research to develop the technical basis for development of a revised leak-before-break methodology for piping.

In FY 2000, the NRC will complete the corrosion testing of Stellite valve facing material and publish a final report describing the potential impact on the operation of safety-related motor-operated valves.

During FY 2000, the NRC will participate in ASME codes and standards activities related to mechanical components and material properties, and Institute of Electrical and Electronics Engineers (IEEE) standards activities related to electrical components; and will complete the review of standards and publish regulatory guides endorsing ASME code cases and selected IEEE standards.

In FY 2000, the NRC will complete confirmatory research on the methods used by licensees to demonstrate compliance with EQ requirements in power uprate submittals.

In FY 2000, the NRC will complete the LOCA testing and condition monitoring measurements of low-voltage I&C cables.

In FY 2000, the NRC will continue to assess the effects of aging on the environmental qualification of electrical power cables and penetrations.

Containment Integrity and Structural Aging--For beyond-design-basis accidents, the failure modes and associated failure loads for containment structures have not been fully validated. Also, experience and research results suggest that corrosion effects may significantly degrade the margin that containments have to accommodate design-basis accidents and beyond. Research on failure modes for current containment types will provide the bases for evaluating both the performance of containments in accidents beyond the design basis and evaluating the impact of containment degradation on the capability to withstand design-basis loads. Further, the NRC initiative to develop a risk-informed perspective for regulation requires more realistic estimates of containment capacity than those that were used for the design of the first generation of containments. For purposes of design, it was sufficient to have a high degree of assurance that a containment could sustain the loads associated with what were felt to be limiting accident scenarios. A joint research program, in cooperation with the Ministry of International Trade and Industry (MITI) of Japan, involving the testing to failure of large models of steel and concrete containments, will be completed in FY 2000.

Experience has shown that corrosion effects that have the potential to reduce containment capacity occur in both steel and steel-lined concrete containments. Currently, research is concentrating on the use of analytical models of containment behavior to predict the effects of corrosion on containments and the amount of corrosion required at a given location to reduce the capacity. Experimental efforts to validate these predictive analytical models will begin in FY 2000.

In FY 2000, the NRC will perform the test to failure of the 1/4-scale prestressed concrete model and begin the post-test comparison of predictions and observations.

During FY 2000, the NRC will participate in codes and standards (ASME Section III and XI and ACI) activities.

In FY 2000, a report presenting the results of experimental validation of candidate methods for inspection of inaccessible portions of the containment pressure boundary will be finalized. A draft report summarizing information on candidate techniques for inspection of thick, heavily reinforced, concrete sections will be completed and circulated for peer and staff review. The sensitivity analysis on dominant risk contributors of steel containments and the steel liners of concrete containments will be completed. A final report on the risk analyses for containment failure and insights that can be drawn from them will be completed and reviewed by peers.

Structural and Civil Engineering--Research in this area covers broad disciplines of structural and civil engineering and earth science (seismology, geology, meteorology, etc.). The focus of the research is on the response of structures and components to internal and external loading and the determination of site suitability and loading resulting from natural hazards such as earthquakes, high winds, and floods. The NRC will continue to obtain data to evaluate the performance of structures, systems, and components when subjected to design basis, severe operational and accident loads, and natural hazards. Results of this research are needed for modification, repair, evaluation, design, and siting of power reactor facilities (results of this research are also applied to nonpower reactor facilities). As new information and research results become available, issues pertaining to the adequacy of the design basis and plant capacity will continue to be raised. The past and current examples include (1) the discovery of new faults near plant sites, (2) the much-larger-than-considered velocities and displacements associated with near-field seismic events, (3) inspection of damage caused by hurricanes, which emphasized the need to consider the interaction of safety-related and non-safety-related systems, and (4) new NOAA models that predict storm surge floods in excess of the flood levels used in design. One of the significant activities in this program deals with interface and coordination with the codes and standards such as Sections III and XI of ASME Boiler and

Pressure Vessel code, American Concrete Institute codes, and American Nuclear Society standards dealing with external hazards.

The data from this research will be used to help ensure the safety of nuclear power plants and nonpower facilities by enabling the NRC to (1) evaluate calculational methods used in analysis, (2) assess actual performance of structures, systems, and components in past external events, (3) validate design codes and probabilistic risk assessment (severe accident) techniques, (4) incorporate new events into the existing earthquake database to update hazard estimates, as necessary by the NRC staff, (5) confirm the assumptions made in the earlier licensing decisions, and (6) develop design basis for nonpower reactor sites. These data have enabled the NRC to (1) publish new earthquake engineering and seismic and geologic siting criteria, (2) develop positions and guidance for external event evaluations at operating nuclear power plants to identify severe accident vulnerabilities, and (3) publish lessons learned from recent hurricanes.

In FY 1999, the NRC will publish reports that will provide the technical basis for revision of Regulatory Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants." The items considered include the differences in spectral shape for rock vs. soil sites, the frequency content of central and eastern U.S. and western U.S. ground motion, and the effects that near-field and distant epicentral locations have on plant response. The development of the staff technical positions addressing the aforementioned items (rock vs. soil, etc.) will be initiated in FY 1999 and completed in FY 2000. In FY 2001, Draft Revision 2 to Regulatory Guide 1.60 will be published for public comment.

During FY 2000, the NRC will participate in codes and standards (ASME Sections IIIC and XI, ACI, ASCE, and ANS) activities and, during the same period, will coordinate with the national Earthquake Hazards Reduction Program in the areas such as strong seismic ground motion, earthquake recurrence, and seismicity.

In FY 2000, the NRC will complete the pre-test and post-test evaluations of 1/10-scale model tests of a reinforced-concrete containment. In this program, the Nuclear Power Engineering Corporation (NUPEC) of Japan will conduct seismic structural and functional integrity tests of the reinforced concrete containment model at Tadotsu Engineering Laboratory. The NRC is conducting analytical investigations to validate and understand limitations of current analysis methods and to draw more robust insights for risk assessment modeling.

In FY 2000, the NRC will publish for public comment a draft revision of the regulatory guide on modal combinations; the final guide, incorporating public comment, will be published in FY 2001.

In FY 1999, the NRC will complete a trial application of probabilistic risk assessment (PRA) methodology for BWR jet pumps to calculate the change in core damage frequency (CDF) caused by intergranual stress corrosion cracking (IGSCC) under accident-loading conditions. In FY 2000, the NRC will complete extending this methodology to all major BWR vessel internal components that can be degraded by IGSCC. In FY 2001, the program will be completed with a final report on recommendations on application of the methodology and overall assessment of the potential consequences and risks associated with failures of BWR reactor vessel internal components caused by IGSCC.

In FY 2000, the NRC will continue the evaluation of an International Standard Problem on Soil Structure Interaction Analysis to be sponsored by the Committee for Safety of Nuclear Installations /Nuclear Energy Association PWG-3 Subgroup on Seismic Behavior.

Reactor Legal Advice

The *Office of the General Counsel* (OGC) provides legal advice and assistance to the NRC Staff and the Commission with respect to all matters related to nuclear reactor safety and research and the environmental impacts of nuclear reactor operation. This includes review of proposed licensing actions (such as those associated with initial licensing and subsequent license amendments, the adoption of improved technical specifications, license renewal, license transfer, and advanced reactor activities), enforcement actions, conduct of investigations, promulgation of NRC regulations and regulatory guides, responses to petitions for rulemaking and regulatory interpretations. The OGC represents the NRC staff in administrative adjudications arising from proposed reactor licensing and enforcement actions; represents the Commission in lawsuits arising from adjudicatory and rulemaking decisions relating to reactors; provides legal advice and assistance with respect to all matters related to reactor research programs, including contractual advice; and provides legal analyses of regulations, statutes, and cases relevant to NRC activities.

Reactor Adjudication

The *Atomic Safety and Licensing Board Panel* (ASLBP), a statutorily authorized office of the NRC, conducts hearings as independent adjudicatory tribunals, usually at or near the site where the dispute arose. ASLBP judges hear and decide hearing petitions by intervenors and licensees concerning public health, safety, and environmental issues arising out of the grant, suspension, revocation, amendment, or renewal of licenses to operate and decommission nuclear power plants. In its 1998 statement on the Policy on Conduct of Adjudicatory Proceedings, the Commission reiterated its longstanding commitment to the expeditious completion of adjudicatory proceedings while still ensuring that hearings are fair and produce

an adequate record for decision. The Commission directed its hearing boards and presiding officers to continue to employ measures and techniques to reduce the time for completing licensing and other proceedings.

NUCLEAR MATERIALS SAFETY

STRATEGIC GOAL

Prevent radiation-related deaths and illnesses, protect the environment, and safeguard special nuclear material and facilities in the civilian use of source, byproduct, and special nuclear materials.

DESCRIPTION OF STRATEGIC ARENA

The Nuclear Materials Safety strategic arena encompasses NRC efforts to ensure that NRC-regulation aspects of nuclear fuel cycle facilities and nuclear materials activities are handled in a manner that provides adequate protection of public health and safety. The Nuclear Materials Safety arena encompasses more than 20,000 specific and 100,000 general licensees that are regulated by the NRC and 30 Agreement States.[10] This arena covers a wide range of nuclear material uses ranging from very low-risk smoke detectors to potentially high-risk irradiators, chemical processing of special nuclear material, and storage and transportation of spent nuclear reactor fuel. This arena also includes all regulatory activities carried out by the NRC and the Agreement States to ensure that nuclear materials and facilities are used in a manner that protects public health and safety and the environment, and protects against radiological sabotage and theft or diversion of special nuclear materials. The Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, as amended, provide the foundation for regulating the Nation's civilian uses of nuclear materials.

The scope of regulatory activities carried out under this arena includes regulation and guidance development; nuclear materials research; licensing/certification, inspection, and enforcement activities; identification and resolution of safety and safeguard issues; certification of spent fuel storage casks and transportation packages; operating experience evaluation; incident investigation; threat assessment; emergency response; technical training; and investigation of alleged wrongdoing by licensees, applicants, certificate holders, contractors and vendors. This arena also provides regulatory assistance to the Department of Energy (DOE).

These efforts are conducted primarily by the Office of Nuclear Material Safety and Safeguards, the Office of Nuclear Regulatory Research and the Office for Analysis and Evaluation of Operational Data with the assistance and coordination of the NRC Office of Nuclear Reactor

[10] Under Section 274 of the Atomic Energy Act of 1954, as amended, a State may assume and the NRC discontinue regulatory jurisdiction for certain uses of byproduct, source, and limited quantities of special nuclear materials within the State. The assumption in authority is accomplished through an agreement with the State upon an NRC finding that the State's program is adequate to protect public health and safety, and is compatible with the NRC regulatory program.

Regulation, Office of Enforcement, Office of Investigations, Office of State Programs, Office of Administration, Office of the Chief Information Officer, Office of the General Counsel, and Atomic Safety and Licensing Board Panel.

The Nuclear Materials Safety strategic arena comprises the following 13 programs: Fuel Facilities Licensing and Inspection; Spent Fuel Storage and Transportation Licensing and Inspection; Nuclear Materials Users Licensing and Inspection; State Programs; Materials Research; Materials Incident Response; Materials Operational Experience Evaluation; Materials Technical Training; Materials Enforcement Actions; Materials Investigations; Materials Legal Advice, Materials Adjudication; and Regulation of the Department of Energy. The contract support funds are allocated for work done by DOE contractors, commercial contractors, small business entities, nonprofit organizations (e.g., universities and foundations), and grantees.

MEASURING RESULTS -- PERFORMANCE GOALS

The NRC has established the following performance goals for measuring results in achieving its nuclear materials safety strategic goal to prevent radiation-related deaths and illnesses; protect the environment; and safeguard special nuclear material and facilities in the civilian use of source, byproduct, and special nuclear materials. In developing these goals, a careful review and analysis of existing performance data were performed. Although targets for performance were not established until FY 1998, FY 1997 performance, where available, is provided. FY 1998 performance, where available, is also provided. These data provide a firm baseline for the development of future performance targets and the assessment of performance.

1. **Zero radiation-related deaths resulting from civilian use of source, byproduct, and special nuclear materials.**

   This goal pertains to non-reactor uses of nuclear materials. This measure addresses actual deaths resulting from acute radiation exposure, not statistical deaths. The performance indicator is the number of radiation-related deaths per year. The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)

The FY 2000 target is zero. The FY 1999 target is zero.
FY 1998 Performance: Zero radiation deaths due to civilian use of source, by product, and special nuclear materials were identified in FY 1998.
FY 1997 Performance: Zero radiation deaths due to civilian use of source, byproduct, and special nuclear materials were identified in FY 1997.

2. **No increase in the number of significant radiation exposures resulting from loss or use of source, byproduct, and special nuclear materials.**

The performance indicator is the number of radiation exposures (excluding those to patients caused by medical misadministrations) per year at or above the level for reporting abnormal occurrences to Congress. (See Appendix I, Item I.A.) The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)

The **FY 2000 target** is that the combined five-year average for the NRC and Agreement States (FY 1996-FY 2000) will not exceed two per year. The **FY 1999 target** is that the combined five-year average for the NRC and Agreement States (FY 1995-FY 1999) will not exceed two per year.

FY 1998 Performance: Preliminary data indicate that the combined five-year average for the NRC and Agreements States for FY 1998 is **1.6** per year.

FY 1997 Performance: The combined five-year average for the NRC and Agreement States for FY 1997 is **1.8** per year.

Significant Radiation Exposures Resulting from Loss or Use of Source, Byproduct, and Special Nuclear Materials

	YEAR					Total	5-Year Average
	1994	1995	1996	1997	1998		
NRC	0	1	0	1	1	3	0.6
Agreement States	2	1	0	2	0	5	1.0

2.a. **No increase in the number of losses of licensed material as reported to Congress annually.**

The performance indicator is the number of losses of licensed material annually which meet the NRC criteria for reporting abnormal occurrences to Congress. (See Appendix I, Item I.C.1.) The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)

The **FY 2000 target** is that the combined five-year average for the NRC and Agreement States (FY 1996-FY 2000) will not exceed **two** per year. The **FY 1999 target** is that the combined five- year average for the NRC and Agreement States (FY 1995-FY 1999) will not exceed **two** per year.

FY 1998 Performance: Preliminary data indicate that the combined five-year average for the NRC and Agreements States for FY 1998 is **0.6** per year.

FY 1997 Performance: The combined five-year average for the NRC and Agreement States for FY 1997 is 1.2 per year.

Loss of Licensed Material Reported to Congress Annually							
	YEAR					Total	5-Year Average
	1994	1995	1996	1997	1998		
NRC	0	0	0	0	0	0	0.0
Agreement States	1	0	2	0	0	3	0.6

2.b. **No accidental criticality involving licensed material.**

The performance indicator is the number of occurrences of accidental criticality (an inadvertent self-sustaining nuclear chain reaction) annually. (See Appendix I, Item I.D.1.) The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)

The **FY 2000 target** is **zero**. The **FY 1999 target** is **zero**.
FY 1998 Performance: Preliminary data indicate that **zero** incidents of accidental criticality involving licensed material were identified in FY 1998.
FY 1997 Performance: **Zero** incidents of accidental criticality involving licensed material were identified in FY 1997.

2.c. **No increase in the number of misadministration events which cause significant radiation exposures.**

The performance indicator is the number of misadministration events per year that cause radiation exposures at or above the level for reporting abnormal occurrences to Congress. (See Appendix I, Item I.A.) The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)

The **FY 2000 target** is that the combined five-year average for the NRC and Agreement States (FY 1996-FY 2000) will not exceed **six** per year. The **FY 1999 target** is that the combined five-year average for the NRC and Agreement States (FY 1995-FY 1999) will not exceed **six** per year.
FY 1998 Performance: Preliminary data indicate that the combined five-year average for the NRC and Agreements States for FY 1998 is **3.4** per year.
FY 1997 Performance: The combined five-year average for the NRC and Agreement States for FY 1997 is **3.8** per year.

Misadministration Events Which Cause Significant Radiation Exposures							
	YEAR					Total	5-Year Average
	1994	1995	1996	1997	1998		
NRC	4	3	1	1	3	12	2.4
Agreement States	2	0	0	2	1	5	1.0

3. **Zero offsite releases of radioactive material from operating facilities that have the potential to cause an adverse impact on the environment.**

The **performance indicator** is the number of offsite releases annually which meet the NRC criteria for reporting abnormal occurrences to Congress. (See Appendix I, Item I.B.1.) The **data** to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)

The **FY 2000 target** is **zero**. The **FY 1999 target** is **zero**.
FY 1998 Performance: Preliminary data indicate that **zero** offsite releases were identified in FY 1998.
FY 1997 Performance: **Zero** offsite releases were identified in FY 1997.

3.a. **No increase in the number of offsite releases of radioactive material from operating facilities that exceeds the limits specified in 10 CFR Part 20.2203.**

The **performance indicator** is the number of offsite releases per year in excess of 10 CFR Part 20 limits. The **data** to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)

The **FY 2000 target** is that the combined five-year average for the NRC and Agreement States (FY 1996-FY 2000) will not exceed **one** per year; the **FY 1999 target** is that the combined five-year average for the NRC and Agreement States (FY 1995-FY 1999) will not exceed **one** per year.
FY 1998 Performance: The combined five-year average for the NRC and Agreements States for FY 1998 is **0.6** per year.
FY 1997 Performance: The combined five-year average for the NRC and Agreement States for FY 1997 is **0.6** per year.

Offsite Releases of Radioactive Material from Operating Facilities that Exceeds the Limits Specified in 10 CFR Part 20.2203							
	YEAR					Total	5-Year Average
	1994	1995	1996	1997	1998		
NRC	0	0	0	0	0	0	0.0
Agreement States	1	2	0	0	0	3	0.6

4. **No significant accidental releases of radioactive material from the storage or transportation of nuclear material or nuclear waste.**

The **performance indicator** is the number of accidental releases of radioactive material per year that meet the NRC criteria for reporting abnormal occurrences to Congress. (See Appendix I, Items I.B.1 and 2.) The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)

The **FY 2000** target is zero. The **FY 1999 target** is zero.
FY 1998 Performance: Preliminary data indicate that **zero** accidental releases of radioactive material from the storage or transportation of nuclear material or nuclear waste were identified in FY 1998.
FY 1997 Performance: Zero accidental releases of radioactive material from the storage or transportation of nuclear material or nuclear waste were identified in FY 1997.

5. **Zero loss, theft, or diversion of formula quantities of strategic special nuclear material, or unauthorized enrichment of special nuclear material regulated by the NRC.**

This goal is written within the context of the safeguards program which is to prevent theft or diversion of formula quantities of strategic special nuclear material. The **performance indicator** is the number of losses or thefts annually which meet the NRC criteria for reporting abnormal occurrences to Congress. (See Appendix I, Item I.C.1.) The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)

The **FY 2000** target is **zero** thefts or losses. The **FY 1999 target** is **zero** thefts or losses.
FY 1998 Performance: Preliminary data indicate that **zero** incidents of loss or theft or diversion of formula quantities of strategic special nuclear material were identified in FY 1998.
FY 1997 Performance: Zero incidents of loss or theft or diversion of formula quantities of strategic special nuclear material were identified in FY 1997.

5.a.	**No substantiated case of actual or attempted theft or diversion of formula quantities of strategic special nuclear material.** **The performance indicator is the number of substantiated cases of attempted thefts or diversions annually. (See Appendix I, Item I.C.2.) The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)**

The FY 2000 target is zero. The FY 1999 target is zero.
FY 1998 Performance: Preliminary data indicate that **zero** substantiated cases of attempted theft or diversion of formula quantities of strategic special nuclear material were identified in FY 1998.
FY 1997 Performance: Zero substantiated cases of attempted theft or diversion of formula quantities of strategic special nuclear material were identified in FY 1997.

5.b.	**No substantiated breakdown of physical protection or material control and accounting systems (i.e., detection, assessment, access control, containment, or accounting systems) that significantly weakens protection against theft or diversion of formula quantities of strategic special nuclear material.** **The performance indicator is the number of substantiated breakdowns of physical protection or material control annually. (See Appendix I, Item I.C.4.) The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)**

The FY 2000 target is zero. The FY 1999 target is zero.
FY 1998 Performance: Preliminary data indicate that there were **zero** substantiated breakdowns of physical protection or material control involving formula quantities of strategic special nuclear material in FY 1998.
FY 1997 Performance: There were **zero** substantiated breakdowns of physical protection or material control involving formula quantities of strategic special nuclear material in FY 1997.

5.c.	**No substantiated case of unauthorized enrichment of special nuclear material.** **The performance indicator is the number of substantiated cases of unauthorized enrichment of special nuclear material per year. The data to support this indicator are currently collected in the Nuclear Materials Event Database. (See Appendix I.)**

The FY 2000 target is zero. The FY 1999 target is zero.
FY 1998 Performance: Data are not available.
FY 1997 Performance: Data are not available.

5.d.	**No substantiated case of unauthorized disclosure or compromise of classified information concerning security measures for protection of special nuclear material or plant equipment vital to the safety of production or utilization facilities which causes damage to the national security.** The **performance indicator** is the number of substantiated cases per year of unauthorized disclosure or compromise of classified information or documents concerning security measures for protection of special nuclear material or plant equipment vital to the safety of production or utilization facilities which causes identifiable damage to the national security. The **data** to support this indicator are currently reported in accordance with the provisions of 10 CFR Part 95.57, and investigated by the Regional Administrator of the appropriate NRC Regional Office, the NRC Division of Facilities and Security or the cognizant security authority under the National Industrial Security Program.

The **FY 2000 target** is **zero**. The **FY 1999 target** is **zero**.
FY 1998 Performance: There were **zero** substantiated cases of unauthorized disclosure or compromise of classified information in FY 1998.
FY 1997 Performance: There were **zero** substantiated cases of unauthorized disclosure or compromise of classified information in FY 1997.

6.	**Environmental impacts are considered through the National Environmental Policy Act (NEPA) process before regulatory action is taken.** **The performance indicator** is the number of environmental impacts identified and substantiated each year by external sources which were not identified as part of the NRC's NEPA process.

The **FY 2000 target** is zero. The **FY 1999 target** is zero.
FY 1998 Performance: Data for this measure will be reviewed in FY 1998 and will be reported for FY 1999.
FY 1997 Performance: Data are not available.

STRATEGIES

1. The NRC will maintain and further develop the capability to provide timely and independent technical bases for its regulatory decisions.

2. The NRC will maintain and improve the NRC regulatory framework[11] and incrementally use risk-informed and, where appropriate, less prescriptive performance-based approaches.

[11] The regulatory framework is rules and regulations that ensure adequate protection of public health and safety.

3. The NRC will authorize the use and storage of nuclear materials, the operation of fuel cycle facilities, and transportation packages only after the NRC has determined that these proposed activities are consistent with the regulatory framework and the level of risk.

4. The NRC will ensure that licensees understand and carry out their primary responsibility for conducting activities consistent with the regulatory framework.

5. The NRC will work with Agreement States and within NRC to ensure consistent protection of the public health and safety nationwide. We will ensure that Agreement States establish and implement adequate and compatible regulatory programs.

6. The NRC will be prepared to respond to incidents and emergencies involving potential radiological consequences.

7. The NRC will ensure that nuclear materials experience is evaluated, communicated to stakeholders, and used to improve the regulatory framework and its implementation.

8. The NRC will position the NRC to perform regulatory oversight of certain DOE activities.

The following table depicts the relationship of the Nuclear Materials Safety programs to the arena strategies identified above. The required resources are developed based on the programs and functions necessary to implement the strategies. Detailed information on the resources, programs, and their associated output measures is provided in the Nuclear Materials Safety arena of the FY 2000 budget request. FY 1998 baseline data for the FY 1999 and FY 2000 output measure targets is provided, where available.

NUCLEAR MATERIALS SAFETY

FY 2000 NUCLEAR MATERIALS SAFETY ARENA PROGRAM LINK TO ARENA STRATEGIES

LINKS TO ARENA STRATEGIES	STRATEGIES							
FY 2000 PROGRAMS ($63,881K, 464 FTE)	1	2	3	4	5	6	7	8
Fuel Facilities Licensing and Inspection ($14,125K, 100 FTE)			X	X		X		
Spent Fuel Storage & Transportation Licensing and Inspection ($9,824K, 60 FTE)			X	X				
Nuclear Materials Users Licensing and Inspection ($22,361K, 179 FTE)		X	X	X		X	X	
State Programs ($3,989K 36 FTE)					X			
Materials Research ($3,402K, 12 FTE)	X							
Materials Incident Response ($209K, 2 FTE)						X		
Materials Operational Experience Evaluation ($514K, 1 FTE)							X	
Materials Technical Training ($863K, 2 FTE)	X							
Materials Enforcement Actions ($951K, 9 FTE)				X				
Materials Investigations ($1,290K, 11 FTE)				X				
Materials Legal Advice ($1,956K, 18 FTE)		X	X	X				X
Materials Adjudication ($1,147K, 8 FTE)			X					
Regulation of DOE ($3,250K, 26 FTE)								X

BUDGET AUTHORITY BY FUNCTION AND BY PROGRAM
FULL-TIME EQUIVALENT EMPLOYMENT BY PROGRAM

(Dollar amounts in tables represent thousands of dollars ($K). In text, whole dollar amounts are used. Staff numbers represent full-time equivalents (FTEs).)

Total FY 2000 Estimate $63,881,000

Summary	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Function ($K)				
Salaries and Benefits	44,522	44,898	46,684	1,786
Contract Support	14,204	14,221	14,639	418
Travel	2,998	2,589	2,558	-31
Total	61,724	61,708	63,881	2,173
Budget Authority by Program ($K)				
Fuel Facilities Licensing and Inspection	12,550	13,591	14,125	534
Spent Fuel Storage and Transportation Licensing and Inspection	8,175	9,556	9,824	268
Nuclear Materials Users Licensing and Inspection	20,816	21,598	22,361	763
State Programs	3,578	3,802	3,989	187
Materials Research	3,003	2,930	3,402	472
Materials Incident Response	0	195	209	14
Materials Operational Experience Evaluation	212	596	514	-82
Materials Technical Training	744	909	863	-46
Materials Enforcement Actions	875	894	951	57
Materials Investigations	1,439	1,313	1,290	-23
Materials Legal Advice	1,933	1,825	1,956	131
Materials Adjudication	1,399	1,299	1,147	-152
Regulation of the Department of Energy	7,000	3,200	3,250	50
Total	61,724	61,708	63,881	2,173

NUCLEAR MATERIALS SAFETY

Summary	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Full-Time Equivalent Employment by Program				
Fuel Facilities Licensing and Inspection	101	100	100	0
Spent Fuel Storage and Transportation Licensing and Inspection	57	64	60	-4
Nuclear Materials Users Licensing and Inspection	195	185	179	-6
State Programs	35	37	36	-1
Materials Research	16	12	12	0
Materials Incident Response	0	2	2	0
Materials Operational Experience Evaluation	2	1	1	0
Materials Technical Training	2	2	2	0
Materials Enforcement Actions	9	9	9	0
Materials Investigations	13	12	11	-1
Materials Legal Advice	19	18	18	0
Materials Adjudication	11	10	8	-2
Regulation of the Department of Energy	22	27	26	-1
Total	482	479	464	-15

EXPLANATION OF RESOURCE CHANGES BY PROGRAM

Fuel Facilities Licensing and Inspection. The resource increase in FY 2000 results from increased personnel costs (pay raises, within-grade increases, and benefits costs increases) and increased resources to support preparation for and the review of the new Atomic Vapor Laser Isotope Separation (AVLIS) license application. These increases are offset by decreases associated with the completion of the initial recertification of the gaseous diffusion plants in FY 1999.

Spent Fuel Storage and Transportation Licensing and Inspection. Resources increase in FY 2000 to support the update of the Modal Study--a study of spent fuel cask response to severe accident conditions. Staffing decreases in FY 2000 to reflect the anticipated completion of a significant portion of backlogged applications for spent fuel storage and transport cask designs and spent fuel storage facilities, and a reduction in overhead.

Nuclear Materials Users Licensing and Inspection. Resources increase in FY 2000 to support increased personnel costs (pay raises, within-grade increases, and benefits costs increases), and to develop and implement the general license registration program. These increases are offset by decreases that result from completion of the 10 CFR Part 35 rulemaking on the medical use of byproduct material, and a reduction to overhead.

State Programs. Resources increase overall in FY 2000 to reflect increased personnel costs, even though staffing decreases as a result of completion of materials license transfer activities in FY 1999 when Ohio becomes an Agreement State.

Materials Research. The net resource increase in FY 2000 reflects starting research in methods development and demonstration of dry cask storage risk assessment; and an increased effort on developing the technical basis for performance criteria for dry storage casks under seismic loading conditions. These increases are offset by eliminating an evaluation of the role of unusual moderators, and previously unanticipated fissile materials to determine their effect on the potential to develop a critical mass.

Materials Incident Response. There are no significant resource changes.

Materials Operational Experience Evaluation. The resource decrease in FY 2000 reflects a reduction in the level of support for the Nuclear Materials Events Database (NMED).

Materials Technical Training. The resource decrease in FY 2000 reflects the completion of the conversion of most of the fuel cycle curriculum courses to self-study format by the end of FY 1999.

Materials Enforcement Actions. There are no significant resource changes in FY 2000.

Materials Investigations. The resource decreases in FY 1999 and FY 2000 are primarily based upon projected decreases in the materials caseload. The decreases are offset by increased personnel costs (pay raises, within-grade increases, and benefits cost increases).

Materials Legal Advice. The resource increase in FY 2000 is based upon projected increases in personnel costs (pay raises, within-grade increases and benefits cost increases).

Materials Adjudication. The resource decrease in FY 2000 is primarily based upon expected efficiencies in the Atomic Safety and Licensing Board Panel's operations, including use of available technology.

Regulation of the Department of Energy. There are no significant resource changes in FY 2000.

JUSTIFICATION OF PROGRAM REQUESTS

Fuel Facilities Licensing and Inspection

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Timeliness of safety and safeguards inspections. (FY 1998: 100 percent completed on time.)	Complete 90 percent of the core safety and safeguards inspections scheduled in the Fuel Cycle Master Inspection Plan on time.	Complete 90 percent of the core safety and safeguards inspections scheduled in the Fuel Cycle Master Inspection Plan on time.

The NRC licenses and inspects all commercial nuclear fuel facilities involved in the processing and fabrication of uranium ore into reactor fuel as part of the agency's nuclear fuel cycle safety and safeguards mission. Detailed health, safety, safeguards, and environmental licensing reviews and inspections of licensee programs, procedures, operations, and facilities are conducted to ensure and secure safe operations. Each of the approximately 25 fuel facilities must have a license that specifies the materials the licensee may possess, sets restrictions on how the materials may be used, and establishes additional licensee responsibilities (such as worker protection, environmental controls, and financial assurance), as appropriate.

The NRC will complete the review and evaluation of approximately 100 license applications (amendments, renewals, and reviews) for nuclear fuel cycle facilities during FY 2000. To achieve its timeliness goal for safety- and safeguards-related licensing actions in FY 2000, the NRC plans to complete the review of 50 percent of the safety- and safeguards-related licensing actions within 180 days.

The NRC sets basic standards for the conduct of licensed activities at fuel cycle facilities through rulemaking, augmented by regulatory guidance documents that specify acceptable approaches for meeting the standards. In FY 2000, the NRC will continue to upgrade the fuel cycle facility program by evaluating changes to the regulatory base for 10 CFR Part 70 to maintain confidence in the safety at these facilities.

The NRC will work with the International Atomic Energy Agency (IAEA), the European Atomic Energy Community (EURATOM), and other countries on the tracking and reporting of special nuclear materials transfers. The NRC, in conjunction with DOE, will continue to support the operation and maintenance of the Nuclear Materials Management Safeguards System used to track the movement of domestic and foreign special nuclear materials under the safeguards control and special accounting procedures of the U.S. Government and U.S. treaties and obligations. Reports generated by this system are used to confirm material transactions, physical inventories and shipper-receiver difference evaluations in the domestic arena, and to satisfy the terms of U.S./IAEA safeguards agreements and certain bilateral and multi-lateral cooperative international agreements.

Routinely scheduled safety and safeguards inspections of approximately 10 major fuel cycle facilities are conducted each year to provide reasonable assurance that licensees conduct and maintain safe nuclear operations and provide adequate protection of the workers, the public, the environment and the common defense and security. In addition, safeguards inspections ensure that licensees comply with NRC requirements pertaining to the control and accounting of special nuclear materials, the physical protection of special nuclear material to prevent theft or diversion, contingency plans for responding to threat situations, and training of armed response personnel. The NRC's goal is to conduct timely core safety and safeguards inspections at these facilities. The target for FY 2000 is to complete 90 percent of the core safety- and safeguards-related inspections in accordance with the schedules in the Fuel Cycle Master Inspection Plan.

Uranium enrichment is the process used to increase the relative weight percentage of uranium-235 in reactor fuel to make it efficient for use in civilian nuclear power reactors. Enrichment can be accomplished using a number of different technologies including gaseous diffusion, centrifuge, and atomic vapor laser isotope separation. The NRC is responsible for regulating the operational safety and safeguards aspects of enrichment facilities in the United States.

In March 1997, the NRC assumed regulatory oversight of the United States Enrichment Corporation's two gaseous diffusion enrichment plants (located in Paducah, Kentucky and Portsmouth, Ohio). The NRC will conduct the first recertification in FY 1999, in accordance with the United States Enrichment Corporation Privatization Act which requires that the NRC recertify these plants at least once every 5 years, to ensure that they are in compliance with NRC regulations and that the United States Enrichment Corporation's operation of the gaseous diffusion enrichment plants provides adequate protection of public health and safety, the workers, the environment, and the common defense and security. The NRC will continue to issue reports to Congress at the time of recertification on the status and performance of the

plants and indicate whether these plants are operating in compliance with NRC's standards. The NRC also provides security policy and classification guidance support for the protection of National Security Information and Restricted Data for licensing, certifying, or regulating uranium enrichment facilities.

NRC's FY 2000 budget includes resources to review the license application for the United States Enrichment Corporation's Atomic Vapor Laser Isotope Separation (AVLIS). The licensing review of AVLIS present novel and highly complex technical challenges never before considered -- especially in areas of safeguards, nuclear criticality safety, chemical process safety, fire protection and accident analysis.

To verify operational safety and safeguards, and to assess licensee performance, the NRC conducts a program of scheduled safety and safeguards inspections that relies on resident inspectors to provide onsite presence and focus on daily operations, and on headquarters and regional inspectors to provide specialized technical expertise in areas such as radiological and chemical process safety, physical protection, physical security, nuclear criticality safety, material control and accounting, fire protection, training, emergency planning, and management control.

As part of its mission to ensure the protection of public health and safety, the NRC must maintain the ability to ensure that licensed nuclear activities are properly protected against radiological sabotage and theft of special nuclear material or malevolent use of nuclear material. In its continuing effort to evaluate the threat environment, the NRC will assess reported information on potential or actual threats worldwide; adversary characteristics and intentions and capabilities of terrorist groups; and any domestic or foreign events for relevancy to the U.S. domestic nuclear threat environment.

Spent Fuel Storage and Transportation Licensing and Inspection

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Non-spent fuel transport container design review completions. (FY 1998: Completed 96; exceeded target of 71 reviews.)	Complete 95 design reviews.	Complete 95 design reviews.
Spent fuel container and installation design review completions. (FY 1998: Completed 35; exceeded target of 28 reviews.)	Complete 50 design reviews.	Complete 40 design reviews.

Approximately 3 million shipments of radioactive materials are made each year in the United States. Regulating the safety and security of these shipments is a responsibility shared by a number of different Federal agencies including the NRC. To carry out its regulatory responsibilities for spent fuel and non-spent fuel storage and transportation, the NRC certifies transport container package designs, and licenses and inspects interim storage of spent fuel both at and away from reactor sites to ensure that licensees transport nuclear materials in packages that will provide a high degree of safety and that licensees provide safe interim storage of spent reactor fuel. NRC's transportation activities are closely coordinated with those of the Department of Transportation (DOT) and, as appropriate, with the Department of Energy (DOE) and the Federal Emergency Management Agency. NRC's transportation activities also include reviewing transportation plans, performing route approvals and surveys for shipments of nuclear material, and relaying Department of Transportation notifications from licensees and carriers of planned import, export, or domestic shipment of nuclear material.

In the course of its regulatory, licensing, and certification activities during FY 2000, the NRC will complete the review of approximately 95 applications submitted by the Departments of Energy and Transportation and by commercial vendors for non-spent fuel transport container designs and the review of approximately 40 storage and transport cask design and storage facility applications associated with spent fuel (new licenses, topical reports, and license amendments and renewals). Of the 40 spent fuel-related applications, approximately 15 are expected to be for commercial spent fuel transport designs (including 3 dual-purpose

designs); 5 for DOT/DOE spent fuel transport designs; 5 for commercial spent fuel storage designs (including 3 dual-purpose designs); and 15 for interim storage of spent fuel. The NRC is currently reviewing the Private Fuel Storage, Limited Liability Company (PFS) application for an away-from-reactor, independent spent fuel storage installation (ISFSI). PFS's application is for construction and operation of the ISFSI on the Reservation of the Skull Valley Goshute Indians in Toole County, Utah. PFS represents a consortium of eight utilities (21 nuclear power plants). On October 19, 1998, an application from the Pigeon Spur for an away-from-reactor ISFSI in Utah was submitted to the NRC for review and approval.

The industry's spent fuel storage activities require detailed health, safety, and environmental reviews of licensee and vendor procedures and facilities to ensure safe operations. Licensed utilities are responsible for the interim storage of their spent fuel until a Federal repository or centralized interim storage facility is available. All utilities have either installed or are planning to install high-density racks in their existing spent fuel pools. However, even with these modifications, pools are reaching capacity. To provide for "full-core" reserve, many utilities are constructing ISFSIs, which generally consist of a passive storage system using dry cask technology.

The NRC will continue to maintain awareness of any potential delays in DOE's waste disposal program and will closely monitor the DOE system for inventory and forecast of spent fuel and high-level radioactive waste generation to provide early warning of capacity problems and facilitate timely and adequate waste management regulatory action.

In FY 2000, the NRC will continue the review of the Department of Energy's Topical Safety Analysis Report (TSAR) on the Dry Transfer System (DTS). The DTS (essentially a large-shielded transfer cell) gives a nuclear utility or other spent fuel handling facility the ability to perform cask-to-cask transfers of individual spent fuel bundles without the current requirement of first returning the fuel to a conventional spent fuel pool. This ability is necessary, due to engineering restrictions many utilities have that prevent them from directly utilizing the large-capacity transport and/or storage systems either already licensed or under active review by the NRC.

To ensure that staff reviewers are thoroughly prepared to perform their technical reviews, the NRC will issue a final standard review plan on transportation packages for spent nuclear fuel in FY 1999. The NRC will also continue efforts in FY 2000 to revise transportation (10 CFR Part 71) and storage (10 CFR Part 72) regulations. The NRC will continue the update of the Modal Study, "Shipping Container Response to Severe Highway and Railroad Accident Conditions," a study of spent fuel cask response to severe accident conditions, particularly rail-truck accident parameters. This update is needed to reflect changes that have occurred since

the Modal Study was first issued in 1987, including the current family of shipping casks (dual purpose casks used for both storage and transportation), computer modeling advances, and the expected increased emphasis on rail shipments. During FY 2000, the NRC will continue the update of the survey of unclassified radioactive material shipments in the United States. The last survey was published in 1985 using shipment information from 1981 and 1982. The survey estimated that 2.79 million packages, containing approximately 8.97 million curies of radioactive material, were shipped annually (the results do not include spent fuel shipments).

The industry's spent fuel storage activities require inspections of licensee and vendor procedures and facilities to ensure safe operations. In the course of its regulatory and inspection activities during FY 2000, the NRC will complete approximately 35 quality assurance reviews of designers', fabricators' and users' quality assurance programs for the design, fabrication and use of transportation packages. In addition to these activities, the NRC will conduct approximately 20 safety inspections to ensure that safety measures are correctly implemented by licensees, certificate holders, applicants, designers and fabricators of NRC-certified spent fuel storage systems and transport packages. The NRC will also perform on-site inspections of concrete vaults and casks at reactors.

Nuclear Materials Users Licensing and Inspection

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Timeliness of reviews of applications for new materials licenses, license amendments, license renewals, and sealed source and device designs. (FY 1998: Completed 82 percent of reviews [new applications and amendments] within 90 days. Completed 94 percent of renewals and reviews [sealed source and device] within 180 days.)	Complete 80 percent of the reviews for new applications, and amendments, within 90 days. For license renewals and sealed source and device reviews received after October 1, 1997, complete 80 percent of the reviews for license renewals and sealed source and device reviews within 180 days.	Complete 80 percent of the reviews for new applications, and amendments, within 90 days. For license renewals and sealed source and device reviews received after October 1, 1997, complete 80 percent of the reviews for license renewals and sealed source and device reviews within 180 days.
Timeliness of safety inspections of materials licensees. (FY 1998: Less than 1 percent overdue.)	Complete core inspections with less than 10 percent overdue as defined in Inspection Manual Chapter 2800.	Complete core inspections with less than 10 percent overdue as defined in Inspection Manual Chapter 2800.

The NRC licenses and inspects activities related to approximately 5,900 specific licenses for use of nuclear byproduct and other radioactive material. These uses include medical diagnosis and therapy, medical and biological research, academic training and research, industrial gauging and nondestructive testing, production of radiopharmaceuticals, and fabrication of such commercial products as smoke detectors and other sealed sources and devices. Detailed health and safety reviews and inspections of licensee procedures and facilities provide reasonable assurance of safe operations and the development of safe products.

The NRC plans to complete the review of approximately 3,100 applications for new licenses, license amendments, license renewals, and sealed source and device designs for use of radioactive material in FY 2000. It is NRC's goal to complete 80 percent of the reviews for new applications, and amendments within 90 days. For renewals and sealed source and device reviews received after October 1, 1997, the goal is to complete 80 percent of the reviews for license renewals and sealed source and device reviews within 180 days. During FY 2000, the NRC will continue to consolidate into NUREG documents the information presently contained in regulatory guidance documents and technical assistance reports as they relate to the nuclear

material safety program. The NRC expects to realize efficiencies in FY 2000 as a result of guidance consolidation and implementation of the proposed new process for streamlining materials licensing.

The materials inspection program is designed to ensure that licensees are conducting operations in a safe manner and in accordance with procedures and regulations. The NRC will conduct approximately 1,500 routine health and safety inspections and closeout inspections of materials licensees in FY 2000. If conditions are noted that could cause unnecessary exposures or releases, prompt and appropriate enforcement actions are taken. As part of its materials inspection program, NRC conducts both core and non-core inspections. Core inspections encompass (a) all initial inspections (the first inspection after a license is issued to a licensee), and (b) all routine inspections of priority 1, 2, or 3 licensees. Non-core inspections include all other types of materials inspections. The inspection priority assigned to a licensee reflects the frequency of a routine inspection, and is based on the potential radiation hazard of the licensee's programs. The NRC's goal is to complete core inspections of materials licensees to ensure that less than 10 percent are overdue, as defined in NRC's Inspection Manual Chapter 2800. In FY 2000, the NRC will implement the NRC Registration Program to include the necessary features for registering licensees' devices and perform followup activities including onsite inspections with some of the licensees (infrastructure development will began in FY 1998).

The NRC develops regulations and regulatory guidance applicable to materials licensees. During FY 2000, the NRC expects to review 6 to 8 petitions for materials rulemaking, develop and complete 8 to 10 rulemaking actions, and develop OMB clearance packages for 5 to 8 new rulemakings and 12 to 15 OMB Clearance renewals. During this period, the NRC will continue to complete rulemakings in accordance with the timeliness goals and schedules in the semi-annual rulemaking plan. The goal for decisions on the course of action for resolution of rulemaking petitions received after October 1998, is that these will be accomplished within 12 months from the date the notice of receipt of the petition is published in the Federal Register. During FY 2000, the NRC's Regulatory Product Design Center (RPDC), which serves as a testing laboratory for the creation and validation of new systems and new operational methodologies, will continue to support and facilitate analysis, evaluation and redesign of programs and business systems, and will facilitate creating, revising, and consolidating regulatory requirements and guidance documents.

The NRC responds to incidents and allegations through reactive inspections, allegation followup, investigations, enforcement actions, operational data analysis, and identification of generic issues. During FY 2000, the NRC will continue to analyze and evaluate operational experience from NRC licensees and Agreement States to identify generic issues resulting from

incidents and events, to determine the root causes of certain incidents and events and to identify those safety concerns that may warrant regulatory action. This includes operational events, such as overexposure to radioactive materials, and medical misadministrations of nuclear material.

State Programs

The NRC provides for cooperation and program compatibility, oversight, technical assistance, and liaison with States, local governments, Indian tribes, and interstate organizations. This ensures adequate protection of public health and safety from the hazards associated with the use of radioactive materials in 30 Agreement States, and ensures that nuclear safety policy and program information is shared with States and State organizations.

Under the Agreement State Program, the NRC provides assistance to States seeking Agreement State status; conducts training courses, workshops, and meetings for Agreement State staff; evaluates technical licensing and inspection issues from Agreement States; evaluates State rule changes; and provides early and substantive involvement of the States in NRC rulemaking and other regulatory efforts (sometimes using NRC/Agreement State working groups). The NRC also coordinates with Agreement States on the reporting of event information and on responses to allegations reported to NRC involving Agreement States.

The NRC, with Agreement State participants, also conducts periodic Integrated Materials Performance Evaluation Program (IMPEP) reviews of Agreement States and regional office programs for adequacy to ensure public health and safety and compatibility of Agreement State programs with NRC programs. IMPEP uses a common process that is applicable to both Agreement State and NRC regional materials programs. In FY 2000, ten Agreement State and two NRC regional IMPEP reviews are scheduled.

Under the State Liaison Program, the NRC coordinates activities of interest to State, local, and Indian tribal governments with other NRC offices; keeps the Commission and staff informed of significant State actions; and participates in activities conducted by the Conference of Radiation Control Program Directors, Inc. The NRC regularly consults with the Governor-appointed State Liaison Officers, and maintains contact with representatives of State Public Utility Commissions, National Governors' Association, and the National Association of Regulatory Utility Commissioners to identify NRC regulatory initiatives affecting States and to keep the NRC apprised of those organizations' activities. The NRC negotiates memoranda of understanding with States on various NRC and State activities involving mutual cooperation.

NUCLEAR MATERIALS SAFETY

Materials Research

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Technical bases for safety and regulatory guidance and decisionmaking.	Issue 6 research products that respond to high and medium priority needs from the Commission and NRC's licensing organizations. Develop, maintain, or improve one engineering code/model for use by RES and licensing organizations for regulatory analyses/decisionmaking.	Issue 7 research products that respond to high and medium priority needs from the Commission and NRC's licensing organizations. Develop, maintain, or improve one engineering code/model for use by RES and licensing organizations for regulatory analyses/decisionmaking.
Definition: Research products are typically reports containing experimental or analytical results that form the technical basis for regulations, regulatory guides, new methods, the resolution of generic safety issues and regulatory decisionmaking.		

NRC's research program addresses materials criticality and radiation protection issues. It also supports development of a technical basis for renewals of licenses and certificates of compliance for dry storage systems for spent nuclear fuel and waste at independent spent fuel storage installation sites.

As the nuclear industry pursues new initiatives directed at the use of higher uranium enrichment fuels and higher fuel burnup in reactors, issues related to materials criticality safety are likely to raise questions about or identify needed revisions to NRC regulations or regulatory guidance. Historically, criticality research has focused on the extreme ends of the enrichment spectrum: high enriched uranium weapon material and low enrichment reactor fuels of less than 5 percent enrichment in the uranium isotope U-235. This material criticality safety research will result in development of appropriate criticality standards for regulating the processing, storage, and transportation of fuels of enrichments of greater than 5 percent U-235. This work is significant because current criticality standards may not adequately address processing, transport, and storage of uranium of greater than 5 percent enrichment.

In FY 2000, research will continue to provide a methodology for establishing the range of applicability for use of codes for criticality safety and to provide an updated code for processing neutron cross-section data.

The state of technical knowledge concerned with measuring internal and external exposure, and estimating health risks associated with these exposures is rapidly evolving. This work includes evaluating the effectiveness of health physics practices and techniques to maintain occupational and public exposure as low as is reasonably achievable, modeling the uptake and distribution of radionuclides in humans, and participating in the review and revision of national and international exposure standards and guidance. Also, substantial medical and laboratory information has become available during the past several years on the effects of radiation exposure. This research is concerned with developing an improved understanding of the relationship between human exposure to ionizing radiation and the potential occurrence of radiogenic health effects.

For FY 2000, the NRC will continue to provide support for development of technical bases for materials radiation protection-related rulemakings and guidance.

In FY 2000, the NRC will finalize documentation providing the technical basis to support a site clearance rulemaking. The dose estimate information developed will be used by program offices in rulemaking.

In conjunction with the Savannah River Technology Center, the NRC will complete the development of water chemistry limits to minimize the potential for corrosion in FY 2000.

The NRC requires a technical basis for renewals of licenses and certificates of compliance for dry storage systems for spent nuclear fuel and high-level radioactive waste at independent spent fuel storage installation (ISFSI) sites. Renewing licenses that cover periods ranging from 20 to 100 years, requires the development of a technical basis for ensuring continued safe performance under extended service conditions. Verification of past performance of selected components (spent fuel, and all structures, systems and other components with functions important to safety) is needed to establish part of that technical basis. This research assesses the ability of the component to maintain safety functions that include maintaining subcriticality, maintaining confinement, ensuring that radiation rates and doses to workers and the public do not exceed acceptable levels and remain as low as is reasonably achievable, maintaining retrievability, and ensuring heat removal as needed to meet the safety requirement, which will comprise the technical basis. One activity in this research effort focuses on monitoring ISFSI test of prototype cask service behavior to verify performance of the fuel and storage system under extended service conditions. Another activity focuses on understanding the effects of zinc vapor on Zircaloy clad spent fuel surfaces for fuel that has already been loaded into a cask with zinc coating. A third activity focuses on the evaluation of licensing issues for ISFSI storage of high burnup fuel, specifically the potential for fuel cladding

degradation due to hydrogen embrittlement. A fourth element will assess the public health risk from the use of dry cask storage systems.

A typical ISFSI licensed under 10 CFR Part 72 consists of arrays of free-standing storage casks resting on a concrete pad. In evaluating the seismic safety of a dry cask storage system (DCSS), the cask stability is assessed. Current Standard Review Plan (SRP) provisions use a safety margin of 1.1 as the review criterion against cask sliding and overturning for a postulated design earthquake; i.e., the cask is not allowed to move or tip. However, when strong earthquake ground motion strikes, the casks may move and wobble in various directions. Simultaneous sliding and tipping is a complex technical issue. In the safety review process, it is important to know how the casks would behave seismically, how much sliding and tipping is likely to take place, how the casks would impact on each other, and how the internals of the cask would be affected. There are no guidelines in the current criteria to address these questions. Thus, there exists a need for a confirmatory research project for establishing criteria or review guidelines for evaluating the seismic behavior of the storage casks.

During FY 2000, the NRC will continue methods development and demonstration for risk to the public from sealed sources, restart research in methods development and demonstration of dry cask storage risk assessment, and identify and initiate methods development for other facilities and/or devices as regulated.

In FY 2000, the NRC will continue to develop appropriate data and analyses on materials aspects of spent fuel storage in ISFSI test of prototype cask environments, publish a progress report in FY 2000, with a NUREG/CR published in FY 2001 to document the findings.

In FY 2000, the NRC will conduct detailed studies on mechanisms for long-term effects of zinc vapor on mechanical properties of fuel cladding, and will publish a progress report in FY 2000.

In FY 2000, the NRC will initiate the development of fracture mechanics based criteria for evaluating the structural integrity of high-burnup fuel cladding, and will publish a progress report in FY 2000.

In FY 2000, the NRC will continue analytical studies and testing, as needed, to evaluate the performance of casks and concrete pads, and will initiate development of guidance on review of casks on the pad for different seismic loading scenarios.

NUCLEAR MATERIALS SAFETY

Materials Incident Response

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Emergency Response Performance Index	90 percent	90 percent

Definition: Index provides the single overall measure of the degree to which the agency believes it is ready to respond to an emergency situation. It serves as a method for measuring disparate activities that comprise the elements of the Incident Response Program. It will be determined by averaging the degree of satisfaction of the following program functions: Response Organization Staffing, Response Facility Availability, Communications Reliability, Response Organization Training, 24-Hour Notification Point, Timeliness of Activation Decision, and Timeliness of Activation. If the overall index falls below or approaches its target value of 90 percent, management will determine what is contributing most to the decline and conduct appropriate corrective measures on the basis of this review.

Materials incident response activities are conducted to maintain incident and accident investigation programs to ensure that safety-significant operational events involving nuclear materials and fuel cycle facilities are investigated in a timely, systematic, and technically sound manner and that information is obtained on the causes of the events so that NRC can take timely and effective corrective actions. Emergency response activities are also conducted to ensure NRC is prepared to carry out its role in a radiological emergency involving radiological materials and fuel cycle facilities, licensee responses are consistent with licensee responsibilities and NRC responses are coordinated with other Federal response activities and State and local government activities.

The Incident Investigation Program (IIP) will be maintained in a high state of readiness to establish and support an Incident Investigation Team (IIT) at any time. The Incident Investigation Manual (NUREG-1303), which provides formal guidance on the conduct of IITs, will be revised if necessary, to address investigation and programmatic deficiencies if any. IIT rosters will be revised, as needed. IITs will be established and supported, and findings will be documented as staff followup actions. In FY 2000, independent reviews will be conducted for actions assigned from previous IITs.

During FY 2000, the emergency response program will continue to be updated based on lessons learned. The on-call position of response coordination team member will be continuously staffed to initiate the call-out process when the NRC Headquarters Operations Center (HOC) is activated. Response team readiness will be maintained. The staff will continue its interfaces with other Federal agencies involved in radiological incident response.

The NRC will respond to new initiatives while maintaining its role in the principal Federal response plans (Federal Response Plan, Federal Radiological Emergency Response Plan and National Contingency Plan). The incident response staff will participate in exercises, drills, major organizational meetings and training sessions with State coordination as a focus. The training will be conducted in the most expeditious way possible.

In FY 2000, the NRC staff will improve the conceptual design of emergency response courses, prepare and revise training documents, and schedule, track and conduct training for headquarters and regional responders. In this way, the efficiency and effectiveness of headquarters and regional responder training will be significantly improved. Training outside the exercise environment will continue to be provided in order to improve responder technical skills. The NRC will conduct one materials exercise in FY 2000.

During FY 2000, the Regional Incident Response Program will be maintained at a high level of readiness at all times. To accomplish this, the NRC Regional Offices (Regions) will train response personnel as required to maintain technical and administrative skills, participate periodically in drills and exercises, maintain response equipment in a state of operational readiness, maintain response procedures current, and implement program improvements resulting from lessons learned. The Regions will designate sufficient staff to participate as response team members to implement program objectives, keeping in mind program efficiencies. In addition, the Regions will continually evaluate ways to improve response through upgrades to equipment, resources, and facilities. The Regions will work with NRC Headquarters, other Federal agencies, licensees, and State and local governments to maintain a high level of cooperation necessary for response to emergencies.

NUCLEAR MATERIALS SAFETY

Materials Operational Experience Evaluation

OUTPUT MEASURE		
Output/Baseline	FY 1999 Target	FY 2000 Target
The Nuclear Materials Events Database (NMED) which contains information about nuclear materials events reported to the NRC by NRC licensees and Agreement States, will be maintained by entering materials event information in a timely manner. (FY 1998: Materials event information entered within the specified time 90 percent of the time.)	Materials event information from morning reports, event notifications, and preliminary notifications of occurrences will be entered into NMED within 2 working days from the date of the document, and NMED records will be updated within 2 working weeks of the data of receipt 90 percent of the time.	Materials event information from morning reports, event notifications, and preliminary notifications of occurrences will be entered into NMED within 2 working days from the date of the document, and NMED records will be updated within 2 working weeks of the data of receipt 90 percent of the time.

The NRC collects nuclear materials event data from NRC licensees and Agreement States, codes the data, and enters them into the Nuclear Materials Events Database (NMED). This database is available to NRC and Agreement States staff. In FY 1999, in response to a request from the Conference of Radiation Control program directors representing the States, NMED will be expanded to capture orphan sources, discrete radioactive material that is not under the control of a licensee and that presents a radiological threat to public health and safety, containing Atomic Energy Act (AEA) and non-AEA materials. Enhancements will also be made to collect additional event information, accommodate more users, and provide online registration of orphan sources. Nuclear materials event data will be systematically screened and reviewed for significant health and safety lessons. The annual Abnormal Occurrence Report to Congress will be prepared.

Materials Technical Training

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Numbers and types of materials technical training courses offered. (FY 1998: 100 percent of cumulative needs met.)	Numbers and types of courses offered will meet 90 percent of cumulative needs identified by offices and regions in semiannual needs surveys.	Numbers and types of courses offered will meet 90 percent of cumulative needs identified by offices and regions in semiannual needs surveys.

Materials technical training is conducted to ensure that NRC staff possesses the requisite knowledge, skills, abilities and competencies to accomplish the mission of the agency. Under this activity, technical training is provided for formal NRC materials inspector and license reviewer qualification, development, and training programs in support of the materials program. The NRC will continue to maintain the Technical Training Center (TTC) and manage the technical training program for NRC staff. Curriculum areas will be maintained in radiation protection, fuel cycle technology, safeguards, regulatory skills, and probabilistic risk assessment to provide the technical and regulatory foundation to support staff decisions in the regulatory oversight process. Technical training will continue to be provided using the principles of the systems approach to training which is a standard, multiphase program that includes needs analysis, program design and development, implementation of training, and program evaluation.

Required core, specialized, and refresher technical training is developed, implemented, and maintained in support of the qualification of NRC personnel with defined qualification, development, and training programs. Materials technical training is provided for formal NRC staff qualification in support of the nuclear materials and fuel cycle programs. Similar training is also provided in support of the Agreement State program. The materials technical training program will continue to offer approximately 17 courses ranging in duration from 3 days to 5 weeks. In FY 2000, the NRC will provide 90 percent of the numbers and types of sources required by the offices and regions.

In FY 2000, initial materials technical training and refresher training will be provided to NRC materials inspectors and license reviewers in formal qualification or development programs for Agreement State personnel. In addition, materials technical training will be available for NRC technical managers. Major curriculum adjustments to best satisfy the highest priority regional and program office training needs will continue.

Reactive training needs are addressed in materials technical training curriculum areas as identified by job and task analyses and agency management through forums such as training focus groups, division director counterpart meetings, and senior management meetings. The NRC will provide technical training to support special staff development programs. During this period, a limited amount of technical training will be provided in specialized areas to supplement the initial training provided to technical staff. This training provides selected technical staff with specific expertise in areas for which all technical staff do not require the expertise. New and expanded materials technical training will be developed and implemented during FY 2000, as necessary, in areas identified by program offices and regions. This includes new training courses to support the agency-wide probabilistic risk assessment implementation plan, training in regulatory skills, and new training determined to be necessary by technical training needs surveys.

Materials Enforcement Actions

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Timeliness in completing enforcement actions. (FY 1998: Enforcement case average of 67.1 days for 90 percent of cases. Enforcement case average of 80.6 days for 100 percent of cases.)	90 percent of materials enforcement cases will average 90 days or less. 100 percent of materials enforcement cases will average 120 days or less. The measuring period starts on the latest of the following dates: (1) inspection exit, for non-OI cases, (2) the date of the OI memorandum forwarding the OI investigation to the staff, for OI cases, (3) the date that the Department of Justice says NRC may proceed, for cases referred to the DOJ, or (4) the date of the Department of Labor decision that is the basis for the action.	90 percent of materials enforcement cases will average 90 days or less. 100 percent of materials enforcement cases will average 120 days or less. The measuring period starts on the latest of the following dates: (1) inspection exit, for non-OI cases, (2) the date of the OI memorandum forwarding the OI investigation to the staff, for OI cases, (3) the date that the Department of Justice says NRC may proceed, for cases referred to the DOJ, or (4) the date of the Department of Labor decision that is the basis for the action.

The NRC's enforcement program is used as a deterrent to emphasize the importance of compliance with requirements and to encourage prompt identification and comprehensive correction of violations. The basic enforcement sanctions are notices of violations, civil monetary penalties, and various enforcement orders. The nature and extent of the enforcement action taken by the NRC reflect the seriousness of the violation involved.

NUCLEAR MATERIALS SAFETY

The NRC expects to consider approximately 100-200 potentially escalated nuclear materials enforcement actions. As the number and types of enforcement actions taken in any period of time are a function of the number of licensees and the licensees' performance, it is difficult to predict future activity levels. However, previous enforcement activity has been as follows:

Materials Enforcement				
Fiscal Year	Actions Considered	Resulting Civil Penalties	Notices of Violation Without Civil Penalty	Orders Issued
1996[1/]	160	28	33[2/]	13
1997	211	41	83	18
1998	164	29	55	10

[1/] Reflects a change in the threshold for considering escalated actions.

[2/] The information for FY 1996 was based on enforcement actions issued to licensees. Because an enforcement case or enforcement action can include more than one escalated enforcement item or issue, FY 1997 data are based on accounting for escalated enforcement items. Therefore, for consistency, data for FY 1996 have been adjusted to reflect this method of accounting.

The NRC also monitors discrimination actions filed with the U.S. Department of Labor under Section 211 of the Energy Reorganization Act and develops enforcement actions for properly supported findings of discrimination, either from the Office of Investigations or from the Department of Labor adjudications.

Materials Investigations

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Timeliness in completing investigations. (FY 1998: Completed cases, on average, in 6.3 months. 7.8 percent of cases open for more than 12 months.)	Complete cases, on average, in 9 months or less. Maintain the average number of cases within the active care inventory for more than 12 months, at 9 percent or less.	Complete cases, on average, in 9 months or less. Maintain the average number of cases within the active care inventory for more than 12 months, at 9 percent or less.

The NRC investigates allegations of wrongdoing by NRC licensees, certificate holders, and others within its regulatory jurisdiction. All findings and conclusions that result from investigations are sent to the appropriate program office, the Office of Enforcement and the

Office of the General Counsel to review the issues involved and to determine whether enforcement action is warranted. Investigations that substantiate criminal violations concerning NRC licensees and others within the NRC's regulatory jurisdiction are referred to the U.S. Department of Justice. In FY 2000, the Office of Investigation anticipates investigating an inventory of approximately 80-100 materials cases and that 50-75 cases will be closed. In addition to managing its own investigations' caseload, the NRC works closely with other investigative agencies and organizations to ensure the timely exchange of information of mutual interest.

Materials Legal Advice

The *Office of the General Counsel* (OGC) provides legal advice and assistance to the Office of Nuclear Materials Safety and Safeguards (NMSS) and the Commission with respect to all matters related to the regulation of nuclear materials and the storage of spent fuel. OGC's legal support will include legal advice and assistance on NRC's FY 2000 licensing, inspection, and enforcement activities concerning the application of regulatory requirements to particular factual situations as presented by NMSS or the regional offices including legal review of licenses, amendments, certificates, environmental documents and inspection reports, enforcement, and any contractual matters that may arise in performing these activities. OGC will also provide legal analyses and interpretations of regulations, statutes, and cases relevant to materials and spent fuel storage activities; continue to represent the NRC staff in adjudications arising from proposed licensing and enforcement actions and represent the Commission in lawsuits arising from adjudicatory and rulemaking decisions relating to materials and spent fuel storage; and provide legal advice and assistance for any rulemaking activities in the materials area.

Materials Adjudication

The *Atomic Safety and Licensing Board Panel (ASLBP)*, a statutorily authorized office of the NRC, conducts hearings as independent adjudicatory tribunals, usually at or near the site at which the dispute arose. ASLBP's administrative judges sit alone and in three-member boards; they hear and decide requests to grant, suspend, revoke, or amend nuclear materials licenses that address issues involving health, safety, and the environment. ASLBP judges also preside over materials enforcement and decommissioning cases.

In its 1998 statement on the Policy on Conduct of Adjudicatory Proceedings, the Commission reiterated its longstanding commitment to the expeditious completion of adjudicatory proceedings while still ensuring that hearings are fair and produce an adequate record for decision. The Commission directed its hearing boards and presiding officers to continue to

employ measures and techniques to reduce the time for completing licensing and other proceedings.

Regulation of the Department of Energy

The Department of Energy (DOE) and the NRC, in recognition of a mutual commitment to the effective and efficient protection of public health and safety and the environment, will continue to resolve issues of concern that relate to the potential NRC regulation of DOE nuclear facilities, projects and activities. DOE will obtain assistance from the NRC on projects and activities pertaining to DOE's responsibilities and the NRC will obtain information from DOE that may be relevant to the regulation of licensed activities.

Under a Memorandum of Understanding with DOE, dated November 21, 1997, NRC and DOE agreed to conduct a pilot program to simulate external regulation of DOE by testing regulatory concepts at selected DOE sites and facilities. DOE is principally responsible for conduct of the pilot evaluations, while NRC performs a substantial supporting role. The overall objective of the pilot program is to determine the desirability of NRC regulatory oversight of DOE nuclear facilities by evaluating the standards, requirements, procedures and practices at the pilot facilities in accordance with the NRC's regulatory safety standards and provide support for a decision on whether legislation should be pursued to authorize NRC regulation of certain DOE nuclear facilities. In FY 1998, NRC tested its regulatory concepts at three DOE pilot facilities–the Lawrence Berkeley National Laboratory (LBNL), the Radiochemical Engineering Development Center, and the Savannah River Site-Receiving Basin for Offsite Fuel.

In the FY 1999 appropriations language, Congress directed DOE to include the Occupational Safety and Health Administration (OSHA), and appropriate State and local regulatory entities in the external regulation pilot projects. DOE is to send a report to Congress by March 31, 1999, on the results of the comprehensive pilot project at LBNL (reflecting the involvement of DOE, NRC, OSHA and California's State and local government entities responsible for worker health and safety).

In FY 1999, DOE may add up to three additional pilot facilities of greater complexity to the program. The experience gained from these pilots will allow both DOE and NRC to address significant technical, policy, and legal issues related to NRC regulation of DOE facilities. Legislation may be submitted in FY 1999 to have NRC regulate either various classes of, or all non-defense program facilities. Assuming that legislation moves forward, program development and rulemaking initiatives would begin in FY 2000 in order to facilitate a smooth transition into external regulation starting in FY 2001. In addition, discussions would take

place with pilot facilities on implementation issues and prelicensing consultations with DOE facilities.

In FY 2000, the NRC will continue to support DOE on the Hanford Tank Waste Remediation System at Richland, Washington. DOE initiated this effort in 1996 to demonstrate technologies for solidifying highly radioactive tank waste at the Hanford site through the design of a pilot-scale facility. The NRC is participating in this effort to acquire sufficient knowledge and understanding of the Hanford tank waste and the processes, technology, and hazards to: (1) assist DOE in performing technical reviews in a manner consistent with NRC's regulatory approach; and (2) be prepared to develop an effective and efficient regulatory program for the possible future licensing of DOE contractor-owned and contractor-operated facilities that will process waste at Hanford, pending resolution of certain statutory and regulatory issues. In FY 2000, the NRC will continue to develop an overall review strategy for Phase I activities including review of design, construction, and operation in preparation for the proposed NRC licensing. To assist in this effort, the NRC on-site representative will continue to interface with DOE and to provide NRC coordination and support.

The *Office of the General Counsel* provides legal support, review and advice to the staff on the external regulation of DOE facilities and sites, primarily involving DOE Hanford tank waste remediation, and the pilot programs on the general oversight of DOE facilities.

NUCLEAR WASTE SAFETY

STRATEGIC GOAL

Prevent adverse impacts to the current and future public health and safety and the environment, as a result of uranium recovery[12], facilities decommissioning, cleanup of contaminated sites, and disposal of radioactive wastes.

DESCRIPTION OF STRATEGIC ARENA

Nuclear waste is a byproduct of the use of radioactive materials. Such waste is produced by nuclear reactors that generate electric power, as well as fuel processing plants, uranium recovery operations, and institutions such as hospitals and research facilities. It also results from decommissioning nuclear facilities that are permanently shut down. The strategy for disposing of these wastes largely depends on the potential hazard and the time period over which this hazard will exist. The objective of such disposal is to isolate the wastes from humans and the environment during the period of greatest hazard, and to ensure that potential releases will not result in adverse impacts to public health and safety and the environment. High-level radioactive waste results primarily from the fuel used by reactors to produce energy. Low-level radioactive waste results from reactor operations, and from medical, academic, industrial, and other commercial uses, and generally contains relatively limited concentrations of radioactivity.

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The Nuclear Waste Safety strategic arena encompasses the NRC's high-level waste regulatory activities associated with high-level waste storage and high-level waste disposal at Yucca Mountain as mandated by the Nuclear Waste Policy Act of 1982, the Nuclear Waste Policy Amendments Act of 1987, and the Energy Policy Act of 1992; and the NRC's low-level radioactive waste activities associated with the disposal of waste in accordance with the Low-Level Radioactive Waste Policy Act of 1980, amended in 1985.

NRC regulatory and oversight activities also include decommissioning, which involves safely removing a facility from service and reducing residual radioactivity to a level that permits the property to be released. This action is to be taken by a licensee before termination of the license. Some power reactor licensees have recently decided to shut down their facilities prematurely, before the expiration of the current operating licenses (e.g., Haddam Neck, Maine Yankee, Zion, etc.). These unexpected shutdowns have resulted in additional staff efforts in the areas of decommissioning inspections and in the licensing area to process license

[12] "Uranium recovery" means the removal of uranium from ore and the stabilization of tailings from this process.

amendments and exemptions reducing regulatory requirements to correspond to the reduced risk posed by the permanently shutdown plants. In some cases, non-licensed facilities may also be required to reduce or stabilize contamination before sites are released. This activity comprises NRC's integrated regulation of the decontamination and decommissioning of facilities and sites associated with NRC-licensed activities, including associated research, rulemaking efforts, and the technical interface with the Environmental Protection Agency (EPA) to resolve issues of mutual interest in accordance with the March 1992 General Memorandum of Understanding.

This strategic arena also includes NRC's regulation of uranium recovery. The Uranium Mill Tailings Radiation Control Act of 1978, as amended, (UMTRCA) directs the NRC to amend its regulations to conform to the Environmental Protection Agency standards for uranium mill tailings reclamation and groundwater cleanup, and to regulate the reclamation of tailings and groundwater cleanup from licensed uranium mills. In addition, UMTRCA also directs NRC to review and concur in the reclamation of uranium mill tailings and groundwater cleanup being conducted by the Department of Energy at abandoned mill sites. These activities require detailed health, safety, and environmental reviews; inspections of licensee procedures and facilities to provide reasonable assurance of safe operations; the development of NRC regulations and guidance to implement the applicable standards; and the site-by-site evaluation of licensee and Department of Energy plans for reclamation of mill tailings and cleanup of groundwater.

These efforts are conducted primarily by the Office of Nuclear Material Safety and Safeguards, the Office of Nuclear Reactor Regulation, and the Office of Nuclear Regulatory Research, with the assistance and coordination of the NRC offices of the General Counsel, the Atomic Safety Licensing Board Panel, the Advisory Committee on Nuclear Waste, the Secretariat, and the Chief Information Officer.

The Nuclear Waste Safety strategic arena is comprised of the following six programs: High-Level Waste Regulation; Regulation of Low-Level Waste; Regulation of Decommissioning; Radionuclide Transport and Decommissioning; Uranium Recovery Licensing and Inspection; and Non-High-Level Waste Safety Legal Advice. The contract support funds are allocated for work done by Department of Energy (DOE) contractors, commercial contractors, small business entities, nonprofit organizations (e.g., universities and foundations), and grantees.

MEASURING RESULTS -- PERFORMANCE GOALS

The NRC has established the following performance goals for measuring results in achieving its nuclear waste safety strategic goal to prevent adverse impacts to the current and future public health and safety and the environment, as a result of uranium recovery, facility decommissioning, cleanup of contaminated sites, and disposal of radioactive waste. In developing these goals, a careful review and analysis of existing performance data were performed. Although targets for performance were not established until FY 1998, FY 1997 performance, where available, is provided. FY 1998 performance, where available, is also provided. These data provide a firm baseline for the development of future performance targets and the assessment of performance.

1.	**No radiation exposures or releases of radioactive material are likely to occur now or in the future that will have significant adverse impacts on the health and safety of the public, and the environment, as a result of uranium recovery, facility decommissioning, cleanup of contaminated sites, and disposal of radioactive wastes.** **The performance indicators and targets for FY 2000 are established under the following performance goals.**

1.a.	**Minimize the number of radiation exposures or offsite releases that exceed the regulatory requirements for operational activities.** **This goal includes sites regulated by Agreement States, but excludes sites under EPA Superfund authority. The performance indicator is the number of accidental releases per year that exceed the dose standards in 10 CFR Part 20.1201, 10.1208, or 20.1301. The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)**

The **FY 2000 target** is that the five-year average (FY 1996-FY 2000) will not exceed **two** per year. The **FY 1999 target** is that the five-year average (FY 1995-FY 1999) will not exceed **two** per year.

1.b.	**Estimated post-operational offsite releases will not exceed regulatory requirements.** **This goal includes sites regulated by the Agreement States but excludes sites under EPA Superfund authority. The performance indicator is the number of offsite releases per year in excess of the standards in 10 CFR Part 40 Appendix A Criterion 6, 10 CFR Part 20 Subpart E, or 10 CFR 61.41. The data to support this indicator are currently collected in the Nuclear Material Events Database. (See Appendix I.)**

The **FY 2000 target** is **zero.** The **FY 1999 target** is **zero.**

1.c.	**Potential environmental impacts will be considered in accordance with the National Environmental Policy Act (NEPA) before regulatory action is taken.** **The performance indicator is the number of environmental impacts identified and substantiated each year by external sources which were not identified as part of the NRC's NEPA process.**

The **FY 2000** target is **zero.** The **FY 1999 target** is **zero.**
FY 1998 Performance: Data for this measure will be reviewed in FY 1998 and will be reported for FY 1999.

2.	**The regulatory framework for high-level waste disposal will be established consistent with current national policy.** **The performance indicator is the development of 10 CFR Part 63 in accordance with the Commission's strategy, which includes incorporating the legislatively required environmental standard.**

The **FY 2000** target is to publish a final site-specific, performance-based regulation applicable to the proposed repository at Yucca Mountain.
The **FY 1999 target** is to publish a proposed site-specific, performance-based regulation applicable to the proposed repository at Yucca Mountain.

2.a.	**Develop guidance to address key technical issues most important to the performance of a high-level waste repository during the pre-licensing period.** **The performance indicator is the resolution of subissues that make up the key technical issues. The data source are the issuance of specific issue resolution status reports.**

The **FY 2000 target** is to resolve at least five of the seven subissues related to: (1) extent of dilution due to transport and well bore mixing; (2) waste package chemical environment; (3) chemical environment for radionuclide release; (4) retardation in fractures; (5) retardation in matrix; (6) criticality in far-field; and (7) tectonic model of Yucca Mountain.

The **FY 1999 target** is to resolve five subissues related to: (1) rate of shallow infiltration; (2) rate of deep percolation; (3) physical and chemical system affecting radionuclide transport; (4) consequences of igneous activity; and (5) design for seismic events and fault disruption.

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2.b.	**Participate in developing a high-level waste radiation safety standard and implement the standard through a site-specific, performance-based regulation and Yucca Mountain review plan.** **The performance indicator is the development of a Yucca Mountain Review Plan that will implement the site-specific, risk-informed and performance-based regulations for a proposed repository at Yucca Mountain, Nevada. The date source are the issuance of specific documents for the Yucca Mountain regulation and review plan.**

The FY 2000 target is to refine the Yucca Mountain Review Plan format and content that will implement the site-specific, risk-informed, and performance-based regulations for a proposed repository at Yucca Mountain, and build sections using Issue Resolution Status Reports, acceptance criteria and review methods.

The **FY 1999 target** is to develop an initial Yucca Mountain Review Plan format and content.

STRATEGIES

1. The NRC will maintain and further develop the capability to provide timely and independent technical bases for its regulatory decisions.

2. The NRC will maintain and improve its regulatory framework[13] and incrementally use risk-informed and, where appropriate, less prescriptive performance-based approaches.

3. The NRC will authorize uranium recovery activities, decommissioning of nuclear reactors and materials facilities, and the disposal of radioactive waste only after the NRC has determined that these proposed activities will be conducted in accordance with the regulatory framework.[11]

4. The NRC will ensure that licensees understand and carry out their primary responsibility for conducting activities consistent with the regulatory framework.

5. The NRC will prepare to license a high-level waste repository by focusing on the issues most significant to repository safety and provide feedback to the DOE at a pace consistent with the national program.

[13] The regulatory framework is rules and regulations that ensure adequate protection of public health and safety.

6. The NRC will streamline and improve its decommissioning regulatory process to be more performance-based and efficient.

The following table depicts the relationship of the nuclear waste safety programs to the arena strategies identified above. The required resources are developed based on the programs and functions necessary to implement the strategies. Detailed information on the resources, programs, and their associated output measures is provided in the Nuclear Waste Safety arena section of the FY 2000 budget request. FY 1998 baseline data for the FY 1999 and FY 2000 output measure targets are provided, where available.

FY 2000 NUCLEAR WASTE SAFETY ARENA PROGRAM LINK TO ARENA STRATEGIES

LINKS TO ARENA STRATEGIES	STRATEGIES					
FY 2000 PROGRAMS ($42,143K, 195 FTE)	1	2	3	4	5	6
High-Level Waste Regulation ($19,150K, 53 FTE)			X		X	
Regulation of Low-Level Waste ($1,353K, 12 FTE)		X				
Regulation of Decommissioning ($13,729K, 85 FTE)		X	X	X		X
Radionuclide Transport and Decommissioning ($4,001K, 15 FTE)	X					
Uranium Recovery Licensing & Inspection ($3,470K, 26 FTE)			X	X		
Non-High-Level Waste Safety Legal Advice ($440K, 4 FTE)		X	X	X		

BUDGET AUTHORITY BY FUNCTION AND BY PROGRAM
FULL-TIME EQUIVALENT EMPLOYMENT BY PROGRAM

(Dollar amounts in tables represent thousands of dollars ($K). In text, whole dollar amounts are used. Staff numbers represent full-time equivalents (FTEs).)

Total FY 2000 Estimate $42,143,000

Summary	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Function ($K)				
Salaries and Benefits	14,875	18,354	19,892	1,538
Contract Support	16,972	19,668	21,485	1,817
Travel	788	720	766	46
Total	32,635	38,742	42,143	3,401
Budget Authority by Program ($K)				
High-Level Waste Regulation	15,000	17,000	19,150	2,150
Regulation of Low-Level Waste	897	1,387	1,353	-34
Regulation of Decommissioning	8,866	12,322	13,729	1,407
Radionuclide Transport and Decommissioning	4,372	4,431	4,001	-430
Uranium Recovery Licensing and Inspection	3,088	3,191	3,470	279
Non-High-Level Waste Safety Legal Advice	412	411	440	29
Total	32,635	38,742	42,143	3,401
Full-Time Equivalent Employment by Program				
High-Level Waste Regulation	44	50	53	3
Regulation of Low-Level Waste	8	12	12	0
Regulation of Decommissioning	63	85	85	0
Radionuclide Transport and Decommissioning	17	17	15	-2
Uranium Recovery Licensing and Inspection	27	23	26	3
Non-High-Level Waste Safety Legal Advice	4	4	4	0
Total	163	191	195	4

EXPLANATION OF RESOURCE CHANGES BY PROGRAM

High-Level Waste Regulation. Resources increase in FY 2000 for activities associated with (1) preparation of preliminary sufficiency comments for DOE, (2) review and comment on DOE's draft license application for Yucca Mountain, and (3) development of the Yucca Mountain Review Plan.

Regulation of Low-Level Waste. There are no significant resource changes in FY 2000.

Regulation of Decommissioning. Resources increase in FY 2000 to work off the licensing backlog, to complete the Standard Review Plan for decommissioning, and to support an increased level of activity associated with rulemaking for clearance of materials and equipment that have residual radioactivity (recycle rulemaking).

Radionuclide Transport and Decommissioning. Resources decrease in FY 2000 as a result of completing the modeling effort to support regulatory guidance on decommissioning.

Uranium Recovery Licensing and Inspection. Resources increase slightly in FY 2000 to continue development of the 10 CFR Part 41 rulemaking for uranium milling and milling facilities, to review efforts for uranium recovery Title I groundwater reviews, and to reflect increased personnel costs (pay raises, within-grade increases, and benefits costs increases). These increases are offset by decreases that result from completing the majority of reclamation plan reviews in FY 1999.

Non-High-Level Waste Safety Legal Advice. There are no significant resource changes in FY 2000.

JUSTIFICATION OF PROGRAM REQUESTS

High-Level Waste (HLW) Regulation

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Resolve subissues related to (1) extent of dilution due to transport and well bore mixing, (2) waste package chemical environment, (3) chemical environment for radionuclide release, (4) retardation in fractures, (5) retardation in matrix, (6) criticality in far-field, and (7) tectonic model of Yucca Mountain. (FY 1998: No output data available.)	None.	Resolve at least 5 of the 7 subissues targeted.
Resolve subissues related to (1) rate of shallow infiltration, (2) rate of deep percolation, (3) physical and chemical systems affecting radionuclide transport, (4) consequences of igneous activity, and (5) design for seismic events and fault disruption. (FY 1998: No output data available.)	Resolve 5 of the subissues targeted.	
Development of the Yucca Mountain Review Plan (YMRP).	Develop an initial Yucca Mountain Review Plan format and content.	Refine YMRP format and content; build YMRP sections using Issues Resolution Status Reports, acceptance criteria, and review methods.
Establish a site-specific, performance-based regulation applicable to the proposed repository at Yucca Mountain.	Publish a proposed site-specific, performance-based regulation applicable to the proposed repository at Yucca Mountain.	Publish a final site-specific, performance-based regulation applicable to the proposed repository at Yucca Mountain.

NUCLEAR WASTE SAFETY

The NRC's efforts in the area of high-level radioactive waste (HLW) licensing are governed by the Nuclear Waste Policy Act of 1982 (NWPA), the Nuclear Waste Policy Amendments Act of 1988 (NWPAA), and the Energy Policy Act of 1992 (EnPA). This legislation specifies a detailed approach for the long-range undertaking of HLW disposal as well as the respective roles of NRC, the U.S. Department of Energy (DOE), and the U.S. Environmental Protection Agency (EPA) in the HLW program. DOE has the responsibility for the actual disposal of HLW, developing the geologic repository and operating it. EPA has been charged with developing the necessary environmental standards, consistent with the recommendations of the National Academy of Sciences, that will be used to evaluate the safety of the geologic repository developed by DOE. The NRC has extensive pre-licensing responsibilities and is the regulatory agency that will determine whether DOE's safety case for a geologic repository at Yucca Mountain, Nevada, complies with the applicable regulatory standards developed by both NRC and EPA.

The NRC high-level waste program was strategically realigned during FY 1996-FY 1997 to improve its effectiveness and in response to budget reductions. This realignment focused all HLW work on a set of 10 key technical issues (KTIs) and their component subissues, that address the technical concerns of greatest potential impact on post-closure repository performance. However, despite these reductions in previous years, the program realignment has (1) significantly improved the focus of the HLW program, (2) presented opportunities for substantial cost savings to the overall program, and (3) provided opportunities to reduce the schedule risk associated with the licensing process.

Pre-closure activities, for which previous regulatory experience exists (i.e., emergency plans, safeguards and security, compliance with 10 CFR Part 20), were curtailed as part of the program realignment. For certain pre-closure design issues and operations where experience is lacking and standards have not been developed--waste package retrievability--some work will be conducted in FY 1999-FY 2000 although the Yucca Mountain License Application Review Plan (YMRP) sections themselves will not be completed until the License Application is submitted in FY 2002.

Progress toward resolution of the KTIs has been the focus of NRC's program during FY 1996-FY 1998 and will continue to be the case until DOE submits a License Application (LA). Overall, KTI resolution comprises four interrelated phases. The first phase--resolution at the staff level--is achieved when the staff has no further questions regarding how the DOE is addressing a particular subissue; such resolution does not preclude the issue being raised and considered during the licensing proceeding. This phase will be completed between FY 1999-FY 2002. Issue Resolution Status Reports (IRSRs), which are being progressively developed over time, will document the current technical bases and acceptance criteria for issue

resolution and subsequent use in staff reviews. The YMRP will be developed in the second phase for use by the NRC staff in conducting its review of the LA. The YMRP will be a highly focused, site-specific document that integrates the regulatory basis of the regulation with the acceptance criteria and review methods contained in the IRSRs. Following issue resolution at the staff level, the third phase of work will continue through FY 2002 to (1) develop the review methods, total-system performance assessment (TSPA) and process-level models, and confirmatory databases needed to review the LA, (2) conduct limited, focused studies aimed at developing confidence in the application of review methods to licensing the proposed Yucca Mountain repository, and (3) monitor and provide feedback to DOE regarding implementation of acceptable approaches. The final phase of resolution involves monitoring DOE performance confirmation activities.

FY 2000 resources will allow the NRC to fulfill it own statutory responsibilities by conducting activities in HLW rulemaking, and in pre-licensing issue resolution with DOE in the areas most important to geologic repository licensing.

The EnPA requires that NRC develop implementing regulations within one year after promulgation of the final EPA standard for Yucca Mountain. The NRC plans to complete work on the development of the proposed site-specific disposal regulations for the proposed geologic repository at Yucca Mountain in FY 1999 and complete the final site-specific disposal regulations in FY 2000. It should be recognized that this schedule could be impacted by EPA's schedule for promulgating the standard or passage of legislation currently before Congress. Once the rulemaking is completed, the NRC will focus on evaluating the existing 1990 Waste Confidence findings for geologic disposal of HLW in FY 2000.

The NRC will continue to pursue the first phase of pre-licensing issue resolution with DOE in FY 1999. The KTIs will be re-evaluated and possibly re-prioritized based on the following: (1) changes or new developments in DOE's program, as a result of the findings of the Viability Assessment (VA); (2) evaluation of sensitivity results produced by DOE and NRC total system performance assessments (TSPAs) that identify issues most important to repository performance; and (3) results of the staff review of the VA. Based on these activities, the staff will prepare updates to its IRSRs in FY 2000.

The NRC will complete its review of DOE's VA in FY 1999, and will enter the second phase of issue resolution with DOE by undertaking the initial development of the YMRP, which will be used as guidance for NRC's review of DOE's draft LAs (FY 2000 and FY 2001) and the final LA (in FY 2002).

Additional NRC goals in the HLW program for this period include (1) the conduct of observation audits of DOE's quality assurance (QA) program to ensure that it is being implemented effectively, (2) maintenance of the NRC Licensing Support System Network, which will be necessary to support a potential Yucca Mountain licensing hearing, and (3) continued contract management and administrative support of the Center for Nuclear Waste Regulatory Analyses (CNWRA), in order to ensure that it is managed effectively and efficiently.

In FY 2000, the NRC plans to initiate new activities with the goal of achieving pre-licensing issue resolution with DOE. Specifically, NRC intends to provide timely comments to DOE on the following major program milestones: (1) its draft LA, (2) its draft environmental impact statement (EIS) (which the Commission will later adopt, to the extent practicable, as part of a DOE LA), and (3) the extent to which DOE's site characterization analysis and waste form proposal are sufficient for inclusion in a DOE LA (the so-called "Commission's preliminary sufficiency comments").

Other HLW program activities include the licensing, inspection and environmental reviews for the safe management, storage, and transportation of nuclear materials, including spent nuclear fuel. During FY 2000, the NRC will continue its reviews of the DOE Topical Reports on Burn-up Credit and the adequacy of long-term dry storage in the existing Waste Confidence Decision.

The *Office of the General Counsel* (OGC) provides legal advice and assistance to the technical staff on proposed amendments to regulations on the transportation, storage and disposal of HLW and spent fuel; on the rulemaking to develop implementing regulations after promulgation of final EPA standards; on NRC issue resolution status reports; on NRC review of DOE's siting guidelines, its viability assessment and its draft EIS for the Yucca Mountain site; on development of a repository licensing standard review plan; and on the Commission's required 10-year review of its Waste Confidence proceeding. The OGC will also represent the NRC in all proceedings on the HLW repository license application, including the review of material generated by the NRC and by contacts with persons and entities outside the NRC.

The *Advisory Committee on Nuclear Waste* provides advice on issues concerning the management of high-level radioactive waste (HLW) including: interim storage of spent nuclear fuel; transportation; the disposal of HLW in geologic repositories, pre-licensing activities such as viability assessment, the environmental impact statement, and site suitability; standards, regulations, and guidance; and other issues as appropriate, including decommissioning and uranium mill tailing. This advice will be responsive to Commission needs, expectations, and requests, and will be issued in a timely manner to support Commission decisionmaking.

The *Atomic Safety and Licensing Board Panel* (ASLBP), a statutorily authorized office of the NRC, conducts hearings as independent adjudicatory tribunals, usually at or near the site at which the dispute arose. ASLBP judges will hear and decide petitions for hearing by intervenors and applicants concerning public health, safety, and environmental issues arising out of the application for a construction authorization and a license to receive and possess nuclear materials in a high-level waste repository.

The *Office of the Chief Information Officer* provides support for the Licensing Support System (LSS) which provides shared document discovery and facilitates electronic motions practice for the hearings on a license application, ensuring that all documents relevant to the licensing are made equally accessible in a timely manner to all parties and potential parties. FY 2000 resources will be used to develop the LSS home page and search interfaces; establish and test the linkage from it to the NRC home pages maintained under the Agency-wide Documents Access and Management System (ADAMS); and implement the hardware, software, staff operations, and other resources to develop an operating program for automated auditing of participant-operated home pages. One test audit will be conducted toward the end of FY 2000 in order to validate that a fully operational and tested audit capability is in place by September 30, 2000. This provides a 6-month time frame prior to the anticipated March 2001 Site Recommendation going to the President (the event that will trigger actual availability of the LSS).

The *Secretary* serves as Chairman of the Licensing Support Network Advisory Review Panel which provides advice and recommendations on the operation of the Licensing Support System for the HLW licensing proceeding.

The NRC will continue the contract management and administrative activities of the Center for Nuclear Waste Regulatory Analyses (CNWRA) in accordance with all applicable laws and regulations and the provisions of the NRC contract. This includes, but is not limited to, the quality assurance function that ensures CNWRA compliance with NRC's quality assurance requirements in 10 CFR Part 50, Appendix B; selection, recruitment, and/or retention of high-quality technical skills; implementation of management procedures and administrative practices; planning activities; maintaining staff capabilities; providing appropriate computer support and associated security systems; and production of periodic CNWRA management and fiscal reports.

NUCLEAR WASTE SAFETY

Regulation of Low-Level Waste (LLW)

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Maintenance of the regulatory framework for low-level waste disposal.	There is no FY 1999 target for this measure.	Consolidate low-level waste regulatory guidance. Complete Branch Technical Position on Low-Level Waste Disposal Facility Performance Assessment.

The classification of nuclear waste depends on origin, level of radioactivity, and potential hazard. Low-level waste (LLW), which results from many commercial, medical, and industrial processes, typically contains a small amount of radioactivity dispersed in a large amount of material and poses little potential hazard. However, because of its radioactivity, disposal of LLW requires special handling to avoid the health and environmental hazards associated with radiation. To adequately protect against these hazards, the NRC regulates the management, storage, and disposal of low-level radioactive waste.

The Low-Level Radioactive Waste Policy Act of 1980, amended in 1985, made States responsible for providing for the disposal of commercially-generated low-level waste within their borders. The Act encourages States to enter into compacts that would allow several States to dispose of waste at a regional disposal facility. Most States have entered into compacts and several States are proceeding with plans to construct and operate new disposal facilities. However, to date, no new disposal facilities have been opened since passage of the Act, with the exception of the Envirocare facility in Utah. The three operating disposal facilities are located in Agreement States, and all of the States with near-term plans to license a new disposal facility are also Agreement States. Therefore, the NRC does not expect to receive an application for a disposal facility license in the near future. The NRC plans to maintain its capability to perform low-level waste performance assessment modeling through technical reviews associated with the Site Decommissioning Management Program. This will ensure that NRC is prepared to respond to any application for a low-level waste disposal facility from a non-Agreement State.

During FY 1999 and FY 2000, the NRC will provide technical support to the States, as requested, to resolve specific technical issues concerning low-level waste storage and disposal. The NRC will also provide information to the States through the Department of Energy's National Low-Level Waste Management Program and other appropriate forums. In support

of State efforts and potential future NRC licensing activities, the NRC will continue to review and update its guidance on low-level waste storage and disposal. During FY 1999, LLW storage guidance will be revised and guidance will be developed on criticality safety for emplacement of low-level waste containing special nuclear material. In FY 2000, the NRC will complete a guidance document on Low-Level Waste Disposal Facility Performance Assessment. Also in FY 2000, LLW guidance will be consolidated into a single document. The NRC will continue its support of international low-level waste programs through its review of International Atomic Energy Agency safety standards and guides and by hosting visits and technical exchanges with counterparts from foreign countries.

Because of the costs associated with offsite disposal, some licensees have chosen to store waste onsite pending the development of new disposal facilities. Others allow their waste to decay in storage or store waste while awaiting processing and shipment for disposal. The NRC will address technical issues related to such storage practices as they arise. In addition, the NRC receives several requests each year for onsite disposal. The NRC will conduct safety and environmental reviews of these requests as received.

Regulation of Decommissioning

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Cleanup problem materials and fuel facility sites listed in the Site Decommissioning Management Plan (SDMP). (FY 1998: 3 sites were removed from SDMP list.)	Remove 3 sites from the SDMP list after satisfactory cleanup.	Remove 3 sites from the SDMP list after satisfactory cleanup.

In FY 1999 and FY 2000, the NRC will continue to enhance the reactor decommissioning program to add stability, predictability, and efficiency to the power reactor decommissioning process. These activities include the completion of guidance documents that implement the 1997 decommissioning rule, implement the experience gained from plants undergoing the decommissioning process, and implementing the Commission's direction on regulatory approaches to power reactor decommissioning proposed by the staff in response to the Commission's decisions on DSI-24, "Decommissioning - Power Reactors." This will enable the decommissioning staff to conduct rulemaking related to the decommissioning process, including development of the associated implementation guidance, as well as development of a range of guidance documents for both the NRC and the industry to effectively and efficiently

implement the revised decommissioning rule. The staff will take regulatory action to address plant-specific licensing actions and exemption requests to facilitate timely decommissioning while formal rulemakings to resolve generic issues proceed.

Decommissioning project managers provide the overall management of activities pertaining to the regulation of assigned nuclear power plants and serve as headquarters point of contact with licensees, other NRC staff, and the public on safety and safeguards matters concerning specific nuclear power plants. Licensing actions require NRC review and approval before they can be implemented by licensees. These issues include: issuance of licenses, amendments of licenses, NRC originated orders, exemptions, reliefs, and notices of enforcement discretion. Other project management activities include conducting public meetings in support of the decommissioning process, reviewing licensee Post Shutdown Decommissioning Activity Reports (PSDARs), coordinating with State and local contacts, and responding to correspondence.

In FY 2000, the NRC will conduct decommissioning activities for 19 commercial power reactors to include Millstone 1, Maine Yankee, Haddam Neck, Big Rock Point, Indian Point 1, Saxton, TMI-2, Yankee Rowe, Dresden 1, LaCrosse, Humboldt Bay, Rancho Seco, San Onofre 1, Trojan, GE VBWR, Fermi, Peach Bottom 1, and Zion 1 and 2.

Portland General Electric, the licensee for the Trojan reactor, plans to ship its reactor vessel in one piece, with the internal components intact (Trojan Reactor Vessel Package [TRVP]) to the licensed low-level waste disposal site in Hanford, Washington. This shipment requires exemptions from certain NRC and Department of Transportation regulations. In October 1998, NRC reviewed and authorized the TRVP for transport, with a specific exemption from regulatory requirements and an authorization to transport which is unique to the TRVP. In November 1998, DOT approved the exemption to its regulations, and the State of Washington, which is responsible for determining the suitability of the TRVP for disposal at the Hanford waste disposal site, approved the disposal plan. The shipment is scheduled to take place in August 1999.

By conducting inspections, the NRC evaluates the licensee's ability to store or dismantle and decontaminate the power reactor plant in a safe manner maintaining the licensed configuration of the facility and managing the use of decommissioning funds as described in the regulations. The NRC's core inspection program for reactors undergoing decommissioning examines four areas: (1) facility management and cost controls, (2) decommissioning support activities, (3) spent fuel safety, and (4) radiological safety. Special inspections of major decommissioning activities using subject matter experts are also conducted.

Materials and fuel facility decommissioning involves safely removing a facility from service and reducing residual radioactivity to a level that permits the property to be released for use. This action is taken by a licensee before termination of the license. In some cases, non-licensed facilities may also be required to reduce or stabilize contamination before sites are released. This activity comprises NRC's integrated requirements for the decontamination and decommissioning of facilities and sites associated with NRC-licensed activities, including the technical interface with the Environmental Protection Agency to resolve issues of mutual interest in accordance with the March 1992 General Memorandum of Understanding and research and rulemaking efforts.

In FY 2000, the NRC will continue to manage the national program for materials and fuel cycle decommissioning including program oversight, guidance development, licensing, and casework reviews of submittals including: decommissioning plans, environmental reports, final radiological survey reports, financial assurance certifications and funding plans, and related license amendments and license termination requests.

The NRC provides increased attention to timely cleanup of approximately 40 known materials and fuel facility sites through the implementation of its Site Decommissioning Management Plan (SDMP). At these sites, buildings, former disposal areas, piles of tailings, groundwater, and soil are contaminated with low levels of uranium, thorium, or other radionuclides. Consequently, they represent varying degrees of radiological hazard, cleanup complexity, and associated costs. Additional sites are expected to be added to this list as a result of the NRC's review of all files of licenses that have been terminated to ensure that facilities were properly decontaminated and to identify any additional contamination that may require remediation. In addition, it is anticipated that additional sites will be added to the list of difficult sites as a result of licensee decisions to cease licensed operations. In addition, NRC terminates several hundred licenses per year for non-complex sites.

The NRC has implemented a graded approach (i.e., one in which the regulatory effort and requirements match the safety risks) for reviewing decommissioning activities at licensed facilities. This approach relies on a series of assessments to determine whether additional characterization, remediation, and confirmatory surveys are necessary. Included in this review are SDMP sites and other routine and non-routine materials and fuel cycle facilities. In conjunction with this graded approach, NRC will continue a decommissioning pilot program aimed at streamlining the decommissioning process by identifying new and different approaches and conducting workshops with licensees who are technically and financially capable of pursuing expedited decommissioning of their facilities in accordance with Commission direction on decommissioning at non-reactor facilities.

In FY 1999, the NRC will initiate an enhanced participatory rulemaking to establish radiological criteria for the clearance of materials and equipment that have residual radioactivity. In FY 1999, the NRC will complete the technical basis for the rulemaking, consult with EPA and other Federal agencies and the States, and complete its initial public involvement activities, including the development of an issues paper and a series of public meetings. Based on the results of these activities, the NRC will finalize its rulemaking, complete consultations with Federal agencies and the Agreement States, and develop the proposed rule and associated environmental impact statement (EIS) in FY 2000. The proposed rule and draft EIS will be published for public comment in FY 2001.

The NRC will also continue decommissioning oversight activities related to the Department of Energy's West Valley facility in accordance with the West Valley Demonstration Project Act. The Commission recently conducted a public briefing with stakeholders to discuss potential decommissioning and decontamination criteria for the site. This is a highly complex site that requires careful consideration.

The NRC will continue to work with the EPA in FY 2000 to resolve issues of mutual concern related to the regulation of radionuclides in the environment to avoid unnecessary duplication of regulatory requirements. The NRC will focus its activities in this area in supporting the Interagency Steering Committee on Radiation Standards (ISCORS). In addition to NRC and EPA, ISCORS member agencies include the Departments of Energy, Defense, Transportation, Health and Human Services, and Labor (Occupational Health and Safety Administration) and the Office of Science and Technology. Topics being addressed by ISCORS include harmonization of risk goals and assessment methods, management of mixed low-level and hazardous wastes, radioactive contamination of sewer sludge, risks associated with naturally-occurring radioactive material, implementation of NRC's decommissioning criteria, and standards for recycling.

In FY 2000, the NRC will maintain an inspection program to ensure the safety of decommissioning and to assess compliance with NRC regulations and license conditions at material and fuel cycle facilities listed in the SDMP and other non-routine decommissioning projects. Inspections will include routine radiation protection inspections, in-process inspections during decommissioning, and accompaniments during licensee-conducted final radiological surveys to assess the adequacy of the licensee's remediation process. The NRC will operate its regional laboratories to analyze samples collected during these inspections.

The NRC will continue to operate the Computerized Risk Assessment and Data Analysis Lab (formerly the Advanced Computer System) to assist NRC staff in the review of applicant site

characterization activities and engineered facilities and in performance assessments for licensing decisions in support of the Nuclear Waste Safety program.

Radionuclide Transport and Decommissioning

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Technical bases for safety and regulatory guidance and decisionmaking.	Issue 3 research products that respond to high- and medium-priority needs from the Commission and NRC's licensing organizations. Develop, maintain, or improve 2 engineering codes/models for use by RES and licensing organizations for regulatory analyses/decisionmaking.	Issue 4 research products that respond to high- and medium-priority needs from the Commission and NRC's licensing organizations. Develop, maintain, or improve 2 engineering codes/models for use by RES and licensing organizations for regulatory analyses/decisionmaking.
Definition: Research products are typically reports containing experimental or analytical results that form the technical basis for regulations, regulatory guides, new methods, the resolution of generic safety issues and regulatory decisionmaking.		

The radionuclide transport and decommissioning program supports the development of a performance assessment capability to assess the movement of radionuclides in the environment and consequent dose to the public from NRC-licensed facilities. Topics of concern within the context of performance assessment include source term, engineered barriers, flow and transport processes, pathway analysis, and calculation of doses. It also supports the development of rules and regulatory guidance to address decommissioning issues.

Radionuclide contamination from NRC-licensed activities will continue to be a concern and, in many instances, contamination will involve varied amounts of diverse species of radioactive materials and complex natural environments. This research is concerned with assuring that the NRC has the capability to make realistic assessments of the movement of radionuclides in the environment, and with the exposure of the public to radionuclides after release from NRC-licensed facilities and from sites for which the license has been terminated. The research includes the evaluation of models, databases, and analytical frameworks to determine their appropriateness in a wide range of licensing activities such as: source-term characterization to support transport analyses, performance of engineered barriers over design life, flow and

transport processes, definition of critical groups and pathway analyses, and integrated performance assessment modeling.

During FY 2000, the regulatory guidance supporting the final rule addressing radiological criteria for license termination will be revised by the NRC on the basis of public comments and issued as final.

In FY 2000, the NRC will provide independent technical support for revisions and updates to improving the MARSSIM methodology. The Multi-Agency Radiation Survey and Site Investigation Manual provides information on planning, conducting evaluations, and documenting environmental radiological surveys of surface soil and building surfaces for demonstrating compliance with regulations.

The NRC will provide independent technical support in performing a survey of sewer sludge and ash, and will provide the technical basis for any rulemaking addressing radiological criteria for environmental effluents. The NRC will also update DandD (a code for Decontamination and Decommissioning) to address subsurface contamination and other issues identified in the review and use of the code.

During FY 2000, the NRC will also (1) provide a draft methodology for groundwater model selection and develop two field data bases to test the methodology; (2) extend studies of radionuclide solubilities to include additional sources of contamination; (3) provide data on column experiments to support mechanistic performance assessment modeling of contaminated field site; (4) continue to evaluate the mineral composition of slags from various smelting processes with concentrated radionuclides; (5) provide a comparison of models, analytical methods and instrumentation used for infiltration assessments and analysis of soil properties in site characterization studies; (6) provide final documentation on monitoring for long-term groundwater quality stability; (7) provide a progress report on mechanistic modeling of clay sorption and the feasibility assessment for incorporating mechanistic sorption in the Sandia Environmental Decision Support System (SEDSS), which is both a decision-support methodology and an automated decision-support tool to assist environmental decision makers in selecting appropriate tool characterization and remediation schemes; (8) provide an assessment of the importance and difficulty of considering spatial and statistical distribution of data in SEDSS and the complexity associated with including mechanistic sorption modeling; and (9) provide an evaluation of conceptual model assumptions used to assess monitoring systems for deep unsaturated systems and data sets for use in evaluating and testing conceptual models.

NUCLEAR WASTE SAFETY

Uranium Recovery Licensing and Inspection

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Licensing Actions. (FY 1998: The number of reviews met the budget estimate.)	Conduct reviews such that the number of application reviews completed meets or exceeds the budget estimates.	Conduct reviews such that the number of application reviews completed meets or exceeds the budget estimates.
Safety inspections of uranium recovery facilities. (FY 1998: Completed 43, exceeded target of 40 inspections.)	Complete an average of 25 inspections per year.	Complete an average of 25 inspections per year.

NRC efforts for uranium recovery are governed by the Atomic Energy Act (AEA) of 1954, (AEA) as amended and the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, as amended. Under the AEA, the NRC is responsible for licensing the activities involved with the concentration of uranium from ore into source material. UMTRCA establishes two programs to protect health and the environment: Title I and Title II. The Title I program established a joint Federal/State-funded program for remedial action at abandoned mill tailings sites, with ultimate Federal ownership under license from NRC. Under Title I, the NRC must evaluate the Department of Energy's (DOE's) designs and concur that DOE's actions meet standards set by the Environmental Protection Agency. The Title II program deals with sites under license to the NRC or Agreement States, as provided by the AEA. Under Title II, the NRC has the authority to control radiological and non-radiological hazards associated with byproduct material, and ensure that sites licensed by NRC and Agreement States meet all applicable standards and requirements before termination of the license.

For licensed uranium mills, the NRC's goal is to complete the review of two uranium recovery site reclamation plans in FY 1999. The NRC will also complete the review of three applications for alternate concentration limits or Corrective Action Plan reviews for groundwater cleanup at license sites. This effort will include the preparation of safety evaluations and environmental assessments. In FY 1999, the NRC also plans to continue development of a new set of regulatory requirements solely applicable to uranium recovery facilities. The new rulemaking will: (1) update the additional technical requirements for solution mines; (2) clarify existing requirements and remove inconsistencies; and (3) codify criteria that will allow uranium mill tailings sites to be used for the disposal of contaminated

soil from other NRC-licensed sites undergoing decommissioning. The NRC's goal is to have a revised rule promulgated by early FY 2001.

The NRC will complete the review of approximately 80 license amendments in FY 2000, plus two new license applications in FY 2000. The NRC will also conduct the review of approximately two construction completion reports, which must be approved before termination of site-specific licenses. Besides ensuring that the reviewed actions comply with the applicable requirements, the NRC's goal is to meet or exceed the budget projections for completed actions.

Through its inspection program for uranium recovery sites, the NRC will verify acceptable implementation of licensee commitments, and confirm that facilities are being operated or decommissioned in compliance with applicable requirements. The lead for inspections will be the NRC regional office. However, support will be provided by NRC Headquarters staff for technical disciplines that are not available in the region. In addition, NRC Headquarters will be the lead for inspections verifying acceptable completion of construction work related to tailings reclamation. The NRC's goal for FY 1999 through FY 2001 is to conduct approximately 42 inspections over the three-year period through its regional office, as supported by Headquarters staff. Besides supporting field related inspections, the NRC will also provide event followup activities. This includes the identification, evaluation, and closure of violations identified through normal licensing actions, preparation of generic correspondence to all licensees to ensure an industry-wide knowledge of problems and operational issues; and revisions to inspection procedures and guidance documents to reflect lessons learned from inspections.

Consistent with DOE's completion of surface reclamation, for FY 1999, the NRC will complete the licensing of the final two Title I sites being reclaimed by DOE. The NRC's efforts in this area will include completing the design review at one site, and the construction completion review and licensing of both sites. In FY 1999 and FY 2000, the NRC will also conduct licensing of Title II reclaimed uranium mill tailings impoundments for long-term care in each fiscal year. This effort covers mills under site-specific license to NRC and Agreement States. Other work that will be completed in this area during FY 1999 and FY 2000 is the NRC evaluation of DOE's post-licensing actions for Title I and II sites at uranium mill tailings impoundments under long-term care by DOE. In FY 2000, the NRC will continue to evaluate the groundwater cleanup aspects for the Title I sites. This effort covers the concurrence on DOE strategies and cleanup programs for all Title I sites, and the overall concurrence that groundwater reclamation has been completed in compliance with applicable Environmental Protection Agency standards.

Non-High-Level Waste Safety Legal Advice

The *Office of the General Counsel* (OGC) will provide legal advice and assistance to the Commission and NRC staff on low-level waste and transportation of radioactive materials and waste, and in the decommissioning of materials facilities.

INTERNATIONAL NUCLEAR SAFETY SUPPORT

STRATEGIC GOAL

Support U.S. national interests in the safe and secure use of nuclear materials and in nuclear non-proliferation.

DESCRIPTION OF STRATEGIC ARENA

The NRC maintains a program of international cooperation to help ensure the safe, secure, and environmentally acceptable uses of nuclear energy. As the regulator of the world's largest civilian nuclear program, the NRC has extensive regulatory experience to contribute to international programs in areas such as nuclear reactor safety, radiation protection, nuclear materials safety and safeguards[14], waste management, and decommissioning of nuclear facilities.

The International Nuclear Safety Support strategic arena encompasses international nuclear policy formulation, export-import licensing for nuclear materials and equipment, treaty implementation, international information exchange, international safety and safeguards assistance, and deterring nuclear proliferation. NRC international activities support broad U.S. national interests, as well as the NRC's domestic mission. The primary foundation for these activities is the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, the Nuclear Non-Proliferation Act of 1978, executive orders, and treaties and conventions.

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Domestic safeguards activities are conducted primarily by the Office of Nuclear Material Safety and Safeguards (NMSS). The Office of International Programs takes the lead in the international arena with the support of other NRC offices: NMSS, Nuclear Reactor Regulation, Nuclear Regulatory Research, Administration, and the General Counsel.

The International Nuclear Safety Support strategic arena encompasses the program, Participation in International Activities. The contract support funds are allocated for work done by Department of Energy (DOE) contractors, commercial contractors, small business entities, nonprofit organizations (e.g., universities and foundations), and grantees.

[14] Safeguards include physical protection as well as material control and accounting.

INTERNATIONAL NUCLEAR SAFETY SUPPORT

MEASURING RESULTS -- PERFORMANCE GOAL

The NRC has established the following performance goal to measure progress in achieving the strategic goal of international nuclear safety support to support U.S. national interests in the safe and secure use of nuclear materials and in nuclear non-proliferation.

1. **Strengthen international nuclear safety and safeguards through leadership and participation in international nuclear policy formulation and exchange activities by providing assistance through international agreements. Support U.S. nuclear non-proliferation interests through export/import licensing and other activities.**

   The performance indicator is the completion of the significant program outputs that are discussed in the International Nuclear Safety Support arena of the FY 2000 budget request.

The **FY 2000 target** is to complete those outputs that are scheduled for FY 2000.
The **FY 1999 target** is to complete those outputs that are scheduled for FY 1999.
FY 1998 Performance: Information on FY 1998 outputs presented in the International Nuclear Safety Support arena of the FY 2000 budget request.

STRATEGIES

1. The NRC will take a more active role in formulating international nuclear regulatory policy.

2. The NRC will provide leadership to strengthen nuclear safety and safeguards worldwide.

3. The NRC will assist in curbing the proliferation of the capability to produce nuclear explosives.

INTERNATIONAL NUCLEAR SAFETY SUPPORT

The following table depicts the relationship of the international nuclear safety support program to the arena strategies identified above. The required resources are developed on the basis of the program and functions necessary to implement the strategies. Detailed information on the resources, programs, and their associated output measures, are presented in the International Nuclear Safety Support arena of the FY 2000 budget request. FY 1998 baseline data for the FY 1999 and FY 2000 output measure targets are provided, where available.

FY 2000 INTERNATIONAL NUCLEAR SAFETY ARENA PROGRAM LINK TO ARENA STRATEGIES

INTERNATIONAL NUCLEAR SAFETY ARENA PROGRAM LINK TO ARENA STRATEGIES	STRATEGIES		
FY 2000 PROGRAMS ($4,840K, 41 FTE)	1	2	3
Participation in International Activities	X	X	X

BUDGET AUTHORITY BY FUNCTION AND BY PROGRAM
FULL-TIME EQUIVALENT EMPLOYMENT BY PROGRAM

(Dollar amounts in tables represent thousands of dollars ($K). In text, whole dollar amounts are used. Staff numbers represent full-time equivalents (FTEs).)

Total FY 2000 Estimate $4,840,000

	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Function ($K)				
Salaries and Benefits, Fee Base	4,437	3,315	3,536	221
Salaries and Benefits, General Fund (AID)	0	0	600	600
Total	4,437	3,315	4,136	821
Contract Support	177	145	205	60
Travel	488	471	499	28
Total	5,102	3,931	4,840	909
Budget Authority by Program ($K)				
Participation in International Activities	5,102	3,931	4,840	909
Full-Time Equivalent Employment by Program				
Participation in International Activities, Fee Base	47	35	35	0
Participation in International Activities, General Fund (AID)	0	0	6	6
Total	47	35	41	6

EXPLANATION OF RESOURCE CHANGES BY PROGRAM

Participation in International Activities. The resource increase in FY 2000 is primarily based upon NRC's having renegotiated its reimbursable agreements with AID to obtain full recovery of NRC's FY 1999 FTE costs for providing nuclear safety assistance to the countries of the former Soviet Union (FSU). In FY 2000, NRC will include the AID-related work for the FSU and Central and Eastern Europe countries within the General Fund portion of the requested appropriation, but off of the fee base.

JUSTIFICATION OF PROGRAM REQUESTS

Participation in International Activities

The NRC participates in a wide range of mutually beneficial programs involving information exchange with counterparts in the international community. It also provides for support for strengthening of the International Atomic Energy Agency (IAEA) safeguards and technical reviews associated with export licensing.

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Negotiate/renew bilateral exchange arrangements between NRC and appropriate foreign counterparts to ensure that an effective framework for NRC's international exchanges is in place. (FY 1998: Completed 7 arrangements.)	Negotiate/renew 5 arrangements.	Negotiate/renew 5 arrangements.
Issuance of NRC licenses. (FY 1998: Completed 90 staff reviews. 100 percent were completed within 60 days.)	Complete reviews for and issue as appropriate, approximately 75-100 NRC import/export authorization (NRC licenses or amendments). Staff reviews, including the drafting of required Commission decision papers, will be completed for 90 percent of the cases within 60 days of the receipt of all necessary documentation, including Executive Branch views and recipient country assurances, and when applicable, State and LLW and Compact acceptance letters, and public intervention petitions and associated filings.	Complete reviews for and issue as appropriate, approximately 75-100 NRC import/export authorization (NRC licenses or amendments). Staff reviews, including the drafting of required Commission decision papers, will be completed for 90 percent of the cases within 60 days of the receipt of all necessary documentation, including Executive Branch views and recipient country assurances, and when applicable, State and LLW and Compact acceptance letters, and public intervention petitions and associated filings.

Reviews of Executive Branch proposed Part 810 licenses, Subsequent Arrangements, and Section 123 Agreements for Cooperation. (FY 1998: Completed 34 staff reviews, 100 percent were completed within 60 days.)	Complete staff reviews within 60 days.	Complete staff reviews within 60 days.

The NRC maintains a leadership role in the standing committees and senior advisory groups of the IAEA and the Nuclear Energy Agency and participates in exchange of views in other high-level meetings focused on international nuclear regulatory policy formulation. The NRC participates with the international community in developing approaches for the safe and secure use of nuclear material for peaceful purposes, and initiated the formation of the International Nuclear Regulators Association (INRA). The INRA was established to enable its members to influence and enhance nuclear safety worldwide from a regulatory perspective and to facilitate international cooperation in nuclear regulation.

The NRC participates in a wide range of mutually beneficial programs involving information exchange with counterparts in the international community and also provides a carefully selected range of safety and safeguards assistance to develop and strengthen foreign nuclear regulatory authorities, especially those in the New Independent States of the former Soviet Union (FSU) and countries of Central and Eastern Europe (CEE). The NRC currently maintains 34 information exchange arrangements. These arrangements provide communications channels that ensure the prompt reciprocal notification of power reactor safety problems that could affect both U.S. and foreign plants. They are the foundation for bilateral cooperation with other nations in nuclear safety, physical security, materials control and accounting, waste management, environmental protection, and other areas to which the parties agree. The NRC participation in bilateral information exchanges with the regulatory authorities of foreign countries that have established nuclear power programs helps to gain safety insights and information useful to the regulatory mission of the NRC. Priority is given to those countries where most relevant information may be gained, such as Japan, France, United Kingdom, Spain, Sweden, and Switzerland. In addition to its extensive program of bilateral cooperation with other countries, the NRC also works closely in the area of nuclear safety with international organizations such as the International Atomic Energy Agency (IAEA) in Vienna, and the Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development (OECD) in Paris. In FY 2000, the NRC will sponsor an IAEA operational safety assessment review team visit to a volunteer U.S. nuclear power plant to evaluate elements of operational safety over and above compliance and performance measures normally required

by NRC; this will enhance the plant's self-assessment and independent assessment processes. NRC assistance efforts include helping countries strengthen their regulatory organizations, training foreign inspectors, and working together in the areas of operational safety and risk reduction. In providing this assistance, the NRC works closely with the Department of State (DOS), the Department of Energy (DOE), and the Department of Defense (DoD), and the Agency for International Development (AID). Presently, funding for the assistance to the New Independent States of the FSU and countries of CEE is provided by AID, DOE, and DoD.

In addition, the NRC financial management policy is that the NRC will pursue reimbursement from Federal agencies and other outside organizations for the full costs of activities that are not a part of its statutory mission and for which the NRC has not received appropriations. Consequently, the NRC has renegotiated its reimbursable agreements with the AID to obtain full recovery of NRC's FTE costs for providing nuclear safety assistance to countries of the FSU for FY 1999. In FY 2000, the NRC will include the AID work for the FSU and CEE countries within the General Fund portion of the requested appropriation.

The NRC participation in U.S. initiatives at presidential summits and vice-presidential commissions (e.g., U.S.-Russian Joint Commission on Economic and Technological Cooperation, U.S.-South African Binational Commission, and other vice-presidential/prime minister-level commissions as they arise) could result in additional requests for safety assistance to the New Independent States of the FSU, CEE, South Africa, China and other countries. International nuclear safety assistance and cooperation are expected to expand in the Pacific Rim countries with rapid growth in their economies and electric energy sectors. These activities will require a continued and focused commitment of staff resources.

The international Convention on Nuclear Safety (CNS) became effective on October 24, 1996. Assuming U.S. Senate ratification of the CNS, the Commission will be required to implement several of its major elements, including preparation of the U.S. report, review of national reports of other contracting parties, and participation in preparatory, organization, and review meetings--all of which will require sustained commitment of staff resources. Two additional international conventions on waste management and liability have been negotiated. The Executive Branch is reviewing them and will likely forward them to the Senate for its advice and consent for ratification in Calendar Year 1999. Assuming that the U.S. Senate ratifies these conventions, the Commission will be required to implement several of their major elements, including preparation of national reports and participation in review meetings--all of which will require sustained commitment of staff resources.

The NRC will also continue to participate as a member of interagency U.S. physical protection review teams to exchange technical information with representatives of foreign governments

on physical protection procedures and practices and to host reciprocal visits to the United States. The NRC will continue to support IAEA-sponsored international safeguards activities deterring nuclear proliferation. It will facilitate IAEA information gathering and inspection activities at selected U.S. nuclear facilities, as required. It will continue to participate in the management and direction of interagency groups supporting the strengthening and implementation of IAEA safeguards. The NRC will also continue to assist the regulators in Russia, Ukraine, and Kazakhstan in developing and implementing national systems for accounting and control of nuclear materials and for physical protection. The objective of this program is to develop systems of material control and accounting and physical protection that will include a body of regulations, guides, technical review criteria, implementation standards and procedures, and a licensing and inspection program.

The NRC participation in international activities also involves awarding and administering contracts to countries in the Commonwealth of Independent States and other countries in Eastern Europe and the translation of documents under the Lisbon Agreement protocols between the NRC and its counterpart regulatory agencies in Russia, the Ukraine, Belarus, Kazakhstan, Armenia, Lithuania, Bulgaria, Hungary, the Czech Republic, and Slovakia. Included are documents related to reactor safety systems, waste management, emergency planning, and strengthening organizational oversight, among others.

Under the Atomic Energy Act of 1954, as amended, the NRC is responsible for licensing the export and import of nuclear materials and equipment to ensure these items are used for peaceful purposes. This authority extends to nuclear reactors and other fuel cycle facilities and equipment, to source and special nuclear material, to byproduct materials, and to certain other commodities, including heavy water, nuclear-grade graphite and radioactive waste. The NRC obtains the views and recommendations of other governmental agencies and departments in its prelicensing reviews, and, in turn, provides its views and recommendations to DOS, DOE, and the Department of Commerce (DOC) on nuclear-related export authorizations under Executive Branch jurisdiction.

Approximately 75-100 NRC licensing cases for the export of nuclear materials will be completed in FY 2000, following required reviews and determinations, including safeguards, legal, policy, and physical protection evaluations by the NRC staff.

MANAGEMENT AND SUPPORT

MANAGEMENT GOALS AND STRATEGIES

The management goals and strategies cut across all NRC regulatory and support activities and are designed to build an environment conducive to accomplishing the agency's strategic goals and mission. These goals, and their associated strategies, define the means by which the NRC will conduct business to ensure success in the implementation of the strategic plan and the accomplishment of the agency's mission.

In establishing these goals, the NRC has placed significant emphasis on achieving excellence and public confidence. Striving for excellence in all NRC functions is both desirable and necessary to maintain an effective and efficient regulatory framework in today's changing environment. As stated in the NRC's "Principles of Good Regulation," the American taxpayer, the rate-paying consumer, and licensees are all entitled to the best possible management and administration of the NRC's activities. Building and maintaining public confidence is critical to carrying out the agency's mission and achieving its vision. To be an effective steward of nuclear safety, NRC's actions must be such that the public, those the agency regulates, and other stakeholders have respect for and confidence in the NRC. The following overarching management goals provide the means to accomplish these goals, mission, and vision.

Management Goals	Management Strategies
Achieve excellence by effectively and efficiently carrying out NRC regulations and support functions.	The NRC will continue to assess and improve the effectiveness and efficiency of the regulatory process, incorporating innovative approaches in response to a changing environment. The NRC will provide excellent and timely support services.

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Management Goals	Management Strategies
Inspire public confidence by providing the public, those the NRC regulates, and other stakeholders in the national and international community with clear and accurate information about, and a meaningful role in, NRC's regulatory program.	The NRC will objectively demonstrate that its efforts enable the nation to use nuclear materials safely and securely. The NRC will respond to the requests, inquiries, and concerns of its stakeholders in a timely, courteous, and professional manner. The NRC will identify regulatory decisions or issues that are likely to generate substantial public interest or concern at an early stage, and employ appropriate methods to inform and involve the public. The NRC will ensure that information is technically sound, clear, accurate, reliable and timely.
Sustain a high-performing, diverse workforce.	The NRC will obtain and retain a high-quality, culturally diverse workforce. The NRC will foster a work environment that provides opportunities for employees to use their diverse talents and contribute their maximum to accomplishing the NRC's mission. The NRC will strengthen the staff's ability to accomplish NRC's mission through training and development. Through executive succession planning and executive development, the NRC will select and develop strong managers who can provide vision and strategic leadership. The NRC will focus on results and recognize employees for achieving those results.

Management Goals	Management Strategies
Apply information technology to streamline processes, improve information delivery, and support scientific computing and information needs.	The NRC will increase our knowledge of and ability to apply information technology to improve NRC performance. The NRC will improve delivery of the information needed to achieve our mission. The NRC will maintain a robust and reliable information technology infrastructure that is driven by current and planned technical and business application needs. The NRC will make sound information management technology investments that are focused on results and responsive to customer needs. The NRC will ensure that its computer systems are Year 2000 compliant, and oversee licensee activities to ensure that Year 2000 issues do not adversely affect public health and safety.
Employ innovative and sound business practices.	The NRC will create and maintain a planning, budgeting, and performance management process that is focused on outcomes and provides an effective tool for setting goals, allocating resources, tracking progress, measuring results, and identifying areas for improvement. The NRC will acquire goods and services in an efficient manner that helps to accomplish the agency's mission, ensures fair and equitable treatment for all parties wishing to do business with the NRC, and results in the best value to the NRC.

MANAGEMENT AND SUPPORT

FY 2000 MANAGEMENT AND SUPPORT LINK TO STRATEGIC ARENAS

The following table depicts the relationship of the Management and Support program to the strategic arenas. The required resources are developed based on the program and functions necessary to implement the strategies designed to build an environment conducive to accomplishing the agency's strategic goals, mission, and vision. Detailed information on the resources, programs, and their associated output measures are provided in the Management and Support section of the FY 2000 budget request. FY 1998 baseline data for the FY 1999 and FY 2000 output measure targets is provided, where available.

	Strategic Arenas			
	Nuclear Reactor Safety	Nuclear Materials Safety	Nuclear Waste Safety	International Nuclear Safety Support
FY 2000 Programs ($144,493K, 629 FTE)				
Management Services ($55,458K, 176 FTE)	X	X	X	X
Information Technology and Information Management ($47,911K, 172 FTE)	X	X	X	X
Financial Management ($19,750K, 106 FTE)	X	X	X	X
Policy Support ($21,374K, 175 FTE)	X	X	X	X

MANAGEMENT AND SUPPORT

DESCRIPTION

Management and Support encompasses NRC's central policy direction, legal advice for the Commission, analysis of long-term policy issues, administrative proceedings review and advice, liaison with outside constituents and other Government agencies, financial management, all administrative and logistical support, information resources management, executive management services for the Commission, personnel and training, and matters involving small and disadvantaged businesses and civil rights.

Two major information technology systems are currently being developed to provide for agency-wide efficiencies. A discussion of the efficiencies to be provided by STARFIRE, an agency-wide integrated financial and resource management system, and ADAMS, an agency-wide document management system, are discussed in Appendix I, "FY 2000 Performance Plan," under Agency Efficiency.

Management and Support comprises the following four programs: Management Services, Information Technology and Information Management, Financial Management, and Policy Support. The contract support funds are allocated for services and products obtained from commercial contractors and other Federal agencies, such as the General Services Administration and the Office of Personnel Management.

BUDGET AUTHORITY BY FUNCTION AND BY PROGRAM
FULL-TIME EQUIVALENT EMPLOYMENT BY PROGRAM

(Dollar amounts in tables represent thousands of dollars ($K). In text, whole dollar amounts are used. Staff numbers represent full-time equivalents (FTEs).)

Total FY 2000 Estimate $144,493,000

	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Function ($K)				
Salaries and Benefits	55,614	56,654	59,329	2,675
Contract Support	91,839	92,580	84,225	-8,355
Travel	1,077	1,035	939	-96
Total	148,530	150,269	144,493	-5,776
Budget Authority by Program ($K)				
Management Services	54,737	53,406	55,458	2,052
Information Technology and Information Management	54,385	54,464	47,911	-6,553
Financial Management	18,839	21,702	19,750	-1,952
Policy Support	20,569	20,697	21,374	677
Total	148,530	150,269	144,493	-5,776
Full-Time Equivalent Employment by Program				
Management Services	196	181	176	-5
Information Technology and Information Management	176	175	172	-3
Financial Management	103	108	106	-2
Policy Support	181	181	175	-6
Total	656	645	629	-16

EXPLANATION OF RESOURCE CHANGES BY PROGRAM

Management Services. The resource increase in FY 2000 reflects support for the Human Resources Information System (HRIS), a component of the agency-wide integrated financial and resource management system (STARFIRE) and is offset by a reduction in the level of training, and adjustments to accommodate for inflation in rent.

Information Technology and Information Management. The resource decrease in FY 2000 is associated with a reduced level of support for activities in the areas of information technology infrastructure, applications development, information management, and efficiency gains in the way business is conducted. Resources are also decreased due to the closing of the local public document rooms beginning in the latter part of FY 1999 and concluding in FY 2000. These program decreases are offset by increased personnel costs associated with salary and other benefits cost increases.

Financial Management. The resource decrease in FY 2000 is primarily based upon decreased requirements for the agency-wide integrated financial and resource management system (STARFIRE), as the new system's core accounting capability becomes operational in FY 1999, and efficiencies achieved through ongoing operations of the new system.

Policy Support. The resource increase in FY 2000 primarily results from increased personnel costs (pay raises, within-grade increases, and benefits cost increases).

Management Services

	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Function ($K)				
Salaries and Benefits	14,883	14,206	14,812	606
Contract Support	39,719	39,061	40,569	1,508
Travel	135	139	77	-62
Total	54,737	53,406	55,458	2,052
Budget Authority by Activity ($K)				
Administration	44,030	42,265	43,292	1,027
Human Resources	9,653	10,069	11,084	1,015
Small Business and Civil Rights	1,054	1,072	1,082	10
Total	54,737	53,406	55,458	2,052
Full-Time Equivalent Employment by Activity				
Administration	127	115	112	-3
Human Resources	62	59	57	-2
Small Business and Civil Rights	7	7	7	0
Total	196	181	176	-5

Administration

The Administration activity includes responsibility for rent and facility management, security, administrative services, and acquisition of goods and services. These functions are in direct support of the staff in carrying out the mission of the agency.

Rent and Facility Management--In FY 2000, the agency's rent payments to the General Services Administration (GSA) and facilities management costs will total approximately $25 million, which represents 60 percent of the costs for this activity. Rent payments to GSA are for the two building White Flint North complex, regional offices, the warehouse, the Public Document Room (PDR) in Washington, DC, and other ancillary space. The day-to-day oversight of office and support space at the headquarters is conducted within the rent and facility management planned accomplishment. This includes establishing policies, standards

and procedures for NRC-wide space and building acquisition and utilization, administering the terms of the GSA delegation program applicable to the White Flint Complex, operating and maintaining buildings and grounds at White Flint, and managing the agency's conservation program.

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Conduct program assessments with representatives from program offices and the Office of Human Resources to evaluate the effectiveness in various areas based upon criteria used by GSA. Satisfactory rating will be evidence that the White Flint complex is operated and maintained in conformance with GSA delegation and NRC standards; and that office space alterations maximize space utilization consistent with agency FTE reductions and streamlining initiatives, and provide a safe and healthy work environment for NRC employees.	A score of 90 or higher on the GSA-supplied criteria. Promulgate results by September 30, 1999.	A score of 90 or higher on the GSA-supplied criteria.
One White Flint North (OWFN) Restack Project milestones. After ten years of occupancy, the purpose of the OWFN Restack Project is to upgrade communications cabling, replace/repaint floor and wall coverings, and restack and reconfigure offices due to agency downsizing.	Complete floors 15, 14, 13, and 8 in the OWFN Restack project commensurate with the following schedule: Floor 8: January 1999 Floor 14: April 1999 Floor 15: July 1999 Floor 13: Sept. 1999	Complete the Restack project in April 2000.

Security--Safeguarding the NRC's personnel, property, and information requires a comprehensive security program. The safeguarding of restricted data and national security information at contractor, licensee, and certificate holder facilities are conducted within this planned accomplishment. Also included are the requesting and adjudicating of security investigations/reinvestigations, operation of the NRC secure communications center,

administering the NRC drug testing program for employees and applicants, and administering the NRC intelligence support program.

Administrative Support Services--An efficient and effective administrative support infrastructure is essential in supporting the programmatic efforts of the agency. Management oversight is provided for: 1) transportation services, including management of motor vehicles, and traffic mitigation including employee subsidies for public transit; 2) office provisions, including warehouse operations, supplies, office equipment, and furniture; 3) administrative services, including conference facilities scheduling and management, audio-visual services, recycling, and various facility-related support services; 4) rule review, internal directives system management, rulemaking support services and translations services; and 5) mail, messenger and postage services.

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Complete review of draft rules without need for substantive changes and within schedules established by the Office of the Federal Register and NRC.	Completed reviews within schedule 98 percent of the time.	Completed reviews within schedule 98 percent of the time.

Acquisition of Goods and Services--This planned accomplishment encompasses all aspects of contract management necessary to ensure that the agency obtains goods and services in an efficient manner consistent with mission needs. It includes the development and implementation of agency-wide contracting policies and procedures, and implementation of the Agency's Small Business Program, whose primary goal is to ensure that small, 8(a), small disadvantaged, and small women-owned businesses receive full and fair opportunity to participate in NRC's procurement activities. It also includes the development and application of streamlined procurement processes and adherence to sound business practices in the negotiation, award, administration and closeout of agency contracts. NRC/DOE work orders are monitored to ensure that these sound business practices are applied and that assistance is provided to agency program offices in the negotiation and administration of these agreements. This planned accomplishment also ensures that agency personal property is accounted for, including property held by contractors and DOE laboratories.

MANAGEMENT AND SUPPORT

Human Resources

In managing the agency's human resources, a variety of activities are conducted in the area of recruitment, organization, program and policy analysis, placement, utilization, and training and development of agency employees. Administration of NRC-wide occupational health and safety, employee assistance, health and fitness, and child development programs are also part of the Human Resources program. In FY 2000, additional focus will be directed toward managing anticipated workforce reductions, which will challenge human resources management agency-wide.

Training and Development--The training and development planned accomplishment is composed of three major task areas: external training, in-house training and development, and management development. In concert, these task areas support the mission-related need to facilitate workplace learning by ensuring that continuous learning opportunities are supported, promoted, and fully integrated into the organizational culture as changes take place in organizational goals, technologies, programs, and environment. In support of this program accomplishment human resources professionals facilitate the development of new knowledge, skills, and competencies to meet the NRC's organizational, occupational, and individual performance expectations as well as meet recruitment goals. This planned accomplishment contributes toward NRC's need to recruit, develop, and maintain a highly skilled, competent, and responsive workforce capable of meeting today's needs and ensuring that development dollars are directed toward the highest priority needs in the organization--those that relate closest to accomplishing the agency's mission and performance goals. Training and development supports in-house and external training in the areas of information technology, management and supervision, equal employment opportunity, regulatory skills, communication skills, acquisition, financial management, and a variety of other special disciplines including management development programs sponsored by external organizations.

Recruitment and Staffing--NRC's recruitment and staffing planned accomplishment supports the creation of a competent, motivated, and culturally diverse workforce. This includes activities necessary to recruit and hire new employees and to assign both new and current employees to positions established to carry out the mission of the agency. Principal activities include position management and evaluation, recruitment contacts, advertising and recruitment visits, competitive and non-competitive staff placement activities including merit promotion, pay-setting, personnel transaction processing, and personnel records maintenance. These planned accomplishments support cultural diversity in recruitment, staffing and placement activities throughout NRC. Additional efforts will be devoted to managing workforce reductions in light of anticipated reductions in agency resources. This effort will be conducted in concert with changes in organizational culture and agency mission.

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Develop and maintain a high quality, culturally diverse workforce and applicant pool.	Manage staffing strategies to achieve targeted workforce reductions (i.e.,reductions in staff size, management and supervisory positions, and non-supervisory positions at high grade levels). Maintain a high quality, culturally diverse workforce that is no more than 25 percent under represented as compared to the available labor force, as reflected by data provided by the Oak Ridge Institutes of Science and Education.	Manage staffing strategies to achieve targeted workforce reductions (i.e.,reductions in staff size, management and supervisory positions, and non-supervisory positions at high grade levels). Maintain a high quality, culturally diverse workforce that is no more than 25 percent under represented as compared to the available labor force, as reflected by data provided by the Oak Ridge Institutes of Science and Education.

Workforce Effectiveness and Utilization--The workforce effectiveness and utilization planned accomplishment provides the infrastructure, policy, support, information, and analysis necessary for NRC managers and employees to carry out their responsibilities. The task areas in this planned accomplishment includes human resource program and policy development, workforce analysis, administration of employee appraisal and recognition programs, employee relations/labor-management partnership activities, management of human resources information and data, and human resources computer application development work. It also includes the administration of benefits and retirement, employee assistance and employee health services and safety programs. Additional resources must be devoted in FY 2000 on workforce analysis and planning, and resource monitoring and projections due to anticipated reductions in agency resources. Concurrently, an effective and efficient means to access, analyze, and project human resources information and data must be developed and maintained. This effort will be conducted in concert with changes in organizational culture and agency mission.

Small Business and Civil Rights

The Office of Small Business and Civil Rights (SBCR), develops, implements, and manages four major programs: (1) Affirmative Action, including the Federal Women's Program and implementing a managing diversity process, (2) Civil Rights, (3) Historically Black Colleges and Universities (HBCU), and (4) Small Business. The programs' mission is to (1) facilitate

equal employment opportunity for all NRC employees and applicants for employment through an ongoing affirmative employment process, (2) provide for prompt, fair, and impartial processing of discrimination complaints filed under applicable civil rights statutes (3) administer grants to HBCU faculty and graduate and undergraduate students, which affords these individuals opportunities to participate in NRC's scientific, engineering, and research activities, and (4) ensure that small, 8(a), small disadvantaged, and small women-owned businesses have full and fair opportunity to participate in NRC procurement activities.

These activities include developing the agency's Equal Employment Opportunity Program, and conducting the semi-annual briefing to the Commission on the status and progress of the Agency's Affirmative Employment Plan. SBCR implements a managing diversity process to maintain a work environment that supports valuing and utilizing all employees regardless of differences.

Information Technology and Information Management

	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Function ($K)				
Salaries and Benefits	13,997	14,811	15,656	845
Contract Support	40,282	39,560	32,168	-7,392
Travel	106	93	87	-6
Total	54,385	54,464	47,911	-6,553
Budget Authority by Activity ($K)				
Planning and Resource Management	2,554	2,709	2,861	152
Information Technology Infrastructure	23,332	26,245	23,276	-2,969
Application Development	7,040	7,002	5,554	-1,448
Information Management	21,459	18,508	16,220	-2,288
Total	54,385	54,464	47,911	-6,553
Full-Time Equivalent Employment by Activity				
Planning and Resource Management	25	25	24	-1
Information Technology Infrastructure	35	35	34	-1
Application Development	30	30	30	0
Information Management	86	85	84	-1
Total	176	175	172	-3

The Office of the Chief Information Officer (OCIO) plans, directs, and oversees the NRC's information resources, including information technology infrastructure, applications systems, and delivery of information management services, to meet the mission and goals of the agency. The OCIO ensures that information technology resources are acquired and information resources are managed consistent with Federal Information Resources Management laws and regulations, including implementation of the Clinger-Cohen Act of 1996.

Planning and Resource Management

OUTPUT MEASURES		
Output	FY 1999 Target	FY 2000 Target
Percent of agency executives and managers who have received IT training.	All NRC senior executives and managers.	All executives and managers within 12 months of hire.
Percent of OCIO employees who completed training.	70 percent of training course slots identified in OCIO employee training plans have been completed.	70 percent of training course slots identified in OCIO employee training plans have been completed.
Percent of high-level data entities in the agency's primary applications systems that are shared. FY 1998: Baseline established as 28 percent.[15]	Thirty-five percent of data entities.	Forty-five percent of data entities.

This activity encompasses the direction and coordination of agency-wide information resources planning, including development of information technology (IT) and information management (IM) goals and measures, development of agency IT architectures and standards, assessment of technology trends and their applicability to NRC business needs, direction of planning for new information technology, and management of the agency's IT Capital Planning and Investment Control process. Also included are coordination of IT and IM program evaluation, development of agency IT and IM policy, and coordination of agency IT training. This activity also covers OCIO general administrative and resource management functions, including budget, financial management, personnel, and acquisition support.

This activity also includes the NRC's computer security program, which implements administrative, technical, and physical security measures for the protection of NRC's information, automated information systems, and information technology. The computer security program encompasses special safeguards to protect classified information, unclassified safeguards information, and sensitive unclassified information that is processed, stored, or produced in all automated information systems.

[15] Entities reflect those identified by formal data modeling. As additional modeling work is done, the list of entities may change. Entities are scored "low, medium or high" in terms of the portion of systems in the business area which share the data. The percentage shared is the portion of all entities modeled which score medium or high.

MANAGEMENT AND SUPPORT

Information Technology Infrastructure

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Availability of key infrastructure services which are provided as part of the agency information technology infrastructure. (FY 1998: Baseline established as 1 percent unavailability.)	The unavailability of Infrastructure services will decrease by 10 percent per year until infrastructure services are available 99.5 percent.	The unavailability of Infrastructure services will decrease by 10 percent per year until infrastructure services are available 99.5 percent.
Availability of agency network servers within the agency information technology infrastructure (determined by the percentage of work hours agency network servers are available for staff use exceeding scheduled downtime and scheduled outages). (FY 1998: baseline established as 1 percent unavailability.)	The unavailability of network servers will decrease by 10 percent per year until infrastructure services are available 99.5 percent.	The unavailability of network servers will decrease by 10 percent per year until infrastructure services are available 99.5 percent.
Agency employees have workstation configurations that will support ADAMS and other planned agency-wide applications.	Complete replacement of all 486-based desktop PC workstations.	Replace workstations as required to support new agency applications.

This activity provides for the development, integration, implementation, management, and support of the agency's information technology (IT) infrastructure to support the mission and program activities of the NRC. The activity manages and operates the Customer Support Center which functions as a single point of contact for service questions, service requests, problem reporting, and request status. It provides desktop support which includes the replacement/upgrade of desktop microcomputers to meet agency program and business requirements and maintaining basic desktop workstations and peripheral equipment in operational condition. The telecommunications services and support area of this program provides agency long distance and headquarters local telecommunications services to meet current business needs and the related services necessary to implement and maintain these services. It provides operations and administrative support for agency communications

systems including operation of the NRC message center, videoconferencing services, voice mail system, local and long distance voice and data telecommunications services, personnel communications equipment (pagers, faxes, modems, cellular), and support for the NRC Operations Center. This activity provides for development, integration, implementation, maintenance, and support of all agency network, telecommunications, and desktop resources. This activity provides for the operation and systems programming support of agency-wide application systems and timesharing services. It provides technical support for design of the agency's information technology architecture pertaining to IT infrastructure development, standards, and practices. This activity provides technical guidance and direct assistance as needed to headquarters and regional offices concerning implementation of agency-wide application systems and IT infrastructure issues and practices. It provides personnel to serve as a liaison with application development teams to coordinate program office infrastructure development, operations, and support requirements.

Applications Development

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
Level of staff satisfaction with information in NRC's primary applications systems. (FY 1998: Baseline established as 3.52.[16])	Improve staff satisfaction level to 3.60.	Improve staff satisfaction level to 3.75.
Renovation and installation of corrected mission-critical and business essential systems to handle dates from January 1, 2000, and beyond.	By March 31, 1999, the Year 2000 renovation, validation and implementation of all maintained mission-critical and business-essential application systems will be completed.	Zero adverse affects on the public, NRC licensees, and other stakeholders.

This activity encompasses the development and maintenance of a comprehensive information technology (IT) applications management program to support the mission and program activities of the NRC, and involves the coordination of all agency IT applications development and support activities to ensure applications are efficiently developed and operationally sound on an agency-wide basis. It includes the formulation of approaches to provide appropriate

[16] The basis question asks for overall satisfaction with reliability, accuracy, and accessibility of information in selected systems.

information technology solutions to information management problems confronting the agency. Also included are the development and maintenance of methodologies to guide all agency activities throughout the entire applications life cycle, and the development of components of the agency's information technology architecture pertaining to software engineering and development tools, data base management systems, and document management systems.

Information Management

OUTPUT MEASURES		
Output/Baseline	FY 1999 Target	FY 2000 Target
ADAMS will develop demonstrable returns on investment to the agency.	No significant deviations (as defined by Clinger-Cohen Act of 1996).	No significant deviations (as defined by Clinger-Cohen Act of 1996).

This activity provides for the organizational and electronic integration of agency information management (IM) functions and for providing agency-wide IM services. It includes planning, developing policy for, managing, and delivering services related to the Public Document Room; the NRC Technical Library; the File Center; the Freedom of Information Act and Privacy Act programs; the agency's Information Collection Budget; and NRC's records, forms, and correspondence management programs. Additionally, it includes duplicating, copying, printing, editing, writing, and graphic services; centralized receipt, processing, distribution and electronic and paper inventory maintenance of agency documents; and electronic publishing, including NRC's World Wide Web internal and external sites. This activity also provides for the development, implementation and maintenance of ADAMS, the agency's electronic system that supports document creation and capture, workflow maintenance, records management, and search and retrieval by both NRC staff and the public. Efficiencies to be gained from the implementation of ADAMS will be reflected in future budget submissions.

Financial Management

	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Function ($K)				
Salaries and Benefits	7,679	8,665	9,143	478
Contract Support	11,141	13,018	10,589	-2,429
Travel	19	19	18	-1
Total	18,839	21,702	19,750	-1,952
Budget Authority by Activity ($K)				
Budget and Analysis	2,897	3,372	3,467	95
Accounting and Finance	11,478	12,430	10,488	-1,942
Permanent Change of Station	4,464	5,900	5,795	-105
Total	18,839	21,702	19,750	-1,952
Full-Time Equivalent Employment	103	108	106	-2

The Office of the Chief Financial Officer has the lead for the implementation of the Government Performance and Results Act of 1993, including the development of NRC's Strategic Plan, which was published in September 1997, and development of the NRC Planning, Budgeting, and Performance Management (PBPM) process. This process is a disciplined, integrated method for planning, budgeting, and assessing performance that will enable the agency to meet the demands of the new results-driven Federal environment. In addition to the leadership role in financial management and planning, the OCFO continues to direct the agency's traditional budgeting and accounting functions, as described below.

Budget and Analysis

This activity provides for the required functions of budget planning, development, and oversight of budget execution. This includes managing the agency planning process, including updating the agency Strategic Plan and developing the annual Performance Plan and annual Performance Report, as required by the Government Performance and Results Act of 1993. The NRC plans to provide the FY 2000 Performance Plan to Congress and the public by early February 1999 and the FY 2001 Plan to OMB in mid-September 1999. Annual performance

reports are due to the President and the Congress within 6 months of the close of the fiscal year. This activity also includes administering the NRC's authorization and appropriation legislation, managing the administrative control of appropriated and non-appropriated funds, and approving and issuing allowances and financial plans to users of agency funds.

Accounting and Finance

OUTPUT MEASURES		
Output/Baseline	**FY 1999 Target**	**FY 2000 Target**
Timeliness and quality of NRC's Annual Financial Statement. (FY 1998: Published in March 1998; received an unqualified opinion.)	Publish the FY 1998 Statement by March 1999 and receive an unqualified opinion.	Publish the FY 1999 Statement by March 2000 and receive an unqualified opinion.
Collect amounts due NRC. (FY 1998: Actual collections were within 0.9 percent of projected collections; receivables at $2.3 million.)	Achieve 98 percent actual collections when compared with projected collections and maintain past due accounts receivable at $5 million or less by the end of the fiscal year.	Achieve 98 percent actual collections when compared with projected collections and maintain past due accounts receivable at $5 million or less by the end of the fiscal year.
Pay Bills (FY 1998: 85 percent of bills by EFT; 95 percent of payments on time.)	Pay 100 percent of bills by electronic funds transfer and achieve 94 percent of payments on time.	Pay 100 percent of bills by electronic funds transfer and achieve 94 percent of payments on time.
Fee Rule (FY 1998: Issues proposed rule in March 1998; final rule in June 1998, to be effective in August 1998.)	Issue proposed rule by March. Issue final rule by June.	Issue proposed rule by March. Issue final rule by June.
Major systems subject to the CPIC process (STARFIRE) will develop demonstrable returns on investment to the agency. (FY 1998: No significant deviations.)	No significant deviations (as defined by Clinger-Cohen Act of 1996).	No significant deviations (as defined by Clinger-Cohen Act of 1996).

Accounting activities include the maintenance of a general ledger accounting system, the financial reporting required by other federal agencies, payments to vendors for goods and services received, and an annual, audited financial statement. The FY 1999 financial statement will be published by March 2000. During FY 2000, the NRC will move its core accounting system to a new agency-wide integrated financial and resource management system (STARFIRE). Efficiencies gained from the implementation of STARFIRE have been reflected in this budget submission. Additional savings will be factored into future budget requests.

The NRC is required to recover approximately 100 percent of the agency's budget authority through license and annual fees. Activities necessary to meet this requirement include developing and issuing rules that reflect fees to offset the budget authority each year; providing policy, processing applications, and analyzing fee-related data; issuing approximately 7,000 annual fee bills and 2,200 full cost licensing and inspection invoices per year; pursuing collection action; and responding to congressional constituent and licensee correspondence regarding fee billings. The office also provides services directly to employees, such as temporary duty travel services and change of station travel, as well as the traditional functions of payroll services that ensure that disbursements are accurate and timely.

Permanent Change of Station

This activity is carried out to ensure that NRC personnel who are required to change duty stations are afforded the required relocation services and expenses related to permanent change of station services and moves, such as expenses incurred in connection with the sale and purchase of a residence, transportation and storage of household goods, and subsistence while occupying temporary quarters and other miscellaneous moving expenses.

Policy Support

	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Function ($K)				
Salaries and Benefits	19,055	18,972	19,718	746
Contract Support	697	941	899	-42
Travel	817	784	757	-27
Total	20,569	20,697	21,374	677
Budget Authority by Activity ($K)				
Commission	5,261	5,182	5,539	357
Commission Appellate Adjudication	445	446	478	32
Congressional Affairs	1,004	988	1,060	72
General Counsel	4,499	4,272	4,134	-138
Public Affairs	1,462	1,546	1,655	109
Secretariat	1,788	1,956	2,086	130
Executive Director for Operations	2,751	2,900	2,974	74
Advisory Committees for Reactor Safeguards/Nuclear Waste	3,359	3,407	3,448	41
Total	20,569	20,697	21,374	677
Full-Time Equivalent Employment by Activity				
Commission	45	45	45	0
Commission Appellate Adjudication	4	4	4	0
Congressional Affairs	9	9	9	0
General Counsel	41	38	34	-4
Public Affairs	13	14	14	0
Secretariat	16	17	17	0
Executive Director for Operations	24	25	24	-1
Advisory Committees for Reactor Safeguards/Nuclear Waste	29	29	28	-1
Total	181	181	175	-6

MANAGEMENT AND SUPPORT

The *Commission* is the governing body of the Nuclear Regulatory Commission. It is responsible for determining the fundamental policy and for guiding staff offices to ensure that the civilian use of nuclear energy is regulated in a manner consistent with public health and safety, environmental quality, national security, and antitrust laws. The following Commission-level offices provide support to the Commission.

Commission Appellate Adjudication assists the Commission in its disposition of appeals of licensing board decisions and other adjudicatory matters coming before the Commission and monitors pending board cases.

Congressional Affairs serves as the principal point of contact between the Commission and Congress. The primary objectives of this activity are to ensure that Congress is kept fully and currently informed about agency activities, to coordinate appearances by and testimony of the Commission and other NRC officials before Congress, to track Congressional actions and keep the Commission apprised of legislative activities likely to affect the agency, and to help ensure that Congressional requests are responded to in a timely manner.

The *General Counsel* is the Commission's chief legal advisor and advises the Commission on the legal aspects of agency policy initiatives, programs rules and adjudicatory matters.

The Office of the General Counsel (OGC) provides advice and assistance to the Commission and NRC offices on matters involving interagency agreements, legislation, procurement, intellectual property, budget, fees, security, alternate dispute resolution matters and administrative functions, and represents the NRC in public rulemaking and administrative hearings involving procurement, personnel, personnel security, labor relations, and equal employment opportunity matters. The General Counsel is the designated agency official and provides advice to the Commission and OGC staff on all matters related to ethics and conflict of interest, and is responsible for administering the ethics program prescribed by the Office of Government Ethics.

Public Affairs (OPA) assists the Chairman in carrying out responsibilities as principal spokesman for the NRC. It assists the Commission and senior NRC staff by managing and directing the agency's public affairs program. This includes keeping top management informed of public interest in and media coverage of NRC's regulatory activities, advising the Commission on a public affairs strategy that can be implemented effectively, and advising management on conducting public meetings. Public Affairs keeps the public and media informed of NRC policies, programs, and activities; and works with civic groups. The office distributes press releases, speeches and other key documents. It responds to inquiries from reporters and the public by electronic mail, telephone, facsimile, and letter, obtaining

information requested. Public Affairs arranges technical interviews as needed, and maintains regular dialog with reporters who follow NRC to provide them with accurate, contextual information, to gain advance knowledge of what is being reported, and to notify reporters about major agency actions and release of key documents when they are about to occur.

The *Secretariat* (SECY) provides executive management services to support the Commission and to implement Commission decisions including the planning and scheduling of Commission business and preparing the Commission's meeting agenda, managing the Commission's decision-making process, codifying Commission decisions in memoranda directing staff actions, and monitoring staff compliance of pending issues and commitments. SECY maintains the Commission's adjudicatory and rulemaking dockets, including the management of the Commission's Electronic Hearing Docket which enhances the processes for handling the Commission's adjudicatory activities, processes and controls Commission correspondence, maintains the Commission's official records, and administers the NRC historical program.

The *Executive Director for Operations* (EDO) leads the operational and administrative activities of the Agency. The EDO plans and directs the programs necessary to regulate civilian use of nuclear reactors and nuclear materials, and support activities, such as research, performance evaluation and analysis, enforcement, investigations, and policy development and implementation which combined ensure the regulatory mission of the NRC is met. Additionally, the EDO manages the operating plan as part of the Planning, Budgeting, and Performance Management process.

The *Advisory Committee on Reactor Safeguards* (ACRS) is independent of the NRC staff and is statutorily mandated by the Atomic Energy Act of 1954, as amended. The ACRS reviews safety studies and facility license and license renewal applications referred to it and makes reports thereon to the NRC, advises the NRC on the hazards of proposed or existing reactor facilities and the adequacy of proposed reactor safety standards, and performs such other duties as the NRC may require. At present, the ACRS is reviewing several matters, including risk-informed and performance-based regulatory approaches, plant-specific applications of Safety Goals, possible modifications to the Safety Goal Policy Statement, proposed Phase 1 and 2 Standards for PRA quality, improvements to the NRC inspection and assessment programs, proposed revisions to 10 CFR Part 50 and 10 CFR 50.59 (Changes, Tests, and Experiments), extended power uprates, application of alternate source term at operating reactors, AP600 design certification rule, thermal-hydraulic code upgrade program, steam generator integrity issues, and applications for license renewal. The ACRS, on its own initiative, may conduct reviews of specific generic matters or nuclear facility safety-related items. As requested by the Commission, the ACRS also performs a comprehensive review of the NRC Safety Research Program and provides a report to the Commission annually. Upon request from the

Department of Energy (DOE), the ACRS reviews and provides reports on U.S. Naval reactor designs, and also advises DOE with regard to the hazards of DOE nuclear activities and facilities. In addition, upon request, the ACRS provides technical advice to the DOE Defense Nuclear Facilities Safety Board.

The *Advisory Committee on Nuclear Waste* (ACNW) was established by the Commission in June 1988 to provide independent technical advice on agency activities and programs, and to review key technical issues associated with the regulation, management, and safe disposal of radioactive waste. In performing its work, the Committee examines and reports on areas of concern as requested by the Commission and may undertake studies and activities on its own initiative, as appropriate. The bases of this advice include regulations governing the low-level waste (LLW), and other applicable regulations and legislative mandates. The scope of this advice encompasses reviewing and commenting on all issues that affect nuclear waste management disposal facilities, includes disposal of LLW in near-surface facilities; transportation; storage; nuclear materials safety; research; application of risk-informed, performance-based regulation; the risks of low-level ionizing radiation; and the evaluation of licensing documents, rules, and regulatory guidance. The Committee interacts with representatives of NRC, ACRS, other Federal, State, and local agencies, Indian Tribes, and private, international, and other organizations, as appropriate, to fulfill its responsibilities.

OFFICE OF THE INSPECTOR GENERAL

FY 2000 PERFORMANCE PLAN

OVERVIEW

The American people expect excellence and accountability from their Government. Toward that end, the U.S. Congress passed the Inspector General (IG) Act in 1978 to ensure integrity and efficiency within the Federal Government and its programs. In accordance with the 1988 amendment to the Act, NRC's Office of the Inspector General (OIG) was established as a statutory entity on April 15, 1989.

In 1993, Congress passed the Government Performance and Results Act (GPRA) due to continued concerns of waste and inefficiency in Government management. GPRA forces a shift in the focus of Federal agencies away from the traditional concerns such as staffing and activities, and more toward a single overriding issue: results. Congress was not seeking simple measures, it was seeking broad measures that would reflect the affects of agency activities on society. GPRA sought to create a management tool useful in improving the operation of Government agencies. It sought to link performance goals to planning for budget purposes, and integrate them with reasonable indicators of progress. GPRA enlists agency managers and inspectors general in fighting waste and improving accountability for financial and general management.

Accordingly, NRC's OIG is committed to ensuring the integrity and efficiency of NRC programs and operations, including within its own office, as it carries out the mandates of the Inspector General Act of 1978, as amended. To this end, and with the support of Arthur Anderson and Co. in 1995, OIG adopted its own performance goals and measures in conformance with the intent of GPRA. Since 1995, these performance goals have been modified slightly to address the contemporary issues of OIG and agency program managers.

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STRATEGIC PLAN

This section summarizes the key elements of the OIG's strategic plan as a prelude to discussion of the OIG's FY 2000 performance goals. The performance outputs that support these goals are discussed in the OIG's FY 2000 budget request.

OIG Mission

The Inspector General Act of 1978 established the legislative framework for the mission of Inspectors General.

The NRC-OIG mission is to (1) independently and objectively conduct and supervise audits and investigations relating to the NRC's programs and operations; (2) prevent and detect fraud, waste, and abuse, and (3) promote economy, efficiency, and effectiveness in NRC's programs and operations.

OIG Vision

We are the agents of positive change striving for continuous improvement in NRC's management and program operations and in the OIG's office.

OIG Strategic Goals

The OIG strategic plan contains four general goals and a number of supporting objectives. In addition, the goals in OIG's Annual Plan identify specific audits and evaluations that will be conducted during the year to achieve the strategic plan's goals and objectives.

OIG will carry out its mission by working to achieve the following strategic goals:

- To add value to NRC's technical and administrative programs, OIG will identify opportunities for improvement in the agency and will conduct activities for the purpose of preventing and detecting fraud, waste, and abuse in NRC's programs and operations.

- In order to keep our stakeholders well informed, OIG will enhance its communication and liaison activities with OIG's customers, including NRC management, the U.S. Congress, Government agencies, the nuclear industry, and public entities.

- The OIG will make value-added policy, legislative, and regulatory recommendations relating to NRC's programs and operations.

- The OIG will improve the effectiveness of its efforts in conducting activities for the purpose of preventing and detecting fraud, waste, and abuse in NRC's programs and operations by ensuring the economical, efficient, and effective operation of its office.

The OIG's performance goals and associated measures are directly related to these strategic general goals and objectives, and are linked to OIG's FY 2000 budget request.

VERIFICATION AND VALIDATION OF MEASURED VALUES AND PERFORMANCE

The OIG uses numerous small database systems to measure OIG performance. Primarily, OIG uses Microsoft Access and Clipper applications. In some instances, customer and stakeholder surveys, as well as peer reviews, are used to determine whether OIG has achieved its stated goal.

CROSS-CUTTING FUNCTIONS WITH OTHER GOVERNMENT AGENCIES

The NRC's OIG has a cross-cutting function relating to its investigatory case referrals to the Department of Justice (DOJ). Some performance outputs are dependent upon the expediency of DOJ's case processing.

OPERATIONAL PROCESSES/ORGANIZATIONAL ELEMENTS

The principal operational processes are criminal and civil investigations of fraud and abuse, financial and management audits, program evaluations and event inquiries, legislative reviews, and management support. The OIG employs auditors, management analysts, criminal investigators, investigative analysts, an attorney, and various support personnel. The OIG also uses private-sector contractors for the conduct of its Chief Financial Officers (CFO) Act audit work, contract audit work, special projects, and quality assurance reviews of its investigative program. Audit quality assurance is accomplished through applying internal policy and procedures to its audit work and through peer reviews by IGs from other Government offices.

Historically, OIG's audit and investigative staff applied approximately 45 percent of its resources to NRC's reactor program, 50 percent to management and support programs, and 5 percent to nuclear materials and nuclear waste programs. Absent any significant changes in NRC's program mix, OIG expects to continue with this approximate resource allocation if the necessary funding is provided. The OIG was authorized 44 Full Time Equivalent (FTE) employees for FY 1999.

Funding and Staffing

To carry out mandated OIG activities in FY 2000, additional funding is required. In FY 1996, OIG experienced significant staff attrition, which resulted in available carryover funds. In response, OIG reduced its budget request for FY 1998, intending to use prior year money to fund necessary activities, such as the CFO audit. The OIG attempted to restore its budget in FY 1999 but was unsuccessful. Beginning in FY 2000, available carryover funds will be exhausted.

Without an increase in the OIG's FY 2000 budget, OIG will not be able to provide adequate oversight coverage of NRC's high-risk programs. If OIG's funding is held to the FY 1998 budget of $4.8 million, OIG will have no available funds to support its program activities. This level of funding will only allow OIG to only meet its salaries and benefits costs. The resources to meet the FY 2000 performance goals and their associated FY 2000 target levels as shown in this plan are contained in the OIG's FY 2000 budget request.

Human Resources Management

All the direct mission staff of the OIG are specialists. These specialists are hired with the qualifications needed to carry out these complex operational processes. In addition, continuing education is an integral part of OIG staff career development, and essential to fulfilling their professional requirements.

Information Technology

The NRC made many changes in the way it manages its Information Technology (IT) as a result of the Clinger-Cohen Act. To ensure that agency information resource investments are cost effective and well managed, the agency has implemented an IT capital planning and investment control process. In addition, the NRC is moving toward cost center budgeting and intends to shift additional IT financial and technical responsibilities to the OIG beginning in FY 1999 and continuing in subsequent years.

Prior to FY 1992, the OIG appropriation supported its own IT requirements. To facilitate the agency's budgeting and accounting processes, OIG agreed to transfer its funds to the agency's Salaries and Expenses appropriation in exchange for the agency's support of OIG's IT requirements. The FY 2000 OIG budget reestablishes an IT funding activity to support this shift of financial responsibility for OIG office-specific IT activities from the agency's appropriation to the OIG appropriation.

Request for Waivers of Administrative Requirements to Provide Managerial Flexibility

The OIG has not identified any waivers of administrative procedures that are required to achieve its stated FY 2000 performance goals. Certain performance indicators require the use of surveys that may require OMB clearance in accordance with existing procedures.

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BUDGET AUTHORITY BY FUNCTION AND BY PROGRAM
FULL-TIME EQUIVALENT EMPLOYMENT BY PROGRAM

(Dollar amounts in tables represent thousands of dollars ($K). In text, whole dollar amounts are used. Staff numbers represent full-time equivalents (FTEs).)

Total FY 2000 Estimate $6,000,000

	FY 1998 Enacted	FY 1999 Estimate	FY 2000 Estimate	
			Request	Change from FY 1999
Budget Authority by Function ($K)				
Salaries and Benefits	4,199	4,400	4,800	400
Contract Support	360	160	[1]960	800
Travel	241	240	240	0
Total	4,800	4,800	6,000	1,200
Budget Authority by Program ($K)				
Audits	1,819	1,887	2,470	583
Investigations	1,932	2,002	2,156	154
Management, and Operational Support	1,049	911	1,374	463
Total	4,800	4,800	6,000	1,200
Full-Time Equivalent Employment by Program				
Audits	18	18	18	0
Investigations	18	18	18	0
Management, and Operational Support	7	8	8	0
Total	43	44	44	0

[1] CFO audit $410,000; information technology $375,000; and $175,000 for other mission-related activities.

EXPLANATION OF RESOURCE CHANGES

Inspector General

FY 2000 Change from FY 1999 ..... $1,200,000

The resource increase in FY 2000 stems from a recognition that after FY 1999, OIG carryover funds will be insufficient to restore OIG base-funding to a level at which the OIG can carry out its essential programs. Contract support requirements were previously funded in prior years using OIG carryover funds. These requirements include the procurement of private-sector contractors to perform the annual audit of the NRC's financial statements and provide technical investigative and audit support. In prior years, the NRC Salaries and Expenses appropriations funded OIG's information technology. The FY 2000 budget request includes new funding for OIG office-specific information technology requirements.

Audits

FY 2000 Change from FY 1999 ..... $583,000

The resource increase in FY 2000 for the audit program includes the procuring of a private-sector contractor for audit services to perform, with OIG oversight, the annual audit of NRC's financial statements as mandated by the CFO Act. The provision of these funds will ensure the ready availability of sufficient audit staff who have a well-developed understanding of NRC's programs and operations to provide audit coverage of most major high-risk agency programs on a regular, timely, and comprehensive basis. Funding is also included to acquire specialized skills of private experts to address ad hoc audit technical requirements. These costs were previously funded in prior years using OIG carryover funds.

Investigations

FY 2000 Change from FY 1999 ..... $154,000

The resource increase in FY 2000 for the investigative program includes the procuring of specialized law-enforcement equipment and the payment of fees associated with access to indoor and outdoor firearms ranges to implement the deputation provisions of the Memorandum of Understanding (MOU) with DOJ. Funding is also included to acquire specialized skills of private experts to address ad hoc investigative technical requirements. These costs were previously funded in prior years using OIG carryover funds.

Management, and Operational Support

FY 2000 Change from FY 1999 ..... $463,000

The resource increase in FY 2000 for operational support includes acquiring the services of private sector contractors to perform quality assurance reviews to measure compliance with the President's Council on Integrity and Efficiency (PCIE) Quality Standards for Investigators, DOJ guidelines, the NRC/OIG Special Agent Handbook, and other applicable laws, policies, and regulations, as well as GPRA/customer surveys. These necessary services were previously funded by using OIG carryover funds.

For FY 2000, the NRC has advised the OIG of its intention to shift the cost responsibility for OIG-specific information technology (IT) requirements, heretofore funded from the NRC's Salaries and Expenses appropriation, pursuant to the March 1991 MOU between NRC and OIG. In response, this budget includes funding for OIG office-specific IT requirements to include system development and enhancements, adaptive and corrective maintenance and operation of existing database systems, acquisition of office-specific hardware and software, and fees associated with on-line database searches conducted in association with ongoing OIG investigations.

JUSTIFICATION OF PROGRAM REQUESTS

Inspector General

The NRC's Office of the Inspector General (OIG) was established in April 1989 to independently evaluate the agency's programs and operations to ensure their efficiency and effectiveness, and to investigate allegations of fraud, waste, and abuse. The OIG accomplishes its mission by performing audits, investigations, event inquiries, assessments, and other reviews. In addition, OIG reviews the agency's policies and procedures to ensure they meet specific legislative mandates.

The NRC and the OIG each has complementary unique responsibilities in support of the agency's mission. The NRC's mission is to regulate the Nation's civilian use of byproduct, source, and special nuclear materials to ensure adequate protection for public health and safety, to promote the common defense and security, and to protect the environment. The OIG, therefore, plays a critical role by assessing and reporting on the efforts of the NRC to ensure that its safety-related programs are operating effectively.

Similarly, the NRC is responsible for ensuring that individuals who identify nuclear safety concerns regarding the use of nuclear materials do not suffer adverse job actions resulting from such activities. The OIG continually assesses the NRC's efforts to combat this type of unlawful discrimination.

Audits

Performance Measure

Improved Program Management

The audit program is designed to provide assurance to the Chairman and to Congress that NRC programs and operations are working efficiently and effectively. To do this, the OIG audit staff conducts performance and financial audits. Performance audits focus on NRC's administrative and program operations. Financial audits focus on NRC's internal control systems, transaction processing, and financial systems.

FY 2000 resources will allow the OIG to conduct 16 to 18 audits. The audits planned for this period are based on a comprehensive annual audit plan that includes input from various elements of the NRC, Congress, the General Accounting Office (GAO), the Office of Management and Budget (OMB), the Department of Energy (DOE), and the nuclear industry, as well as from the OIG staff. The plan identifies key, high-risk, high-cost programs for audit, including NRC's inspection, research, waste management, international activities, and information technology programs.

In the financial management area, the audit plan includes several audits to meet legislative and OMB requirements. FY 2000 contract support resources of $460,000 will allow the OIG to procure private-sector contractors for the annual audit of the NRC's financial statements as mandated by the Chief Financial Officers Act and for technical audit assistance. The staff plans to complete the FY 1999 Financial Statements Audit Report by March 2000.

Additionally, in FY 2000, the OIG will assess and report on NRC's response to recommendations made by OIG and other audit entities, such as GAO, concerning NRC programs.

Investigations

Performance Measures

- Department of Justice convictions
- Agency actions taken in response to reports generated by OIG

Consistent with the Inspector General Act of 1978, OIG receives and investigates allegations concerning violations of Federal laws and regulations, as well as allegations of mismanagement, waste, and danger to public health and safety. The mission of the investigative program is to perform investigative activities related to the integrity of NRC's programs and operations.

The majority of investigative activities focus on violations of law and misconduct by NRC employees and contractors as well as allegations of irregularities or abuse in NRC programs and operations. However, proactive investigations may also be conducted where indications of potentially systematic violations such as theft of Government property or contract fraud have been raised. In addition, OIG periodically performs root cause analysis and implements other preventive initiatives such as integrity awareness training.

FY 2000 resources will allow the OIG to conduct 80-100 investigations and event inquiries covering a broad range of criminal misconduct and wrongdoing affecting various NRC programs. Investigations and event inquiries may be initiated as a result of allegations or referrals from private citizens, licensee employees, NRC employees, Congress, other Federal, State and local law enforcement agencies, OIG Audits, OIG Hotline, and proactive efforts directed at areas bearing high potential for fraud, waste, and abuse.

Cases involving allegations of criminal and other wrongdoing will continue to be a high priority. We have concentrated our main efforts and resources on investigations of health and safety-related issues. These investigations include alleged misconduct by high-ranking NRC officials and other NRC officials, such as managers and inspectors, whose positions directly affect public health and safety. The investigative unit will also undertake a number of proactive project initiatives where resources allow.

The investigative caseload is primarily determined by the number of allegations received and the complexity of issues raised. On the basis of historical trends, the investigative workload has continually increased in complexity since the inception of the OIG in April 1989. The OIG opened 111 investigations and event inquiries, and closed 74 in FY 1997, and opened 92 investigations and event inquiries, and closed 103 in FY 1998. It is anticipated that a like or increased number of cases will be opened and closed during FY 1999 and FY 2000. In addition, investigators may participate in agency task forces that examine ways to strengthen agency operations.

Management and Operational Support

The Inspector General's management and operational support staff consists of senior managers, administrative support and legal counsel.

Management

FY 2000 resources will allow the OIG senior managers to lead a diverse program and provide policy direction and guidance in the conduct and supervision of audits and investigations, as well as provide leadership and coordination in recommending policies to prevent and detect fraud and abuse in agency programs and operations. To effectively supervise audits and investigations, OIG managers will provide leadership, policy direction, and coordination of OIG programs. Further, OIG managers will promote economy and efficiency and combat fraud and abuse in NRC programs and operations.

Operational Support

Performance Measures

- Provide relevant and timely support services to the NRC/OIG staff.
- Properly safeguard the use of OIG appropriated funds.

FY 2000 resources will allow the OIG administrative staff to formulate and execute the OIG budget; prepare OIG's semiannual report to Congress; operate an independent personnel program; manage the OIG contract audit program; administer the control of OIG funds;

authorize OIG travel; administer the information technology program; provide space planning, security management, quality assurance, training, and procurement support to the OIG; and serve as the liaison and point of contact for activities of the President's Council for Integrity and Efficiency. In addition, FY 2000 resources will allow the OIG to analyze and report on 40 to 50 contract audit reports for questioned costs and funds put to better use issued by DCAA and HHS. Moreover, FY 2000 contract support resources of $375,000 will allow the OIG to satisfy OIG office-specific IT requirements.

Legal Counsel

Performance Measure
Provide objective, relevant, timely recommendation(s) on legislation, regulations, and policy affecting economy, efficiency, and fraud and abuse prevention.

FY 2000 resources will allow the OIG Counsel to provide independent advice on issues concerning criminal law and procedures, evidence, and constitutional law as these relate to the OIG's investigative program. In addition, OIG Counsel develops legal interpretations of appropriation law, financial management statutes and regulations, and procurement and funding rules in support of OIG's audit program. The OIG Counsel furnishes litigation support to DOJ and others as necessary, and advises on matters concerning personnel, procurement, labor law, and Privacy Act and Freedom of Information Act issues. The OIG Counsel also reviews in depth and comments on existing and proposed legislation, regulations, directives, and policy issues that affect NRC programs and operations.

STRATEGIC PLAN/PERFORMANCE PLAN LINKAGE

Role of the OIG

The existence of the OIG relieves agency program managers and executives from being solely responsible for gathering objective data and evidence in circumstances in which wrongdoing is suspected and intense scrutiny and controversy exist. In this capacity, an OIG is the focal point for the responsibility for conducting audits and investigations relating to the programs and operations of the agency.

In order to accomplish this broad mandate, Inspectors General (IGs) have substantial independence and authority. Within this broad purview, the IGs are authorized to conduct audits and investigations of agency programs; have direct access to agency records and materials; issue subpoenas for all necessary information, data, reports, and other documentary evidence; hire their own staffs; and, request assistance from other Federal, State, and local Government agencies. The IG structure allows them to act as independent fact gatherers, often undertaking initiatives at the request of the agency head, and provide assessments in such areas as financial management systems and internal controls. In such instances, the IGs and agency management pursue the same ultimate goal–efficient and effective program operation and delivery of services.

Audits

The OIG audit staff conducts performance and financial audits as well as special evaluations. Audits are conducted in accordance with Government Auditing Standards. Performance audits are conducted on NRC administrative and program operations to evaluate the effectiveness and efficiency with which managerial responsibilities are carried out. They focus on whether management controls, practices, processes, and procedures are adequate and effective, and whether programs achieve intended results.

Financial audits include the financial statements audit required by the Chief Financial Officers Act and other financial-related audits. These audits include such items as internal control systems, transaction processing, financial systems, and contracts. As a complement to the audit function, OIG auditors perform a limited number of special evaluations. These evaluations provide a mechanism for the OIG to perform an initial, quick review of a question or an issue to determine whether in-depth, independent audit work should be planned. In preparing reports summarizing audit findings, the OIG strives to maintain an open channel of

communication between the agency and management officials to ensure that audit findings are accurate and fairly presented in the audit report.

Investigations

Investigations are conducted in accordance with the Quality Standards for Investigations of the President's Council on Integrity and Efficiency (PCIE), Department of Justice (DOJ) guidelines, the NRC/OIG Special Agent Handbook, and other applicable laws, policies, and regulations. OIG investigators conduct investigations of individuals and entities suspected of offenses against the criminal and civil laws of the United States or NRC regulations, in accordance with the IG Act. The OIG coordinates investigations with DOJ, U.S. Attorney's offices, and other law-enforcement agencies. Investigations generally fall into the following categories: fraud, waste, abuse, and mismanagement involving NRC programs, activities and functions; contract and procurement fraud and improprieties; conflict of interest and ethics violations; and NRC employee misconduct and improprieties.

Many sources refer allegations of criminal misconduct and wrongdoing to the investigative staff. These sources include NRC management and staff, the Congress, public interest groups, the nuclear industry, other Government agencies, and the general public. The OIG maintains a toll-free telephone hotline to facilitate the receipt of allegations.

In addition to criminal and administrative investigations, OIG investigators conduct event inquiries that have traits common to both audits and investigations. Institutional weaknesses that led to or allowed a problem to occur are addressed during these inquiries, which may serve as precursors for more extensive activity by OIG's audit and/or investigative staff.

Legal Counsel

The OIG Counsel reviews proposed legislation, regulations, directives, and policy initiatives that affect NRC's programs and offices. Significant concerns are documented in regulatory commentaries and given to the agency for consideration. These commentaries provide OIG's objective analysis of vulnerabilities created by proposed or existing statutes, regulations, or policies. Commentaries cite the IG Act as authority for the review; state the specific law, regulation, or policy examined; the pertinent background information considered; and identify OIG concerns, observations, and suggestions. Significant observations regarding NRC action or inaction in response to OIG commentaries are reported in the Semiannual Report to Congress.

Management Support

The Resource Management and Operational Support staff performs myriad support functions. These include formulating and executing the OIG budget, administering independent personnel services, preparing the OIG Semiannual Report to Congress, supporting information technology within OIG, and coordinating strategic planning activities.

LINKAGE BETWEEN THE GENERAL GOALS OF THE OIG FY 1998--FY 2003 STRATEGIC PLAN AND THE FY 2000 PERFORMANCE PLAN

The OIG's strategic plan includes four general goals and a number of supporting objectives that describe planned accomplishments.

The following is a linkage between the general goals of the OIG FY 1998 - FY 2003 Strategic Plan and the FY 2000 Performance Plan. This includes a tie-in between the level of activity by the OIG in its audit, investigation and support functions with the objectives related to the general goals. It also includes the performance goals (outcomes) for measuring results, performance indicators, FY 1999/FY 2000 targets and FY 1997 and FY 1998 performance levels.

General Goal 1 (Strategic Goal)

To add value to the NRC's technical and administrative programs, the OIG will identify opportunities for improvement in the agency and conduct activities for the purpose of preventing and detecting fraud, waste, and abuse in the NRC's programs and operations.

Objectives (Strategies)
1. Conduct timely, effective, and independent audits and investigations.
2. Proactively identify and act on current and emerging issues.
3. Advise the NRC in areas of OIG expertise.
4. Enhance programs for prevention and awareness of fraud, waste and abuse.

FY 2000 Activities	Objectives 1	2	3	4
OIG will conduct between 16 and 18 audits and special evaluations. Audit resources will be applied between 40-50 percent to NRC's reactor program, between 40-50 percent to NRC's management and support programs and between 5-10 percent to nuclear materials and nuclear waste programs. The allocation of audit resources applied in the different NRC program areas may be subject to change based on current NRC reorganizations and budget initiatives.	x	x	x	x
OIG will conduct between 80-100 investigations and event inquiries. Investigative resources will be applied between 40-50 percent to NRC's reactor program, between 40-50 percent to NRC's management and support programs and between 5-10 percent to nuclear materials and nuclear waste programs.	x	x	x	x

Measuring Results - Performance Goals (Outcomes)

OIG has established the following performance goals for measuring its results in achieving General Goal 1.

1.1. Conduct timely, effective, and independent audits and investigations.

Performance Indicators for Audits	FY 1999/FY 2000 Targets
Keep average cost per audit to 1 FTE or less.	.95 FTE applied per audit.
Complete audits in 6 months or less, on average.	Complete audits in 5.2 months on average.
Obtain satisfactory peer review.	Achieve 100% compliance with audit standards per peer review.
Obtain customer feedback on timeliness and quality of audits.	Obtain customer feedback on all audit reports issued.
Obtain agency agreement on at least 80% of audit recommendations.	Obtain agreement by the agency on 80-90% of audit recommendations.

FY 1998 Performance: .53 FTE applied per audit.
4.65 months per audit on average.
100% compliance with audit standards per peer review.
100% feedback obtained on issued audit reports.
100% agreement by the agency on audit recommendations.

FY 1997 Performance: .95 FTE applied per audit.
5.2 months per audit on average.
100% compliance with audit standards per peer review.
100% feedback obtained on issued audit reports.
100% agreement by the agency on audit recommendations.

Performance Indicators for Investigations	FY 1999/FY 2000 Targets
Complete investigations in an average time frame of 8 months.	Complete investigations in 8 months on average.
Apply an average of 185 hours or less on completed investigations.	Apply 185 hours or less on completed investigations.

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Performance Indicators for Investigations	FY 1999/FY 2000 Targets
Achieve a minimum success rate of 70% for convictions/pleas on cases accepted by DOJ.	Achieve 80% success rate for convictions/pleas.
Achieve a minimum success rate of 70% for actions taken by NRC management on referrals with program modification or wrongdoing aspects.	Achieve 80% success rate for management referrals.
Achieve a minimum success rate of 70% for Program Fraud and Civil Remedies Act (PFCRA) cases accepted by NRC's Office of General Counsel (OGC).	Achieve 80% success rate for PFCRA referrals.
Address 80% of issues raised in customer surveys.	90% of survey issues addressed.
Address all issues identified in quality control reviews.	100% of quality control issues addressed.

FY 1998 Performance:
6.8 months per investigation on average
160 hours per completed investigation on average
convictions/pleas - N/A
100% success rate for management referrals
PFCRA referrals - one pending
90% of survey will be addressed
100% of quality control issues will be addressed

FY 1997 Performance:
5.3 months per investigation on average
205 hours per completed investigation on average
100% success rate for convictions/pleas
100% success rate for management referrals
100% success rate for PFCRA referrals
100% of survey issues addressed
100% of quality control issues addressed

1.2. Proactively identify and act on current and emerging issues.

Performance Indicators for Audits	FY 1999/FY 2000 Targets
Develop a detailed annual audit plan, listing audits to be performed and estimated required resources, with input from agency management, Congress, industry, other Government agencies, GAO, and the public.	Complete Audit Plan by October 1, 1998, for FY 1999 and, by October 1, 1999, for FY 2000.

FY 1999 Performance: Plan completed on time.

FY 1998 Performance: Plan completed on time.

FY 1997 Performance: Plan completed on time.

Performance Indicators for Investigations	FY 1999/FY 2000 Targets
Develop a detailed annual investigative plan, based in part on sources of information developed by investigative staff. Sources include members of public interest groups, NRC employees, representatives of other agencies and licensees.	Complete Investigative Plan by October 1, 1998, for FY 1999 and, by October 1, 1999, for FY 2000.

FY 1999 Performance: Plan will be completed in March 1999.

FY 1998 Performance: Plan completed in November 1997.

FY 1997 Performance: Plan completed in November 1996.

1.3. Advise the NRC in areas of OIG expertise.

Performance Indicators for Audits and Investigations	FY 1999/FY 2000 Targets
Participation, by auditors and/or investigators, in one or more NRC management projects or task forces as observers	Participation in at least one project or task force by OIG auditors and/or investigators.

FY 1998 Performance: Participation on three intergovernmental task forces by OIG investigators

FY 1997 Performance: Participation on one intergovernmental task force by an OIG investigator

1.4. Enhance programs for prevention and awareness of fraud, waste and abuse.

Performance Indicators for Audits and Investigations	FY 1999/FY 2000 Targets
Completion of annual training for NRC employees and others, in areas most at risk for fraud, waste, and abuse	Conduct training at NRC regional offices (FY 1999) and major Headquarters components (FY 2000). Training will be provided by senior members of the OIG staff.
	Conduct training of NRC contract specialist (FY 1999) and other identified employees (FY 2000) who may detect indicators of contract fraud during the course of their duties. Training will be provided by OIG investigative staff.

FY 1998 Performance: Training was completed at Headquarters components and an updated version of "The IG at NRC" was distributed to NRC employees.

FY 1997 Performance: Training was completed at regional offices.

General Goal 2 (Strategic Goal)	
In order to keep our stakeholders wellinformed, OIG will enhance its communication and liaison activities with OIG's customers, including NRC management, the U.S. Congress, Government agencies, the nuclear industry, and public entities.	
Objectives (Strategies) 1. Develop and maintain liaison activities with OIG customers.	
	Objective
FY 2000 Activities	1
Periodically meet with the NRC Chairman, the Commission, other key NRC executives and members of Congress. Hold planning conferences and invite customers for input, provide reports to Congress summarizing results of OIG activities and accomplishments.	x

Measuring Results - Performance Goals (Outcomes)

We have established the following performance goals for measuring our results in achieving General Goal 2.

2.1. Develop and maintain liaison activities with OIG customers.

Performance Indicators for the Office	FY 1999/FY 2000 Targets
The IG/Deputy IG will meet periodically with the NRC's EDO, CFO, CIO, and the General Counsel.	The IG/Deputy IG will meet four times each year with the EDO, CFO, CIO, and the General Counsel.
The IG/Deputy IG will brief the NRC Chairman and the NRC Commissioners periodically on important OIG matters.	The IG/Deputy IG will brief the Chairman monthly and the Commissioners quarterly on OIG matters.
The IG/Deputy IG/senior members of the OIG staff will meet periodically with appropriate Congressional Committees and issue summaries of audits and investigations to the U.S. Senate Committee on Governmental Affairs.	The IG/Deputy IG/senior members of the OIG staff will meet twice each year with appropriate oversight committees and provide quarterly summaries of reports to the Committee on Governmental Affairs.
OIG will timely produce, and appropriately distribute, a Semiannual Report to Congress and other interested parties.	Semiannual reports will be distributed no later than one month following the end of the reporting period.
OIG will make publicly releasable documents available on the Internet.	All audit reports and investigative event inquiries will be on the Internet within four weeks of issuance.

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Performance Indicators for the Office	FY 1999/FY 2000 Targets
OIG investigators will be assigned liaison responsibilities for designated Government agencies and meet with representatives of these agencies on a periodic basis.	Investigators will meet quarterly with designated Government agency representatives and report results to the Assistant Inspector General for Investigations.

FY 1998 Performance:

Met 4 times with the EDO, CFO, and CIO, and 3 times with the General Counsel.

Chairman received monthly briefings and each Commissioner received a quarterly briefing.

Quarterly summaries were timely provided to oversight committees.

Semiannual reports were issued within one month after close of reporting period.

Audit reports were available on the Internet within four weeks of issuance.

Two investigative event inquiries were available on the Internet within four weeks of issuance.

Investigators met with approximately 12 designated agencies on a quarterly basis.

FY 1997 Performance:

Met once with the EDO and twice with the CFO.

Chairman received monthly briefings; Commissioners were briefed either semiannually or annually.

Quarterly reports were not requested or provided to oversight committees.

Semiannual reports were issued within one month after close of reporting period.

Audit/Investigative reports were not available on the Internet.

General Goal 3 (Strategic Goal)	
OIG will make value-added policy, legislative, and regulatory recommendations relating to the NRC's programs and operations.	
Objectives (Strategies) 1. Review existing and proposed legislation and regulations.	
	Objective
FY 2000 Activities	**1**
OIG Counsel will review existing and proposed policy legislation, and regulations relating to NRC's programs and operations. OIG will provide timely reports that make recommendations concerning the impact of such legislation or regulations as they pertain to economy and efficiency of programs and operations and vulnerability to fraud, waste, and abuse.	x

Measuring Results - Performance Goals (Outcomes)

We have established the following performance goals for measuring our results in achieving General Goal 3.

3.1. Review existing and proposed legislation and regulations.

Performance Indicators for OIG Counsel	FY 1999/FY 2000 Targets
Responses to requests from the agency for comment/input will be made within the due date(s).	90 percent of requests will be reviewed within the due date.
The agency will consider input from OIG Counsel in its decisionmaking process in the majority of matters reviewed.	OIG Counsel input will be considered in 60 percent of the matters reviewed.

FY 1998 Performance: Targets were met.

FY 1997 Performance: N/A

General Goal 4 (Strategic Goal)			
OIG will improve the effectiveness of its efforts in conducting activities for the purpose of preventing and detecting fraud, waste, and abuse in the NRC's programs and operations by ensuring the economical, efficient, and effective operation of our office.			
Objectives (Strategies) 1. Maximize organizational efficiency and effectiveness. 2. Evaluate the sufficiency of the current Issue Area Monitoring (IAM) Program. 3. Develop a specialized training program and increase the organizational knowledge of the OIG staff.			
	Objectives		
FY 2000 Activities	1	2	3
OIG will evaluate the OIG report production process and determine where and how they can be streamlined. OIG will also assess the efficiency of current methods for information distribution within OIG and establish a means to allow OIG staff to provide direct input to the IG/Deputy IG regarding audit and investigative issues.	x		
OIG will evaluate how current agency issue areas are monitored and consider whether it is appropriate to expand the current OIG program, which is currently an audit staff function, to include investigations.		x	
OIG will establish a specialized training program for the OIG staff to enhance awareness of investigative, audit, legal and pertinent legislative processes.			x

Measuring Results - Performance Goals (Outcomes)

OIG has established the following performance goals for measuring its results in achieving General Goal 4.

4.1. Maximize organizational efficiency and effectiveness.

Performance Indicators for the Office	FY 1999/FY 2000 Targets
OIG, as part of its planning efforts, will periodically evaluate the OIG process for producing reports.	OIG will review the OIG report production process on an annual basis.
OIG will conduct an assessment to address ease of retrieving information relevant to operation, barriers to access and communication, and benefits associated with the introduction of a paperless environment.	OIG will conduct an initial assessment in FY 1999 addressing the information retrieval issue with a followup review in FY 2000.

Performance Indicators for the Office	FY 1999/FY 2000 Targets
The IG and Deputy IG will schedule periodic meetings with OIG staff in order to obtain direct input regarding audit and investigative issues.	The IG and Deputy IG will meet directly with OIG audit and investigative staff on a quarterly basis each year to obtain input on audit and investigative issues.

FY 1998 Performance: Report production process reviewed in investigations resulting in streamlining of reports.

FY 1997 Performance: N/A

4.2. Evaluate the sufficiency of the current IAM program.

Performance Indicator for the Office	FY 1999/FY 2000 Targets
OIG will use a team approach to review the IAM process.	A review will be complete, with a summary report, no later than the first quarter of FY 2000.

FY 1998 Performance: N/A

FY 1997 Performance: N/A

4.3. Develop a specialized training program and increase the organizational knowledge of the OIG staff.

Performance Indicators for Audits	FY 1999/FY 2000 Targets
Auditors will attend Continuing Professional Education (CPE) in accordance with Government Auditing Standards.	Each OIG auditor will complete a minimum of 20 hours of CPE in each year and a total of 80 hours for both years combined. Of the 80 hours, 24 hours must be directly related to Government environment and to Government auditing. For entry-level employees with less than 2 years with the audit organization, a pro rata number of hours will be acceptable.
Newly hired OIG auditors will attend an NRC-developed technical training course for non-engineers at the Technical Training Center (TTC).	At least 50% of newly hired auditors will complete the TTC course.

Performance Indicators for Audits	FY 1999/FY 2000 Targets
Auditors will develop an Individual Development Plan (IDP) for long-term career development.	At least 75% of the Audit staff will develop IDPs.

FY 1998 Performance: Auditors met training requirements.

FY 1997 Performance: Auditors met training requirements.

Performance Indicators for Investigations	FY 1999/FY 2000 Targets
Investigators will attend periodic technical training relevant to NRC operations and refresher training relating to their law-enforcement function.	Each investigator will receive at least 40 hours of training.
Newly hired investigators will attend an NRC-developed training course for non-engineers at the TTC.	At least 50% of newly hired investigators will complete the TTC course.
Investigators will develop an IDP for long-term career development.	At least 75% of the investigative staff will develop IDPs.

FY 1998 Performance: Investigators met training requirements.

FY 1997 Performance: Investigators met training requirements.

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VERIFICATION AND VALIDATION OF MEASURED VALUES OF PERFORMANCE

Most of the data used to measure performance goals come from the NRC's abnormal occurrence (AO) data, and from reports submitted by licensees. The AO criteria were developed by NRC in order to comply with the legislative intent of Section 208 of the Energy Reorganization Act of 1974, as amended. The Act requires the NRC to inform Congress of unscheduled incidents or events that the Commission determines to be significant from the standpoint of public health and safety. Events that meet the AO criteria are included in an annual "Report to Congress on Abnormal Occurrences" (NUREG-0090). In addition, in 1997, the Commission determined that events occurring at Agreement State licensed facilities that meet the AO criteria should be reported in the annual AO report to Congress. Therefore, the AO criteria developed by the NRC are applied uniformly to events that occur at facilities licensed bor otherwise regulated by the NRC and the Agreement States.

Data for the abnormal occurrences originate from external sources, such as Agreement States and NRC licensees. The NRC has a high degree of confidence about the reliability of these data because (1) the information needed from external sources is required to be reported to the NRC by regulations, (2) the NRC maintains an aggressive inspection program that, among other activities, audits licensees and evaluates Agreement State programs to determine that information is being reported as required by the regulations, and (3) there are Agency procedures for reviewing and evaluating licensees.

The NRC systems that support these data include the Sequence Coding and Search System (SCSS), the Accident Sequence Precursor (ASP) Database, the Nuclear Materials Events Database (NMED), and the Radiation Exposure Information Report System (REIRS). The SCSS and ASP systems support the performance goals in the Reactor Safety arena, the NMED system supports performance goals in the Nuclear Materials Safety and the Nuclear Waste Safety arenas, and the REIRS system supports exposure performance goals in the Nuclear Reactor Safety and the Nuclear Materials Safety arenas. In FY 1998, the NRC identified the primary data systems that provide the information necessary to apply the Agency's performance measures. The NRC will implement a systems assessment of these primary data systems in FY 1999 to ensure that the Agency can report accurate and reliable data in FY 1999, the first year of implementing the performance plan under the Government Performance and Results Act.

The NRC has established procedures for the systematic review and evaluation of events reported by NRC licensees and Agreement State licensees. The objective of the review is to identify events that are significant from the standpoint of public health and safety based on criteria that

include specific thresholds. The NRC uses a number of sources to determine the reliability and the technical accuracy of events information reported to NRC. Such sources include (1) NRC licensee reports, (2) NRC inspection reports, (3) Agreement State reports, (4) NRC consultant/contractor reports, and (5) U.S. Department of Energy Operating Experience Weekly Summaries. In addition, there is daily interaction and exchange of events information between headquarters and regional offices, and periodic conference calls between headquarters, the region, and Agreement States to discuss event information. Events identified that meet the AO criteria are verified and concurred by all applicable NRC headquarters program offices, regional offices, and Agency management prior to submission to Congress.

The NRC also continues to rely on established procedures, such as OIG audits and management reviews, to verify and validate performance data. Prior to Agency implementation of GPRA and the development of the performance measures reflected in the FY 1999 Performance Plan, the OIG reviewed a selected number of performance measure data systems annually for the performance measures reported in the Agency's annual Accountability Report. Two such systems were reviewed in FY 1996. The OIG systems reviews in FY 1997, however, were not initiated based on the Agency reevaluation of its existing performance measures at that time to assess their viability for compliance with GPRA reporting requirements. The NRC plans to coordinate with the OIG in FY 1999 to develop a specific plan that establishes the scope of performance measures data systems evaluations and the OIG role in data verification and validation of the Agency's current performance measures.

Data security is ensured by the Agency's computer security program. This program provides administrative, technical, and physical security measures for the protection of the Agency's information, automated information systems, and information technology infrastructure. This includes special safeguards to protect classified information, unclassified safeguards information, and sensitive unclassified information that is processed, stored, or produced on all types of automated information systems.

The Year 2000 compliance is addressed later within this Appendix I, FY 2000 Performance Plan, under Agency Processes/Organizational Elements, "Information Technology." Descriptions of the primary data sources and the abnormal occurrence criteria follow.

Reactor Operational Data

The primary source of information about an operational event is the licensee event report (LER) submitted to NRC in accordance with 10 CFR 50.73. Other data NRC uses include immediate notifications to the NRC Operations Center in compliance with 10 CFR 50.72; monthly operating reports submitted to NRC in accordance with plant technical specifications; the

database of component failures in systems managed by the Institute of Nuclear Power Operations (INPO); reports of defects and noncompliance in accordance with 10 CFR Part 21; NRC inspection reports, and allegations. Reactor licensee event reports (LER) are stored in the Sequence Coding and Search System(SCSS) database.

The Accident Sequence Precursor (ASP) program provides a structured and systematic means of qualitatively evaluating operational events or conditions that have occurred at licensed U.S. civilian nuclear power reactors. The program uses probabilistic risk assessment techniques to evaluate the conditional core damage probabilities of nuclear power plant events and equipment unavailabilities, and categorizes precursors that could lead to accident sequences with a potential to cause severe damage to a reactor's core. Results of the ASP analyses are considered indications of the level of risk associated with operating nuclear power plants based on the direct assessment of actual operational experience. The ASP program uses the information gained to provide an ongoing assessment of nuclear power plant operation and helps to identify how well plant designs and capabilities can cope with actual operational events or conditions. The ASP program results are published annually in the NUREG/CR-4674 series.

Nuclear Materials Operational Data

Event Data

Nuclear materials licensees are required by Title 10 of the *Code of Federal Regulations*, comparable Agreement State regulations, or license conditions to submit reports of events that meet established criteria. Reportable nuclear materials events include medical misadministrations of radiation or radiopharmaceuticals to patients, radiation overexposures, loss of control of licensed material, problems with equipment that uses licensed material or is otherwise associated with the use of licensed material, releases of material or contamination, leaking radioactive sources, problems during the transportation of licensed material, problems in fuel cycle facilities, and problems in power reactors. The NRC collects, reviews, and codes nuclear materials event information reported to the NRC and the Agreement States. The NRC maintains this information in the Nuclear Material Events Database (NMED).

Radiation Exposure Data

All NRC licensees are required to monitor employee exposure to radiation and radioactive materials at levels sufficient to demonstrate compliance with the occupational dose limits specified in 10 CFR Part 20. Licensees of power reactors, and those involved in industrial radiography, the manufacture and distribution of radioactive materials, fuel fabrications and processing, low-level radioactive waste disposal, and independent spent fuel storage, are required

by 10 CFR 20.2206 to provide to the NRC annual reports of exposure data for individuals for whom personnel monitoring is required. NRC maintains this information in the Radiation Exposure Information Report System (REIRS).

Abnormal Occurrence Criteria[1]

The Energy Reorganization Act of 1974 requires the Nuclear Regulatory Commission to submit abnormal occurrence reports to Congress. The Act defines an abnormal occurrence as an unscheduled incident or event that the Commission has determined to be significant from the standpoint of public health and safety. For each occurrence, the report must contain the date and place, the nature and probable consequence, the cause or causes, and any action taken to prevent recurrence.

Criteria by types of events used to determine which incidents or events will be considered for reporting as AOs are as follows:

I. For All Licensees

A. Human Exposure to Radiation From Licensed Material

1. Any unintended radiation exposure to an adult (any individual 18 years of age or older) resulting in an annual total effective dose equivalent (TEDE) of 250 millisievert (mSv) (25 rem) or more; or an annual sum of the deep dose equivalent (external dose) and committed dose equivalent (intake of radioactive material) to any individual organ or tissue other than the lens of the eye, bone marrow and the gonads, of 2500 mSv (250 rem) or more; or an annual dose equivalent to the lens of the eye, of 1 mSv (100 rem) or more; or an annual sum of the deep dose equivalent and committed dose equivalent to the bone marrow, and the gonads, of 1 Sv (100 rem) or more; or an annual shallow-dose equivalent to the skin or extremities of 2500 mSv (250 rem) or more.

2. Any unintended radiation exposure to any minor (an individual less than 18 years of age) resulting in an annual TEDE of 50 mSv (5 rem) or more, or to an embryo/fetus resulting in a dose equivalent of 50 mSv (5 rem) or more.

[1] Appendix A to NRC's Abnormal Occurrence General Statement of Policy (From the Federal Register dated 04/17/97, Pages 18820-18824)

3. Any radiation exposure that has resulted in unintended permanent functional damage to an organ or a physiological system as determined by a physician.

B. Discharge or Dispersal of Radioactive Material From Its Intended Place of Confinement

1. The release of radioactive material to an unrestricted area in concentrations which, if averaged over a period of 24 hours, exceed 5000 times the values specified in Table 2 of Appendix B to 10 CFR 20, unless the licensee has demonstrated compliance with Sec. 20.1301 using Sec. 20.1302(b)(1) or 20.1302(b)(2)(ii).

2. Radiation levels in excess of the design values for a package or the loss of confinement of radioactive material resulting in one or more of the following: (a) A radiation dose rate of 10 mSv (1 rem) per hour or more at 1 meter (3.28 feet) from the accessible external surface of a package containing radioactive material; (b) a radiation dose rate of 50 mSv (5 rem) per hour or more on the accessible external surface of a package containing radioactive material and that meet the requirements for "exclusive use" as defined in 10 CFR 71.47; or (c) release of radioactive material from a package in amounts greater than the regulatory limits in 10 CFR 71.51(a)(2).

C. Theft, Diversion, or Loss of Licensed Material, or Sabotage or Security Breach[2]

1. Any lost, stolen, or abandoned sources that exceed 0.01 times the A_1 values, as listed in 10 CFR Part 71, Appendix A, Table A-1, for special form (sealed/nondispersible) sources, or the smaller of the A_2 or 0.01 times the A_1 values, as listed in Table A-1, for normal form (unsealed/dispersible) sources or for sources for which the form is not known. Excluded from reporting under this criterion are those events involving sources that are lost, stolen, or abandoned under the following conditions: sources abandoned in accordance with the requirements of 10 CFR 39.77(c); sealed sources contained in labeled, rugged source housings; recovered sources with sufficient indication that doses in excess of the reporting thresholds specified in AO criteria I.A.1 and I.A.2 did not occur during the time the source was missing; and unrecoverable sources lost under

[2] Information pertaining to certain incidents may be either classified or under consideration for classification because of national security implications. Classified information will be withheld when formally reporting these incidents in accordance with Section 208 of the Energy Reorganization Act of 1974, as amended. Any classified details regarding these incidents would be available to the Congress, upon request, under appropriate security arrangements.

such conditions that doses in excess of the reporting thresholds specified in AO criteria I.A.1 and I.A.2 were not known to have occurred.

2. A substantiated case of actual or attempted theft or diversion of licensed material or sabotage of a facility.

3. Any substantiated loss of special nuclear material or any substantiated inventory discrepancy that is judged to be significant relative to normally expected performance, and that is judged to be caused by theft or diversion or by substantial breakdown of the accountability system.

4. Any substantial breakdown of physical security or material control (i.e., access control containment or accountability systems) that significantly weakened the protection against theft, diversion, or sabotage.

D. Other Events (i.e., Those concerning Design, Analysis, Construction, Testing, Operation, Use, or Disposal of Licensed Facilities or Regulated Materials)

1. An accidental criticality [10 CFR 70.52(a)].

2. A major deficiency in design, construction, control, or operation having significant safety implications requiring immediate remedial action.

3. A serious deficiency in management or procedural controls in major areas.

4. Series of events (where individual events are not of major importance), recurring incidents, and incidents with implications for similar facilities (generic incidents) that create a major safety concern.

II. For Commercial Nuclear Power Plant Licensees

A. Malfunction of Facility, Structures, or Equipment

1. Exceeding a safety limit of license technical specification (TS) [§50.36(c)].

2. Serious degradation of fuel integrity, primary coolant pressure boundary, or primary containment boundary.

3. Loss of plant capability to perform essential safety functions so that a release

of radioactive materials, which could result in exceeding the dose limits of 10 CFR 100 or 5 times the dose limits of 10 CFR 50, appendix A, General Design Criterion (GDC) 19, could occur from a postulated transient or accident (e.g., loss of emergency core cooling system, loss of control rod system).

B. Design or Safety Analysis Deficiency, Personnel Error, or Procedural or Administrative Inadequacy

1. Discovery of a major condition not specifically considered in the safety analysis report (SAR) or TS that requires immediate remedial action.

2. Personnel error or procedural deficiencies that result in loss of plant capability to perform essential safety functions so that a release of radioactive materials, which could result in exceeding the dose limits of 10 CFR 100 or 5 times the dose limits of 10 CFR 50, Appendix A, GDC 19, could occur from a postulated transient or accident (e.g., loss of emergency core cooling system, loss of control rod system).

III. For Fuel Cycle Licensees

A. A shutdown of the plant or portion of the plant resulting from a significant event and/or violation of a law, regulation, or a license/certificate condition.

B. A major condition or significant event not considered in the license/certificate that requires immediate remedial action.

C. A major condition or significant event that seriously compromises the ability of a safety system to perform its designated function that requires immediate remedial action to prevent a criticality, radiological or chemical process hazard.

IV. For Medical Licensees

A medical misadministration that:

(a) Results in a dose that is (1) equal to or greater than 1 gray (Gy) (100 rads) to a major portion of the bone marrow, to the lens of the eye, or to the gonads; or (2) equal to or greater than 10 Gy (1000 rads) to any other organ; and

(b) Represents either (1) a dose or dosage that is at least 50 percent greater than that prescribed in a written directive; or (2) a prescribed dose or dosage that, (I) is the wrong radiopharmaceutical[3], or (ii) is delivered by the wrong route of administration, or (iii) is delivered to the wrong treatment site, or (iv) is delivered by the wrong treatment mode, or (v) is from a leaking source(s).

V. Guidelines for "Other Events of Interest"

The Commission may determine that events other than AOs may be of interest to Congress and the public and be included in an appendix to the AO report as "Other Events of Interest." Guidelines for events to be included in the AO report for this purpose are items that may possibly be perceived by the public to be of health or safety significance. Such items would not involve a major reduction in the level of protection provided for public health or safety; therefore, they would not be reported as abnormal occurrences. An example is an event where upon final evaluation by an NRC Incident Investigation Team, or an Agreement State equivalent response, a determination is made that the event does not meet the criteria for an abnormal occurrence.

[3] The wrong radiopharmaceutical as used in the AO criterion for medical misadministrations refers to any radiopharmaceutical other than the one listed in the written directive or in the clinical procedures manual.

CROSS-CUTTING FUNCTIONS WITH OTHER GOVERNMENT AGENCIES

Detailed information concerning the NRC's cross-cutting functions and overlap in mission with other agencies is provided in the strategic plan currently under development. Because of the potential impact to our programs and the Agency's ability to accomplish its mission, that information is provided in total in this performance plan.

Several Government agencies have missions that overlap in scope with the NRC. The NRC identified no inconsistent or duplicative areas in its respective strategic plans, but the Agency continues to be alert to potential inconsistencies or duplication in its cooperative activities. A table of the major cross-cutting functions with other agencies and their relationship to NRC programs, and associated strategies and performance goals is provided below. In many instances, the interaction and coordination efforts are critical to meeting the NRC goals and accomplishing the Agency's mission. In most instances, the NRC has, or is developing, memoranda of understanding (MOU) or other agreements with these agencies to ensure that areas of mutual interest and cooperation are treated in a consistent, coordinated, and complementary way that avoids unnecessary duplication or conflict. To develop programs in those areas that are critical to the NRC's mission, senior agency management meet with agency counterparts and establish plans and strategies in the areas of common programs and goals. Interagency committees are established, as necessary, to facilitate program development and implementation. One such example is the interagency committees to establish EPA radiological criteria. Commission briefings on the status of programs are held as well, such as the periodic briefings by DOE on the high-level waste program. In other areas of mutual interest, agency staff coordinates with other agencies as appropriate. The review of cross-cutting programs, the coordination of those programs, and the identification of any issues are also an integral part of the NRC's internal technical program review process. In the area of intra-agency cross-cutting activities and functions within the NRC, there is no substantive cross-cutting or overlap between the programs within the agency. Descriptions of the specific NRC areas of mutual interest with other agencies follows the table. Additional discussion of these areas of mutual interest and coordination efforts with other Government agencies is provided in the FY 2000 budget request, as appropriate.

APPENDIX I: FY 2000 PERFORMANCE PLAN

Agency	Areas of Mutual Interest	NRC Program/(Strategic Arena)
Department of Energy (DOE)	High-level Waste Disposal	High-Level Waste/(Nuclear Waste Safety)
	Transportation and Storage of Spent Fuel and Waste	Spent Fuel Storage and Transportation Licensing and Inspection (Nuclear Materials Safety)
	Uranium Mill Tailings Radiation Control Act	Uranium Recovery Licensing and Inspection (Nuclear Waste Safety)
	Low-Level Waste	Regulation of Low-Level Waste (Nuclear Waste Safety)
	Excess Plutonium Disposition	Fuel Facilities Licensing and Inspection (Nuclear Materials Safety)
	Mitigation of Threat from Certain Discrete Radioactive Material	Regulation of Low-Level Waste (Nuclear Waste Safety)
	Pilot Program to Simulate NRC Regulation at DOE Sites	Regulation of the DOE (Nuclear Materials Safety)
	Security of Classified National Security Information and Restricted Data	Fuel Facilities Licensing and Inspection (Nuclear Materials Safety)
Environmental Protection Agency (EPA)	Protection of Public Health and Safety and the Environment	(Nuclear Materials Safety) (Nuclear Waste Safety)
	High-level Waste Site-specific Standards	High-Level Waste Regulation (Nuclear Waste Safety)
Federal Emergency Management Agency (FEMA)	Offsite Nuclear Power Plant Emergency Planning	Reactor Incident Response (Nuclear Reactor Safety)
	National Dam Safety Program	Uranium Recovery Licensing & Inspection (Nuclear Waste Safety)
Federal Energy Regulatory Commission (FERC)	Utility Economic Deregulation, Antitrust and Market Power Issues	(Nuclear Reactor Safety)
Department of Transportation (DOT)	Transportation of Radioactive and Fissile Materials	Spent Fuel Storage and Transportation Licensing and Inspection (Nuclear Materials Safety)
Food & Drug Administration (FDA)	Approval of Medical Devices Incorporating Byproduct Materials, Radiopharmaceuticals, and Radioactively Labeled Biologic Materials	Nuclear Materials Users Licensing and Inspection (Nuclear Materials Safety)
Occupational Safety & Health Administration (OSHA)	Worker Health and Safety	Fuel Facilities Licensing & Inspection (Nuclear Materials Safety)

APPENDIX I: FY 2000 PERFORMANCE PLAN

Agency	Areas of Mutual Interest	NRC Program/(Strategic Arena)
Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (HHS/PHS/ATSDR)	Public Health and Safety in the Release and Transportation of Ionizing Radiation	Reactor Inspection Reactor Incident Response (Nuclear Reactor Safety) Fuel Facilities Licensing and Inspection Materials Incident Response State Programs (Nuclear Materials Safety) High-Level Waste Regulation (Nuclear Waste Safety)
Department of Interior (DOI)	Protection of the Environment	Uranium Recovery Licensing and Inspection (Nuclear Waste Safety)
Department of Labor (DOL)	Enforcement	Reactor Enforcement Actions (Nuclear Reactor Safety) Materials Enforcement Actions (Nuclear Materials Safety)
Department of Justice (DOJ)	Enforcement	Reactor Enforcement Actions (Nuclear Reactor Safety) Materials Enforcement Actions (Nuclear Materials Safety)
	Investigations	Reactor Investigations (Nuclear Reactor Safety) Materials Investigations (Nuclear Materials Safety)
Department of State (STATE)) Department of Defense (DoD) Agency for International Development Department of Energy (AID)	Nuclear Safety and Safeguards Assistance to Other Countries	Participation in International Activities (International Nuclear Safety Support)
Department of State (STATE) Department of Defense (DoD) Department of Energy (DOE) Department of Commerce (DOC) Arms Control Disarmament Agency (ACDA)	Export of Nuclear and Nuclear Related Materials, Equipment, and Technology	Participation in International Activities (International Nuclear Safety Support)

Department of Energy (DOE)--The NRC and DOE share responsibility for **high-level waste (HLW) disposal**. As specified in the Nuclear Waste Policy Act of 1982, as amended (NWPA), DOE is responsible for characterizing the site and for the design and construction of the repository, and NRC is responsible for regulatory oversight, including licensing the construction and operation of the facility. Our strategy is to advise DOE and prepare to license a high-level waste repository at a pace consistent with the national program. An agreement is in place with DOE that outlines the procedures for staff consultation and exchange of information. This procedural agreement is currently being updated to incorporate changes to the HLW program since 1993.

The NRC also interacts with DOE on a number of activities associated with the **transportation and storage of spent nuclear fuel and high-level radioactive waste.** The NRC and DOE have a procedural agreement regarding spent fuel and HLW transportation packaging. Further, DOE is required by law to use NRC-certified packaging for certain waste and spent fuel shipments. NRC and DOE have signed a cost-reimbursable interagency agreement whereby NRC provides DOE oversight of physical security arrangements for certain foreign research reactor spent fuel shipments.

The NRC and DOE have a joint responsibility in carrying out the **Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Program and in the long-term care of reclaimed uranium mill tailings sites.** Although DOE has the responsibility for carrying out remedial action, the NRC must concur in DOE's selection and completion of the remedial action and must license the sites for long-term care. The NRC and DOE have a memorandum of understanding (MOU) to minimize or eliminate unnecessary duplication of effort between the two agencies.

NRC and DOE are assigned responsibilities for the **management of low-level radioactive waste** (LLW) under the Low-Level Radioactive Waste Policy Act of 1980 and its 1985 amendments. These responsibilities are different but complementary; thus, an MOU or other type of agreement has not been necessary. NRC and DOE frequently interact on LLW policy, regulatory, and technical issues.

DOE and NRC have established a reimbursable agreement for NRC to provide technical assistance and coordinate with DOE on **regulatory issues associated with DOE's disposition of excess plutonium.** Under the agreement, NRC advises DOE on regulatory issues associated with this effort, including prelicensing consultation support and development of standard review procedures for a mixed-oxide (MOX) fuel fabrication facility.

The NRC and DOE currently have an agreement that outlines the procedures for NRC requests for DOE assistance to **mitigate threats to the public from certain discrete radioactive material,** including material that exceeds Class C waste classification. This agreement is being formalized in an MOU.

To provide a comprehensive framework to support legislation for the **external regulation of certain DOE nuclear facilities or classes of facilities,** DOE signed an agreement with NRC on November 21, 1997, to establish a pilot program to simulate NRC regulation at 6 to 10 DOE sites over a 2-year period (FY 1998-1999). NRC and DOE have established task forces to test regulatory concepts at certain DOE nuclear facilities against the standards that the NRC believes would be appropriate to ensure safety at the facilities. The pilot program will test regulatory concepts by evaluating a facility and its standards, requirements, procedures, practices, and

activities. This pilot program is to determine the feasibility of NRC regulatory oversight of DOE non-defense program nuclear facilities and to support a decision on whether to seek legislation to authorize NRC regulation of either various classes of, or all, DOE non-defense program nuclear facilities. A major goal of the pilot program is to develop a clear understanding of the regulatory and legal issues and the NRC resource implications to facilitate a smooth transition into external regulation in FY 2001 if the Congress enacts authorizing legislation. NRC and DOE task groups and steering committees have been established to coordinate and facilitate this effort. External regulation would ensure more effective enforcement by placing such authority in independent hands engaged only in the achievement of safety.

The NRC and DOE share responsibility for the **security of classified National Security information and Restricted Data at certain licensees** (principally Naval Nuclear Fuel Facilities) and at the U.S. Enrichment Corporation (USEC). Although DOE has principal responsibility at Naval Nuclear Fuel Facilities under the auspices of its classified contracts with those firms, NRC has responsibility for the personnel security program for access to or control over strategic nuclear material and for information related to the physical security plans for the protection of the strategic nuclear material. At USEC, NRC has primary responsibility for the protection of classified information and DOE for the Personnel Security Program. The NRC and DOE have several MOUs in place to minimize or eliminate duplication of effort between the two agencies.

Environmental Protection Agency (EPA)--The NRC and EPA share responsibility for **protection of public health and safety and the environment**. There are numerous MOUs and interrelated activities between the NRC and EPA. NRC and EPA have been successful in many of these interrelated activities, including the development of the Multi-Agency Radiation Site Survey and Investigation Manual and the Multi-Agency Radiation Laboratory Protocols Manual, support for the National Research Council Committee on the Biological Effects of Ionizing Radiation, development of the Joint NRC/EPA Guidance for Testing Requirements for Mixed Radioactive and Hazardous Waste, development of a Technical Position for Disposition of Cesium-137 Contaminated Emission Control Dust, development of a nationwide survey to analyze for radioactive contamination of sewer sludge and ash at publicly-owned treatment works, and development of modeling scenarios in support of potential rulemakings for recycle/reuse of radioactively contaminated materials. The NRC is currently working with EPA to define roles, responsibilities, and jurisdictions regarding orphan source issues.

NRC and EPA currently share responsibility for **establishing and implementing site-specific HLW standards for a geologic repository** under existing legislation. As specified in the Energy Policy Act of 1992 (EnPA), EPA is tasked to develop site-specific HLW standards consistent with the recommendations of the National Academy of Sciences report on the

Technical Bases for Yucca Mountain Standards. NRC has one year to develop an implementing rule after issuance of final EPA standards. Both Houses of Congress are expected to pass legislation that would, among other things, prescribe an overall performance standard for Yucca mountain, and, depending on which bill is enacted, could impact NRC and EPA responsibilities. The NRC maintains a formal liaison with the EPA staff and has implemented a strategy for the conforming requirements to ensure that the NRC completes the implementing rule within a year of issuance of the final EPA standards. Differences continue between the EPA and the NRC on groundwater protection requirements and other matters; and may impact the requirements, complexity, and costs of licensing the repository.

Areas where the NRC and EPA have been unsuccessful is in Environmental standards establishing radiological criteria for decommissioning/cleanup of contaminated sites, and high-level waste disposal. EPA is responsible for developing general radiation standards, which are then reflected in NRC regulations and other requirements. EPA regulations frequently limit radiological activities of NRC licensees and these requirements may be added to NRC regulations and implemented by the NRC. The NRC is seeking legislation that would eliminate the overlap in standard setting authority with regard to contaminated sites by recognizing NRC's and Agreement States' standards in this area. EPA has expressed concerns with certain provisions of NRC's license termination rule and included in their guidance, Establishment of Clean-up Levels for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Sites with Radioactive Contamination, a statement that the dose limits established in the NRC license termination rule would not provide a protective basis for establishing preliminary remediation goals for cleanup at CERCLA sites and that the NRC sites could require further remediation. Top-level NRC and EPA management have addressed these issues to resolve the question of finality for sites that have complied with the NRC or equivalent Agreement State cleanup standards and have had their licenses terminated. It is NRC's position that changes to legislation are needed to resolve these issues. The NRC has also supported provisions in high-level waste legislation in both Houses of Congress that would effectively remove EPA from the standard-setting role for the Yucca Mountain repository and establish a Congressional standard for which NRC would issue implementing regulations. While the bills differ on specifics, either would be preferable to the current statutory provisions on standard setting.

Federal Emergency Management Agency (FEMA)–FEMA has lead responsibility for **offsite nuclear power plant emergency planning and for nuclear materials emergency planning.** FEMA also has the lead in assessing offsite emergency plans and preparedness for adequacy. NRC is responsible for onsite radiological emergency preparedness and for review of FEMA findings and determinations as to whether offsite plans are adequate and can be implemented. NRC also has the responsibility to make radiological health and safety decisions with regard to

the overall state of emergency preparedness, such as assurance for continued operation and shutdown of operating reactors. Should an actual peacetime radiological emergency require more than one agency to respond, the Federal Radiological Emergency Response Plan (FRERP) provides for coordination of all Federal response activities. The FRERP is maintained by the Federal Radiological Preparedness Coordinating Committee (FRPCC); NRC is a member actively involved in several FRPCC subcommittees that develop Federal procedures and guidance. In the event of an emergency involving an NRC-regulated entity, NRC is the lead Federal agency and works closely with six agencies: FEMA, DOE, EPA, USDA, HHS, and NOAA. Representatives of these agencies train with, and are integrated into, the NRC response team. Response coordination on a broader scale is provided by the Federal Response Plan (FRP) for emergencies of all kinds, including responses under the National Contingency Plan (NCP) for emergencies involving chemical and radiological hazards together. NRC is a member of the teams that coordinate actions under the NCP. The NRC also supports the FBI in the event of an emergency involving terrorist threats or other illegal acts.

FEMA and the NRC share involvement in the **National Dam Safety Program**. The primary purpose of this program is to bring together the expertise and resources of the Federal and non-Federal communities to achieve national dam safety hazard reduction. The NRC has regulatory authority over only uranium mill tailings dams and those dams integral to the operation of licensed facilities, or the possession and use of licensed material, that pose a radiologically safety-related hazard if they fail.

Federal Energy Regulatory Commission (FERC)--The NRC and the Federal Energy Regulatory Commission (FERC) have ongoing interaction regarding **issues of mutual concern**, such as: (1) FERC actions with respect to economic deregulation of the electric utility industry and the potential impact of FERC's deregulation activities on the NRC's mandate to protect public health and safety; and (2) the respective roles of the NRC and FERC in evaluating antitrust and market power issues arising from NRC power reactor license applicants or licensees. NRC supports those aspects of the President's electric sector restructuring legislation that pertain to it, in particular, the elimination of NRC's duplicative role in antitrust reviews.

Department of Transportation (DOT)--Under an MOU, the NRC and the Department of Transportation (DOT) share responsibility for developing, establishing, implementing, and enforcing consistent and comprehensive regulations and requirements for the **safe transportation of radioactive and fissile materials**, often through interagency committees. Generally, the NRC works with DOT to develop regulations for transporting materials, and the NRC adopts DOT requirements into its regulations.

Food and Drug Administration (FDA)--The NRC and the Food and Drug Administration (FDA) have an MOU that outlines procedures for sharing information of mutual interest relating to the **approval of medical devices incorporating byproduct materials, radiopharmaceuticals, and radioactively-labeled biologic materials.** The NRC routinely relies on prior FDA approval of medical devices as an essential component of the NRC's sealed source and device safety evaluations. The MOU also establishes procedures for notification, sharing of information, and coordination of joint inspections of events related to design and manufacturing defects and failures of these devices or of radiopharmaceuticals.

Occupational Safety and Health Administration (OSHA)--By an October 1988 OSHA/NRC MOU, NRC and OSHA share responsibility for worker health and safety at NRC-regulated facilities. NRC regulates worker safety concerning radiation and chemical risks resulting from processing radioactive material and OSHA regulates worker safety concerning non-radiological and other industrial hazards.

Agency for Toxic Substances and Disease Registry (ATSDR)--The NRC coordinates with ATSDR on issues relevant to the agency's mission to prevent exposure and human health effects and diminished quality of life associated with exposure to hazardous substances from waste sites, unplanned releases, and other sources of pollution present in the environment. This coordination includes ATSDR's hazardous substances role in public health, including the impact of radioactive releases from power plants on adjacent communities' and Indian reservations' air, water, and food chain and impacts resulting from transportation of nuclear waste.

Department of the Interior (DOI), Fish and Wildlife Service--Under the Endangered Species Act, the NRC has responsibility to assure that its actions are protective of endangered species. NRC consults with the Fish and Wildlife Service (FWS) in evaluating effects on endangered species of proposed NRC actions. If a proposed NRC action has the potential of affecting endangered species, NRC prepares a biological assessment of the effects, and the FWS then renders a biological opinion. This consultation process can be extensive, as in the Atlas uranium mill tailings remediation case.

Department of Labor (DOL)/Department of Justice (DOJ)--The NRC monitors discrimination actions filed with the Department of Labor (DOL) under Section 211 of the Energy Reorganization Act and develops enforcement actions where there are properly supported findings of discrimination, either from NRC's Office of Investigations or from DOL adjudications. Suspected criminal activities concerning NRC licensees, and others within NRC's regulatory jurisdiction, are referred to the Department of Justice (DOJ). Coordination with DOJ occurs prior to initiating any enforcement action for matters under DOJ consideration for criminal prosecution.

Department of State (State), Department of Defense (DoD), Agency for International Development (AID), Department of Energy (DOE), Department of Commerce (DOC), Arms Control Disarmament Agency (ACDA)--The NRC shares responsibility with the Department of State (State), DOE, DoD and the Agency for International Development (AID) in providing nuclear safety and safeguards assistance to other countries. State provides foreign policy guidance for U.S. government agencies in carrying out such assistance, while NRC contributes actively to the formulation of this guidance and clears its assistance programs with State to ensure they are within U.S. Government policy and budgetary guidelines. The NRC also shares responsibility with DOE for providing nuclear safety and safeguards assistance internationally. The NRC and DOE coordinate their efforts with each other and with other countries providing assistance to ensure they are complementary and to avoid duplication and conflict. The NRC and DOE are developing an MOU to specify their roles and responsibilities in the international assistance area. NRC participates in DoD and AID programs to provide nuclear safety and safeguards assistance to the former Soviet Union and Central and Eastern Europe countries. In addition, State, DoD, and AID coordinate on the programs developed by the NRC. The National Security Council and the Office of the Vice President provide high-level policy guidance on key issues in the international assistance area and resolve questions that arise in providing such assistance.

The NRC, DOE, State, DoD, Arms Control Disarmament Agency (ACDA), and the Department of Commerce (DOC) have interrelated roles in controlling exports of nuclear and nuclear-related materials, equipment, and technology. The NRC's primary role involves issuing export licenses for nuclear materials and equipment, including reactors. The following issue licenses or authorizations in related areas: DOE for nuclear technology exports and for retransfers or changes in form or content of previously exported nuclear materials and equipment; State for munitions made with depleted uranium; and Commerce for nuclear reactor balance-of-plant equipment and "dual use" commodities. Each agency is obliged to consult with the others (including, if warranted, ACDA and DoD) for significant cases.

AGENCY PROCESSES/ORGANIZATIONAL ELEMENTS

Planning, Budgeting, and Performance Management Process

In applying business-like principles to its regulatory processes, the Commission's goal is to ensure that the NRC is both effective and efficient in implementing its mission. Beginning with the FY 2000 budget cycle, the agency implemented a disciplined, integrated process to improve the agency's processes for planning, budgeting, and performance management that will enable the agency to meet the demands of the new results-driven Federal environment. The four major components of the new process are:

1. setting the strategic direction,
2. determining resources and planned accomplishments,
3. measuring and monitoring performance, and
4. assessing performance.

The first step of the process is to establish the goals and objectives for the agency and to decide how it will meet those goals and objectives. The products of this step are the agency's strategic plan and performance plan. The strategic plan sets the strategic direction of the agency and the performance plan establishes how those goals and objectives are met. Using the direction established by the strategic plan and the performance plan, the second step in the process is to determine the resources and planned accomplishments required to achieve those objectives. The result of this step is the agency budget which reflects the priority of activities and the level of resources based on the goals and objectives established in step one. This step also includes the development of internal agency program-level operating plans, which include performance measures and targets. This enables the agency to track the degree to which it is achieving its objectives (the third step), as reflected in the planned accomplishments (found in the budget), the NRC performance goals (found in the performance plan), and the program- level operating plans used by each office. The final step in the process is the assessment phase, which determines the effectiveness of our performance and compares performance against the established objectives. These assessments include annual program reviews, program evaluations, self-assessments, and internal and external audits. The results of the assessment phase form the basis for the reevaluation of the agency's strategic direction, and the next cycle of the planning, budgeting and performance management process.

Funding and Staffing

The resources required to meet the FY 2000 performance goals and their associated FY 2000 target levels as shown in this plan are included in the budget.

A summary of the NRC's FY 2000 funding request is shown below by strategic arena, and management and support. These resources support the programs and strategies required to accomplish the agency's goals and mission. A more detailed discussion of the NRC funding requirements and the FY 2000 program outputs and targets are addressed in the FY 2000 budget request.

Funding and FTE (Full-Time Equivalents)						
	FY 1998 Enacted		FY 1999 Estimate		FY 2000 Request	
Strategic Arena	$K	FTE	$K	FTE	$K	FTE
Nuclear Reactor Safety	224,009	1,586	210,350	1,487	210,043	1,431
Nuclear Materials Safety	57,724	482	61,708	479	63,881	464
Nuclear Waste Safety	32,635	163	38,742	191	42,143	195
International Nuclear Safety Support	5,102	47	3,931	35	4,840	41
Management and Support	148,530	656	150,269	645	144,493	629
Total	468,000	2,934	465,000	2,837	465,400	2,760

For FY 2000, the distribution of funding and FTE is as follows:

	% of Funding Requested	% of FTE Requested
Nuclear Reactor Safety	45	52
Nuclear Materials Safety	14	17
Nuclear Waste Safety	09	07
International Nuclear Safety Support	01	01
Management and Support	31	23
Total	100%	100.000%

APPENDIX I: FY 2000 PERFORMANCE PLAN

Human Resources Management

A high-performing workforce is essential for achieving the NRC's mission, providing significant results, and delivering quality products and services. Effective human resource management is an integral part of the agency's Planning, Budgeting, and Performance Management Process. The agency is also developing a program for performance management and performance recognition that links employee performance to program outcomes, organizational effectiveness, and accomplishment of the agency's mission. Through these initiatives, the agency can effectively and efficiently manage its current and future human resource requirements and accomplish the agency's mission and goals.

Information Technology

Information technology (IT) is essential for streamlining NRC processes in an era of downsizing and constrained resources. The rapid evolution of technology and growth of networks is providing necessary and unprecedented opportunities, not only to reengineer the Agency's business processes, but also to improve information access and analysis, and to facilitate internal and external communication. Wider use of technology for advanced scientific computing enables the NRC to better understand complex physical processes and evaluate the potential risks from the use of the radioactive materials the agency regulates. The NRC is working to implement integrated, secure, and reliable information systems that deliver the information needed to achieve the NRC's mission. As required in the Clinger-Cohen Act of 1996, programs are being implemented to assess and enhance IT skills throughout the agency to improve productivity and to provide better ways of doing business. Clinger-Cohen requirements for an Information Technology Architecture are also being aggressively implemented to provide an integrated framework for evolving and maintaining the agency's IT infrastructure and applications. To ensure that major agency information resource investments are cost-effective and well managed, the agency has implemented an IT capital planning and investment control process (CPIC), an integral part of the agency overall Planning, Budgeting, and Performance Management Process. This process is designed to maximize the returns and minimize the risks of IT investments, and ensure that IT investments are focused on results.

The NRC is working to ensure that its computer systems are Year 2000 compliant and on schedule to ensure that all affected systems are repaired or replaced. The NRC, through cooperative efforts with industry associations, is also overseeing licensee activities to ensure that Year 2000 issues do not adversely affect public health and safety, and to ensure that licensees are in compliance with their licenses and NRC regulations. The agency utilizes information notices,

as needed, to alert licensees, certificate holders, and registrants of potential Year 2000 problems in their computer systems, and will continue to monitor the status of licensee efforts to deal with any potential or existing Year 2000 problems.

The Clinger-Cohen Act requires additional information on the agency's goals and performance in improving the efficiency and effectiveness of agency operations through the effective use of information technology. This information has been provided to OMB, together with other IT related material in NRC's Exhibit 42, "Report on Information Technology," and Exhibit 300B, "Capital Asset Plan and Justification."

Request for Waivers of Administrative Requirements to Provide Managerial Flexibility

The NRC has not identified any waivers of administrative procedures that are required to achieve its stated FY 2000 performance goals. Certain of the performance indicators require the use of surveys, which may require OMB clearance in accordance with existing procedures.

AGENCY EFFICIENCY

To improve agency efficiency and effectiveness, a number of program evaluations are scheduled for FY 1998-FY 2000. These evaluations have been identified as areas where there exists a strong potential for performance and/or cost improvement. Currently scheduled program evaluations include the assessment of the Office of Nuclear Reactor Regulation, the Planning, Budgeting, and Performance Management Process, the reactor inspection program, the reactor licensing support and regulatory oversight program, safety decisionmaking through the use of probabilistic risk assessment (PRA) insights and agency support functions. Additional areas for program evaluations are being evaluated at this time by the agency's Executive Council. Detailed information on these evaluations aimed at improving the agency's efficiency and effectiveness in accomplishing its goals and mission can be found in the agency's strategic plan currently under development.

Pending initiation of the evaluation of agency support functions, the NRC has taken action to effect some efficiencies in the management and support area. For example, since FY 1994, NRC has reduced full-time-equivalent staff year utilization by more than 12 percent, from 3,374 to 2,949; reduced the number of managers and supervisors by 42 percent, from more than 700 to 400 by the end of the FY 1998. Planned reorganizations are expected to further reduce that number to approximately 335 by the end of FY 1999. In the context of the staffing levels in the President's FY 1999 budget, this will equate to an 8:1 ratio of staff to supervisors and managers. Since FY 1994, NRC has significantly reduced the number of SES positions from 220 to approximately 180 positions, a reduction of almost 40 positions. Targeted reductions will continue into FY 2000. In the area of management services, the implementation of the Procurement Reinvention Laboratory (PRL) reduced procurement lead time by an average of over two months. Key innovations available through the PRL to reduce procurement lead times include waiving the requirement to synopsize procurements in the CBD; utilizing oral presentations in lieu of written proposals; utilizing simplified evaluation criteria; and limiting the number of Source Evaluation Panel members when appropriate. The expanded use of technology and the implementation of the BankCard program have also improved the agency's procurement capability and efficiency.

An additional specific area where the agency has focused on agency and program efficiency is in its efforts to achieve total program costs/unit cost and to conform with Federal cost accounting standards. The agency has initiated the development of an agency-wide integrated financial and resource management system (STARFIRE). This system will be far-reaching and when fully operational, will be used by all employees of the agency. STARFIRE will serve as the single authoritative source for financial and resource information to support the mission of the agency,

support program and fiduciary decisionmaking, support performance reporting, and support the preparation of auditable financial statements. STARFIRE integrated modules include core accounting, funds control, payroll, cost accounting, debt management/fee billing, property, travel management, automated procurement, performance measurement, basic human resources, and a labor cost distribution system. This system will support the alignment of agency resources with program outputs, strategies, and strategic goals to support a results-oriented environment and provide the tool for managers to make informed program and resource decisions. Phased-in implementation will begin in FY 1999.

Another area where the agency is improving efficiency and effectiveness in the way it does business is in the development of an agency-wide document management system. This system, the Agency-wide Documents Access and Management System (ADAMS), is being developed to meet current and future document storage and retrieval needs and to provide the capability to perform document management processes more efficiently and effectively by managing documents electronically rather than in a paper-based mode. ADAMS will support the electronic submission of documents by NRC licensees, store all new documents electronically in one location, permit full-text document retrieval capability from each employee workstation, and allow for the electronic routing, concurrence, and distribution of documents. ADAMS will also improve the public availability of NRC documents by providing access to the ADAMS public document collection via the Internet. This system will also be integrated with the financial and resource management system, STARFIRE, discussed above. The ADAMS system will be deployed agency-wide by the end of FY 1999.

KEY EXTERNAL FACTORS

Key external factors specific to each strategic arena are provided in the FY 1997-FY 2002 Strategic Plan. These factors are continually monitored through agency programs and factored into agency planning and program development. Maintaining a high degree of involvement and information positions the agency to effectively mitigate any negative impact to agency operations and to achieve the agency's goals and mission. A discussion of the major external factors that the NRC has identified follows:

Electric Utility Deregulation

The economic deregulation of electric utilities has continued its rapid transition from the wholesale to the retail environment. While the Federal Energy Regulatory Commission and the State Public Utility Commissions have the responsibility for rate regulation, several areas of NRC focus have emerged as the transition to a competitive market has begun to take shape. As utilities restructure internally, as ownership arrangements changes, as mergers occur, and as licensees work to control and reduce costs, the NRC must understand and respond appropriately to the effect of the changing business environment on nuclear safety. NRC areas of focus include the impact of cost-competitiveness on safe nuclear operations, electric grid reliability, and the availability of funds for decommissioning. We believe our regulatory framework is generally sufficient at this time to address the restructuring and reorganization that likely will arise as a result of electric utility deregulation. Several actions have been taken by NRC to address these issues.

In the area of license transfers, NRC has initiated a comprehensive review of the license transfer process. To date, the NRC has issued a final rule to streamline the hearing process associated with license transfers (which was published in the *Federal Register* on December 3, 1998), completed final Standard Review Plans (SRPs) on antitrust reviews and financial qualifications and decommissioning funding assurance, and is finalizing a draft SRP on foreign ownership, control, and domination issues. As part of this review, the NRC is also developing guidance on specific aspects of license transfer reviews for use by NRC staff and licensees and the public and will disseminate this guidance through standard publication and circulation procedures (e.g., publication in the *Federal Register* and mailings to NRC licensees).

Concerning cost-competitiveness and safe nuclear operations, the NRC continues to focus on any possible impact of cost-competitiveness pressures on safe nuclear operations. NRC safety assessments at some reactor facilities have identified deficiencies that may stem from the economic pressure on a licensee to be a low-cost energy producer, which in turn, may limit the

resources available for corrective actions and plant maintenance. The NRC is developing measures that could help to identify plants where economic stress may be adversely impacting safety. In addition, the NRC is conducting an integrated review of reactor-related assessment processes to enhance our existing program for plant performance assessment.

Concerning electrical grid reliability, while station blackouts are extremely rare to date, the possibility of a "station blackout" continues to be a focus for NRC. A station blackout refers to an event in which a loss of offsite power is coupled with the inability of the onsite emergency diesel generators to provide vital power to plant safety equipment. This event is a major contributor to core damage frequency. The analysis of power reactor experience in this area shows that nuclear generating stations are robust in design and operational standards, allowing them to help stabilize the electrical grid. However, analysis also shows that nuclear generating stations are vulnerable to grid disturbances, and especially to loss-of-offsite-power events. The NRC has established a grid reliability action plan to address concerns regarding the impact of utility deregulation on the reliability of the grid in supplying offsite power to nuclear power plants.

Concerning decommissioning funding assurance, current NRC decommissioning regulations require power reactor licensees to set aside funds periodically in external trust fund accounts (or to provide third-party guarantees) for estimated decommissioning costs. By the time a licensee permanently ceases operations at the end of its licensed term, the total amount of funds estimated as needed to complete decommissioning is expected to be available. In the emerging environment of electric utility restructuring, the NRC has reevaluated certain aspects of these provisions for decommissioning funding assurance, including the NRC definition of "electric utility," the potential impact of new ownership arrangements, and the problem of above-market costs. The NRC has taken several actions in this area. A final policy statement on electric utility restructuring and deregulation was issued in August 1997 indicating that the NRC will continue to conduct its financial qualifications, decommissioning funding, and antitrust reviews; will identify all direct and indirect owners of nuclear power plants; will establish and maintain working relationships with rate regulators; and will reevaluate the adequacy of its regulations in this area. A proposed rule on decommissioning funding was issued for public comment in September 1997. The comments have been evaluated and a final rule was issued on September 22, 1998. Numerous meetings have been held with industry representatives, State and Federal rate regulators, the financial community, and other stakeholders. Staff-level liaisons have been established where appropriate. As mentioned above the NRC supports those aspects of the President's electric utility restructuring legislation that pertain to it, in particular the elimination of duplicative antitrust reviews.

APPENDIX I: FY 2000 PERFORMANCE PLAN

Decline in the Number of Operating Reactors

Eleven reactors have shut down prematurely over the past ten years, including six in the past three years. Increased economic pressure on owners and operators of power reactors as the utility industry continues deregulation and restructuring and the predictability and stability of the license renewal review process are factors that affect the number of operating reactors. There are currently 103 operating reactors (FY 1999). In FY 2000 and in FY 2001, one reactor each year is anticipated to shut down before the expiration of its license. There will be 102 operating nuclear power reactors in FY 2000, and 101 in FY 2001. The agency has undertaken an assessment of the effect this will have on agency operations and resources, recognizing that there are uncertainties in the current projections and resource estimates.

Changes in the National High-Level Waste Program/Changes in DOE HLW Program

Changes in the national HLW program and changes in DOE activities and funding have significant impact on the ability of the NRC to plan, implement, and fund the program to provide regulatory oversight and achieve its program goals. The NRC and DOE continue to work cooperatively to maintain parallel programs to ensure that the HLW program goals are achieved. The NRC is working to resolve a set of key technical issues considered most important to repository safety performance. We are reviewing the DOE Viability Assessment, which was submitted in December 1998, providing feedback to DOE on its strategy for preparing a license application scheduled to be submitted in 2002, and developing an NRC Standard Review Plan for reviewing such an application for the proposed repository at Yucca Mountain. The NRC will be able to determine, with reasonable assurance, whether spent fuel and other high-level waste can be disposed of safely in a geologic repository, provided (1) that DOE submits a high-quality application; (2) that NRC requirements are met; (3) budget resources permit the NRC to maintain its technical capability for licensing a geologic repository; and (4) that timely, reasonable, and implementable radiological standards are developed for the repository. Currently there is legislation being considered by Congress that would alter the national program. As mentioned above, the NRC testified in favor of legislation similar to the current proposal (H.R. 45), in particular the standard-setting aspects of the legislation. The NRC will continue to monitor the status of this legislation for any impact to the agency's high-level waste program.

Fee Collection

Currently, NRC funding is limited by the amount of funds appropriated by Congress. The Omnibus Budget Reconciliation Act of 1990, as amended, requires the NRC to recover 100 percent of new budget authority, less the amount appropriated from the Nuclear Waste Fund for high-level waste activities, by assessing fees. The fees collected by NRC are used to offset

the Congressional appropriation. The 100 percent fee recovery requirement was to revert to 33 percent at the end of FY 1998, however, it was extended for one year in the agency's FY 1999 appropriation legislation. Consistent with the Administration's policy, the NRC will submit proposed authorization legislation that would extend the 100 percent fee collection through FY 2004 to provide a sound future funding base for NRC programs.

Core Competencies and Staffing

This area addresses projecting and maintaining skill requirements, availability, and staff required to accomplish the NRC's mission. Maintaining the correct balance of knowledge, skills, and abilities (KSAs) is critical to the accomplishment of the NRC's mission and is affected by a number of external factors that may impact the agency's ability to maintain the correct balance of KSAs. External factors include the labor market for experienced professionals, the workload as projected by the activity of the nuclear industry, and the declining university enrollment in nuclear engineering studies and other fields related to nuclear safety.

APPENDIX II: Performance Output Measures

NUCLEAR REACTOR SAFETY STRATEGIC ARENA SUMMARY OF OUTPUT MEASURES* INCLUDED IN FY 2000 BUDGET REQUEST TO CONGRESS			
Program	**Output**	**FY 1999 Target**	**FY 2000 Target**
Reactor Licensing	Licensing actions completed per year.	1,670 actions.	1,800 actions.
	Size of licensing action inventory.	1,000 actions or less.	700 actions or less.
	Age of licensing action inventory.	80% of inventory 1 year old or less; 95% 2 years old or less; all actions 3 years old or less.	95% of inventory should be 1 year old or less; all actions 2 years old or less.
	Other licensing tasks completed per year.	800.	925.
	Number of operator examinations administered.	Meet licensee demand - approximately 400 initial and 400 generic fundamentals examinations.	Meet licensee demand - approximately 400 initial and 400 generic fundamentals examinations.
	Major systems subject to the CPIC process will develop demonstrable returns on investment to the agency.	No significant deviations (as defined by Clinger-Cohen Act of 1996).	No significant deviations (as defined by Clinger-Cohen Act of 1996).
Reactor License Renewal	Completion of license renewal application reviews.	Complete major milestones scheduled to support completion within 36 months.	Complete major milestones scheduled to support completion within 36 months.
Reactor Inspection	Core inspection program completed.	All operating reactors.	All operating reactors.
	Average time to complete reviews of allegations.	180 days.	180 days.
Reactor Performance Assessment	Timeliness of assessments conducted and reports issued.	Within 60 days of the end of the assessment cycle.	Within 60 days of the end of the assessment cycle.
	Plant performance review.	Conduct two reviews per site.	Conduct two reviews per site.
	Senior management meetings.	Conduct an annual meeting.	Conduct an annual meeting.
Reactor Incident Response	Emergency Response Performance Index (IRPI).	90 percent.	90 percent.
	Index provides the single overall measure of the degree in which the agency believes it is ready to respond to an emergency situation.		

*This document provides a summarization of the NRC's output measures. Further output and target detail and FY 1998 baseline data is provided in the FY 2000 Budget Request to Congress (February 1999).

APPENDIX II: Performance Output Measures

NUCLEAR REACTOR SAFETY STRATEGIC ARENA SUMMARY OF OUTPUT MEASURES* INCLUDED IN FY 2000 BUDGET REQUEST TO CONGRESS			
Program	**Output**	**FY 1999 Target**	**FY 2000 Target**
Reactor Operational Experience Evaluation	Operational Experience Evaluation Performance Index. Index provides the single overall measure of the timeliness and thoroughness of reactor operational experience evaluation and the risk associated with that experience.	90 percent.	90 percent.
Reactor Technical Training	Numbers and types of reactor technical training courses offered.	Meet 90 percent of cumulative needs identified by semiannual needs surveys.	Meet 90 percent of cumulative needs identified by semiannual needs surveys.
Reactor Enforcement Actions	Timeliness in completing enforcement actions.	90 percent of cases will average 90 days or less. 100 percent of cases will average 120 days or less.	90 percent of cases will average 90 days or less. 100 percent of cases will average 120 days or less.
Reactor Investigations	Timeliness in completing investigations.	Complete cases, on average, in 9 months or less. Maintain the average number of cases within the active case inventory for more than 12 months, at 9 percent or less.	Complete cases, on average, in 9 months or less. Maintain the average number of cases within the active case inventory for more than 12 months, at 9 percent or less.
Reactor and Plant Performance Research	Technical bases for safety and regulatory guidance and decision making.	Issue 23 research products that respond to priority needs. Develop, maintain, or improve 6 engineering codes/models for regulatory analyses/decision making.	Issue 24 research products that respond to priority needs. Develop, maintain, or improve 6 engineering codes/models for regulatory analyses/decision making.
Reactor Materials and Component Behavior Research	Technical bases for safety and regulatory guidance and decision making.	Issue 16 research products that respond to priority needs. Develop, maintain, or improve 2 engineering codes/models for regulatory analyses/decision making.	Issue 16 research products that respond to priority needs. Develop, maintain, or improve 2 engineering codes/models for regulatory analyses/decision making.

*This document provides a summarization of the NRC's output measures. Further output and target detail and FY 1998 baseline data is provided in the FY 2000 Budget Request to Congress (February 1999).

APPENDIX II: Performance Output Measures

NUCLEAR MATERIALS SAFETY STRATEGIC ARENA SUMMARY OF OUTPUT MEASURES* INCLUDED IN FY 2000 BUDGET REQUEST TO CONGRESS			
Program	**Output**	**FY 1999 Target**	**FY 2000 Target**
Fuel Facilities Licensing and Inspection	Timeliness of safety and safeguards inspections.	Complete 90 percent of core inspections scheduled in the Fuel Cycle Master Inspection Plan on time.	Complete 90 percent of core inspections scheduled in the Fuel Cycle Master Inspection Plan on time.
Spent Fuel Storage and Transportation Licensing and Inspection	Non-spent fuel transport container design review completions.	Complete 95 design reviews.	Complete 95 design reviews.
	Spent fuel container and installation design review completions.	Complete 50 design reviews.	Complete 40 design reviews.
Nuclear Materials Users Licensing and Inspection	Timeliness of reviews of applications for new materials licenses, license amendments, license renewals, and sealed source and device designs.	For new applications and amendments, complete 80 percent within 90 days. For license renewals and sealed source and device reviews received after October 1, 1997, complete 80 percent within 180 days.	For new applications and amendments, complete 80 percent within 90 days. For license renewals and sealed source and device reviews received after October 1, 1997, complete 80 percent within 180 days.
	Timeliness of safety inspections of materials licensees.	Less than 10 percent of core inspections overdue as defined in Inspection Manual Chapter 2800.	Less than 10 percent of core inspections overdue as defined in Inspection Manual Chapter 2800.
Materials Research	Technical bases for safety and regulatory guidance and decision making.	Issue 6 research products that respond to priority needs. Develop, maintain, or improve 1 engineering code/model for regulatory analyses/decision making.	Issue 7 research products that respond to priority needs. Develop, maintain, or improve 1 engineering code/model for regulatory analyses/decision making.
Materials Incident Response	Emergency Response Performance Index Index provides the single overall measure of the degree in which the agency believes it is ready to respond to an emergency situation.	90 Percent.	90 Percent.

*This document provides a summarization of the NRC's output measures. Further output and target detail and FY 1998 baseline data is provided in the FY 2000 Budget Request to Congress (February 1999).

APPENDIX II: Performance Output Measures

NUCLEAR MATERIALS SAFETY STRATEGIC ARENA **SUMMARY OF OUTPUT MEASURES*** INCLUDED IN FY 2000 BUDGET REQUEST TO CONGRESS			
Program	**Output**	**FY 1999 Target**	**FY 2000 Target**
Materials Operational Experience Evaluation	Timeliness of materials event information entered into the Nuclear Materials Events Database (NMED).	Within 2 working days from the date of the document, morning reports, event notifications, and preliminary notifications of occurrences will be entered. Within 2 working weeks of date of receipt, NMED records will be updated 90 percent of the time.	Within 2 working days from the date of the document, morning reports, event notifications, and preliminary notifications of occurrences will be entered. Within 2 working weeks of date of receipt, NMED records will be updated 90 percent of the time.
Materials Technical Training	Numbers and types of materials technical training courses offered.	Meet 90 percent of cumulative needs identified by semiannual needs surveys.	Meet 90 percent of cumulative needs identified by semiannual needs surveys.
Materials Enforcement Actions	Timeliness in completing enforcement actions.	90 percent of cases will average 90 days or less. 100 percent of cases will average 120 days or less.	90 percent of cases will average 90 days or less. 100 percent of cases will average 120 days or less.
Materials Investigations	Timeliness in completing investigations.	Complete cases, on average, in 9 months or less. Maintain the average number of cases within the active care inventory for more than 12 months, at 9 percent or less.	Complete cases, on average, in 9 months or less. Maintain the average number of cases within the active care inventory for more than 12 months, at 9 percent or less.

*This document provides a summarization of the NRC's output measures. Further output and target detail and FY 1998 baseline data is provided in the FY 2000 Budget Request to Congress (February 1999).

APPENDIX II: Performance Output Measures

NUCLEAR WASTE SAFETY STRATEGIC ARENA SUMMARY OF OUTPUT MEASURES* INCLUDED IN FY 2000 BUDGET REQUEST TO CONGRESS			
Program	**Output**	**FY 1999 Target**	**FY 2000 Target**
High-Level Waste (HLW) Regulation	Resolve subissues related to the key technical issues most important to the performance of a HLW repository.	Resolve five of the subissues targeted.	Resolve at least five of the seven subissues targeted.
	Development of the Yucca Mountain Review Plan (YMRP).	Develop an initial Yucca Mountain Review Plan format and content.	Refine YMRP format and content; build YMRP sections using Issues Resolution Status Reports, acceptance criteria, and review methods.
	Establish a site-specific, performance-based regulation applicable to the proposed repository at Yucca Mountain.	Publish a proposed site-specific, performance-based regulation applicable to the proposed repository at Yucca Mountain.	Publish a final site-specific, performance-based regulation applicable to the proposed repository at Yucca Mountain.
Regulation of Low-Level Waste (LLW)	Maintenance of the regulatory framework for low-level waste disposal.	There is no FY 1999 target for this measure.	Consolidate low-level waste regulatory guidance. Complete Branch Technical Position on Low-Level Waste Disposal Facility Performance Assessment.
Regulation of Decommissioning	Clean up problem materials and fuel facility sites listed in the Site Decommissioning Management Plan (SDMP).	Remove three sites from the SDMP list after satisfactory cleanup.	Remove three sites from the SDMP list after satisfactory cleanup.
Radionuclide Transport and Decommissioning	Technical bases for safety and regulatory guidance and decision making.	Issue 3 research products that respond to priority needs. Develop, maintain, or improve 2 engineering codes/models for regulatory analyses/decision making.	Issue 4 research products that respond to priority needs. Develop, maintain, or improve 2 engineering codes/models for regulatory analyses/decision making.
Uranium Recovery Licensing and Inspection	Licensing Actions.	Number of application reviews completed meets or exceeds the number estimated.	Number of application reviews completed meets or exceeds the number estimated.
	Safety inspections of uranium recovery facilities.	Complete an average of 25 inspections per year.	Complete an average of 25 inspections per year.

*This document provides a summarization of the NRC's output measures. Further output and target detail and FY 1998 baseline data is provided in the FY 2000 Budget Request to Congress (February 1999).

APPENDIX II: Performance Output Measures

INTERNATIONAL NUCLEAR SAFETY SUPPORT STRATEGIC ARENA **SUMMARY OF OUTPUT MEASURES*** INCLUDED IN FY 2000 BUDGET REQUEST TO CONGRESS			
Program	**Output**	**FY 1999 Target**	**FY 2000 Target**
Participation in International Activities	Negotiate/renew bilateral exchange arrangements with appropriate foreign counterparts.	Negotiate/renew 5 arrangements.	Negotiate/renew 5 arrangements.
	Issuance of NRC licenses.	Complete reviews for and issue as appropriate, approximately 75-100 NRC import/export authorization (NRC licenses or amendments). Staff reviews will be completed for 90 percent of the cases within 60 days of the receipt of all necessary documentation.	Complete reviews for and issue as appropriate, approximately 75-100 NRC import/export authorization (NRC licenses or amendments). Staff reviews will be completed for 90 percent of the cases within 60 days of the receipt of all necessary documentation.
	Reviews of Executive Branch proposed Part 810 licenses. Subsequent Arrangements, and Section 123 Agreements for Cooperation.	Complete staff reviews within 60 days.	Complete staff reviews within 60 days.

*This document provides a summarization of the NRC's output measures. Further output and target detail and FY 1998 baseline data is provided in the FY 2000 Budget Request to Congress (February 1999).

APPENDIX II: Performance Output Measures

MANAGEMENT AND SUPPORT SUMMARY OF OUTPUT MEASURES* INCLUDED IN FY 2000 BUDGET REQUEST TO CONGRESS			
Program	**Output**	**FY 1999 Target**	**FY 2000 Target**
Administration	Conduct program assessments to evaluate the effectiveness in various areas based upon criteria used by GSA.	A score of 90 or higher on the GSA-supplied criteria.	A score of 90 or higher on the GSA-supplied criteria.
	One White Flint North (OWFN) Restack Project milestones.	Complete floors 15, 14, 13, and 8 in the OWFN Restack project.	Complete the Restack project in April 2000.
	Complete review of draft rules without need for substantive changes and within schedule.	Completed reviews within schedule 98 percent of the time.	Completed reviews within schedule 98 percent of the time.
Human Resources	Develop and maintain a high quality, culturally diverse workforce and applicant pool.	Manage staffing strategies to achieve targeted workforce reductions. Workforce of no more than 25% under represented as compared to workforce availability data.	Manage staffing strategies to achieve targeted workforce reductions. Workforce of no more than 25% under represented as compared to workforce availability data.
Information Technology - Planning and Resource Management	Percent of agency executives and managers who have received IT training.	All NRC senior executives and managers.	All executives and managers within 12 months of hire.
	Percent of OCIO employees who completed training.	70 percent completion of training course slots identified.	70 percent of training course slots identified.
	Percent of high-level data entities in shared primary applications systems.	Thirty-five percent of data entities.	Forty-five percent of data entities.
Information Technology Infrastructure	Availability of key infrastructure services.	Unavailability of infrastructure services will decrease by 10 percent.	Unavailability of infrastructure services will decrease by 10 percent.
	Availability of agency network servers.	Unavailability will decrease by 10 percent.	Unavailability will decrease by 10 percent.
	Agency employee workstation configurations support planned agency-wide applications.	Complete replacement of all 486-based desktop PC workstations.	Replace workstations as required to support new agency applications.

*This document provides a summarization of the NRC's output measures. Further output and target detail and FY 1998 baseline data is provided in the FY 2000 Budget Request to Congress (February 1999).

APPENDIX II: Performance Output Measures

MANAGEMENT AND SUPPORT SUMMARY OF OUTPUT MEASURES* INCLUDED IN FY 2000 BUDGET REQUEST TO CONGRESS			
Program	**Output**	**FY 1999 Target**	**FY 2000 Target**
Information Technology - Applications Development	Level of staff satisfaction with information in NRC's primary applications systems.	Improve staff satisfaction level to 3.60	Improve staff satisfaction level to 3.75.
	Renovation and installation of applicable systems to handle dates from January 1, 2000, and beyond.	Complete by March 31, 1999.	Zero adverse affects on the public, NRC licensees, and other stakeholders.
IT - Information Management	ADAMS will develop demonstrable returns on investment to the agency.	No significant deviations (as defined by Clinger-Cohen Act of 1996).	No significant deviations (as defined by Clinger-Cohen Act of 1996).
Financial Management - Accounting and Finance	Timeliness and quality of NRC's Annual Financial Statement.	Publish the FY 1998 Statement by March 1999 and receive an unqualified opinion.	Publish the FY 1999 Statement by March 2000 and receive an unqualified opinion.
	Collect amounts due NRC.	Achieve 98 percent actual collections when compared with projected collections and maintain past due accounts receivable at $5 million or less by the end of the fiscal year.	Achieve 98 percent actual collections when compared with projected collections and maintain past due accounts receivable at $5 million or less by the end of the fiscal year.
	Pay Bills.	Pay 100 percent of bills by electronic funds transfer. Achieve 94 percent of payments on time.	Pay 100 percent of bills by electronic funds transfer. Achieve 94 percent of payments on time.
	Fee Rule.	Issue proposed rule by March. Issue final rule by June.	Issue proposed rule by March. Issue final rule by June.
	STARFIRE will develop demonstrable returns on investment to the agency.	No significant deviations (as defined by Clinger-Cohen Act of 1996).	No significant deviations (as defined by Clinger-Cohen Act of 1996).

*This document provides a summarization of the NRC's output measures. Further output and target detail and FY 1998 baseline data is provided in the FY 2000 Budget Request to Congress (February 1999).

APPENDIX III: LEGISLATIVE PROGRAM PROJECTIONS

U. S. NUCLEAR REGULATORY COMMISSION LEGISLATIVE PROGRAM PROJECTIONS (Dollars are in millions.)				
	SALARIES AND EXPENSES APPROPRIATION		INSPECTOR GENERAL APPROPRIATION	
	Budget Authority	Budget Outlays	Budget Authority	Budget Outlays
FY 1999 Enacted	465.0	465.8	4.8	4.8
FY 2000 Estimate	465.4	465.4	6.0	5.8
FY 2001 Estimate	465.4	465.4	6.0	6.0
FY 2002 Estimate	465.4	465.4	6.0	6.0
FY 2003 Estimate	465.4	465.4	6.0	6.0
FY 2004 Estimate	465.4	465.4	6.0	6.0

APPENDIX IV: REPORT TO CONGRESS ON DRUG TESTING

U.S. NUCLEAR REGULATORY COMMISSION
REPORT TO CONGRESS ON DRUG TESTING

The Nuclear Regulatory Commission's (NRC's) Drug Testing Plan was initially approved in August 1988 and updated in November 1997. NRC drug testing requirements on the nuclear industry through regulations are separate from this program and are not covered by this report. The NRC's Drug Testing Program under Executive Order (E.O.) 12564 includes random, applicant, voluntary, followup, reasonable suspicion, and accident-related drug testing. Testing was initiated for non-bargaining unit employees in November 1988 and for bargaining unit employees in December 1990 after an agreement was negotiated with the National Treasury Employees Union.

The NRC positions meeting the following criteria are considered testing-designated positions, and the employees filling these positions are subject to random testing: (1) regional and headquarters employees who have unescorted access to vital or protected areas of nuclear plants, Category I fuel facilities, and uranium enrichment facilities; (2) employees who have assigned responsibilities or are on call for regional or headquarters incident response centers; (3) employees who require access to sensitive compartmented information, foreign intelligence information, or who require access to classified information (e.g., national security information or restricted data); and (4) employees who are motor vehicle operators carrying passengers.

Approximately 1,675 NRC employees occupy testing-designated positions and are subject to random testing. Potential selectees interviewed for positions in these categories are subject to applicant testing.

Approximately 1,002 tests of all types were conducted between October 1, 1997, and September 30, 1998. Since each employee subject to random testing has an equal chance of being selected each time, some NRC employees were randomly tested more than once. All testing results during this time period have been negative.

Internal quality control reviews were completed during the past year to ensure NRC's program continues to be administered in a fair, confidential, and effective manner.

The NRC's Drug Testing Program is based on the principles and guidance provided through E.O. 12564, Public Law 100-71, Department of Health and Human Services guidelines, and Commission decisions.

APPENDIX V: Reimbursable Work Agreements

U.S. NUCLEAR REGULATORY COMMISSION SUMMARY OF REIMBURSABLE WORK AGREEMENTS (New Budget Authority)			
	FY 1998	FY 1999 (Estimate)	FY 2000 (Estimate)
INTERNATIONAL ASSISTANCE TO FOREIGN GOVERNMENTS AND ORGANIZATIONS			
Core Conversion Project	$50,000	$200,000	$0
International Invitational Travel	$60,935	$60,000	$60,000
Nuclear Safety Initiatives for the New Independent States	$4,300,000	$4,000,000	$0
Regional Energy Efficiency Project	$650,000	$350,000	$250,000
ADMINISTRATIVE AGREEMENTS			
Agreement States Training	$106,309	$100,000	$100,000
Criminal History Program	$690,336	$1,200,000	$1,200,000
Federal Railroad Administration	$150,000	$150,000	$0
Information Access Authorization Program	$134	$10,000	$10,000
Material Access Authorization Program	$389,770	$290,000	$290,000
National Park Service Employee Detail	$6,000	$0	$0
University of Illinois Employee Detail	$100,833	$105,087	$0
Westinghouse Electric Company Participation in the Second USNRC International Steam Generator Program	$0	$50,000	$50,000
OTHER AGREEMENTS			
Aluminum-Based Research Reactor Spent Nuclear Fuel[1]	$0	$0	$0
Closure of High-Level Waste Tanks at Savannah River[2]	$0	$0	$0
Fissile Materials Disposition	$240,000	$0	$0
Foreign Cooperative Research Agreements	$2,279,356	$2,500,000	$2,500,000
Foreign Research Reactor Spent Nuclear Fuel	$120,000	$700,000	$600,000
Navy Porting Reviews	$12,000	$12,000	$10,000
Privatization of U.S. Enrichment Corporation	$550,000	$0	$0
Safety Evaluation at Brookhaven National Laboratory[2]	$0	$0	$0
TOTAL	$9,705,673	$9,727,087	$5,070,000

[1] This workload is continuing into FY 2000, based upon prior year funding.
[2] This workload is continuing into FY 1999, based upon prior year funding.

SUMMARY OF REIMBURSABLE WORK AGREEMENTS

1. Core Conversion Project

Source: Department of Defense (DoD)

Description of Work: The NRC will provide technical assistance to the Russian reactor regulator, Gosatomnadzor (GAN), in support of its review and approval of core conversion activities at Russia's three weapons-grade plutonium production reactors. The reimbursable FTE requirement for this agreement is approximately 1 FTE in FY 1999 and in FY 2000.

Justification for NRC Involvement: DoD has the lead in a US-Russian project to alter the core design of the three Russian reactors referred to above. NRC was assigned by the U.S.-Russian Joint Commission on Economic and Technological Cooperation to provide to GAN assistance in the safety review and licensing of the conversion designs. The NRC and GAN have signed a Statement of Intent to cooperate in this assistance program and DoD has issued an Interagency Cost Reimbursement Order (IACRO) to NRC defining NRC's role and providing for all approved assistance to GAN.

Reimbursement Procedures: DoD provides budget authority in advance for the full cost of the assistance which it approves for NRC to provide to GAN. The NRC bills DoD quarterly for all direct staff hours and contractual support expended for work specified in the reimbursable agreement. The hourly rate charged to DoD for NRC direct staff time is established in 10 CFR Part 170. This agreement was entered into pursuant to the authority of the Economy Act, 31 U.S.C. 1535 and 1536.

2. International Invitational Travel

Source: International Atomic Energy Agency (IAEA), various foreign governments, and other international organizations.

Description of Work: IAEA and various foreign governments reimburse NRC travel costs pertaining to the organization's or government's work.

Justification for NRC Involvement: The NRC is assisting IAEA, other international organizations, and foreign governments by providing support in the area of nuclear safety because of the NRC's specialized expertise in the regulation of the uses of nuclear energy and materials. The NRC is authorized by its appropriation legislation to retain and use funds for services rendered to foreign governments and international organizations.

Reimbursement Procedures: The NRC initially funds the travel cost and is then reimbursed, generally by check, by the organization or country that sponsored the travel.

3. Nuclear Safety Initiatives for the New Independent States (NISs): Energy Efficiency and Market Reform Project

Source: U.S. Agency for International Development (AID)

Description of Work: The purpose of this AID initiative is to continue to implement nuclear safety initiatives in Russia, Ukraine, Armenia, and Kazakhstan. Activities under this agreement include (1) analytical support activities, (2) development of a training center for regulatory personnel, (3) creation of an incident response center, (4) work in the technical area of probabilistic risk assessment, and (5) assistance in legal enforcement and development of draft regulatory legislation. The FTE requirement for this agreement is approximately 6 FTE in FY 1999 and FY 2000.

Justification for NRC Involvement: The NRC is assisting AID in providing support to the NISs in the area of nuclear safety because of the NRC's specialized expertise in the regulation of civilian uses of nuclear energy and materials.

Reimbursement Procedures: AID transfers budget authority to the NRC for travel, contractor support, and administrative expenses (e.g., interpreters). Additionally for r FY 1999, salary costs for NRC employees working under this agreement will be charged to these funds. In FY 2000, NRC will include the staff cost for the AID-related work within the General Fund portion of the Salaries and Expenses appropriation. As costs are incurred by the NRC, the costs are charged to NRC's AID transfer allocation account.

4. Regional Energy Efficiency Project

Source: U.S. Agency for International Development (AID)

Description of Work: The purpose of this AID initiative, started in 1991, is to assist the countries of Central and Eastern Europe (Czech Republic, Slovak Republic, Lithuania, Bulgaria, and Hungary) develop effective regulatory organizations, advance safety culture awareness and practices, strengthen the legal framework and regulatory capability, improve analytic capabilities for performing safety analyses (by providing computer code membership), strengthen inspectorates through intensive training in NRC regulatory inspection philosophy, procedures and techniques and respond quickly to changing assistance priorities. The NRC has continually emphasized a regional approach by including representatives from all the Central and Eastern European countries so that when AID assistance comes to an end, technical experts in each

country will be familiar with and can help their counterparts in adjacent countries.

Justification for NRC Involvement: The NRC is assisting AID in providing support to the countries of Eastern and Central Europe in the area of nuclear safety because of the NRC's specialized expertise in the regulation of civilian uses of nuclear energy and materials.

Reimbursement Procedures: AID provides budget authority in advance to the NRC for travel, contractor support, and administrative expenses (e.g., interpreters). For FY 1999, the Commission waived recovery of salary costs for NRC employees working under this agreement, based on the small resources involved. In FY 2000, NRC will include the staff costs for this AID-related work within the General Fund portion of the Salaries and Expenses appropriation. As costs are incurred by the NRC, AID is billed via the Department of Treasury's on-line payment and collection system.

5. Agreement States Training

Source: Agreement State Governments

Description of Work: The purpose of this program is to offer nuclear materials technical training to the Agreement States. Contracted courses are provided on a cost reimbursable basis.

Justification for NRC Involvement: NRC conducts technical training to ensure that the NRC staff possesses the requisite knowledge, skills, abilities, and competencies to accomplish the agency's nuclear safety oversight mission. NRC also makes this training available to the Agreement States to assist the states in carrying out their oversight mission. Contracted courses are provided on a cost reimbursable basis.

Reimbursement Procedures: The various Agreement States are billed for their proportionate share for participation in the NRC's Technical Training contracted courses. Payments will be made either by check or by electronic funds transfer.

6. Criminal History Program (CHP)

Source: NRC licensees

Description of Work: The NRC has entered into a written agreement with the Federal Bureau of Investigation's (FBI's) Identification/Information Management Division to conduct user fee non-criminal justice fingerprint card checks for which the FBI provides criminal history records for applicants if such exist in FBI files and/or databases. The reimbursable FTE

requirement for this workload is approximately 1 FTE in FY 1999 and FY 2000.

Justification for NRC Involvement: Title 10 of the *Code of Federal Regulations*, Part 73, issued under the authority of the AEA to protect public health and safety and provide for common defense and security.

Reimbursement Procedures: Funds are received from the licensees for fingerprint checks. Payments are made to the FBI via the Department of Treasury's on-line payment and collection system.

7. Federal Railroad Administration

Source: U.S. Department of Transportation, Federal Railroad Administration (FRA)

Description of Work: The purpose of this research program is to develop a risk management tool set to assess a safety critical process in railroad companies, railroad industry suppliers, and the FRA. The development of the tool set is expected to assist in nationwide efforts in diverse applications and industries to apply microprocessors to safety-critical control functions.

Justification for NRC Involvement: The NRC will ensure that the University of Virginia Center for Semicustom Integrated Systems develops and provides a research proposal which meets FRA's needs, along with a mutually agreeable approach, identification of deliverables, costs, and schedules. This railroad-specific work will serve as a case study for the generic techniques being developed by UVA.

Reimbursement Procedures: FRA provided budget authority in advance for NRC's contractual support. FRA is being billed through the Department of Treasury's on-line payment and collection system. Funding is from a no-year appropriation; any FRA funds remaining unexpended at the end of the year may be carried over into future fiscal years unless otherwise notified by FRA. This agreement was entered into pursuant to the authority of the Economy Act, 31 U.S.C. 1535 and 1536.

8. Information Access Authorization Program (IAAP)

Source: NRC licensees

Description of Work: Licensee personnel with access to classified national security information and restricted data are subject to personnel security background investigations conducted by the Office of Personnel Management (OPM) at the NRC's request to ensure their

eligibility for such access. This background investigation is necessary under the Atomic Energy Act (AEA) and Executive Order 12968 to determine their eligibility for access to classified information.

Justification for NRC Involvement: Title 10 of the *Code of Federal Regulations*, Part 25, issued under the authority of the AEA to protect public health and safety and provide for common defense and security.

Reimbursement Procedures: Funds are received from the licensees for background investigations. Payments are made to OPM via the Department of Treasury's on-line payment and collection system. Salary costs for NRC employees administering this program are not reimbursed by the requestor.

9. Material Access Authorization Program (MAAP)

Source: NRC licensees

Description of Work: Licensee personnel with access to, or control of, formula quantities of special nuclear material are subject to personnel security background investigations conducted by the Office of Personnel Management (OPM) at the NRC's request to ensure their eligibility for such access. Such screening is necessary to protect against the theft or diversion of special nuclear material or acts of sabotage.

Justification for NRC Involvement: Title 10 of the *Code of Federal Regulations*, Part 11, issued under the authority of the Atomic Energy Act to protect public health and safety and provide for common defense and security.

Reimbursement Procedures: Funds are received from the licensees for background investigations. Payments are made to OPM via the Department of Treasury's on-line payment and collection system. Salary costs for NRC employees administering this program are not reimbursed by the requestor.

10. National Park Service Employee Detail

Source: National Park Service (NPS), Department of the Interior

Description of Work: The NRC detailed an employee to provide translator services for the NPS.

Justification for NRC Involvement: The NRC employee's services supported members of

the NPS delegation visiting the People's Republic of China for meetings with the Ministry of Construction of China on U.S.-China cooperation in the field of national parks.

Reimbursement Procedures: NPS provided budget authority in advance to the NRC for the direct salary and benefits of the employee. On the basis of actual salary and benefits costs, the NPS was billed via the Department of Treasury's on-line payment and collection system. The employee's travel expenses were reimbursed directly from NPS. This agreement was entered into pursuant to the authority of the Economy Act, 31 U.S.C. 1535 and 1536.

11. University of Illinois Employee Detail

Source: University of Illinois

Description of Work: The NRC provides assistance in the planning, design, coordination and deployment of a new National Center for Technology Transfer. This includes establishing an operational center as a national resource, and assisting the National Center for Super Computing Applications (NCSA) Deputy Directors with planning, outreach and management activities associated with these objectives. This work also includes working directly with the NCSA Director and Deputy Directors to provide assistance in the concept, development, management and operations of the Center. The reimbursable requirement for this workload is approximately 1 FTE in FY 1999.

Justification of NRC Involvement: The NCSA is a recipient of the University of Illinois, National Science Foundation's new Partnerships for Advanced Computational Infrastructure (PACI) Program. The center has begun its new role as the leading edge site for research and academic individuals and institutions nation wide for the National Computational Science Alliance. A critical objective of the PACI program is outreach and technology transfer. To further this objective a new Technology Transfer Center is being established to operate as a national resource. NRC's experience in managing the NRC Technology Center provides valuable assistance to NCSA in the coordination of technology transfer to federal agencies, states and local governments, as well as the National Science Foundation.

Reimbursable Procedures: Funds are received from the University of Illinois on an annual basis. Payments are either made by check or electronic funds transfer. The University of Illinois reimburses NRC for the assignee's actual salary and benefits costs. This agreement was entered into pursuant to the Intergovernmental Personnel Act (IPA).

12. Westinghouse Electric Company Participation in the Second USNRC International Steam Generator Tube Integrity Research Program

Source: Westinghouse Electric Company

Description of Work: The purpose of this research program is to develop experimental data and predictive correlations and models needed for the independent evaluation of the integrity of steam generator tubes as plants age and degradation proceeds, as new forms of degradation appear, and as new defect-specific management schemes are implemented.

Justification for NRC Involvement: NRC is conducting this research under Title 10 of the Code of Federal Regulations, Part 73, issued under authority of the Atomic Energy Act to protect public health and safety and provide for the common defense and security. Westinghouse participation under the cooperative nuclear research program contributes to offsetting the associated costs.

Reimbursement Procedures: Funds will be received from Westinghouse in advance. Payments will be made either by check or by electronic funds transfer. The NRC is authorized by Section 506 of the FY 1999 Energy and Water Development Appropriations Act, P.L. 105-245, to receive, retain, and use funds under the cooperative nuclear research program for the salaries and expenses associated with the program.

13. Aluminum-Based Research Reactor Spent Nuclear Fuel

Source: Department of Energy (DOE)

Description of Work: The NRC provides technical assistance to DOE in connection with DOE's identification of potential issues relating to the ultimate disposition, in a geologic repository, of aluminum-based research reactor spent nuclear fuel (SNF) from both foreign and domestic research reactors. The reimbursable FTE requirement for this agreement is less than 1 FTE each year in FY 1999 and FY 2000.

Justification for NRC Involvement: DOE has developed a technical strategy regarding the interim management and eventual ultimate disposition of aluminum-based research reactor SNF. This strategy calls for technology development efforts to be conducted which will allow DOE to make a decision by the year 2000 on one or more disposition approaches for aluminum-based research reactor SNF. DOE seeks NRC's technical support to assist DOE's Savannah River Operations Office (DOE-SR) in identifying issues relating to NRC disposal requirements that may be applicable to the ultimate disposition of the aluminum-based SNF.

Reimbursement Procedures: DOE provides budget authority in advance to the NRC for the full cost of NRC assistance. The NRC bills DOE for all direct staff hours expended for work specified in the reimbursable agreement, as well as contract support costs, via the Department of the Treasury's on-line payment and collection system. The hourly rate charged to DOE for NRC direct staff time is established in 10 CFR Part 170. This agreement was entered into pursuant to the authority of the Economy Act, 31 U.S.C. 1535 and 1536.

14. Closure of High-Level Waste Tanks at Savannah River

Source: Department of Energy (DOE)

Description of Work: The NRC is reviewing the methodology established by DOE-Savannah River for closure of high-level waste (HLW) tanks and will consider DOE-Savannah River's proposed approach for classification of residual waste in the tanks as "incidental" waste. NRC will advise DOE-Savannah River of the results of the review. This work is currently expected to be completed by April 1999.

Justification for NRC Involvement: DOE's Savannah River Operations Office has established a HLW tank closure program for the 51 HLW tanks at the Savannah River Site. Consistent with Section 202 of the Energy Reorganization Act of 1974, which gives NRC licensing and related regulatory authority over DOE HLW disposal facilities, closure of HLW tanks without the need for licensing by the NRC is predicated on the classification of the residual waste in the tanks as "incidental" waste. DOE-Savannah River seeks NRC technical assistance in reviewing DOE-Savannah River's methodology for classification of the residual waste in the tanks, after waste removal operations, as "incidental" waste.

Reimbursement Procedures: DOE provides budget authority in advance to the NRC for the full cost of NRC assistance. The NRC bills DOE for all direct staff hours expended for work specified in the reimbursable agreement, as well as contract support costs, via the Department of the Treasury's on-line payment and collection system. The hourly rate charged to DOE for NRC direct staff time is established in 10 CFR Part 170. This agreement was entered into pursuant to the authority of the Economy Act, 31 U.S.C. 1535 and 1536.

15. Fissile Materials Disposition

Source: Department of Energy (DOE)

Description of Work: The NRC provides review and advice to DOE on licensing and permitting strategies and plans being developed by DOE addressing the implementation of technologies selected for disposition of surplus fissile materials. This includes NRC comments

on DOE strategies and plans with the principal technical effort being NRC's review of information provided by DOE and interactions between NRC and DOE/DOE contractors to discuss regulatory strategies and associated plans and schedules. The reimbursable FTE requirement for this agreement is approximately 1 FTE each year in FY 1999.

Justification for NRC Involvement: NRC's review and advice to DOE on licensing and permitting strategies and plans being developed to address the implementation of technologies selected for disposition of surplus fissile materials is needed to assure that the information being developed to support DOE's plans for implementation is correct and that the licensing strategies being considered by DOE have the potential to succeed.

Reimbursement Procedures: DOE provides budget authority in advance to the NRC for the full cost of NRC assistance. The NRC bills DOE for all direct staff hours expended for work specified in the reimbursable agreement via the Department of the Treasury's on-line payment and collection system. The hourly rate charged to DOE for NRC direct staff time is established in 10 CFR Part 170. This agreement was entered into pursuant to the authority of the Economy Act, 31 U.S.C. 1535 and 1536.

16. Foreign Cooperative Research Agreements (FCRAs)

Source: Various foreign entities

Description of Work: The NRC enters into nuclear safety cooperative research agreements with foreign entities under the NRC's Foreign Cooperative Nuclear Safety Research Program for the purpose of exchanging nuclear safety-related information, conducting joint projects of mutual interest, and interacting with other organizations concerned with nuclear safety. The research programs subject to these cooperative research agreements are carried out as a part of the agency's nuclear regulatory responsibilities. The foreign entities participating in the Cooperative Nuclear Safety Research Program enter into cooperative research agreements that provide in-kind technical or financial contributions to the NRC.

Justification for NRC Involvement: These foreign contributions are provided to the NRC in return for access to information that has been developed and continues to arise from the NRC research programs before final publication and release to the public domain. These contributions support broad safety research programs and also allow the foreign entity direct participation in the execution of the research program. Both parties benefit from the cooperative efforts.

Reimbursement Procedures: The foreign entity provides an advance of funds to the NRC using the Fedwire Deposit System (i.e., electronic funds transfer) or by check or money order. The NRC is authorized by Section 506 of the FY 1999 Energy and Water Development

Appropriation Act, P.L. 105-245, to receive, retain, and use funds under the cooperative nuclear research program for the salaries and expenses associated with the program.

17. Foreign Research Reactor Spent Nuclear Fuel

Source: Department of Energy

Description of Work: The Department of Energy (DOE) has established a program to accept and manage foreign research reactor spent nuclear fuel containing uranium enriched in the United States. The purpose of the DOE program is to support the broad United States' nuclear weapons nonproliferation policy calling for the reduction and eventual elimination of the use of highly enriched (weapons grade) uranium in civil commerce worldwide. The scope of the Interagency Agreement with DOE that was signed on March 30, 1998, was limited to the review of plans for the domestic transportation of a particular shipment of foreign research reactor spent nuclear fuel, and the conduct of route surveys and inspections associated with Foreign Research Reactor Fuel. Late in FY 1998, the scope of the Interagency Agreement was significantly broadened to include: (1) package reviews to support U.S. Department of Transportation (DOT) revalidation of foreign certified packages; (2) resolution of technical issues; (3) route approvals; (4) shipment inspections; (5) NRC participation in public meetings; and (6) other related activities. The reimbursable FTE requirement for this program is approximately 3 FTE each year in FY 1999 and FY 2000.

Justification for NRC Involvement: The NRC is assisting DOE by providing expedited transport package reviews to support Department of Transportation revalidations of foreign certified transport packages. These expedited reviews, along with route approvals and shipment oversight, are needed to support scheduled shipments under the U.S. nuclear weapons nonproliferation policy. The NRC is assisting DOE because of the NRC's specialized expertise in the regulation of civilian uses of nuclear energy and materials.

Reimbursement Procedures: DOE will provide budget authority in advance for the full cost of NRC's assistance. NRC will bill DOE quarterly for all direct staff hours and contractual support expended for work specified in the reimbursable agreement. The hourly rate charged to DOE for NRC direct staff time is established in 10 CFR Part 170. This agreement will be entered into pursuant to the authority of the Economy Act, 31 U.S.C. 1535 and 1536.

18. Navy Porting Reviews

Source: United States Navy (USN)

Description of Work: The NRC conducts porting reviews for the United States Navy. The reimbursable FTE requirement for this agreement is approximately less than 1 FTE in both FY 1999 and FY 2000.

Justification for NRC Involvement: The NRC provides technical advice to the United States Navy on health and safety matters concerning the Navy's nuclear propulsion reactors. These reactors and the special nuclear material used therein are held by the Department of Defense pursuant to directives of the President under Section 91b. of the Atomic Energy Act of 1954. As such, neither these reactors nor the special nuclear material is licensed under that act. From the beginning of the nuclear Navy program in 1946 until the present, such technical advice has been furnished by the NRC or its predecessors when requested.

Reimbursement Procedures: The United States Navy provides budget authority in advance for the full costs of NRC services at the beginning of each fiscal year. The NRC charges a flat rate for each service performed. The flat rate is based on the hourly rate for NRC direct staff time, which is established in 10 CFR Part 170. The NRC will evaluate this rate annually and inform the United States Navy of any changes required to the service charges. The adjusted service charges will be an appendix to the memorandum of understanding. The NRC will bill the United States Navy at the end of each quarter for services performed. This agreement is entered into pursuant to the authority of the Economy Act, 31 U.S.C. 1535 and 1536.

19. Privatization of the U.S. Enrichment Corporation

Source: The United States Enrichment Corporation (USEC)

Description of Work: The NRC determined that the privatized entity that operates the gaseous diffusion plants is not foreign owned, controlled, or dominated, and that certification will not be inimical to common defense and security nor to the maintenance of an economical and reliable source of domestic enrichment. This effort was completed in FY 1998.

Justification for NRC Involvement: The U.S. Enrichment Corporation Privatization Act (Public Law 104-134, signed into law April 26, 1996) and other applicable law, including Atomic Energy Act of 1954, as amended requires that the NRC perform the activities stated above. Section 3104 of Public Law 104-134 states, "Expenses of privatization shall be paid from corporation revenue accounts in the U.S. Treasury."

Reimbursement Procedures: On a quarterly basis, the NRC prepared invoices which detailed actual costs incurred related to the scope of activities described in the Interagency Agreement between NRC and USEC. Payment by check was made to NRC by USEC. The NRC billed USEC for all direct staff hours expended for work specified in the reimbursable agreement. The hourly rate charged to USEC for NRC direct staff time is established in 10 CFR Part 170.

20. Safety Evaluation at Brookhaven National Laboratory

Source: Department of Energy (DOE)

Description of Work: The NRC is performing a safety assessment of the Brookhaven National Laboratory's (BNL) High Flux Beam Reactor (HFBR) operation over the range of power levels for which HFBR has previously operated, conduct a review to assess the extent of compliance with existing DOE safety requirements at the HFBR, and develop an inventory of potential issues associated with regulatory oversight of BNL by entities other than DOE. The reimbursable FTE requirement for this agreement is approximately less than 1 FTE in FY 1999.

Justification for NRC Involvement: NRC involvement was requested in order to provide independent review and assessment of the various safety and regulatory issues at BNL's HFBR by an entity other than DOE as requested by U.S. Representative McDade in a letter dated June 19, 1997, to the Secretary of Energy.

Reimbursement Procedure: DOE advanced $225,000 to NRC on September 25, 1997, via the U.S. Treasury's on-line payment and collection system. These funds were carried over into FY 1998 and FY 1999 to support NRC's full costs of conducting the safety assessment. The NRC charges these funds for all direct staff hours expended for work specified in the agreed upon scope of work via the Department of the Treasury's on-line payment and collection system. The hourly rate charged to DOE for NRC direct staff time is established in 10 CFR Part 170. This agreement was entered into pursuant to the authority of the Economy Act, 31 U.S.C. 1535 and 1536.

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LICENSE AND USER FEES

MR. PACKARD: In fiscal year 1999 and fiscal year 2000, the Commission estimated a total of $50,500,000 and $51,400,000, respectively, for NRC programs and activities that do not directly benefit licensees. Why has your estimate of charges for budgeted costs not related to licensees increased in fiscal year 2000?

CHAIRMAN JACKSON:

This increase is mainly attributable to an increase of budgeted resources necessary for the Site Decommissioning Management Plan Program. There are several programs and activities that comprise the estimate of charges of those budgeted costs that do not directly benefit licensees. These activities include regulatory assistance to Agreement States, Agreement State oversight, assistance to other Federal agencies, exemption for nonprofit educational institutions, the subsidy for small business entities, Site Decommissioning Management Plan site cleanup, generic decommissioning and reclamation activities, and international activities. Subsequent to making the FY 2000 estimate, the NRC's proposal to fund $600,000 from the General Fund for international activities support was approved for inclusion in the President's budget. Therefore, there is only a $300,000 increase projected between FY 1999 and FY 2000.

MR. PACKARD: Since 1994, the Commission has recognized the unfairness of these costs being incurred by licensees through user fees. Please explain why the Commission has not acted on this in a more timely and responsible manner? What specific actions have been taken to rectify this inequity? What can Congress do to assist you in addressing this situation?

CHAIRMAN JACKSON:

Absent legislative relief, the Commission has limited ability to remedy any inequities in its fee structure because the law (Omnibus Budget Reconciliation Act of 1990) requires NRC to collect approximately 100 percent of its budget in fees. The NRC proposed in1994 that the Congress modify the legislation to address this issue. The NRC lacks the legal authority to further mitigate the expenses associated with agency programs that are carried out under statute or which support statutory requirements, but which do not relate directly to individual licensees or classes of licensees. The NRC continues to believe that in order to enhance fairness and equity in the user fee requirements, that further extensions of the fee recovery requirement be based on collecting 90 percent rather 100 percent of its budget authority. As the Congress considers extension of the NRC fee requirements, the Commission urges the support of extending the fee recovery requirement at 90 percent rather than 100 percent.

Over the years, the NRC has taken several actions within existing fee laws to address concerns regarding its fee structure:

- Identified fairness and equity concern categories in the February 1994 Report to Congress on NRC Fee Policy, proposing legislation necessary to address these concerns. The recommended legislation was not enacted.

- In FY 1995, acted under existing fee laws to help to mitigate the fairness and equity concerns by treating costs for these activities similar to overhead and distributing the costs to the broadest base of NRC licensees.

- Established a policy to obtain full cost reimbursement for services provided to other Federal agencies and states when such reimbursements are authorized by law. One example is that NRC instituted a policy to seek reimbursement from Agreement States for attendance NRC technical training classes.

- Obtained appropriation legislation which removed from the fee base certain costs incurred as a result of regulatory reviews and other assistance provided to the Department of Energy and other Federal agencies.

- Updated the information presented in the 1994 Report to Congress on NRC Fee Policy. Based on that update and subsequent information, the Commission sought legislative relief as part of its FY 2000 budget authorization request. As in the past, the OMB has advised NRC that it would not support the legislative request.

- The NRC has also taken action to shift cost recovery for certain activities from annual fees to specific fees for services. For example, effective with the FY 1998 final fee rule, the NRC is assessing fees to the major licensees to recover the full cost of resident inspectors. In addition, costs incurred within 30 days after the issuance of an inspection report are being billed to the specific licensee. The NRC has also proposed for FY 1999 that fees for services be expanded to include additional activities, such as reviews of reports and incident investigations. The Commission is also proposing for FY 1999 to assess annual fees to all power reactors, including those in decommissioning or possession only who currently are not assessed annual fees, to recover costs for generic activities related to reactor decommissioning. This change would reduce the surcharge amount for generic decommissioning/reclamation activities.

- The NRC will be seeking as part of its FY 2000 authorization bill authority to assess fees, beginning in FY 2001, to other Federal agencies for specific licensing and inspection activities performed for those agencies.

- To reduce expenses, obtained legislation (section 506 of the FY 1999 Energy and Water Development Appropriations Act) to permanently authorize the NRC to augment its Congressionally approved funds with monies received for the Cooperative Nuclear Research Program and services rendered to State and foreign governments and international organizations.

MR. PACKARD: What does the Commission consider to be the mandate for involvement in these programs? Provide justification and statutory basis for each of the programs and activities that comprise this funding category.

CHAIRMAN JACKSON:

The NRC regulates the civilian uses of nuclear power reactors, special nuclear material, source material, byproduct material, and related activities pursuant to the Atomic Energy Act of 1954, as amended (AEA), and the Energy Reorganization Act of 1974, as amended. This authority not only extends to regulating the operation of commercial establishments using this equipment or materials, but also to the decontamination, decommissioning, storage, or disposal of these facilities or items following permanent cessation of regulated activities.

These two statutes confer upon the NRC broad authority to regulate civilian nuclear activities conducted by other Federal agencies, nonprofit educational institutions, and small entities. NRC oversight of the Agreement States is mandated by section 274 of the Atomic Energy Act. Finally, NRC conducts its international activities related to nuclear nonproliferation pursuant to the Nuclear Non-Proliferation Act of 1978. NRC conducts its international health and safety activities pursuant to a number of sections in the Atomic Energy Act, particularly sections 3e, 31a, 123, and 161c. In addition, section 506 of the Energy and Water Development Appropriations Act for FY 1999 permanently authorizes the NRC to augment its Congressionally approved funds with money received for the Cooperative Nuclear Research Program and services rendered to foreign governments and international organizations.

The NRC in its 1994 fee report to the Congress explained in detail why legislation should be enacted which would exclude these activities from the fee base. See Enclosure 1.

REACTOR LICENSE RENEWAL

MR. PACKARD: The Commission should be commended on the twenty-five month review of the Calvert Cliffs and Oconee license renewal applications. Did the Commission's decision on the types of hearings that would be conducted (that is a legislative type of hearing versus an adjudicatory one) contribute to this schedule in a significant way? What other factors contributed to this?

CHAIRMAN JACKSON:

In the case of the Calvert Cliffs and Oconee applications, the principal reason for the reduction to 25 months was the fact that no hearings will be held. The Commission did not change the type of hearings that would be conducted for the Calvert Cliffs and Oconee license renewal applications. Rather, the requests for hearings filed in the Calvert Cliffs and Oconee proceedings were evaluated under the Commission's existing Rules of Practice that provide for formal adjudicatory type hearings. The requests for hearings were denied because it was determined that the groups seeking a hearing did not meet the Commission's regulations regarding the identification of issues related to the application. It should be noted that the group on Calvert Cliffs has sought judicial review of the Commission's decision to deny its hearing request. This issue is currently before the Court of Appeals for the D.C. Circuit.

The Commission is also achieving the accelerated schedule through a number of efforts that improve the management and control of the review process. These efforts are described in the NRC's statement for the record on its FY 2000 budget request submitted to the Subcommittee.

The NRC continues to look for opportunities to improve the schedule for review of renewal applications. The renewal safety evaluation report for Calvert Cliffs was issued March 21, 1999, and the NRC expects to issue the report for Oconee by the end of June 1999. The staff plans to meet with the licensees for Calvert Cliffs and Oconee, Baltimore Gas and Electric and Duke Energy, respectively, on a monthly basis to discuss the scope of safety issues that need to be resolved and reviewed. As a result of lessons learned from these initial reviews we will revise, as appropriate, the scope of the license renewal reviews and schedule milestones.

MR. PACKARD: Three additional plant license renewal applications may be submitted by the end of 2000. At what point in time and what process will be used to apply lessons learned from the first two reviews to further streamline technical reviews of the other three plants?

CHAIRMAN JACKSON:

Lessons learned from the review of the first renewal application, Calvert Cliffs, are already being applied where possible to the review of the second renewal application, Oconee. Experience from the review of the first two renewal applications is also being used to help develop resolutions for generic renewal issues, to establish a standard format for future applications, and to provide feedback to licensees preparing the next renewal applications. The NRC's intent is to use the experience gained from the review of the first two renewal applications, review of technical renewal reports submitted by the industry, as well as the resolution of generic renewal issues to develop enhanced implementation guidance (Standard Review Plan for License Renewal, Regulatory Guide, and Industry Implementation Guideline for License Renewal) to improve the effectiveness and efficiency of license renewal reviews.

The NRC's procedure for identifying and implementing lessons learned from the review of the first renewal applications and resolution of renewal issues is contained in NRR Office Letter No. 805, *License Renewal Application Review Process.* This office letter describes the process steps and responsibilities of staff organizations that will ensure that lessons learned are incorporated into the appropriate guidance documents. This process also includes interactions with the industry in a public forum. Therefore, in parallel with the application reviews, the NRC is continuing interactions with the industry to resolve generic renewal issues and incorporate the resolutions into the guidance documents. As progress is made in developing guidance, the NRC may prepare publicly available interim updates of its implementation guidance for use by the NRC staff and the industry.

MR. PACKARD: On April 8, 1999, the Commission published a listing of approximately 100 generic issues associated with license renewal. What is the schedule for resolution of these issues? How many of these issues relate to programs and activities currently implemented by operating plants under their current licensing basis? What specific aging effects have been identified

that are not adequately managed by current maintenance and surveillance programs?

CHAIRMAN JACKSON:

The list of approximately 100 generic issues associated with license renewal originated from public comments on the Draft Standard Review Plan for License Renewal primarily from industry comments by the Nuclear Energy Institute (NEI). These comments along with issues identified by the staff were compiled into a list. Through interactions between the staff and NEI, the list was refined and the issues divided into four priority levels and schedules for resolution were developed.

There are currently 20 Priority 1 renewal issues that require resolution to support the Calvert Cliffs and Oconee license renewal applications. The schedules for resolution of Priority 1 issues are established to support the application review schedules and most of the Priority 1 issues are expected to be resolved by the end of July 1999. The final Priority 1 issue, the update of the Final Safety Analysis Report, will be completed by the end of December 1999.

Priority 2 issues are those generic items relating to development and review of license renewal applications and will be resolved to support the schedule for revision of the Standard Review Plan and Regulatory Guide for License Renewal. As previously discussed, the NRC staff plans to incorporate lessons learned and update of the implementation guidance using the experience gained from the review of the first two renewal applications. Schedules for resolution of the Priority 2 issues have not been established yet. The staff and industry plan to resolve these issues on a generic basis.

Priority 3 issues are non-generic issues important to application development and review and generic issues determined to be less important than Priority 2 issues. Priority 4 issues are low priority issues mostly of an editorial nature. Currently, the staff's focus is on completing the review of the initial renewal applications along with interacting with the applicants and NEI to resolve the Priority 1 issues needed to support issuance of the renewed licenses. Schedules for resolution of the Priority 3 and 4 issues have not been established yet, and will depend on the availability of staff and industry resources.

Approximately one-third of the license renewal issues relate to current licensing basis programs. They are generally in the areas of in-service inspection, containment inspection, environmental qualification of electrical equipment, fatigue of metal components, and reactor vessel surveillance. Examples of specific aging effects that have been identified and are currently under discussion with the industry regarding aging management for the period of extended operation are cracking of reactor coolant system small-bore piping, aging of containment penetration bellows, fatigue of metal components, and environmental qualification of electrical equipment.

PROBABILISTIC RISK ASSESSMENT

MR. PACKARD: How long will it take to complete the process of the Commission's use of risk-informed regulations? Have you developed an action plan containing decision points, priorities and schedule? If not, why not?

CHAIRMAN JACKSON:

The Commission is currently considering a proposal for risk-informing 10 CFR Part 50, in response to a December 23, 1998, paper (SECY-98-300) which described options and a two-phased implementation strategy for modifying reactor regulations in 10 CFR Part 50 to make them risk-informed. In that paper, it was stated that it will take at least 5 years for full implementation of a risk-informed 10 CFR Part 50. The actual length of time that will be necessary to fully risk-inform Part 50 will depend, in part, on the option chosen by the Commission. The schedule depends on the scope, approach, process, resources, and other variables. More detailed schedules are to be developed later this year, after Commission action is taken on this paper and the scope of the effort is defined. Risk-informing non-reactor regulations will be the subject of future actions. Therefore, no schedules have yet been developed except for specific rulemakings, such as medical use (Part 35), disposal of high-level waste (Part 63), and fuel cycle facilities (Part 70).

With regard to development of an action plan, the NRC maintains a Probabilistic Risk Analysis Implementation Plan as a mechanism for identifying and tracking those activities that are undertaken to risk-inform agency activities and implement the 1995 Policy Statement on the Use of Probabilistic Risk Analysis. This plan is an agencywide plan that is updated quarterly and identifies major milestones and schedules for all agency risk-informed activities. When developed, the detailed plan and schedule for risk-informing 10 CFR Part 50 will be included in the implementation plan.

MR. PACKARD: Will the new oversight process factor into the prioritization of risk-informing regulations? When will this be done?

CHAIRMAN JACKSON:

The new reactor oversight process will use action thresholds consistent with the risk criteria in Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment In Risk-Informed Decisions On Plant-Specific Changes to the Licensing Basis," previously approved by the Commission. Therefore, the new oversight process will be risk-informed and is scheduled to be implemented following successful completion and assessment of a 6-month pilot program beginning in June 1999. The staff has presented options for risk-informing NRC's reactor regulations in 10 CFR Part 50, which are currently being reviewed by the Commission. Specific milestones and time frame for completion will be determined following the Commission's decision.

MR. PACKARD: The April 12th edition of Inside NRC contained an article suggesting NRC is "...dominating the writing..." of a PRA standard under the auspices of the American Society of Mechanical Engineers (ASME). Is this true?

According to the article, the Commission's Office of Research is directly involved in this effort. Recent organizational changes assigned the Office of Nuclear Reactor Regulation with responsibility for generating regulatory requirements. Please explain.

CHAIRMAN JACKSON:

No. NRC is contributing to the writing of the PRA standard. In general, the Office of Nuclear Regulatory Research has the lead for working with standards developing organizations to develop consensus standards. If any reactor standard were to be incorporated as part of a regulatory requirement (i.e., rulemaking), that rule would be developed by the Office of Nuclear Reactor Regulation. The recent organizational change you are referring to is the one that transferred the rulemaking functions to the Office of Nuclear Reactor Regulation and Office of Nuclear Material Safety and Safeguards.

The project team tasked to write the PRA standard is comprised of 20 members: one from ASME, six from the nuclear utilities, three from private industry/consulting companies, four from the reactor vendors, three from nuclear industry organizations (Nuclear Energy Institute, Electric Power Research Institute and Institute of Nuclear Power Operations), one from a non-nuclear engineering organization, one from the American Nuclear Society, and one from the NRC. The ASME standard consists of seven chapters and two appendices. At the request and direction of the project team, the NRC member (with support from NRC contractors) contributed substantially to the drafting of one of the chapters and one appendix. Before the release of the draft document for public comment, a core writing group (consisting of six members of the project team) performed a detailed review of the entire draft document and incorporated comments from the project team. NRC contractors were used in this activity solely as a resource to make the modifications to the draft; **all** changes were made when there was a consensus of the core group. On February 1, 1999, ASME published for public review and comment Revision 10 of their draft "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications."

Final issuance of the standard requires review and approval by the ASME Committee on Nuclear Risk Management and the Board of Nuclear Codes and Standards. The Nuclear Risk Management Committee consists of twenty-one individuals: one representative from ASME, three representatives from the reactor vendors, one representative from NEI, four nuclear utility representatives, four private industry consultants, two academia representatives, one insurance representative, two professional society (American Nuclear Society and Institute of Electrical and Electronics Engineers) representatives, one NRC representative, one international representative, and one representative from the Illinois Department of Nuclear Safety. This consensus committee will vote on the standard and any negative votes will have to be addressed and resolved before the standard can be balloted for approval and issued.

MR. PACKARD: How does the PRA standard relate to Regulatory Guide 1.174 and draft NUREG-1602? Please identify the direct costs and man-hours that have been expended in the development of these three documents. Please include Commission staff resources and the use of contractors.

CHAIRMAN JACKSON:

In accordance with Regulatory Guide 1.174, Probabilistic Risk Assessment (PRA) quality is an issue that should be addressed when licensees propose risk-informed changes to the licensing basis using the PRA. Use of a standard is one acceptable approach for ensuring the quality of the PRA. It is the Commission's intent to endorse the ASME standard in RG 1.174, if the published standard meets the Commission's needs. Draft NUREG-1602 was a report issued for comment; it contained the attributes of an acceptable PRA and was intended to support RG 1.174. However, with ASME's development of a consensus standard for PRA, the NRC's desire is to use the ASME standard in lieu of draft NUREG-1602, and, therefore, we have no plans to finalize this report.

The following table displays the direct costs and full-time equivalent (FTE) expended per document.

Document	*Approximate Resources*	
	Staff	*Contractor*
RG 1.174	*10 FTE*	*$1020k*
draft NUREG-1602	*0.5 FTE*	*$230k*
ASME draft standard	*0.75 FTE*	*$650k*

REGULATIONS

MR. PACKARD: How many regulations have been promulgated by the Commission in the last fifteen years. Recognizing that licensee implementation, and staff inspections and reviews may take some time after issuing a new rule, how many of these regulations have been evaluated to ensure the intent of the regulation was indeed accomplished, especially with regard to a demonstrated safety improvement? Please provide a list of those regulations, identifying the demonstrated safety improvement, and a comparison of the estimated costs contained in the regulatory analysis to the actual cost of implementation.

CHAIRMAN JACKSON:

The agency is currently in the process of assessing the effectiveness of its regulations and the extent to which they have accomplished the original intent of the regulations. The NRC has promulgated 386 rules during the last 15 years, of which 259 (67 percent) have been administrative or mandatory. See Enclosure 2. Of the remaining 127 technical rules, 66 (52 percent) have been safety improvement and 61 (48 percent) have reduced unnecessary burden or added greater flexibility for licensees. Since 1992, 78 percent (52) of the technical rules

promulgated have been burden reducing rules and 22 percent (15) have been rules to improve safety. See Enclosure 3.

It is standard practice for the NRC to confirm that the safety intent of each new regulation is being met as it conducts its inspection and oversight activities. In this regard, the Commission has a number of programs in place to ensure that regulatory requirements are both efficient and effective in achieving their safety objective. For example, the Commission has implemented a formal systematic review under the backfit rule (10 CFR 50.109) to ensure discipline and predictability in imposing new requirements that apply to nuclear reactors. This process helps ensure the appropriate use of NRC and licensee resources. Relative to existing requirements, the NRC periodically reviews its regulatory base to identify and eliminate those requirements that do not contribute meaningfully to safety. As noted above, since 1992, a primary focus of NRC rulemaking has been to reduce or eliminate requirements that do not contribute significantly to safety. Additionally, the NRC has instituted a program to assess its effectiveness and to identify rules, standards, guidance, and practices that can be improved.

Although the NRC has not systematically validated the cost-benefit estimates included in each of its regulatory analyses, the NRC has validated a principal cost-estimating tool that is relied upon for many of its cost estimates. This generic cost-estimating tool utilizes the Energy Economic Data Base which provides detailed new construction cost information for different reactor designs. The NRC's cost-estimating tool applies cost adjustment factors to this baseline data to predict costs of retrofits. The validation study (NUREG/CR-5138) of the tool was completed in 1988. This study concluded that the estimates generated using the NRC methodology and cost factors are in reasonably close agreement with the actual values reported by licensees. This generic methodology was reviewed by the Atomic Industrial Forum (AIF), predecessor to the Nuclear Energy Institute, and the AIF found the methodology to be a reasonable basis for estimating construction-related costs at nuclear power plants.

NRC has conducted assessments of the effectiveness of selected regulations. The following are examples of ongoing assessments that have helped the NRC to determine if requirements are achieving their intended safety objectives.

In 1997, the NRC conducted an assessment of the cost effectiveness of the Station Blackout rule, one of NRC's more recent major rulemakings. In this assessment, the benefit was based on the estimate developed in the regulatory analysis supporting the rule. To validate the regulatory analysis costs, the staff relied on the Station Blackout tracking system which identified modifications performed by industry to satisfy the Station Blackout rule. To a large extent, cost estimates were based on the costs actually incurred at individual plants. The study concluded that, on an industry-wide basis, the Station Blackout rule was a cost-effective action based on the originally assumed safety benefit (reduction in public risk due to Station Blackout). As part of this ongoing assessment, the NRC plans to assess the actual safety benefit realized from the Station Blackout rule.

In 1991, the Commission promulgated the Maintenance Rule, which included a 5-year implementation period. As to the rule's demonstrating a safety improvement, the performance indicators show an improving trend since the rule was issued. However, the Maintenance Rule is only one of a number of possible causes for the improvement. The regulatory analysis

prepared for the Maintenance Rule estimated its cost at $9.5 million per reactor, offset in large measure by $9.0 million per reactor in savings because of reduced costs for replacement power. The Commission has directed the NRC staff to report on the efficacy of the rule in 2002, when enough data will have been collected to facilitate the analysis.

In FY 1999, efforts to assess the safety effectiveness and accuracy of cost estimates of other NRC regulations will be initiated. These include an assessment of the costs and safety benefits of 10 CFR Part 50.62, "Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events of Light-Water-Cooled Nuclear Power Plants," and a refinement of the safety benefit for Station Blackout, as noted above.

NRC also assesses its regulatory requirements for materials licensees. A generic assessment panel considers the applicable regulations involved in an event to assess whether the rule needs clarification or modification to prevent a similar event in the future. NRC also reviews licensee requests for exemptions semiannually to determine whether additional cost-effective changes to the regulations are necessary. One example of the evaluation of a current regulation is NRC's "Quality Management Program and Misadministration" promulgated in July 1991. The rule requires that licensees involved in the therapeutic administration of byproduct material and certain uses of radioactive sodium iodide implement a quality management program. The NRC has conducted a detailed analysis of inspections of medical facilities that have occurred since the implementation of this rule. The results of this analysis are being used in support of the ongoing revision to 10 CFR Part 35, "Medical Uses of Byproduct Material."

RESEARCH

MR. PACKARD: What are the ten priority activities currently being conducted by the Office of Research? How many direct NRC staff resources and contractors are assigned to each? How many of these activities specifically relate to regulatory decision making? What is the schedule for completion of these activities such that regulatory decisions will be made?

CHAIRMAN JACKSON:

The ten highest priority issues (not in priority order) being addressed by the NRC Office of Nuclear Regulatory Research are:

- Assuring the integrity of the reactor pressure vessel
- In-service inspection effectiveness and reliability
- Maintaining adequate safety margins for steam generator tube integrity
- Risk informing NRC regulations and regulatory actions
- Risk informing the inspection process
- Assessing operational data and risk informing plant safety assessments
- Changing the Pressurized Thermal Shock (PTS) Rule and Pressure-Temperature (P-T) limits for reactor pressure vessels
- Estimating realistic risk impacts from radiation exposure
- Confirming the safety of long term storage of spent fuel
- Providing burnup credit to reduce unnecessary regulatory burden

Each issue is described below, along with scheduled completion times and Office of Nuclear Regulatory Research staff and contractor resources for FY 2000. All of these priority activities specifically relate to regulatory decision making. Resolution of these issues will provide the technical basis for both generic and plant specific regulatory decisions. The schedules for completing work on these technical issues were developed considering the time periods in which regulatory decisions will have to be made.

The FY 2000 budget of the Office of Nuclear Regulatory Research also contains additional resources to address other high priority issues and to develop and maintain the infrastructure of analytical tools necessary for resolution of these and other efforts.

Assuring the integrity of the reactor pressure vessel: The reactor pressure vessel is the only component in the reactor coolant system whose failure cannot be mitigated by the engineered safety features. Thus, its integrity has been and continues to be a high priority issue. New information on radiation induced degradation -- a mechanism that may degrade the integrity of the pressure vessel -- will continue to be obtained as plants age. Additionally, the fracture mechanics analysis methodologies that are used today to establish safe operating limits for the reactor pressure vessel should be improved. Safe operating limits are a critical factor in maintaining adequate protection. Improved data and analytical tools are needed to support timely and realistic decisions on the integrity of reactor pressure vessels for the current operating license period and for license renewal.

-By FY 2002 the mechanistic and statistical assessment of reactor pressure vessel embrittlement data will be completed, as will assessments of the uncertainties in various methodologies and computer codes for estimating neutron fluence and improvements in fracture analysis methodologies. These will provide a basis for revising and relaxing regulatory criteria on allowable pressure and temperature limits during normal operations. This work will contribute to future decisions on license renewal and may result in a significant reduction in unnecessary burden and a better focus on safety.

Estimated FY 2000 resources - Assuring the Integrity of the Reactor Pressure Vessel
Direct staff resources: 5.0
Contractor resources (staff and test facilities/equipment): $2,550K

In-service inspection effectiveness and reliability: The reliability and effectiveness of non-destructive evaluation methods used by licensees to detect degradation before structural integrity is impaired are key factors in assuring the integrity of components such as the reactor pressure vessel, vessel penetrations, piping, and other components and structures such as spent fuel storage casks. Data are needed to support timely and realistic decisions about industry non-destructive inspection methods and programs.

-By FY 2002, use advanced inspection procedures and techniques to complete the assessment of fabrication flaw distributions in weld sections taken from reactor pressure vessels from several canceled plants and develop a generic flaw distribution that can be used in probabilistic assessments of pressure vessel integrity to evaluate proposed changes in pressure vessel operating criteria.

Estimated FY 2000 resources - In-service Inspection Effectiveness and Reliability
Direct staff resources: 1.0
Contractor resources (staff and test facilities/equipment): $450K

Maintaining adequate safety margins for steam generator tube integrity: Cracking and wastage have been identified as degradation mechanisms which may unacceptably erode the integrity of steam generator tubes, possibly leading to a loss of coolant accident which could bypass containment. This raises the need for improved understanding of the nature and effects of in-service degradation mechanisms, effectiveness and reliability of inspection techniques, new repair techniques, and the accuracy of predictive models.

- By FY 2002 perform destructive examination of both service- and laboratory-degraded steam generator tubes and develop estimates of the probability of detection and sizing accuracy of in-service inspection techniques to provide an independent basis for quantifying the inspection capabilities assumed in regulatory analyses of steam generator tube integrity.

Estimated FY 2000 resources - Maintaining Adequate Safety Margins for Steam Generator Tube Integrity
Direct staff resources: 1.0
Contractor resources (staff and test facilities/equipment): $1,740K

Risk informing NRC regulations and regulatory actions: Many of NRC's existing regulations (e.g., Part 50) and practices were derived using deterministic bases and do not always focus on the most risk-significant items, leading to unnecessary burden on licensees and, potentially, less priority given to important safety matters.

-Recommendations are before the Commission on a phased approach to risk-inform Part 50. Preliminary estimates are that such an undertaking would take at least 5 years and would begin with risk informing the scope of the regulation, using the Maintenance Rule as the first step. It is expected that such changes would result in substantial burden reduction in some areas as well as improvement in safety in others. Detailed schedules are expected to be developed later this year.

Estimated FY 2000 resources - Risk-informed NRC Regulations and Regulatory Actions
Direct staff resources: 5.0
Contractor resources: $1,550K

Risk informing the inspection process: Inspections and findings resulting from them, if not properly focused and characterized from a risk perspective, may result in either unnecessary licensee burden or missed safety issues and hence to an inappropriate regulatory response.

RES will continue to generate and consolidate plant-specific risk insights to help focus plant inspections on risk significant areas. Risk information matrices will be customized to accommodate plant-specific features. Accident likelihood and success criteria matrices will be generated to support inspection finding risk characterization and the reactor assessment process. These matrices will allow inspectors to realistically determine the plant's mitigation

capability that remains under faulted conditions, based on designed-in system redundancy and diversity. RES is also developing a concept for a computerized system that could capture and link cumulative inspector findings to risk. If successfully implemented, the system would map identified faults and failures onto accident sequences to obtain a risk perspective. The outcome would be an improved understanding of plant risk over periods of time and identified trends and patterns that could eventually warrant NRC attention.

-By FY 2002 complete consolidation of plant specific risk insights to support decisions on how to focus plant inspections on risk significant areas. By FY 2002 complete consolidation of plant specific risk insights to support decisions on how to focus plant inspections on risk significant areas.

Estimated FY 2000 resources - Risk Informing the Inspection Process
Direct staff resources: 1.0
Contractor resources: $700K

Assessing operational data and risk informing plant safety assessments: The risk significance of operational events and trends in data from reactor operations need to be assessed in conjunction with current PRAs so that safety vulnerabilities can be identified on a timely basis and so that PRA assumptions can be updated to improve the accuracy and credibility of risk assessments. These include trends in a) initiating events, b) system reliability and availability, c) non-compliance, d) occurrences of common cause failures, and e) events occurring at low power and shutdown conditions

Existing methods, data, and processes used to identify adverse safety trends and individual plants with marginal performance are at times not clearly focused on the most safety important issues and are overly subjective. A more comprehensible and risk informed plant assessment process employing methods and data effective in facilitating the identification and prediction of changes in safety performance could improve NRC's ability to conduct effective plant safety assessments.

These activities consist of three general areas: updating and processing of data, risk-based analysis of operating experience, and the performance indicator program. The activities include current methods, models, data and assessment as well as developmental activities to improve these products to provide analyses and indicators with more focus on risk for use in the new regulatory oversight program. Risk-based analysis of operating experience includes analysis and evaluation of the performance of risk important systems, components, and events. This includes the Accident Sequence Precursor program (which evaluates the risk significance of operational events and conditions), studies of risk important system and component reliabilities, and studies of the frequencies of initiating events (including events such as transients, losses of offsite power, and loss of coolant accidents). The performance indicator programs include evaluation of events and conditions and publication of the annual performance indicator report (NUREG-1187 series) and development of risk-based performance indicators (which will more closely tie monitoring of licensee performance to public risk).

-Each of these are on-going programs that provide input to the reactor regulatory process. The Risk-based Performance Indicator program will be implemented beginning in FY 2001 and will replace the current Performance Indicator program. New methods

and models for analyzing risk associated with reactor events and conditions will be completed in stages between FY 2000 and FY 2004.

Estimated FY 2000 resources - Operational Data Assessment and Plant Safety Assessment

Direct staff resources: 15.0
Contractor resources: $4,670K

Changing the Pressurized Thermal Shock (PTS) Rule and Pressure-Temperature (P-T) limits for reactor pressure vessels: Integrated information from three research disciplines has a high likelihood of substantially reducing unnecessary licensee burden by reducing current requirements imposed by the PTS rule and the PTS limits for reactor pressure vessels under accident conditions.

- By FY 2002 complete probabilistic fracture analyses, including thermal hydraulics research to determine realistic calculations of cool-down rates, pressure, and flow conditions, and research to revise the identification of key PTS transients, to serve as a basis for deciding on the degree to which requirements can be relaxed in the current PTS rule.

Estimated FY 2000 resources
Direct staff resources: 2.0
Contractor resources (staff and test facilities/equipment): $1,000K

Estimating realistic risk impacts from radiation exposure: Radiation risk coefficients are fundamental components of the risk information needed for virtually all NRC decisions involving radiation exposure. However, considerable uncertainties remain at low dose levels and new data continue to emerge from epidemiological and other studies. NRC needs the latest and most realistic risk coefficients and estimating uncertainties on a timely basis.

NRC is funding research on estimating parameter uncertainty in environmental dose models to be consistent with a risk-informed approach to decommissioning that factors in the probability of an individual actually receiving the maximum dose. A major goal of this effort is to develop more realistic models for assessing dose from sites where licensed activities have been terminated.

The NRC and EPA are jointly funding a re-evaluation of the health risks related to exposure to low-level ionizing radiation. A major goal of the National Academy of Science's study, known as BEIR-VII(biological effects of ionizing radiation), will be the assessment of risk related to low-dose radiation and the exploration of what is known regarding the biologic processes that determine those risks. A revision to these risk estimates could result in a revision to NRC regulations.

-By FY 2002 complete BEIR VII.

Estimated FY 2000 resources
Direct staff resources: 4.0
Contractor resources: $470K

Confirming the safety of long term storage of spent fuel: Long term storage of spent fuel and high level radioactive waste in dry casks and at Independent Spent Fuel Storage Installation (ISFSI) sites will be necessary until a high level waste repository is available for permanent storage. However, the risks associated with long term fuel storage, including those associated with fuel handling accidents and the effects of aging degradation on the structural integrity of dry casks, have not been fully analyzed. Better understanding of these risks and phenomena will significantly enhance the technical basis for licensing decisions and dry cask license renewal.

-By FY 2002 characterize the condition and material behavior of spent nuclear fuel and safety-related components in dry storage systems, develop models and analysis methods to evaluate the nuclide inventories and source characteristics of high burnup fuels for storage cask systems, and develop the technical bases for confirming or revising existing licensing issues for independent spent fuel storage of high burnup fuel.

Estimated FY 2000 resources
Direct staff resources: 3.0
Contractor resources (staff and test facilities/equipment): $1,200K

Providing burnup credit to reduce unnecessary regulatory burden: Current regulatory practices use "fresh-fuel" assumptions for evaluating criticality safety in spent fuel and do not provide burnup credit during the interim storage, transportation, and final storage of highly irradiated fuel. Such assumptions are highly conservative and cause unnecessary burden to licensees, e.g., they result in increased costs for a) on-site dry storage, b) reactor pool storage, c) the shipment and disposal of high level waste, and d) more transportation packages than would otherwise be necessary.

- NRC is developing the technical bases to remove the conservatism in the reactivity assumed in current licensing criteria. Revised interim licensing criteria will be produced in FY 2000. Continued work to refine the criteria, which is expected to remove additional conservatism, will be completed in FY 2002.

Estimated FY 2000 resources
Direct staff resources: 1.0
Contractor resources: $600K

MR. PACKARD: Are there any activities at the Commission's Office of Research which overlap activities under the Department of Energy's Office of Nuclear Energy? What role would the Commission have in the proposed Nuclear Energy Plant Optimization program?

CHAIRMAN JACKSON:

Currently, there is little or no overlap between the Commission's research activities and those of the Department of Energy's Office of Nuclear Energy. Historically, there has been some overlap in these activities. Past examples have included the research to evaluate advanced light water reactor designs. We have worked actively to eliminate such overlap and have recently been developing a Memorandum of Understanding with DOE which, among other things, will promote

cooperation in those areas where NRC and DOE have mutual interests, thus avoiding duplication and unnecessary overlap.

In 1998, at the request of the Department of Energy, NRC reviewed DOE's proposed Nuclear Energy Plant Optimization programs from the standpoint of avoiding duplication and identifying where the two agencies could cooperate and share costs in those areas of mutual interest. The results of this review were provided to DOE in a May 20, 1998, letter to Undersecretary Moniz. If DOE's Nuclear Energy Plant Optimization program receives funding we would expect to cooperate with DOE in those areas of mutual interest. Finally, we have also recently participated in the review of proposals received under DOE's Nuclear Energy Research Initiative program with the purpose of further coordinating our agencies' research programs.

MR. PACKARD: What research is the NRC reducing or discontinuing in FY 1999 and FY 2000 at DOE and non-DOE labs:

CHAIRMAN JACKSON:

The table below summarizes the NRC's Office of Nuclear Regulatory Research work by major program:

	Enacted 1998 ($M)	Estimate 1999 ($M)	Request 2000 ($M)
Reactor and Plant Performance Research	23.6	23.0	19.6
Reactor Materials and Component Behavior Research	17.7	15.6	14.6
Nuclear Materials Research	1.4	1.7	2.1
Radionuclide Transport and Decommissioning	2.6	2.7	2.3
TOTAL	**45.3**	**43.0**	**38.6**

Changes to the funding for these research programs in FY 1999 and FY 2000 are described below.

FY 1999:

Reactor and Plant Performance Research - Reductions in thermal-hydraulic code modernization, accident precursor modeling, evaluation of the effectiveness of licensing assessments of safety culture, and severe accident research. Project terminations include research support for hydrogen combustion research, and completion of scheduled projects such as AP600 research support, individual plant examinations (internal events), and regulatory guides on risk-informed regulation.

Reactor Materials and Component Behavior Research - Project completion on addressing advanced non-destructive techniques for measuring material properties.

FY 2000:

Reactor and Plant Performance Research - Anticipate completion of work on electro-magnetic interference/radio-frequency interference effects on digital instrumentation and control, direct containment heating, and individual plant examination/individual plant external event examination reviews. Work will be canceled on a third demonstration of the improved model of the reliability of human performance, Behavior-Oriented Fitness for Duty effort, support for new generic safety issue prioritization and resolution, and assessing management and organization influences on plant performance. Also expect delay on the development and assessment of a human performance model for one year.

Nuclear Materials Research - The overall budget for this program is increasing to address methods development and demonstration of dry cask storage risk assessment, and increased effort on developing the technical basis for performance criteria for dry storage casks under seismic loading conditions.

Radionuclide Transport and Decommissioning - Anticipate completion of the modeling effort to support regulatory guidance on decommissioning.

MR. PACKARD: What are the total amounts spent at the DOE labs:

CHAIRMAN JACKSON:

The following information reflects the NRC research work budgeted for the following DOE laboratories:

DOE LABORATORY	FY 1999 ($M)	FY 2000 ($M)
Argonne National Laboratory	4.7	5.3
Brookhaven National Laboratory	3.9	2.3
Idaho National Engineering and Environmental Laboratory	5.1	5.1
Los Alamos National Laboratory	1.7	0.8
Lawrence Livermore National Laboratory	0.1	0.3
Oak Ridge Institute for Science and Education	0.1	0.3
Oak Ridge National Laboratory	7.3	5.6
Pacific Northwest National Laboratory	1.9	1.6
Sandia National Laboratory	6.6	4.6
Savannah River Technology Center	1.1	0.7
TOTAL	**32.5**	**26.6**

MR. PACKARD: What are the research specialties for each DOE lab:

CHAIRMAN JACKSON:

The NRC is using the following DOE laboratories to perform the specialties indicated:

ANL (Argonne National Laboratory)

- High burn-up fuel materials properties and experimental (hot cell) measurements on irradiated fuel
- Testing and metallurgical examination of irradiated reactor fuel (cladding and fuel segments)
- Testing and metallurgical examination of irradiated materials to assess environmentally assisted cracking characteristics of reactor internals

BNL (Brookhaven National Laboratory)

- Reactor core physics analysis to examine reactor behavior under transient and accident conditions
- Structural engineering on dynamic analysis particularly regarding the dynamic response of structures, piping systems, tanks, and buried components
- Testing and evaluation of environmental qualification of electric cables
- Neutron transport calculations and characterization of neutron irradiation environments for reactor pressure vessels and reactor internal structures

ESTSC (Energy Science Technology Software Center)

- Scientific code distribution

INEEL (Idaho National Engineering and Environmental Laboratory)

- Probabilistic risk assessment (PRA) techniques and their applications to operating experience analyses

LANL (Los Alamos National Laboratory)

- Thermal-hydraulic code maintenance and consolidation
- Statistical support for risk analysis
- Assessment of debris accumulation on PWR sump performance

LBL (Lawrence Berkeley Laboratory)

- Fluid dynamics

LLNL (Lawrence Livermore National Laboratory)

- Review of digital protection systems

ORISE (Oak Ridge Institute for Science and Education)

- Surveys of clearance materials

ORNL (Oak Ridge National Laboratory)

- Searchable database for licensee event reports
- Operating event analyses to determine event risk significance
- Testing, metallurgical evaluation, and atom probe field ion microscope characterization of irradiated materials, particularly reactor pressure vessel steels
- Testing and fracture analyses of reactor pressure vessels and related piping and support structures
- Structural and materials engineering of concrete and steel structures, including non-destructive examination techniques, inspection, maintenance, mitigation of degradation and aging effects

PNNL (Pacific Northwest National Laboratory)

- Fuel behavior computer code development and assessment
- Groundwater transport and flow modeling, especially in the unsaturated zone
- Leaching experiments and solubility measurements for radionuclides
- Evaluation of nondestructive examination techniques and procedures and evaluation of advanced systems for nondestructive examination

SNL (Sandia National Laboratory)

- Severe accident code development and experimental work
- PRA analytical methods development and risk studies

- Design and execution of large scale structural tests of pressurized structures (model containment buildings) and the structural analysis of concrete buildings and civil structures

- Decision logic and optimization modeling in support of decommissioning

SRTC (Savannah River Technology Center)

- Characteristics of nuclear power plant containment protective coatings

- Sealed source and device design safety testing

PERFORMANCE PLAN

MR. PACKARD: The May 27, 1998, General Accounting Office report "NRC's Annual Performance Plan for Fiscal Year 1999" contained the following observations: the performance plan could provide a clearer picture of intended performance across the agency; the performance plan could better discuss how the NRC's strategies and resources will help achieve its goals; the performance plan does not provide confidence that NRC's performance information will be credible.
What actions have you taken in response to these observations? When will you align NRC staff resources to achieve the strategic goals and objectives at an agencywide level as well as strategic functional levels? Has the Commission's Five-Year Plan been audited by an outside auditor? If the report has been completed, please provide a copy.

CHAIRMAN JACKSON:

Since the GAO's report on NRC's FY 1999 Performance Plan, the NRC has taken a number of actions to improve the FY 2000 Performance Plan. As cited in GAO's draft assessment of the NRC's FY 2000 Performance Plan, the Plan better discusses how the agency's strategies and resources will help achieve its goals, directly links strategies to program activities, and discusses crosscutting functions and external factors in a more explicit and coherent manner. The FY 2000 Performance Plan includes a matrix that reflects the relationship between agency strategies and resources, and aligns NRC program resources to achieve each strategic goal. The draft GAO assessment also states that the plan should be useful to decisionmakers in that it provides a general picture of intended performance across the agency. In addition, NRC reduced its strategic arenas from seven to four by incorporating common defense and security, international nuclear safety, public confidence, and excellence goals into the remaining four strategic arenas. NRC also included some baseline and trend information in the Plan.

GAO has looked at NRC's FY 1999 and FY 2000 Performance Plan. The NRC does not plan to have its Strategic Plan or Performance Plan audited by an outside auditor. However, the NRC did use Arthur Andersen LLP to review its Planning, Budgeting, and Performance Management (PBPM) Process. The consultant principally found the PBPM process to be fundamentally sound and that its implementation has assisted in moving the NRC to become more performance-based. Through the PBPM process and consideration of the recommendations in the consultant's March 1999 report, the agency continues to align its work more directly to

outcomes. Through this effort, more direct linkages of agency work, resources, and strategies to specific performance expect to be established, monitored, and reported, and will result in further refinement and improvement to the agency's Performance Plan. NRC recognizes that moving to an outcome-oriented performance-based organization is a multi-year effort and the NRC will continue to make progress.

Enclosure 1

REPORT TO THE CONGRESS ON THE U.S. NUCLEAR REGULATORY COMMISSION'S LICENSEE FEE POLICY REVIEW REQUIRED BY THE ENERGY POLICY ACT OF 1992

February 1994

I. INTRODUCTION

A. PURPOSE:

The purpose of this report is to respond to the Energy Policy Act of 1992 by providing the Congress a review of the NRC's fee policy, including recommended changes to existing law to prevent placing an unfair burden on NRC licensees.

B. BACKGROUND:

The **Omnibus Budget Reconciliation Act of 1990 (OBRA-90)**, as amended, requires that the NRC recover approximately 100 percent of its budget authority, less the amount appropriated from the Department of Energy (DOE)-administered Nuclear Waste Fund (NWF) for FYs 1991 through 1998 by assessing fees to NRC applicants and licensees. Two types of fees are required to recover NRC's budget authority. First, license and inspection fees, established by 10 CFR Part 170 under the authority of the Independent Offices Appropriation Act (IOAA) and the Atomic Energy Act (AEA), as amended, recover the NRC's costs of providing individually identifiable services to specific applicants and licensees. The services provided by the NRC for which these fees are assessed are reviewing applications for the issuance of new licenses or approvals, amending or renewing licenses or approvals, and inspecting licenses. Second, annual fees, established by 10 CFR Part 171 under the authority of OBRA-90, recover generic (e.g., research and rulemaking) and other regulatory costs not recovered through 10 CFR Part 170 fees.

Since OBRA-90 was enacted, the NRC has published four final fee rules after evaluating over 1,000 public comments. On July 10, 1991, the NRC published the first rule that established fees to recover approximately 100 percent of the FY 1991 budget. In addition to establishing the FY 1991 fees, the final rule implemented Commission fee policy decisions and established the underlying basis and method for determining the hourly rate and fees. The Commission policy decisions and the fee methodology used for FY 1991 were also used in the final rules to recover approximately 100 percent of the FY 1992 and FY 1993 budget authority. The FY 1993 rule also included the results of the biennial review required by the Chief Financial Officers (CFO) Act of 1990. The purpose of that review was to ensure that fees and other charges imposed by the NRC reflect costs incurred in providing services and things of value. The review resulted in significant fee increases for some materials licensees.

In April 1992, the NRC published a limited change to 10 CFR Part 171 to address licensee concerns about the unfair burden of fees on extremely small licensees. This change

adjusted the maximum annual fee of $1,800 that was assessed licensees that qualify as a small entity under the NRC's size standards. A lower-tier small entity fee of $400 per licensed category was established for small businesses and nonprofit organizations with gross annual receipts of less than $250,000 and small governmental jurisdictions with a population of less than 20,000.

The FY 1991 rule was challenged in Federal court by several parties. The U.S. Court of Appeals for the District of Columbia Circuit rendered its decision on March 16, 1993. In summary, the court supported the basic fee methodology, but remanded two issues for the Commission to reconsider. One of the issues related to annual fees for nonprofit educational institutions. In response to the court decision, the Commission revoked the exemption from annual fees for nonprofit educational institutions. On September 29, 1993, in response to a petition for reconsideration, the NRC published a proposed rule seeking public comment on the reinstatement of this exemption. The comment period expired October 29, 1993, and the final rule concerning this matter is expected to be issued in early 1994. The second remanded issue was the method of assessing fees for low-level waste (LLW) activities. In response to the court decision, the allocation method was changed in the final FY 1993 rule published July 20, 1993.

The Energy Policy Act of 1992 (EPA-92) directed the NRC to review its policy for assessment of annual charges under OBRA-90, solicit public comment on the need for changes to this policy, and recommend to the Congress any changes needed in existing law to prevent placing an unfair burden on NRC licensees. Consistent with these requirements, the NRC requested public comment on its fee policy in a Federal Register notice published on April 19, 1993 (Attachment 1). The 90-day comment period expired July 19, 1993, and was extended an additional 30 days to August 18, 1993. Although EPA-92 required only public comments on the annual fees assessed by the NRC under 10 CFR Part 171, the NRC also requested comments on 10 CFR Part 170 fee policies because of the interrelationship of 10 CFR Parts 170 and 171 fees.

By the close of the comment period, 566 comments were received as follows:

Reactors	26
Fuel Facilities	11
Educational	46
Medical	20
Industrial	450[1]
Federal Agencies	5
State Agencies	8
	566

A listing of the commenters by group is included as Attachment 2.

C. **SCOPE OF POLICY REVIEW:**

This review is based on the comments received on the EPA-92 request, and NRC's experience in responding to the comments, letters, and telephone calls received during the past three years in implementing OBRA-90. This includes a judicial decision involving annual fees, two petitions for rulemaking proposing changes to our annual fee methodology , and the comments received on the EPA-92 notice. This review also considered a NRC's Office of the Inspector General review of the fee program, that was submitted to the Commission on October 26, 1993.

The following two assumptions have been made to establish the scope for this fee policy review:

1. The public policy question of how to raise revenues (taxes versus fees) will only be addressed to the extent that changes to existing law are necessary to make the fees more fair and equitable.

2. The amount of the budget necessary for NRC to perform its safety mission will not be addressed.

The following fee related areas will not be addressed in this review, as they are being reviewed and decided separately:

- The merits of whether to exempt nonprofit educational institutions from fees. (This review,

[1]Of the 450 comments received from industrial licensees, 405 were form letters supporting comments submitted by Troxler Electronic Laboratories, Inc., opposing increased annual fees assessed to gauge users.

however, addresses how these costs should be treated, assuming the exemption is reinstated.)

- The merits of whether the NRC small entity size standards should be changed. (The NRC is evaluating whether the small entity size standards should be changed based on the results of a survey of NRC licensees and the recent proposed rule published in the Federal Register by the Small Business Administration that would amend the Small Business Size Standards).

- The merits of granting petitions for rulemaking from the American Mining Congress (AMC) and the American College of Nuclear Physicians and the Society of Nuclear Medicine (ACNP/SNM). (The issues raised by the petitioners are among those addressed here and in the final rule on the exemption for nonprofit educational institutions.)[2]

II. **IDENTIFICATION OF MAJOR CONCERNS:**

Essentially, OBRA-90 requires that the NRC recover approximately 100 percent of its budget authority, less the amount appropriated from the DOE-administered NWF, in a fair and equitable manner. To accomplish this, OBRA-90 provides that the NRC shall continue to collect IOAA fees to recover the Commission's cost of providing any service or thing of value to a person regulated by the NRC and shall establish a schedule of annual charges, fairly and equitably allocating the aggregate amount of the charges among licensees. To the maximum extent practicable, the charges shall reasonably reflect the cost of providing services to licensees or classes of licensees.

The NRC has met the first objective of OBRA-90, collecting approximately 100 percent of its budget authority. For FY 1991, the NRC recovered 98 percent of its budget, for FY 1992, 99 percent of its budget and for FY 1993, 98 percent

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[2]Both petitioners identified several adverse impacts which they claim have affected their members. AMC, for example, suggests that NRC implement a system (e.g., a licensee review board) giving NRC licensees some control over their fees. They have also suggested that facilities no longer generating revenue be exempted from fees. ACNP/SNM suggest that NRC provide an exemption for medical services similar to that provided for nonprofit educational institutions. They also suggest a sliding scale for fees based on income.

of its budget. Despite this success, many NRC licensees, as well as members of Congress, have expressed concerns about the fairness and equity of the fees.

These major concerns evolve from the inability of the NRC to meet the principle summarized by one commenter; namely, that if the NRC is to be funded through user fees rather than taxes, then "each direct beneficiary of NRC's activities -- not merely its 'licensees' -- should contribute to an extent commensurate with the benefits it receives."

This principle cannot be met because not all direct beneficiaries of NRC activities pay fees because of legislative constraints and Commission policy. Moreover, fees are based on the agency's costs to perform its regulatory responsibilities, rather than on the licensee's perception of benefits received. This leads some licensees to conclude that the fees for regulatory activities related to them are not commensurate with the benefits they receive.

Another major concern, not directly related to the issue of fairness and equity, is the efficiency to the fee process. This concern was also addressed in the OIG memorandum to the Commission, dated October 26, 1993. Given the Administration's directive to reduce FTEs and costs in the future, the Commission believes that unless efficiencies can be achieved through modification of the fee process, methods, and policies, many fee related activities cannot be performed in a timely manner.

The following sections discuss these three major concerns, and possible methods of resolving these concerns. Following the discussion of the three major concerns, other fee concerns and proposed solutions are also evaluated.

III. MAJOR CONCERN: NOT ALL DIRECT BENEFICIARIES OF NRC ACTIVITIES PAY FEES

Licensees have persistently noted that they are billed for costs not directly related to providing services to them. This concern arises because costs for some NRC activities are not assessed to the beneficiaries of the activities because of legislative constraints and Commission policy. Thus, to recover 100 percent of the budget, these costs must necessarily be assessed to licensees that do not directly benefit from those activities. For this reason, the legislative requirement to collect 100 percent of the budget authority through fees inherently places an unfair burden on licensees. As one commenter stated, assessing fees fairly and equitably is difficult:

> through a system that exempts or excludes certain entities and at the same time must accomplish 100% budget recovery. Given that there are certain regulatory activities whose costs cannot be recovered fairly through user fees, it is clear that 100% recovery is at the root of the user fee allocation problems that the NRC seeks to address through this fee policy review.

Many other comments expressed this same concern. This concern was also noted by the Senate Appropriations Committee, which recently stated in its report on FY 1994 Appropriations for Energy and Water Development:

> The Committee believes that the Commission should ensure that ... international costs are not collected through domestic licensees.

S. Rpt. 103-147, at 188.

Two types of activities are not assessed to the direct beneficiary, but rather to other NRC licensees. They are activities that either (1) cannot be attributed to or associated with an existing NRC licensee or class of licensees or (2) can be attributed to NRC licensees or applicants but are not charged to them owing to statutory constraints or Commission policy decisions.

Under OBRA-90, annual fees can only be charged to licensees. Therefore, costs of activities that cannot be attributed to an existing NRC licensee or class of licensees must be assessed to licensees that do not directly benefit from them. These activities include:

- certain international activities;
- oversight of the Agreement State program; and
- generic activities (e.g., research and rulemaking) associated with classes of applicants or potential applicants where no NRC licensees currently exist.

For FY 1993, the fees for the above activities were equivalent to $21.4 million, of which $18.2 million was assessed to power reactor licensees and $3.2 million to

other licensees.[3] Specific details on these costs are at Attachment 3.

The NRC budget includes certain international activities that are not directly related to NRC applicants or licensees. These activities are performed because of their benefit to U.S. national interests. The NRC is required to perform some of these activities by the AEA and, therefore, must budget for them. Examples of international activities that are not directly related to NRC applicants and licensees are statutorily required consultations with Executive Branch agencies on export activities within their jurisdiction; assistance to countries or international organizations that provide little, if any, benefit to NRC's regulatory programs; and support of international safeguards activities related to nuclear non-proliferation.

The NRC performs activities necessary to oversee and administer the Agreement States program. These activities include reviewing and approving new agreements, performing periodic program reviews to determine their adequacy and compatibility, developing guidance, and providing technical assistance (e.g., inspection assistance) and training to the Agreement States. Because neither the Agreement States nor their licensees are NRC licensees, they cannot be charged annual fees under OBRA-90. The NRC can assess 10 CFR Part 170 fees for specific services (e.g., review of requests for an agreement, periodic reviews of the programs, training and technical assistance) rendered to an Agreement State. However, the Commission has chosen not to do so for policy reasons.

There are no existing LLW disposal facilities licensed by the NRC. Therefore, the NRC generic LLW regulatory activities do not directly support an existing NRC licensee or class of licensees. However, some NRC licensees, as well as some Agreement State licensees, will realize an indirect benefit from these NRC LLW expenditures because they will eventually dispose of LLW at sites that are expected to be licensed in the future.

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[3]In this review, the dollar amounts used are the amount of the FY 1993 fees that would have been assessed for the activities. These dollar amounts are representative of past amounts and should not be considered an upper limit. The amounts for any specific year would depend on the budget for the activities for that year.

The second group of activities for which costs are not assessed to the direct beneficiary involves specific NRC costs that can be attributed to either NRC licensees or other organizations but are not assessed to them because of legislative constraints or Commission policy decisions. The following licensees are not assessed certain fees or pay reduced fees:

- most Federal agencies are not assessed Part 170 fees;
- nonprofit educational institutions are not assessed any fees; and
- small entities are assessed reduced annual fees.

For FY 1993 these activities involved fees equivalent to $18.2 million, of which $16.9 million was assessed to power reactors and $1.3 million to other licensees as shown in Attachment 3.

The first major category of costs includes those activities for which the NRC is unable, on the basis of existing law, to charge a fee to specific applicants or licensees even though they receive an identifiable service from the NRC. These activities include licensing reviews and inspections for Federal agencies (other than the Tennessee Valley Authority (TVA) and the United States Enrichment Corporation).[4] The IOAA prohibits the NRC from assessing 10 CFR Part 170 fees to Federal agencies for the costs of these activities. These activities include reviews of Department of Defense (DOD)/Department of Energy (DOE) Naval reactor projects; licensing reviews and inspections of Federal nuclear materials users, such as Veterans Administration hospitals, Army irradiators, and NASA radiographers; safety and environmental reviews of the DOE West Valley Demonstration Project; review of DOE actions under the Uranium Mill Tailing Radiation Control Act (UMTRCA); and reviews of advanced reactor designs submitted by DOE. In addition, EPA-92 exempts from annual fees certain Federally owned research reactors used primarily for educational training and academic research purposes.

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[4]Section 161w. of the Atomic Energy Act of 1954, as amended, authorizes the NRC to impose fees under 10 CFR Part 170 on a Federal agency that applies for or is issued a license for a utilization facility designed to produce electrical or heat energy (e.g., licensing reviews and inspections of TVA's nuclear power plants) or which operates any facility regulated under sections 1701 or 1702 of the Atomic Energy Act (the enrichment facilities of the United States Enrichment Corporation).

In addition to certain licensees being exempted by law, two groups of licensees are either exempted or pay reduced fees based on prior Commission fee policy decisions. Nonprofit educational institutions are exempted from 10 CFR Part 170 fees and 10 CFR Part 171 annual fees.[5] The Commission has also reduced annual fees for those licensees who qualify as a small entity. These reduced fees are consistent with the Regulatory Flexibility Act of 1980 requirement that agencies consider the impact of their actions on small entities.

To address the fairness and equity concerns related to licensees paying fees for activities not benefitting them, either (1) laws and NRC fee policy must be changed to assess all beneficiaries of NRC activities fees that are commensurate with the cost of those NRC activities; or (2) the requirement to collect 100 percent of the budget by fees must be relaxed. Power reactor licensees, who currently pay fees for most of the activities discussed above, have proposed another alternative. They suggest that these costs be distributed among all NRC licensees. Although this would "reduce the unfairness" to reactor licensees, it would shift some "unfair" costs to materials licensees. Given the impact that existing fees are having on materials licensees, this is not a desirable alternative. Furthermore, the Conference Committee report accompanying OBRA-90 stated that these types of costs may be recovered from such licensees as the Commission determines can fairly, equitably, and practicably contribute to their payment.

While appearing to be fairer, assessing fees to all licensees and organizations that do not currently pay fees would create problems in some instances. In particular, the NRC should not reverse its policy of reduced fees for small entities. To do so would recreate the concerns about unfair burdens and inequities that the Commission rectified by earlier policy decisions and rulemaking. The policy issue regarding the nonprofit educational exemption is being reviewed and decided separately. Over the past several years, the NRC considered various means to recover the costs for international activities serving broad U.S. national interests, but found no viable fair way to do so. Further, it would not be practical to assess fees to foreign organizations, foreign governments, or to the State Department to whom some of the support is provided. For example, assessment of such fees might create foreign policy

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[5]On September 29, 1993, the Commission published a proposed rule seeking public comment on a proposal to restore the generic exemption from annual fees for nonprofit educational institutions. This report is premised on the assumption that the Commission will adopt this proposal in a final rule.

tensions that could complicate U.S. goals such as foreign reactor safety and nuclear non-proliferation.

The Agreement States are the direct beneficiary of NRC oversight and direct technical assistance and some of the costs of these services could legally be recovered under 10 CFR Part 170. However, absent legislation, assessment of fees to Agreement States for this oversight would likely create strong opposition similar to that which occurred over the nonprofit educational exemption issue. Agreement States and their representatives commented that Section 274(g) of the AEA requires the NRC to cooperate with the States in the formulation of standards that may well entail regulatory development costs. They indicate that the 29 Agreement States expend over $13 million annually and have over 200 professional staff in their radiation control programs. This, they say, contributes substantially to the protection of the public health and safety and provides a cadre of qualified personnel to assist the NRC and other Federal agencies. The Organization of Agreement States indicated that they would be adamantly opposed to charging fees to Agreement States. One Agreement State commented that any attempt to recover generic costs from Agreement States or their licensees would be "cumbersome and ill advised." Another State indicated that if the NRC attempted to assess fees to Agreement State licensees, a number of States would probably return their authority to the NRC, thus defeating the purpose of the Agreement State Program.

Regarding Federal agencies, there is no compelling justification for requiring the private sector to pay for NRC licensing and inspection of other Federal agencies. Either all Federal agencies should pay for services received from the NRC or the cost should be deleted from the amount that must be collected through fees. Federal agencies could pay 10 CFR Part 170 fees for license reviews and inspections in the same manner as commercial licensees and State or local government agencies. Note also that Federal agencies already pay annual fees, and TVA and the Uranium Enrichment Corporation pay 10 CFR Part 170 licensing and inspection fees. On the other hand, collecting such fees would not change the amount of revenues received by the U.S. Treasury and therefore may be considered inefficient.

The NRC believes that the current policy and practice of assessing a surcharge to licensees to recover the costs associated with LLW is the right approach. It is not unfair since these costs indirectly support existing classes of licensees. Any LLW site that is licensed would provide facilities for the disposal of LLW from reactors, fuel facilities, and some materials licensees.

To resolve the concerns about some beneficiaries of services not paying fees, commenters also overwhelmingly endorsed legislative change that would 1) reduce the amount of the fees to be collected by the costs of those activities not attributable to an existing NRC licensee or class of licensees and 2) would assess 10 CFR Part 170 fees to Federal agencies.

In summary, the NRC largely agrees with the commenters and proposes that the concerns about fairness and equity resulting from some beneficiaries of NRC activities not paying fees be minimized by--

- Modifying OBRA-90 to remove from the fee base costs (about $25 million in FY 1993 fees) for international activities, Agreement State oversight and direct technical assistance, nonprofit educational institutions, and the small entity subsidy.

- Modifying OBRA-90 to remove from the fee base costs of providing services to Federal agencies (about $6 million) or modifying the Atomic Energy Act (AEA) to permit the NRC to assess Part 170 fees to Federal agencies for these services.[6]

- Continuing to assess fees (about $9 million in FY 1993) to NRC licensees for generic activities for classes (i.e., LLW) that do not currently have licenses.

It is noted that these recommendations would reduce the fee revenues available to the Congress and Administration to offset the NRC budget. If modification to the existing legislation is not a viable option, then the current approach of assessing these costs to NRC licensees (with the majority going to power reactors) with its inherent problems of fairness and equity should be continued, except that legislation that would require assessment of fees to Agreement States should be considered.

IV. MAJOR CONCERN: FEES NOT COMMENSURATE WITH BENEFITS RECEIVED

The second major concern is that some licensees believe that the benefits received are not commensurate with the NRC fees they are assessed. This issue is raised most frequently by materials licensees, especially with regard to annual fees.

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[6]Although the legislation would permit recovery of costs for all licensing reviews and inspections performed for Federal agencies, an alternative proposed later in this review would only require that licensing application review costs be recovered.

The decreasing number of materials licensees is an indication of their belief that the fees are unfair and inequitable. While the number of licenses remained stable before FY 1991, the number of licenses decreased by about 2,000 (from about 9,100 licenses to about 7,100) during FY 1991, the first year of 100-percent fee recovery. Some licensees consolidated licenses, others turned in unused licenses, and some terminated licensed activities. For FY 1992, the number of materials licenses decreased by about 300 to 6,800 and that number, by about 300 during FY 1993. The overall decrease in the number of materials licenses has resulted in increases in annual fees for the remaining licensees.

This concern is also reflected in comments that fees comprise a large percentage of the cost of procuring and operating a licensed product. For example, small gauge users have commented that the FY 1993 annual fee of $2,100 equals about half the purchase price of a new gauge. Others have indicated that the NRC budget, and therefore fees, are higher than what they believe is necessary. Therefore, commenters suggest that the Commission must, as its licensees have already done in their increasingly competitive markets, build cost-effectiveness into its regulatory strategy.

On the basis of NRC's three years of experience administering the annual fees for the materials program and the comments received on the fee policy notice, the NRC concludes that materials licensees perceive their annual fees to be inequitable and unfair for the following three reasons:

(1) The NRC materials regulatory program is necessary for NRC licensees and supports both NRC and Agreement State licensees. However, only NRC licensees pay the annual fees;

(2) From the licensees' perspective, the NRC has assessed large increases in fees without added value; and

(3) Licensees measure the value of their license in economic terms, not NRC regulatory costs.

There is merit to the claim that fees are not commensurate with benefits because the NRC material regulatory program supports both NRC and Agreement State licensees, yet only NRC licensees pay fees to recover the cost of these activities. The NRC performs generic regulatory activities for nuclear materials users and uranium recovery licensees. These activities include conducting research, developing regulations and guidance, and evaluating operational events.

These generic activities provide the basis for the NRC to regulate its approximately 7,000 materials and uranium recovery licensees. Because many Agreement States adopt NRC regulations, these NRC activities also provide the regulatory basis for the 29 Agreement States to regulate their 16,000 materials licensees. Under OBRA-90, the NRC cannot charge an Agreement State or its licensees an annual fee, because they are not NRC licensees. Therefore, only about 30 percent (7,000 NRC licensees of the total population of 23,000) of all materials licensees can be assessed annual charges to recover the cost of generic activities supporting both NRC and Agreement State licensees. As a result, part of the costs (about $15 million in FY 1993 fees) for these generic regulatory activities that are included in the annual fees for NRC materials and uranium recovery licensees could be considered an unfair burden on NRC licensees.

NRC licensees also believe that NRC fees place them at an unfair competitive advantage with licensees in Agreement States. For example, one commenter stated that the fee legislation:

> . . . creates a market place in which approximately 17,000 competitors have an unfair advantage when it comes to competing in the national market place. It is unfair to require certain NRC licensees to carry the burden for activities conducted for government agencies, foreign governments, treaty commitments, or other NRC licensees who, because of special status, are not supporting their share of the NRC's costs. It is also unfair to place these NRC licensees at a financial disadvantage with their Agreement State competitors simply because they are doing business in a Non-Agreement State.

The licensees' perception of unfairness as it relates to activities that support both NRC and Agreement State licensees will continue and likely grow worse if more states become Agreement States. The potential exists for additional Agreement States to be approved by NRC in the near future. Both Pennsylvania and Massachusetts have filed letters of intent with the NRC, and Oklahoma and Ohio are seriously considering agreements. This would shrink the existing materials license fee base further and result in higher annual fees for the remaining NRC materials licensees. If these four states were to become Agreement States, the NRC would lose approximately 2,000 licenses and the annual fee for the remaining 4,500 - 5,000 materials licensees would increase by about 30 percent.

To alleviate this concern, either (1) some of the costs under discussion should be assessed to Agreement States or (2) the requirement to recover 100 percent of the budget should be relaxed.

Significant problems with assessing fees to Agreement States were previously discussed. The materials licensees and Agreement States present valid arguments for not paying fees for the costs involved in this issue. Therefore, the best means to address the issue is to exclude certain of these regulatory costs from the fee base.

With respect to reason (2), that licensees view the increases in annual fees during the past three years as unfair because they received no additional benefits, the Commission reviewed the changes in annual fees for materials licenses. The following table illustrates the changes using several materials fee categories.

	Annual Fees			
Categories of Materials Licenses	FY 1990 and Before	FY 1991	FY 1992	FY 1993
Broad Scope Manufacturing	0	$7,800	$11,150	$18,420
Large Irradiators	0	10,800	16,550	22,020
Broad Scope R&D	0	6,300	9,150	14,320
Well Loggers	0	7,000	10,450	11,420
Broad Scope Medical	0	9,900	13,950	28,020
Other Medical	0	3,500	4,750	5,220
Small Gauge Users	0	1,500	2,250	2,120

In FY 1991, materials licensees were assessed annual fees for the first time. Although the NRC explained that the annual fee was a new requirement, and not an increase in existing 10 CFR Part 170 licensing and inspection fees, many licensees believed that they were paying more than they had in the past with no value being added. The annual fee increased in FY 1992 because of both an increase in the NRC's budget and about a 25 percent reduction in the number

of material licensees available to pay the discretionary fixed costs recovered by annual fees. Again, from the licensees' perspective, fees had increased with no commensurate increase in benefit or value. For example, one commenter stated that "the increasing fees draw attention to whether they reflect the value of the services being provided to regulated entities."

Fees also increased substantially for some materials licensees and changed only slightly for other materials licensees in FY 1993. In fact the annual fees decreased for over 2,000 gauge users. There are three major reasons for the changes in FY 1993 materials fees compared to FY 1992. First, the FY 1993 budgeted amount attributable to materials licensees is about 12 percent higher than the FY 1992 amount. Second, the number of licensees to be assessed annual fees in FY 1993 decreased about 4 percent from the FY 1992 levels (from about 7,100 to about 6,800). Third, and most importantly, changes in the Part 170 license application and inspection fees caused a redistribution of the costs on which the annual fees are based, because these Part 170 fees are used as a proxy to determine the annual fees.

The Chief Financial Officers (CFO) Act of 1990 requires that the CFO perform a biennial review of fees and other charges imposed for services and things of value the agency provides and revise these charges to reflect costs incurred in providing those services and things of value. Consistent with the CFO Act requirement, the NRC reviewed and revised its materials licensing and inspection fees for FY 1993. The evaluation of historical data showed that the average amount of time needed to complete materials licensing actions or to conduct inspections had increased since the last analysis of these times. In particular, the inspection times had increased substantially since the last analysis which was in 1984. Therefore the fees were increased to reflect the costs incurred in providing services to applicants and licensees. The NRC annual fees in 10 CFR Part 171 are based on the 10 CFR Part 170 licensing and inspection fees because the licensing and inspection fees are indicative of the complexity of the license, and therefore, provide a proxy for allocating the costs to the diverse categories of materials licensees. Thus, the changes to licensing and inspection fees in FY 1993 result in changes to the annual fees. The changes, particularly the inspection fees, appropriately redistributed the amount of the annual fee among various materials licensees, resulting in relatively large increases for the more complex licenses, such as broad scope medical and research and development licenses, and minor increases for the small and less complex materials users.

Some commenters expressed a concern that the NRC budget is out of control and that fees will continue their upward spiral in the future. They contend that because the NRC is required to collect 100 percent of its budget authority and licensees are paying for the entire budget, a mechanism should be created, either through the establishment of a separate office or an advisory committee, to (1) assess the cost-effectiveness of proposed generic programs and eliminate potential duplication of industry-sponsored programs; (2) review agency cost trends and accounting practices; and (3) develop and propose future revisions to the fee regulations. They also suggested that the NRC freeze fees at FY 1991 levels or limit increases to some multiple of inflation.

The NRC believes that the primary causes of the previous large, across-the-board annual fee increases are less likely to occur in the future. The annual fee is not new and most licensees now understand its purpose. License terminations in the past two years have been minimal. Large increases in Part 170 fees used to calculate the annual fee should not occur because the fees will be reviewed every two years in response to the CFO Act. In addition, Administration efforts to streamline government are expected to result in smaller budget increases. The NRC is also examining the use of improved cost accounting concepts which should improve the tracing of costs to the diverse classes of material licensees.

However, a large fee increase could occur for a specific category of licenses because a relatively small increase in the budget could result in a large percentage increase in annual fees. For example, a $2-million medical study, which would be unique to medical licensees, would increase the base annual fee for each of the medical licensees by about $1,000 (from $5,100 to $6,100), a 20-percent increase for most of the hospitals and physicians. If the $2-million study were budgeted for small gauge licensees, the small gauge base annual fee would increase by about $700 (from $2,000 to $2,700), a 35-percent increase. The annual fees, as noted above, could also increase if new Agreement States are added, reducing the number of NRC licensees, unless the fee base is adjusted accordingly. The use of improved cost accounting concepts, however, will provide a means to explain the specific increases. The NRC will also examine such increases to ensure that they are justified.

With respect to reason (3), the fact that licensees measure fees in terms of the economic value of the license as opposed to NRC regulatory costs, licensees continuously request that fees be based on the amount of material possessed, the frequency of use and sales generated from

using the licensed material, the number of hospital beds, the size of the facilities, market competitive positions, or other indicators of the economic value to the licensee.

This issue has been addressed by the NRC in the Regulatory Flexibility Analysis presented in Appendix A to the final rule published July 10, 1991 (56 FR 31511-31513). Based on that analysis, the Commission did not adopt the approach recommended by licensees because it would require licensees to submit large amounts of new data and would require additional NRC staff to evaluate the data submitted and to develop and administer even more complex fee schedules. The Commission continues to believe that uniformly allocating generic and other regulatory costs to the specific license to determine the amount of the annual fee is a fair, equitable, and practical way to recover its costs. The Commission believes that establishing annual fees (or "price") based on indicators of the economic value of a license is not practical, would lead to even more concern regarding the equity and fairness of NRC fees, and result in increased fee administration costs.

In summary, to minimize the concerns that fees paid are not commensurate with benefits received, the Commission believes that two actions are necessary. First, the material licensees should not be required to pay for all of the regulatory costs that support both NRC and Agreement States. This could be accomplished through legislation to relax the 100-percent fee recovery requirement or through legislation that would allow the NRC to charge Agreement States an annual charge that could be passed along to Agreement State licensees. For the reasons discussed above relating to charging Agreement States for NRC oversight, the latter option is not recommended. The NRC could also include these costs as agency overhead in calculating the hourly rate. This would reduce the fees for materials licensees and shift most of these costs to power reactors. This would be considered unfair by the power reactors since it would be viewed as adding costs for additional activities that do not benefit them.

The second action necessary is to minimize large, across-the-board fee increases and to improve the explanation of specific increases for specific regulatory needs. To accomplish this, NRC fee policies and methods need to be stabilized. Although the Commission believes future large across-the-board increases in fees are unlikely, large increases could occur for specific subclasses of licensees if NRC makes large budget increases for safety reasons. Implementation of improved cost accounting concepts will

provide better tracing of the costs to the specific subclass of licensees and will provide additional information to help explain the increases.

Another option considered by the NRC and strongly supported by those who commented is to place a cap on the amount of fee increases in any given year. For example, the increase could be limited to a multiple of the Consumer Price Index (CPI). The NRC does not support this alternative because it may be perceived by some as indicating that the NRC budget should be limited to the same increases instead of being determined on the basis of resources needed to carry out the agency mission.

In summary, to minimize the concern over the fees not being commensurate with benefits received, the following actions are proposed:

1. No longer require material licensees to pay for all NRC generic regulatory costs that support both NRC and Agreement State licensees. Towards this end, the NRC recommends that OBRA-90 be modified to exclude a portion of the generic costs for materials licenses from the fee base.

2. Utilize improved cost accounting techniques to provide better data on which to base and explain fees, including specific changes.

V. **MAJOR CONCERN: STREAMLINE FEE EFFORT**

During the past three years of implementing OBRA-90 to collect 100 percent of the NRC's annual budget authority, the NRC has evaluated over 1,000 public comments on fee-related rules; and responded to several hundred requests for exemptions, dozens of letters from Congress, and thousands of telephone calls from licensees concerning the assessment of annual fees and overdue bills. As a result, the workload necessary to implement the fee program has been extremely burdensome on the available NRC staff. Even with the use of contractor assistance, the NRC has struggled to meet the existing workload. As a result, the NRC specifically requested comments on how to reduce its efforts necessary to implement the 100 percent fee recovery legislation.

The OIG in its October 26, 1993 review of fees for licensees also alluded to this question, and concluded that:

> The agency's license fee development process is very detailed and labor intensive. It has been shaped over the years by the implementation of new Federal regulations and court decisions.

> Substantial effort is expended in attempting to make the process equitable and the costs reasonable.

The OIG report went on to note that:

> NRC could significantly reduce time and effort, and related resources devoted to license fee development by adopting a fee schedule similar to that used by FERC. The Part 170 fees could be eliminated completely or, at least, to the maximum extent practicable. Secondly, the determination of the Part 171 fees could be simplified by eliminating/streamlining much of the detailed analyses performed as part of the process.

The NRC believes that in addition to added efficiency, other benefits would accrue from a simpler fee process and policy. A simpler fee structure would make it easier for licensees to understand NRC fees, while still providing for fees that are commensurate with total regulatory services provided to classes of licensees.

Given the comments received as well as the problems encountered in implementing OBRA-90, the Commission has considered several ways to reduce the NRC workload.

One option is to eliminate the requirement to promulgate the fees by notice and comment rulemaking. On the one hand, the Commission would prefer to use notice and comment rulemaking only when fee legislation, fee policy, or fee methodology changes. The NRC sees limited value added to establishing fees through notice and comment when the underlying bases for the fees have not changed. Furthermore, the budget on which the fees are based has been finalized by OMB and Congress by the time the fees are promulgated. On the other hand, those who commented on the EPA-92 notice strongly prefer that the NRC continue to use notice and comment rulemaking to promulgate fees. Their primary reason is that they consider this the only opportunity to express their position on the NRC budget and associated fees that they must pay. For example, some stated that the courts have long recognized that Congress enacted the notice-and-comment rulemaking procedures of the Administrative Procedures Act to "give the public an opportunity to participate in the rulemaking process" and to enable "the agency promulgating the rule to educate itself before establishing rules and procedures which have a substantial impact to those regulated." Others expressed the view that publication of a fee rule in final form without comment ignores the significant monetary changes in fees that have been assessed licensees in the previous year even if the methodology or

policies do not change. To publish fee schedules only in final form "would deny an adversely affected licensee an opportunity to voice its objection." One licensee stated that providing for public comment on the basic fee methodology and policies gives the public and the regulated community a rightful voice in the development of those policies.

As indicated by the comments, most licensees feel strongly that although the policies and procedures related to fee assessment might be the same as before, this should not be used to foreclose the opportunity for new commentary or renewed dissent. Given these strong views, the NRC will retain notice and comment rulemaking of fee schedules. This issue will be revisited if the fees become less controversial in the future.

Another option considered by the Commission to streamline the fee calculations was reducing the complexity of the fee calculation by reducing the number of subclasses of fees for some major classes of licensees. For example, seven subclasses of power reactors paid annual fees in FY 1993 that vary by only three percent (from $2,935,000 to $3,031,000). This difference is relatively small and could be considered de minimus and therefore not commensurate with the effort necessary to reach an apparent level of precision. Those who commented on the fee policy notice, however, disagree with this suggested policy change. They indicated that OBRA-90 guidance requires those entities who require the greatest expenditures of the NRC's resources to pay the greatest annual fee; therefore, the existing policy of assessing each reactor design a charge that reflects the varying amounts of NRC resources spent on generic research and other regulatory activities unique to that design should be retained. They believe the difference in reactor fees of $96,000 between the highest and lowest annual fee is significant enough to warrant the effort of calculating the fees using existing methods.

Fuel facility licensees stated, with respect to a uniform annual fee for all fuel facility licensees, that such a "simplification" would ignore the significant differences between the various steps in the low-enriched fuel fabrication process and the differences between low- and high-enriched fuel as well as the differences in the NRC's budgeted safety and safeguards costs allocated to each class. Commenters indicated that, for example, the two high-enriched uranium fuel manufacturers require much greater safety and safeguards oversight by the NRC because they possess strategic quantities of nuclear materials. According to these commenters, if a uniform fee were assessed, low-enriched uranium manufacturers and uranium

hexafluoride converters would be subsidizing the regulation of high-enriched uranium fuel manufacturers while receiving no tangible benefit. This suggested policy change, they indicate, contradicts OBRA-90's mandate that fees be fairly and equitably allocated among licensees. Again, the NRC defers to the commenters' position but will continue to look toward ways of reducing the number of subclasses if the differences in assessed fees are small.

Another option for streamlining the fee process is to assess only an annual fee, along the lines suggested by the OIG in its October 1993 review of fees. This option will require modifying OBRA-90 to eliminate the requirement for NRC to assess Part 170 licensing and inspection fees. If this option is adopted, the NRC could avoid spending on the order of 10 FTEs and about $200,000 in contractual support used to collect Part 170 fees.

Under this option, the NRC would combine the NRC costs for inspections and licensing amendments, including materials license renewals, into a single increased annual fee. Thus, there would no longer be Part 170 amendment, materials license renewal, or inspection fees assessed for specific services to specific licensees.[7]

This option, which would give the NRC the statutory authority to charge a single annual fee, recognizes that under 100 percent budget recovery the service to the licensees is not each individual action, but is the <u>total</u> annual regulatory activities for a specific license. These total services include not only the services provided in amending, renewing, and inspecting materials licenses but research, rulemaking and other activities necessary to regulate classes of licensees. This concept also recognizes that the cost of providing the individual services, although important, is secondary to the other costs recovered under 100 percent budget recovery. Indicative of this is that only about 20 percent of the budget is recovered from fees for the individual services. In addition to providing a reasonable means to recover the NRC budget, this approach would result in NRC resource savings and a simplified fee structure. Such a fee structure, however, may be perceived by some licensees as less fair than the current one, which assesses individual fees for services rendered to each

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[7]A fee would continue to be assessed for review of applications for initial licenses, such as standard design certifications, renewal of power reactor licenses, new material licenses, etc., since it would be difficult to develop an annual fee for these types of major license applications.

licensee, because of differences in the amount of fees for inspections and amendments that licensees in the same class currently pay. For example, the inspection hours and fees for different reactors may vary. Also, some materials licensees may be inspected more frequently than others. Allied Signal, in the most recent fee case,[8] argued that Sequoyah Fuels, another fuel facility in its license class, was a problem facility that causes NRC to incur considerably more facility-specific costs.

The NRC understands the concerns associated with eliminating the Part 170 fees. However, on balance, the Commission believes that roughly 10 FTE and $200,000 in resource savings and a simpler fee structure resulting from streamlining the NRC fee process to charge only an annual fee outweighs the potential unfairness that some licensees may voice. A single annual fee would represent the total services provided and licensee concerns can be mitigated. First, although fees assessed on a yearly basis may vary, the differences in the average cost over longer periods of time should be reduced. The NRC can also adjust the subclasses of licensees to minimize these differences. Second, NRC would continue to charge fees for new license applications because applicants for a new license would not pay an annual fee until the license is issued. Also, licensees that currently do not pay an annual fee (e.g., decommissioning and possession only (POL) licenses) but pay Part 170 fees would have to pay an annual fee.

The option that would result in the most resource savings (about 20 FTE) is to modify OBRA-90 to allow NRC to assess 100 percent of the budget to operating power reactors and major fuel cycle licensees only.[9] This option, the Commission believes, would be considered totally unfair by the power reactors and major fuel facilities, because they would be paying fees for materials regulatory activities. However, it would eliminate all of the materials licensees' concerns, as well as the numerous letters and phone calls to the NRC about annual fees. Although this approach would result in significant resource savings, it should not be pursued because of the major concern related to fairness that it raises. It would, from the power reactor perspective, be more unfair than the current fee structure. It might also be considered inconsistent with the EPA-92

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[8] Allied-Signal v. NRC, 988 F.2d 146 (D.C. Cir. 1993).

[9] If this option is pursued, previously discussed legislative options to improve fairness and equity, such as deleting certain costs from the fee base, should not be pursued.

request that the NRC recommend changes in existing law to prevent placing an unfair burden on NRC licensees.

In summary, the NRC believes that the most appropriate way to reduce the administrative burden on staff, while retaining a reasonable degree of fairness and equity in the fee schedules, is to modify OBRA-90 to allow the NRC to charge only an annual fee. The NRC will continue to look for opportunities to reduce the number of subclasses for annual fees. With regard to publishing the fees without notice and comment, the NRC will revisit this concept in the future if the controversy over fees subsides.

VI. **OTHER CONCERNS:**

Several other specific concerns have been raised about the fairness and equity of fees.

A. **Proration of Annual Fees for Terminated Licenses**

Currently the full annual fee is assessed to all licensees which have not filed a termination or POL request by the beginning of the fiscal year. One commenter suggested that to be more fair and equitable the NRC should provide in its regulation a provision for prorating the annual fee for the fiscal year in which a licensee requests an amendment to remove the license authority. During the past three years, many materials licensees have written the NRC requesting an exemption from the fees or an extension of time (beyond October 1) to terminate the license and be relieved of the annual fee because (1) no material was ever possessed under the license; (2) the licensed material was never or infrequently used; (3) the material was in storage; or (4) they have attempted to sell the device without success.

The NRC acknowledges this concern and plans to include a proration provision for termination as well as issuance of new licenses in its fee regulations.

B. **Annual Fees for Possession Only, Decommissioning and Reclamation Licensees**

Some reactors, major fuel facilities, and uranium recovery facilities are inoperative but continue to benefit from NRC regulatory activities, primarily those activities related to decommissioning or site reclamation. For example, some power reactor licensees have received a POL from NRC and are in the process of decommissioning their facilities. In addition, many uranium recovery licensees (mills) are no longer operating and have filed reclamation plans for approval by the NRC. These licensees benefit from the research, rulemaking, and issue resolution that the NRC

performs for decommissioning or reclamation. Licensees believe, however, that having non-operating facilities pay annual fees is unfair because they no longer generate revenue and require very little NRC supervision. Some cannot complete decommissioning for lack of a site for waste disposal. Therefore, they conclude that they must retain a non-operating license, through no fault of their own. Another concern of licensees in the uranium recovery area is that only a few active licensees will be left to pay for generic activities, including those related to reclamation.

The NRC will continue the present policy of assessing annual fees to licensees until the license is amended to authorize possession only or decommissioning. This is consistent with policy decisions that those who benefit from a license that authorizes operation or use of material pay annual fees.

C. **Fees For Small Entities**

Currently, the NRC assesses two fees for licensees that qualify as small entities under the NRC's size standards. In general, licensees with gross annual receipts of $250,000 to $3.5 million, pay a maximum annual fee of $1,800. A second or lower-tier small entity fee of $400 was established for small entities with gross annual receipts of less than $250,000 and small governmental jurisdictions with a population of less than 20,000.

Commenters have indicated that more variation in the fees assessed to small entities should be provided. For example, one commenter indicated that NRC should "create more fee categories based on gross annual receipts." Some commenters argued that reducing the gap between the minimum small entity fee of $400 and the maximum fee of $1,800 would eliminate some of the competitive disadvantage experienced by those who are slightly above the established NRC thresholds.

As indicated earlier in this report, the merits of whether the NRC small entity size standards should be changed is being reviewed and decided separately by the Commission. The issues raised by commenters will be deferred until the Commission has made a decision on whether or not to revise the current small entity size standards, since a change in the size standards could cause the NRC to change its small entity fees.

D. **Defer License Review Fees For Advanced Reactors.**

The Commission revised its policy of deferring the costs for standardized reactor design reviews in the final FY 1991 rule implementing 100-percent fee recovery. The Commission

decided that for reasons of fairness and equity, the cost of these reviews, whether for domestic or foreign applicants, should be assessed under Part 170 to those filing an application with the NRC for approval or certification of a standardized design. The Senate Energy and Water Committee recently noted that:

> The Committee is also concerned that the NRC review fees charged to the ALWR design certification applicants are becoming overly burdensome. The recent schedule delay will exacerbate the problem. The Commission should reconsider its policy for allowing payment of those fees to be deferred until the certification is actually employed.

S. Rpt. 103-147 at 188.

The NRC believes that, for the same reasons of fairness and equity that led to the reversal of the decision in FY 1991, the review fees should continue to be assessed to advanced reactor applicants. There is no compelling justification for singling out these classes of applications for special treatment and shifting additional costs to power reactors.

E. Place a Cap or Ceiling on Topical Report Fees.

The issue of establishing a ceiling on Part 170 licensing fees for the review of topical reports was raised by an owners group commenting on the notice. The group stated that some activities requiring NRC review and approval are voluntarily originated by the licensees in order to improve plant safety and performance. The reinstatement of a fee ceiling for topical reports will encourage the continuation of this practice to assure plant safety benefits. The group said that advance knowledge of the limit on the cost of the reviews would enable them to plan the allocation of their limited resources more effectively and efficiently.

A related issue concerns the assessment of Part 170 fees for review and approval of topical reports. The issue is, whether the submittal of the reports by utilities and owners groups should be viewed as "generic," in the broadest sense, and the costs recovered through annual fees rather than of Part 170 fees. This might encourage the submittal of additional reports in the interest of efficient and effective agency operations, which would be cost beneficial to both the NRC and the industry.

The Commission decided in the final FY 1991 fee rule to eliminate the ceiling for topical report reviews based on the 100-percent fee recovery principle and Congressional

guidance that each licensee or applicant pay the full costs of all identifiable regulatory services received from the NRC. NRC costs for topical report reviews vary significantly, depending on the particular topical report reviewed, and therefore make it impractical to establish a fair and equitable ceiling or flat fee.

The NRC will continue the present policy of assessing Part 170 fees, without a ceiling, for the review and approval of topical reports. Inherent in the initial decision to assess Part 170 fees was that the reports were being voluntarily submitted for review and approval and there was no compelling reason not to charge for the review and approval cost. Although a topical report can be used by more than one licensee, this use typically benefits the organization that submits the topical report. The NRC will ensure that reports that assist NRC in resolving NRC identified safety issues are not assessed fees.

F. **Expand Scope of Part 170.**

Presented in the notice was the question of whether to broaden Part 170 to recover costs incurred for specific activities that are now collected as part of the annual fee, including Independent Investigation Teams (IITs), allegations, contested hearings, vendor inspections, orders and amendments resulting from orders, and reviews that do not result in approvals.[10]

A majority of the commenters indicated that if Part 170 were expanded, they would support billing for orders and amendments resulting from such orders. These actions, the comments stated, although not licensee-initiated are provided to a specific licensee and should be assessed on an individual basis. One commenter argued that NRC should correct the situation in which a licensee who does not submit an amendment request recommended by an NRC generic letter until ordered to do so is not charged a fee, but a licensee who voluntarily submits such an amendment is subject to Part 170 fees.

With respect to the remainder of the items listed above, most commenters believe that many do not constitute a specific service to an identifiable licensee and that the costs should continue to be collected under Part 171. For example, commenters claim that the cost of investigating allegations and contested hearings are beyond the licensee's

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[10]This issue becomes moot if the Congress enacts legislation that removes the requirement to assess Part 170 fees.

control and should not be billed on an individual basis. Instead, the NRC should continue to include costs for these activities in the Part 171 annual fee. Other commenters agreed stating that investigations of allegations and contested hearings often raise generic issues of concern to all licensees. Therefore, saddling individual licensees with these additional costs is unfair and inequitable because they arise at NRC's direction, are not requested by a licensee and are beyond a licensee's control. Others commented that all licensees benefit from these regulatory activities and that the costs should be recovered through the annual charge.

The NRC agrees with these comments and will continue to include the costs of IITs, vendor inspections, contested hearings, allegations, and reviews that do not result in approvals, in the annual fee. The Commission will not charge for orders and amendments resulting from orders because most orders are used to impose civil penalties. Charging for orders could be perceived as additional fines to the licensee or in some cases, penalizing a licensee for exercising its right to disagree with NRC.

VII. **CONCLUSIONS:**

For the reasons discussed above, this review of NRC fee policy concludes that modification of existing fee legislation is necessary to minimize licensees' major concerns about fairness, equity, and the administrative burden of fees. To this end, the following legislative changes are recommended:

1. Modify OBRA-90 to remove from the fee base costs for international activities, Agreement State oversight, the exempted fees for nonprofit educational institutions, and the amount of the fee reduction for small entities. This would minimize the major concern associated with NRC licensees paying for activities that do not benefit them. (This would reduce the amount to be collected by about $25 million, or about 5 percent of the FY 1993 budget recovered through fees.)

2. Modify OBRA-90 to remove from the fee base a portion of the cost of generic regulatory activities that supports NRC and Agreement States material licensees. This would eliminate the concern that NRC materials license fees, which support the regulation of both NRC and Agreement State licensees, are not commensurate with benefits received. (This would reduce the amount to be collected by about $15 million, or about 3 percent of the FY 1993 budget recovered through fees.)

3. Modify OBRA-90 to remove from the fee base the costs of providing services to Federal agencies (about $6 million or about one percent of the FY 1993 budget) or modify the AEA to permit NRC to assess application and other fees for specific services to all Federal agencies, in order that other NRC licensees need not have to pay for the cost of these services which do not benefit them.[11]

4. Modify OBRA-90 to eliminate the requirement that NRC assess Part 170 fees, so as to reduce the resources required to assess and collect fees. (If this option is adopted, the NRC could avoid spending about 10 FTEs and about $200,000 for fees.)

If legislation to relax the 100-percent recovery requirement is not enacted, current fee policies should be continued, except that legislation requiring the assessment of fees to Agreement States so as to improve the fairness and equity of the fees for NRC materials licensees should be considered. This is especially appropriate, given the likelihood of more States becoming Agreement States.

[11]This change would still be necessary if the requirement to assess Part 170 fees is eliminated, since the NRC would want to assess an application fee to those agencies applying for new licensees who would not otherwise pay annual fees at that time.

NUCLEAR REGULATORY COMMISSION

10 CFR Parts 170 and 171

RIN 3150-AE54

NRC Fee Policy; Request for Public Comment

AGENCY: Nuclear Regulatory Commission.

ACTION: Request for public comment.

SUMMARY: The Nuclear Regulatory Commission (NRC) is soliciting public comment on the need for changes to its fee policy and associated legislation. This action responds to recent legislation that requires NRC to review its policy for assessment of annual fees, solicit public comment on the need for changes to this policy, and recommend to the Congress the changes in existing law the NRC finds are needed to prevent the placement of an unfair burden on NRC licensees. The NRC is presenting various options, alternatives, and questions for consideration and comment concerning potential legislative changes as well as potential policy changes that would require amendments to NRC's fee regulations. The NRC is also announcing the receipt of and requesting comment on a petition for rulemaking submitted by the American Mining Congress (PRM-170-4) that requests that NRC conduct a rulemaking to evaluate its fee policy.

DATES: The comment period expires July 19, 1993. Comments received after this date will be considered if it is practical to do so, but the Commission is able to ensure only that comments received on or before this date will be considered. Given the relatively long comment period, requests for extensions of the comment period will not be viewed with favor.

ADDRESSES: Submit written comments to: Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555, ATTN: Docketing and Service Branch.

Hand deliver comments to: 11555 Rockville Pike, Rockville, Maryland 20852, between 7:30 a.m. and 4:15 p.m. Federal workdays. (Telephone 301-504-1678).

Copies of comments received may be examined at the NRC Public Document Room at 2120 L Street, NW., Washington, DC 20555, in the lower level of the Gelman Building.

FOR FURTHER INFORMATION CONTACT: C. James Holloway, Jr., Office of the Controller, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Telephone 301-492-4301.

SUPPLEMENTARY INFORMATION:

Background

Public Law 101-508, the Omnibus Budget Reconciliation Act of 1990 (OBRA-90), November 5, 1990, requires that the NRC recover approximately 100 percent of its budget authority less the amount appropriated from the Department of Energy (DOE) administered Nuclear Waste Fund (NWF) for FYs 1991 through 1995 by assessing fees. The NRC assesses two types of fees to recover its budget authority. First, license and inspection fees, established in 10 CFR part 170 under the authority of the Independent Offices Appropriation Act (IOAA) (31 U.S.C. 9701), recover the NRC's costs of providing individually identifiable services to specific applicants and licensees. The services provided by the NRC for which these fees are assessed are generally for the review of applications for and the issuance of new licenses or approvals, amendments to licenses or approvals, and inspections of licensed activities. Second, annual fees, established in 10 CFR part 171 under the authority of OBRA-90, recover generic and other regulatory costs not recovered through 10 CFR part 170 fees.

Subsequent to enactment of OBRA-90, the NRC published three final fee rules after evaluation of public comments. On July 10, 1991 (56 FR 31472), the NRC published a final rule in the Federal Register which established the 10 CFR part 170 professional hourly rate and the materials licensing and inspection fees, as well as the 10 CFR part 171 annual fees to be assessed to recover approximately 100 percent of the FY 1991 budget. In addition to establishing the FY 1991 fees, the final rule established the underlying basis and method for determining the 10 CFR part 170 hourly rate and fees, and the 10 CFR part 171 annual fees. Portions of the 1991 rule were recently remanded to the Commission for reconsideration as a result of the Court's decision in *Allied-Signal v. NRC*, (D.C. Cir. March 16, 1993). A separate Federal Register notice addressing the remand issues will be published in April, 1993.

On April 17, 1992 (57 FR 13625), the NRC published in the Federal Register two limited changes to 10 CFR parts 170 and 171. The limited changes became effective May 18, 1992. The limited change to 10 CFR part 170 allowed the NRC to bill quarterly for those license fees that were previously billed every six months. The limited change to 10 CFR part 171 adjusted the maximum annual fee of $1,800 assessed a materials licensee who qualifies as a

small entity under the NRC's size standards. A lower tier small entity fee of $400 per licensed category was established for small businesses and non-profit organizations with gross annual receipts of less than $250,000 and small governmental jurisdictions with a population of less than 20,000.

On July 23, 1992 (57 FR 32691), the NRC published a final rule in the Federal Register that established the licensing, inspection, and annual fees necessary for the NRC to recover approximately 100 percent of its budget authority for FY 1992. The basic methodology used in the FY 1992 rule was unchanged from that used to calculate the 10 CFR part 170 professional hourly rate, the specific materials licensing and inspection fees in 10 CFR part 170, and the 10 CFR part 171 annual fees in the final rule published July 10, 1991 (56 FR 31472).

Purpose

On October 24, 1992, the Energy Policy Act was enacted. Section 2903(c) of the Act requires the NRC to review its policy for assessment of annual fees under section 6101(c) of the Omnibus Budget Reconciliation Act of 1990, solicit public comment on the need for changes to this policy, and recommend changes in existing law to the Congress the NRC finds are needed to prevent the placement of an unfair burden on certain NRC licensees, particularly those who hold licenses to operate Federally owned research reactors used primarily for educational training and academic research purposes. The Act also exempted from fees certain Federally owned research reactors used primarily for educational purposes. On February 4, 1993, the NRC received a petition for rulemaking submitted by the American Mining Congress (AMC). The petition was docketed as PRM–170–4 on February 12, 1993. The petitioner requested that the NRC amend 10 CFR parts 170 and 171 concerning fees for facilities, materials licenses, and other regulatory services under the Atomic Energy Act of 1954, as amended. The petitioner requested this action to mitigate alleged inequities and problems with the present fee system. Because the issues raised by the petitioner concern the same subjects as the fee policy review required by the Energy Policy Act, the NRC is announcing receipt of the petition and requesting public comment on the issues raised in PRM–170–4 in this document.

The purpose of this notice is to solicit public comment on the need, if any, for changes to the existing NRC fee policy and associated laws in order to comply with section 2903(c) of the Energy Policy Act and to respond to the AMC petition.

In the legislative area, the NRC encourages commenters not to address the public policy issue of whether the Federal government should fund its activities through user fees rather than assessing taxes on the general population. Instead, the NRC asks that commenters focus on this central question: "Given that user fees will be assessed to NRC licensees, what specific legislative or NRC policy changes are needed to eliminate any unfair burden?"

With respect to suggested amendments to the fee policies set forth in 10 CFR parts 170 and 171, comments that request a fee reduction for one licensee or a class of licensees should explicitly indicate who should be assessed the budgeted costs for the proposed fee reductions in order to recover 100 percent of the NRC budget authority. It should be noted that any changes to the existing 10 CFR parts 170 and 171 would require notice and public comment before the changes are made.

The NRC has had two years of experience in implementing the requirement of OBRA–90 to recover approximately 100 percent of the NRC budget authority. During that time, the NRC has evaluated over 500 public comments on fee related rules; responded to several hundred requests for exemptions, letters from licensees, and letters from the Congress; and responded to thousands of telephone calls from licensees concerning the assessment of annual fees. Many of these comments and letters expressed concern about the burden of fees.

Based on previous public comments and letters, the NRC has developed potential options and alternatives for change as well as questions for further consideration and comment by the public. While comments may be made on any and all aspects of the NRC fee policy and the existing laws upon which the fees are based, it would be particularly helpful to the NRC if the comments addressed the specific items identified in this document. This would facilitate the process of analyzing and evaluating the comments in an efficient and timely manner. This would also enable the NRC to provide the Congress with specific recommendations concerning any legislative changes to OBRA–90, and the Atomic Energy Act.

Although the Energy Policy Act requires only comments on the annual fees assessed by the NRC under section 6101(c) of OBRA–90 and 10 CFR part 171, the NRC is also seeking comments on whether or not to broaden the scope of 10 CFR part 170 to recover some costs that are currently recovered as annual fees under 10 CFR part 171. These costs are associated with specific NRC actions for specific applicants, licensees, or other organizations.

Four Major Areas of Concern Identified By NRC

To assist in focusing comment, the NRC has identified four broad areas where previous public comment or concern indicated that the fees may place an unfair burden on licensees. The areas include (1) the surcharge assessed to certain licensees under 10 CFR part 171 and the generic regulatory costs that support the Agreement States; (2) fluctuating annual fees; (3) simplifying the development of annual fees; and (4) the recovery of some costs for specific identifiable services through annual fees.

1. Annual Fee Surcharge and Regulatory Support of Agreement States

Both the Congress and the NRC have recognized that the NRC budget includes costs for required NRC activities but for which the costs cannot be attributed to existing NRC licensees. According to the Conference Report accompanying OBRA–90, "increasing the amount of recovery to 100 percent of the NRC's budget authority will result in the imposition of fees upon certain licensees for costs that cannot be attributed to those licensees or classes of licensees." The Conference Report further stated that: "The conferees intend the NRC to fairly and equitably recover these expenses from its licensees through the annual charge even though these expenses cannot be attributed to individual licensees or classes of licensees." Therefore, to implement 100 percent fee recovery, the NRC must impose the cost of some activities on licensees who neither requested nor derive direct benefit from those activities. In addition, the Commission has made certain policy decisions that result in charging fees to licensees for activities that do not provide regulatory support to those licensees. Under OBRA–90, the costs of those activities can only be recovered by assessing annual fees to existing NRC licensees. To recover these types of costs, the NRC assesses a surcharge to certain licensees.

Activities Included in The Current Surcharge

The following discussion presents the three broad categories of activities that are included in the current annual fee surcharge:

1. *Activities not associated with an existing NRC licensee or class of*

licensees. The first major category of costs covers those NRC activities that cannot be attributed to an existing NRC licensee or class of licensees. This category includes international, Agreement State, generic low-level waste (LLW), and generic uranium enrichment activities.

Some international activities are not directly tied to an individual licensee or class of licensees. These activities include some safety assistance provided to foreign countries and some non-proliferation reviews.

In addition, the NRC's budgeted costs for administering the Agreement State program are attributed only to Agreement State licensees. Only Agreement State licensees benefit from this program. Because Agreement State licensees are not NRC licensees, they cannot be charged an annual fee under OBRA–90.

The three existing LLW disposal facilities are licensed by Agreement States. Two of these facilities also have NRC licenses for disposal of special nuclear material. Therefore, the NRC generic LLW regulatory activities do not fully support an existing NRC licensee or class of licensees. However, some NRC licensees, as well as Agreement State licensees, will indirectly receive the benefits from these NRC LLW expenditures because they will dispose of LLW at sites that are expected to be licensed in the future.

Another area where NRC is establishing the regulatory framework to regulate future licensees is uranium enrichment. Although an application has been filed for an enrichment facility, the license has not been issued and, therefore, there is no uranium enrichment licensee that may be assessed an annual fee for these generic activities. Under OBRA–90, annual fees can only be charged to licensees, not to license applicants.

For FY 1992, approximately $14 million was included in the power reactor surcharge for this category: approximately $4 million was assessed as a surcharge to classes of nonreactor licensees that generate low level waste; and $3 million for administering the Agreement State program was included in the NRC professional hourly rate and assessed to all licensees.

2. *Specific applicants and licensees or classes of licensees that are not subject to fee assessment under IOAA or other law.* The second major category of costs covers those activities for which the NRC is unable, on the basis of existing law, to charge a fee to specific applicants or licensees even though they receive an identifiable service from the NRC. These activities involve licensing reviews and inspections for Federal agencies other than the Tennessee Valley Authority (TVA) and the United States Enrichment Corporation.[1] In addition, the Energy Policy Act exempted from annual fees certain Federally owned research reactors used primarily for educational training and academic research purposes.

With regard to Federal agencies, the NRC performs licensing and inspection activities, and conducts other reviews for which fees, except for IOAA prohibitions, would normally be charged under 10 CFR part 170. For example, the NRC reviews DOD/DOE Naval reactor projects; issues licenses to and conducts inspections of Federal nuclear materials users, for example, Veterans Administration hospitals, Army irradiators, and NASA radiographers; and performs safety and environmental reviews of DOE West Valley and uranium mill tailings actions as required by the West Valley Demonstration Project Act and the Uranium Mill Tailing Radiation Control Act (UMTRCA), respectively. The NRC also reviews advanced reactor designs submitted by DOE.

The IOAA prohibits the NRC from assessing 10 CFR part 170 fees to Federal agencies for the costs of these activities. The Energy Policy Act prohibits the assessment of 10 CFR part 171 annual fees to certain Federally owned research reactors used primarily for educational purposes. Therefore, under OBRA–90, the NRC must assess annual fees to other licensees to recover the costs of these activities in order to comply with the 100 percent recovery requirement.

For FY 1992, approximately $4 million was included in the surcharge for operating power reactors for this category of NRC activities.

3. *Activities relating to applicants and licensees currently exempt from 10 CFR parts 170 and 171 fees or assessed reduced annual fees for small entities based on current Commission policy.* The third major category of costs covers those activities for which specific applicants or licensees receive NRC services and could be assessed fees. However, as a result of existing Commission fee exemption and fee reduction policy decisions, certain licensees are exempt from fees or pay reduced annual fees.

Nonprofit educational institutions, for example, certain nonpower reactor and nuclear material users, are exempted from 10 CFR part 170 licensing and inspection fees and 10 CFR part 171 annual fees. The Commission has also reduced the annual fees for those licensees who can qualify as a small entity under the Commission's regulations. This action is consistent with the requirements of the Regulatory Flexibility Act of 1980 that agencies consider the impact of their actions on small entities.

For FY 1992, approximately $7 million in NRC costs for nonprofit educational institutions was assessed as a surcharge to operating power reactors and approximately $6 million in reduced fees for small entities was assessed as a surcharge to all licensees that are not small entities.

Activities That Support Both NRC and Agreement State Applicants and Licensees

This area covers generic activities that are attributed to a specific class of NRC licensees but also support Agreement State licensees. These activities are associated with the NRC nuclear materials and uranium recovery regulatory program.

The NRC performs generic regulatory activities for nuclear materials users and uranium recovery licensees such as conducting research, developing regulations and guidance, and evaluating operational events. These generic activities provide the basis for NRC to regulate its approximately 7,000 materials and uranium recovery licensees, as well as for the twenty-nine Agreement States to regulate their 16,000 materials licensees. However, under OBRA–90, the NRC cannot charge the Agreement State licensees an annual fee to recover a portion of the cost of these activities because they are not NRC licensees. Therefore, only about 30 percent (7,000 NRC licensees of the total population of 24,000) of the licensees can be assessed an annual charge to recover the cost of generic activities that support both NRC and Agreement State licensees. NRC licensees have indicated that this creates an unfair burden and competitive disadvantage for them. This means that about 70 percent of the generic regulatory costs (about $23 million) that are included in the annual fees for NRC materials and uranium recovery licensees could be considered as an unfair burden.

Legislative options. The NRC has identified the following legislative

[1] Section 161w. of the Atomic Energy Act authorizes the NRC to impose fees under 10 CFR part 170 on a Federal agency that applies for or is issued a license for a utilization facility designed to produce electrical or heat energy (e.g., licensing reviews and inspections of TVA's nuclear power plants) or which operates any facility regulated under sections 1701 or 1703 of the Atomic Energy Act (the enrichment facilities of the United States Enrichment Corporation).

options to address the issues discussed above.

1. Modify OBRA–90 to eliminate the costs of certain activities from the fee base so that the NRC is required to collect approximately 100 percent of its budget, less appropriations from the Nuclear Waste Fund (NWF) and the budgeted costs for other activities that would be specified by the NRC. With respect to this alternative, the NRC is particularly interested in receiving public comment on the following question: Should OBRA–90 be modified to remove all specified activities identified in the four items above from the fee base? If all four activities are excluded, approximately $61 million, based on the FY 1992 budget, would be removed from the fee base.

2. Modify OBRA–90 to permit the NRC to assess annual fees to organizations other than NRC licensees and approval holders that benefit from regulatory activities. For example, if this alternative is pursued, it could result in the NRC charging generic regulatory costs to NRC applicants. This would mean that the first applicant for a new class of license could be required to pay for all NRC regulation development and research costs to put a regulatory program in place to regulate an entire class of licensees.

3. Modify the Atomic Energy Act to permit the NRC to assess 10 CFR part 170 fees to Federal agencies, other than those that already are subject to such assessments, for identifiable services such as reviews, approvals and inspections where direct recovery for these costs is currently prohibited by IOAA. This would result in approximately $4 million in additional fees being collected from Federal agencies.

Policy changes. Policy changes to address the concerns with the surcharge include the elimination of exemptions currently contained in 10 CFR parts 170 and 171. This would include, for example, elimination of the exemption for nonprofit educational institutions.

II. Fluctuating Annual Fees

The amount of the annual fees fluctuates depending on the amount of the budget and the number of licensees available to pay the relatively fixed generic and other regulatory costs. Changes in the budget and the number of licensees can cause relatively large changes in the amounts of the annual fees. For example, the FY 1992 annual fee for some licensees increased by 50 percent due to these factors. Because of the timing of Congressional approval of the NRC's budget, it is not possible to give licensees much advance notice of these increases. Licensees have complained that it is unfair for the NRC to assess such large increases because they do not have sufficient warning to adjust prices and contracts to recover the increases.

Legislative Option

To minimize the potential of large increases in annual fees, one option would be to modify OBRA–90 to limit the annual fee increase for each class of licensees. Any cost not recovered as a result of this limitation would be excluded from the fee base. If this legislative option is pursued, should the increase be limited to the increase as reflected by the Consumer Price Index or some other fixed percentage, for example, 25 percent?

III. Simplifying the Development of Annual Fees

OBRA–90 requires that annual fees be established by rulemaking. Therefore, the NRC must publish a proposed rule for comments, evaluate the comments, and issue a final rule each year, even though the basic fee methodology and policy are unchanged from the previous year. This results in extra staff effort and delay in establishing the annual fees for a particular year.

In addition, the NRC has received comments indicating that the annual fees for operating power reactor licensees and fuel cycle licensees should be simplified. They point out that annual fees for the operating power reactor class of licensees are determined in three ways. First, within the operating power reactor class, a distinction is made between the four vendor groups, that is, Babcock & Wilcox, Combustion Engineering, General Electric, and Westinghouse. Second, within each vendor group, a distinction is made by the type of containment, for example, General Electric Mark I, II and III. Third, a distinction is made based on location of the reactor, that is, whether or not it is located east or west of the Rocky Mountains. As a result, the amount of the fees for any one vendor with a specific containment type could vary significantly from year to year leading one commenter to conclude that the "variability of the difference is greater than the attempted refinement" (58 FR 31479; July 10, 1991). Similarly, for the class of fuel cycle facilities a distinction is made between high enriched fuel fabrication, low enriched fuel fabrication, UF_6 conversion facilities and other fuel facility licensees. NRC's safety and safeguards budgeted costs are separately allocated to these classes.

The NRC is seeking comment on ways to simplify the process of establishing annual fees and simplifying the method for determining annual fees for operating power reactors and fuel fabrication licensees without causing an unfair burden.

Legislative Option

To simplify the process one option is to modify OBRA–90 so fee schedules can be published without soliciting public comment, provided the basic fee methodology and policies remain unchanged from the previous year.

Policy Changes

One option to address the different annual fees for various classes of operating power reactors and fuel facility licensees is to modify 10 CFR 171 to assess one uniform annual fee for all operating power reactors and one uniform annual fee for all fuel facilities.

IV. Expanded Scope for 10 CFR Part 170

The authority for NRC's assessment of the 10 CFR part 170 licensing, approval, and inspection fees by the NRC is the IOAA. The 10 CFR part 170 fees are assessed for specific services rendered by the NRC to identifiable applicants and licensees. Two Supreme Court cases and four Circuit Court decisions relating to the Federal Communications Commission (FCC) and the Federal Power Commission (FPC) fees assessed under the authority of the IOAA, as well as a Fifth Circuit Court of Appeals case relating to IOAA-type NRC fees, have provided additional guidance to the NRC in fee assessment under 10 CFR part 170. The past and current 10 CFR part 170 fees were established based on these court decisions.

Based on the courts' guidance, NRC IOAA-type fees have been structured and are assessed for the review of applications for and the issuance of (1) new licenses; (2) amendments and renewals to existing licenses; (3) approvals, such as topical reports; and (4) for inspections. Under the current 10 CFR part 170 fee policy, an application must be filed for a new license, an amendment, renewal, or approval; or an inspection must be conducted by the NRC in order for a 10 CFR part 170 fee to be assessed.

The courts' decisions on which the current 10 CFR part 170 fees are based were issued before the OBRA–90 requirement to recover 100 percent of the NRC's budget authority through fees. Because there are instances where NRC performs specific services for identifiable applicants, licensees, or other organizations that do not meet existing policy for assessing 10 CFR part

170 fees, the costs of these services are recovered through 10 CFR part 171 annual fees assessed to all licensees in a particular class. If the costs of these types of activities were recovered under 10 CFR part 170, the annual fee would be decreased.

The NRC is seeking comments on the option of broadening the scope of 10 CFR part 170 to recover costs incurred for specific actions for identifiable recipients because of the interrelationship of 10 CFR parts 170 and 171 in recovering 100 percent of the NRC budget authority. Some of these activities are identified and listed below. The listing provided is not intended to be all-inclusive.

1. Incident Investigation Teams (IITs)

The purpose of the agency's incident investigation program is to investigate significant operational events involving power reactors and other facilities in a systematic and technically sound manner. Causes of the events are determined so the NRC can take corrective actions. An incident investigation team investigates events of a potentially major significance. Currently the costs of these investigations are recovered through annual fees.

2. Vendor Inspections

NRC conducts inspections of suppliers of nuclear components, materials, and services in response to specific hardware failures, regulatory concerns, or allegations to determine whether these suppliers are in compliance with applicable NRC and industry requirements. Currently part 170 fees are not assessed for these inspections because vendors are not applicants or licensees of the Commission. The costs of these inspections are recovered through annual fees assessed to power reactors.

3. Allegations

NRC conducts investigations of allegations of wrongdoing by NRC licensees and others within its regulatory jurisdiction. NRC also conducts inspections of allegations made by third parties regarding specific licensees. Not all allegations are substantiated. The Commission previously decided it would not charge 10 CFR part 170 fees for inspections resulting from third party allegations (49 FR 21298; May 21, 1984). The budgeted costs for these investigations are recovered from each class of licensee through annual fees.

4. Site Decommissioning Management Plan (SDMP)

NRC performs reviews and conducts inspections with respect to those companies identified in the Site Decommissioning Management Plan to ensure the clean-up of the sites. Currently, 10 CFR part 170 fees are not assessed because the companies are not NRC applicants or licensees. The budgeted costs for these reviews and inspections are recovered from fuel facilities and materials licensees through annual fees.

5. Reviews That Do Not Result in Formal NRC Approvals

The NRC performs reviews that do not result in the issuance of formal or legal approvals. For example, the NRC staff reviews the results of the Individual Plant Exams (IPE) submittals requested by a generic letter and prepares a draft Safety Evaluation Report (SER) on the findings. 10 CFR part 170 fees are not assessed because the IPE review does not result in a letter of approval or an amendment to the technical specifications or license. NRC also conducts Probabilistic Risk Analysis (PRA) reviews of specific reactors. These reviews have resulted in the generation of a SER. The SER provides a general description of the staff's conclusions on the strengths and weaknesses of the PRA, with more specific conclusions on areas identified by NRC as subject to potential licensing action, such as changes in the technical specifications. 10 CFR part 170 fees are not assessed because the review does not result in a letter of approval or an amendment to the technical specifications or license. Another example is NRC's review of financial assurance/decommissioning funding plans or medical quality management programs. NRC review of such submittals does not result in an approval or license amendment. Therefore, no 10 CFR part 170 fee is currently assessed. To recover 100 percent of the budget authority, the budgeted costs for these reviews are recovered through annual fees.

6. Orders to Licensees and Amendments Resulting From These Specific Orders

NRC issues orders to licensees and reviews and approves amendments to licenses resulting from the specific orders. Under current policy (contained in footnote 1 to § 170.21 and footnote 2 to § 170.31), 10 CFR part 170 fees are not assessed for the orders or amendments resulting from the orders because the NRC, on its own initiative, issues an order. The order is not incident to a voluntary act because the licensee does not request it. Similarly, amendments resulting from orders are not assessed 10 CFR part 170 fees because such amendments are not filed voluntarily by the licensee but are filed as a requirement of the order. The budgeted costs of these activities are recovered through annual fees to all licensees.

7. Contested Hearings

Contested hearings are conducted by the NRC on specific applications, usually at the request of intervenors. The Commission previously decided not to charge fees for contested hearings because a hearing gives the public an opportunity to intervene or participate in the licensing process and serves an educational purpose (42 FR 22159; May 2, 1977). The budgeted costs are recovered through annual fees assessed to all licensees of a particular class.

Policy Changes

One option to address the actions for applicants, licensees, or other organizations identified above is to modify 10 CFR part 170 to recover the costs incurred for specific actions from the identifiable recipients.

American Mining Congress Petition (PRM–170–4)

The Petitioner

The American Mining Congress (AMC), which filed a petition for rulemaking on February 4, 1993, is a national trade association of mining and mineral processing companies that includes owners and operators of uranium mills, mill tailings sites, and *in situ* uranium production facilities who are NRC licensees. Members of the AMC who use byproduct radioactive materials must be licensed by either the NRC or an Agreement State. Because the issues raised by the petition concern the same subject as the Energy Policy Act fee requirement, the NRC is also requesting public comment on the issues raised in PRM–170–4 in this document.

Adverse Impacts on the Petitioner

The AMC has submitted this petition for rulemaking on behalf of its members that hold NRC licenses because it believes they have been adversely affected by the current license fee rule. The petitioner states that many of its members who hold NRC licenses are Class I uranium recovery sites that have ceased operations and are waiting for NRC approval of reclamation plans, or are on standby. The petitioner believes it unfair that these facilities must

continue to pay the NRC an annual fee because they no longer generate revenue and require very little NRC supervision. The petitioner also asserts that some of these facilities have been awaiting NRC approval of final reclamation plans for as long as six or seven years, but in the meantime must continue to pay the NRC an annual fee.

The Petitioner's Concerns

The petitioner's primary concern is that a system that allows an agency to recover 100 percent of its costs invites regulatory abuse as there are no safeguards present to ensure that fees are collected in relation to the amount of necessary NRC oversight and regulation. The petitioner states that, under the current fee system, the NRC is not accountable to anyone and has no oversight or quality control for inspection efforts. There are no limits on how often inspections occur, no provisions for licensees to object to costs, and no assurance for expeditious service by the NRC.

The petitioner claims the NRC is violating the "*fundamental principle of law*" that a reasonable relationship must exist between the cost to licensees of a regulatory program and the benefit derived from the regulatory services. The petitioner believes the 67 percent increase in fees for Class I facilities over the prior year is excessive in comparison with the 6 percent increase in the annual NRC appropriation. The petitioner believes that fee increases should be consistent with the NRC practice of using the consumer price index for annual adjustment of surety bonds. The petitioner believes the annual fee is *exorbitant* for Class I uranium recovery sites, especially those that have ceased operations and have been waiting for several years for NRC approval of reclamation plans.

The petitioner also states that the $123 hourly charge for regulatory services is excessive for NRC staff efforts and notes that such an amount is equivalent to the rate charged by a senior consultant at a nationally recognized consulting firm.

The Petitioner's Proposals

The petitioner requests that 10 CFR parts 170 and 171 be amended to alleviate the inequitable impacts of NRC-imposed fees on its members, specifically for Class I uranium recovery sites that have ceased operation and await NRC approval of reclamation plans. The petitioner also suggests that the NRC implement certain standards for services provided. The petitioner offers the following specific suggestions for ensuring that the fee schedule bears a reasonable relationship to the benefit provided by NRC oversight and regulation.

1. The petitioner suggests the implementation of a system that allows NRC licensees to have some control over fees they are assessed. According to the petitioner, no rational relationship exists between the fees charged by the NRC and the benefits derived by its licensees. A licensee review board should be established that reviews the NRC fee system annually, monitors NRC inspection activities to prevent regulatory abuse, and proposes revisions to the fee system to eliminate inequitable treatment of licensees.

2. The petitioner suggests that the NRC develop a consistent method for applying charges. The petitioner believes that the NRC should supply licensees with a cost sheet that describes charges for various types of services and a specific response interval schedule that prescribes deadlines for all NRC regulatory services. This would eliminate inequities that may occur when the processing of simple amendment requests takes some NRC staff members longer than others to complete. The petitioner also suggests that the NRC establish time limits for processing, such as 30 days for simple license amendment requests, and publish the response times for various regulatory services in a table that would be distributed to licensees.

3. The petitioner suggests that the NRC provide a more complete and detailed accounting of the services it provides. Currently, the NRC lists only the hours spent and the hourly rate on bills sent to licensees. In addition to simply listing the time spent and the hourly rate, the petitioner believes that NRC charges should be itemized to also include a description of the work performed, the name(s) of the individual(s) who performed the work, and the dates on which the work was performed.

4. The petitioner suggests that the NRC eliminate factors that contribute to the inequitable treatment of licensees. The petitioner believes that fees should be waived for facilities that no longer generate revenue and require very little NRC supervision, such as for uranium fuel cycle sites that have ceased operation and are waiting for NRC approval of reclamation plans. According to the petitioner, the intent of Congress in enacting the Omnibus Budget Reconciliation Act of 1990 was that non-power reactor facilities should be exempt for the most part from annual fees because they comprise less than three percent of the NRC's regulatory costs. The petitioner also believes that the Department of Energy (DOE) is improperly receiving NRC oversight and review of its mill tailing site reclamation activities without being charged fees by the NRC. Furthermore, NRC attention to DOE sites prevents adequate NRC resources to be committed to address private sector licensing matters, resulting in exorbitant costs to certain NRC licensees who must continue to pay the NRC fees for many years while awaiting NRC action.

The Petitioner's Conclusion

The petitioner has identified several significant adverse impacts which it claims have effected its members as a result of the current NRC fee system which provides for inequitable treatment of licensees and the potential for regulatory abuse. The petitioner believes that the fees imposed by the NRC unfairly burden its uranium recovery facilities that have ceased operation and are awaiting NRC approval of reclamation plans, in some cases for many years. The petitioner requests that the NRC consider its proposals to amend the rules in 10 CFR parts 170 and 171.

List of Subjects

10 CFR Part 170

Byproduct material, Import and export licenses, Intergovernmental relations, Non-payment penalties, Nuclear materials, Nuclear power plants and reactors, Source material, Special nuclear material.

10 CFR Part 171

Annual charges, Byproduct material, Holders of certificates, registrations, approvals, Intergovernmental relations, Non-payment penalties, Nuclear materials, Nuclear power plants and reactors, Source material, Special nuclear material.

The authority citation for this document is: Sec. 2903(c), Public Law 102-486, 106 Stat. 3125.

Dated at Rockville, Maryland this 13th day of April 1993.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

[FR Doc. 93-9065 Filed 4-16-93; 8:45 am]

BILLING CODE 7590-01-P

ATTACHMENT 2

Comments - Reactor Licensees and Their Representatives

1.	Aerotest	(149)
2.	Arizona Public Service Co.	(534)
3.	B&W Owners Group	(528)
4.	Carolina Power & Light Co.	(527)
5.	Centerior Energy	(524)
6.	Commonwealth Edison	(473)
7.	Duke Power Co.	(523)
8.	Duquesne Light Co.	(520)
9.	Entergy	(488)
10.	Florida Power & Light Company	(519)
11.	General Atomics	(151) (532)
12.	Georgia Power	(493)
13.	Karl W. Gross, Reactor Operator	(460)
14.	Northeast Utilities	(526)
15.	NUMARC	(475)
16.	Pennsylvania Power & Light Co.	(522)
17.	Philadelphia Electric Co.	(529)
18.	Southern California Edison Co.	(508)
19.	South Carolina Electric & Gas Co.	(444)
20.	Southern Nuclear Operating Company	(494)
21.	TU Electric	(463)
22.	Union Electric	(141)
23.	Virginia Power	(535)
24.	Washington Public Power Supply System	(480)
25.	Winston & Strawn	(509)

Comments - Fuel Facility Licensees and Their Representatives

1.	ABB-Combustion Engineering	(518)
2.	Allied Signal	(495)
3.	American Mining Congress	(496) (554)
4.	B&W Fuel Company	(474)
5.	Hunton & Williams	(552)
6.	Louisiana Energy	(489)
7.	Rio Algom Mining Corporation	(505)
8.	Siemens Power Corporation	(512)
9.	U.S. Council for Energy Awareness	(510)
10.	Westinghouse Electric Corporation	(492)

Comments - Educational Licensees and Their Representatives

1.	American Council on Education	(541)
2.	American Society for Engineering Education	(557)
3.	Central Michigan University	(555)
4.	Christopher Plavney	(483) (516)
5.	Cornell University	(490)
6.	Eastern Michigan University	(507)
7.	Fermin M. Perez	(542)
8.	Georgia State University	(1)
9.	John R. Anderson	(560)
10.	Margaret R. Kunselman	(461)
11.	Massachusetts Institute of Technology	(481) (547) (566)
12.	Mount Holyoke College	(533)
13.	National Organization of Test, Research and Training Reactors (TRTR)	(546)
14.	National Science Foundation	(521)
15.	North Carolina State University	(543)

16.	Ohio State University	(464) (466) (472) (544) (545)
17.	Oregon State University	(558)
18.	Penn State University	(465)
19.	Princeton University	(457)
20.	Purdue University	(430)
21.	Saint John's University	(538)
22.	Saint Mary's College	(559)
23.	Simmons College	(564)
24.	Smith College	(530)
25.	South Dakota State University	(549)
26.	University of California-Irvine	(548)
27.	University of Cincinnati	(553)
28.	University of Delaware	(138)
29.	University of Florida	(556)
30.	University of Illinois	(504)
31.	University of Massachusetts	(459)
32.	University of Miami	(531)
33.	University of Michigan	(561)
34.	University of Missouri (Rolla)	(550)
35.	University of Texas	(537)
36.	University of Wisconsin	(551)
37.	Washington & Lee University	(539)
38.	Washington State University	(536)
39.	Xavier University	(563)

Comments - Medical Licensees and Their Representatives

1.	American Association of Clinical Endocrinologists	(434)
2.	American College of Nuclear Physicians	(511)
3.	American College of Radiology	(517)
4.	Association of Independent Research Institutes	(497)
5.	Colorado Hospital Assn.	(503)
6.	Dean W. Broga, Ph.D.	(486)
7.	Elias C. Dow, M.D.	(449)
8.	HCA Johnston-Willis Hospital	(471)
9.	Hospital Association of Pennsylvania	(485)
10.	Hospital Pavia	(62)
11.	Hot Springs County Memorial Hospital	(478)
12.	John R. Sinkey, M.D.	(453)
13.	Lahey Clinical Medical Center	(421)
14.	Medical College of Wisconsin	(2)
15.	Metabolism Associates	(67)
16.	New England Medical Center	(514)
17.	Northern Virginia Endocrinologists	(4)
18.	Richard B. Guttler, M.D.	(439)
19.	Stan A. Huber Consultants, Inc.	(5)
20.	St. John's Mercy Medical Center	(441)

Licensees - Industrial

1. AGG Rok Materials (98)
2. Air Transport Assn. (515)
3. Apgee Corporation (484)
4. Applied Geoscience & Engineering (433)
5. Applied Radiant Energy Corporation (540)
6. Atchison Casting (452)
7. Berthold Systems, Inc. (501)
8. Bowen & Lawson (60) (422)
9. Braun Intertec (491)
10. City of Toledo, Ohio (442)
11. Consol Inc. (143)
12. Duratek (455)
13. Earthtec Inc. (562)
14. Ebasco (477)
15. Froehling & Robertson (429)
16. Frontier Logging Corporation (75)
17. Glovier & Associates, Inc. (6)
18. Glover Construction Co., Inc. (146)
19. Grinnell Corporation (450)
20. Homestake Engineering (454)
21. Intermountain Testing Co. (502)
22. International Hydronics (59)
23. IRRITEC (500)
24. Isomedix (435)
25. J. H. Shears' Sons, Inc. (123)
26. John R. Mercier, H. P. (458)
27. McDonald-Maas Associates (144)
28. Merillat (7)
29. Metropolitan Waste Control Commission (482)
30. National Asphalt Pavement Assoc. (150)
31. Novagen (424)
32. Okanogan County Dept. of Public Works (476)
33. Pashelinsky Smelting & Refining Corp. (61)

34. Passaic Valley Water Commission (451)
35. Radiation Monitoring Devices, Inc. (427)
36. Springfield Water Department (436)
37. Stocker & Yale, Inc. (487)
38. Teledyne Engineering Services (565)
39. TERRA Engineering & Construction Corp. (3)
40. Troxler Electronic Laboratories, Inc. (8) (467)
41. Vecellio & Grogan, Inc. (145)
42. Wilson Engineering (423)
43. Yankee Engineering & Testing, Inc. (425)

COMMENTS REFERENCING TROXLER ELECTRONIC LABORATORIES, INC. FORM LETTER (COMMENT NUMBER 8) DATED 5/19/93

44. Ackenheil & Associates (139)
45. Ackenheil Engineers, Inc. (363)
46. Adams Construction Co. (16) (53)
47. Ajax Paving Industries (448)
48. Allied Construction Technologies, Inc. (315)
49. Allied Corporation, Inc. (63)
50. Allied Testing Labs, Inc. (394)
51. Ambric Engineering, Inc. (158) (358)
52. Ambric Testing & Engineering Associates of VA (152)
53. Ambric Testing & Engineering Associates of PA (157)
54. Ambric Testing Assoc. of New Jersey, Inc. (216)
55. American Engineering & Testing, Inc. (446)
56. Anco Testing Laboratories, Inc. (101) (250)
57. Anderson Engineering, Inc. (302)
58. APAC-Virginia, Inc. (251)
59. ARTCO Contracting, Inc. (382)
60. Ashco, Inc. (192)
61. Asphalt Materials Inc. (190)
62. Asphalt Road & Materials Co., Inc. (22)

63. Asphalt Paving, Inc. (364)
64. Atec Associates, Inc. (187) (296)
65. Banner Associates, Inc. (44)
66. Bardon Trimount, Inc. (389)
67. Barrett Paving Materials, Inc. (54)
68. Barrientos & Associates, Inc. (140)
69. BBC & M Engineering, Inc. (219)
70. Beaver Excavating Co. (15)
71. Becher-Hoppe Engineers (409)
72. Beery & Assoc., Inc. (329)
73. Bellezza Company, Inc. (212)
74. Bernardin, Lochmueller & Assoc. Inc. (213)
75. Berrien County Road Commission (202)
76. Betteroads Asphalt Corporation (262)
77. Blacktop Products Co. (56)
78. Blair Bros., Inc. (330)
79. Blazosky Associates, Inc. (29)
80. Blue Rock Industries (206)
81. Borings Soils & Testing, Co. (255) (256)
82. Boss Engineering (347)
83. Bowen Construction Co. (19)
84. Bowen Engineers & Survey (199)
85. Bowers & Assoc. (227)
86. Bowser Morner, Inc. (271)
87. Braken Construction Co. (97)
88. Bridge Construction Corp. (121)
89. Brooks Construction Co., Inc. (203)
90. Bruschi Brothers, Inc. (311)
91. Bucher, Willis & Ratliff (130)
92. Buckley - Lages, Inc. (26) (81)
93. Burgess & Niple (72) (295)
94. Byrne Sand & Gravel Co., Inc. (384)
95. Campbell Paris Engineers (307)
96. Capital Consultants, Inc. (156)
97. Canonie Environmental (31) (83)

98. Carl Kelly Paving (279)
99. C. C. Mangum, Inc. (248)
100. Central Paving Co. (301)
101. Charleston Construction Co. (11)
102. Chester Bros. Consturction Co. (412) (437)
103. CHMP, Inc. (134)
104. City of Bryan, Ohio (416)
105. City of Detroit, Michigan (287)
106. City of Flint, Michigan (162)
107. City of Goshen, Indiana (249)
108. City of Kettering, Ohio (392)
109. City of Newport News, VA (185)
110. City of Sault Ste. Marie, Michigan (291)
111. City of West Bend, Indiana (169)
112. Civil Engineering Services (207)
113. Civil & Environmental Consultants, Inc. (177)
114. CMC Engineering (222)
115. Cole Associates (186)
116. Commercial Asphalt Co. (9)
117. Commonwealth of Virginia (377)
118. Compton Construction Co. Inc. (88)
119. Con-Spec, Inc. (274)
120. Construction Design Consultants (338)
121. Construction Engineering Consultants, Inc. (359)
122. Construction Services Assoc. (181)
123. Construction Testing Services, Inc. (242)
124. County of Fairfax, VA (232)
125. County of Henrico, Virginia (166)
126. County of St. Clair (215)
127. C. T. Consultants, Inc. (278)
128. CTI & Assoc., Inc. (155)
129. CTL of Virginia, Inc. (104)
130. Cumberland Geotechnical (99)
131. Cuyahoga County Engineers Testing Lab (118)
132. D'Appolonia (161)

133. David Blackmore & Assoc., Inc. (383)
134. Dell Contractors (167)
135. Donaldson Mine Company (375)
136. Donegal Construction Corp. (297)
137. EACCO Construction Co. (173)
138. Earth Engineering, Inc. (373)
139. Ebasco (418)
140. Earth, Inc. (195)
141. Earth Exploration, Inc. (336)
142. Ebony Construction Co., Inc. (349)
143. EDP Consultants, Inc. (95)
144. E. L. Conwell & Co. (30) (90)
145. Elkhart County Highway Department (180)
146. Empire Construction & Materials, Inc. (267)
147. EMSI Engineering, Inc. (170)
148. Engineering & Testing Consultants, Inc. (419)
149. Engineering Mechanics, Inc. (312) (388)
150. Engineering & Testing Services, Inc. (351) (380)
151. English Construction Co., Inc. (93)
152. Erdman, Anthony Assoc., Inc. (293)
153. Esmer & Assoc., Inc. (354)
154. E. T. & L. Construction Corp. (324)
155. E. V. Williams Co., Inc. (132) (260)
156. Farlow Environmental Engineers, Inc. (86) (362)
157. Fenwick Enterprises, Inc. (253)
158. Flexible Pavements, Inc. (114)
159. Flexible Pavements Council of W.Va. (360)
160. Foster Grading Co. (244)
161. Foxfire Consultants, Inc. (28)
162. Frank Bros., Inc. (117)
163. Gannett Fleming, Inc. (172)
164. Gaunt & Son Asphalt, Inc. (320)
165. GEI Consultants (411)
166. General Engineering Company, Inc. (366)
167. Gennaro Pavers, Inc. (74)

168. George Harms Construction Co., Inc. (269) (381)
169. George & Lynch, Inc. (264)
170. Geo-Science Engineering Co., Inc. (125)
171. Geotechnical Group, Inc. (66)
172. Geotecnics, Inc. (323)
173. Geotech Inc. (148)
174. Geo-Test, Ltd. (178)
175. Gerken Materials, Inc. (17)
176. Gilmore & Assoc. Inc. (355)
177. Glasgow, Inc. (76)
178. G. M. T. Inc. (408)
179. Gohmann Asphalt & Construction Co. (37)
180. Golder Assoc., Inc. (397)
181. Gosling Czubak Assoc. (209)
182. Goyle Engineering, Inc. (78)
183. Grannas Bros. Contracting Co., Inc. (289)
184. Grindle & Bender (68)
185. Gust K. Newberg Construction Co. (321)
186. Haines and Kibblehouse, Inc. (228)
187. Haley & Aldrich, Inc. (374)
188. Haller Testing Labs (137)
189. Hamilton & Assoc. (396)
190. Hancock Asphalt & Paving, Inc. (71)
191. Hanson Testing & Engineering, Inc. (378)
192. Harms Inc. (116)
193. Hatcher-Sayre, Inc. (395)
194. Hayes, Seay, Mattern & Mattern (304) (305)
195. Heffner Construction Co. (106)
196. Hempt Bros., Inc. (280)
197. Hennessey Engineers, Inc. (401)
198. Herbert and Assoc., Ltd. (350)
199. Herzog Contracting Corp. (335)
200. Highway Materials, Inc. (58)
201. Hills Materials Company (13)
202. H&D Inc. (40)

203. H. J. Schneider Construction, Inc. (339)
204. Hobet Mining Inc. (225)
205. Hornor Brothers Engineers (18) (82)
206. HRI Inc. (184) (346)
207. Hunt Engineers, Inc. (348)
208. Huntington Asphalt Corporation (352)
209. Hurt & Proffitt, Inc. (233)
210. Indianapolis Airport Authority (406)
211. Independent Materials Testing Labs, Inc. (85)
212. Inspectorate (220)
213. Interstate Construction Corp. (333)
214. Isabella County Road Commission (160)
215. James D. Cummins Co., Inc. (198)
216. Jeff Zell Consultants (163)
217. Jersey Technology Labs, Inc. (322)
218. J. H. Rudolph & Co., Inc. (128) (129)
219. J&L Engineering, Inc. (27)
220. John E. Munsey (445)
221. John T. Boyd Company (188)
222. Johnson Soils Engineering Co. (122)
223. Julian & Wilmarth, Inc. (34)
224. Kent County Michigan Bd. of Public Works (240)
225. Kent County Road Commission (224)
226. Keystone Landfill, Inc. (420)
227. Keystone Lime Co., Inc. (398) (399)
228. Key Tech (261)
229. KFC Airport, Inc. (102)
230. Killam Associates (231) (410)
231. Klug Bros., Inc. (371)
232. K & M Construction Co. (393)
233. Knight Consulting Engineers, Inc. (309)
234. Koester Contracting Corp. (96)
235. Kokosing Materials, Inc. (230)
236. K & S Testing & Engineering, Inc. (285)
237. Kupper & Co. (133)

238. Lawhorne Brothers (32)
239. L-C Associates, Inc. (110)
240. Lee Highway Paving Corp. (282)
241. Lee-Simpson Assoc., Inc. (235)
242. Limestone Products Corp. (313)
243. Livingston County Road Comm. (254)
244. L. Robert Kimball & Assoc., Inc. (196)
245. MAC Construction Co. (298) (299)
246. Macallum Testing Labs, Inc. (283)
247. Mackin Engineering Co. (36)
248. Macomb County Road Commission (332)
249. Management Engineering Corporation (179)
250. Marvin-Moberly Construction Co. (100)
251. Marvin V. Templeton & Sons, Inc. (35)
252. Mashuda Corp. (193) (276) (277)
253. Mason-de Verteuil Geotechncial Services (41) (252)
254. Massachusetts Bay Transportation Authority (52)
255. Mayer Bros. Construction Co. (415)
256. M-B Contracting Co., Inc. (14)
257. McCallum Testing Laboratories, Inc. (45)
258. McTish, Kunkel & Assoc. (300)
259. Mead & Hunt, Inc. (175)
260. Mega Contractors, Inc. (57)
261. Melick-Tully & Associates, Inc. (153)
262. Meshberger Brothers Stone Corp. (194)
263. Midland County Road Commission (316)
264. Midwest Environmental Consultants, Inc. (405)
265. Midwestern Consulting, Inc. (387)
266. Miller Associates (403)
267. Miller Bros. Construction, Inc. (165)
268. Miller-Mason Paving (303)
269. Moore Brothers Company, Inc. (77)
270. Moore & Bruggink (218)
271. Morrison-Maierle (131)

272. Morley and Assoc., Inc. (428)
273. M. S. Consultants, Inc. (310)
274. Mt. Pleasant Central Asphalt Paving Co. (126)
275. Muskegon County Road Comm. (243)
276. New Prince Concrete Construction Co. (226) (308)
277. Nordlund & Assoc., Inc. (204)
278. Northwoods, Inc. (286)
279. Northeastern Road Improvement Co. (247)
280. Norwood Asphalt Products (92)
281. NTH Consultants, Ltd. (265)
282. Nowak & Fraus Corp. (413)
283. Ohio Valley Electric Corp. (356)
284. Ohio Valley Paving Corp. (353)
285. OHM Remediation Services Corp. (379)
286. Old Forge Testing Co. (46)
287. Oldover Corp. (361)
288. OMM Engineering (176)
289. Orders Construction Co. (87)
290. Orders & Haynes Paving Co. (197)
291. Oscoda County Road Commission (211)
292. Ottawa County Road Commission (221)
293. Pavers, Inc. (317)
294. P.C. Goodloe & Son, Inc. (39) (79)
295. Penn-Carrington Engineering Group (154)
396. Pennsylvania Asphalt Pavement Assoc. (111)
297. Pennsylvania Testing Labs (105)
298. Phend & Brown, Inc. (214)
299. Pike Industries, Inc. (168)
300. Port Engineering Assoc., Inc. (245)
301. Potomac Construction Co. (272)
302. Professional Engineering Assoc., Inc. (200)
303. Professional Service Industries of MA (376)
304. Professional Service Industries of PA (400)
305. PSI Energy (127)
306. Quality Environmental Services, Inc. (229)

307. Ranger Fuel Corp. (294)
308. RBS Inc. (38)
309. REA Construction (107)
310. Rieth-Riley Construction Co., Inc. (135) (171) (367)

311. Rissler & McMurry, Co. (112)
312. Robert A. Kinsley, Inc. (266)
313. Rock Road Companies, Inc. (259)
314. Rogers Group, Inc. (65)
315. Regional Services Corp. (147)
316. R. H. Armstrong, Inc. (33)
317. Richard H. Howe (275)
318. Road Commission, Oakland County, Michigan (386)
319. Rogers Group, Inc. (318)
320. Roncari Industries (43)
321. Roofing Consultants of VA, Inc. (263)
322. Roy N. Ford Co., Inc. (73)
323. R. S. Scott Associates, Inc. (47)
324. Rust Environmental & Infrastructure (223)
325. S. A. Charnas, Inc. (113)
326. Saginaw Asphalt Paving Co. (103)
327. SAI Consulting Engineers, Inc. (246)
328. Samtest, Inc. (326)
329. Sanilac County Road Commission (345)
330. Sarver Paving Co. (20)
331. Schloss Paving Co. (417)
332. Schnabel Engineering Assoc. (119)
333. SCI Consultants, Inc. (370)
334. Scott Civil Engineering Co. (443)
335. Scott Construction Co. (189)
336. Scott Consulting Engineers (80)
337. S. E. Johnson/Stoneco, Inc. (237)
338. Seneca Petroleum Co., Inc. (124)
339. Shelly Company (234)

340. Shilts, Graves & Associates, Inc. (51) (70)
341. Site Engineers, Inc. (201) (217) (325)
342. Slusser Bros. Trucking & Excavating Co. Inc. (120)
343. Soil Consultants, Inc. (281)
344. Soil Testing, Inc. (94)
345. Soils & Engineering Services, Inc. (136)
346. Soils & Materials Engineers, Inc. (258)
347. Sumat Engineering (238)
348. South Atlantic Coal Co. (241)
349. South State, Inc. (268)
350. Southern West Virginia Paving, Inc. (319)
351. S. R. Draper Paving Co., Inc. (257)
352. Stack Engineering (407)
353. Stafford Consultants (10)
354. Standard Testing and Engineering Co. (42)
355. Stavola Company (391)
356. STS Consultants Ltd. (369)
357. Stuart M. Perry, Inc. (290)
358. STV Sanders & Thomas (284)
359. Summit Testing & Inspection Co. (343)
360. Summers Construction Co., Inc. (327) (342)
361. Superior Asphalt Company (341)
362. S. W. Cole Engineering, Inc. (344)
363. Swecker Engineering & Surveying (12)
364. Sweetland Engineering (273)
365. T. A. Houston & Assoc. (174)
366. Technical Testing, Inc. (142)
367. Terry Eagle Coal Co. (438)
368. Testing Engineers & Consultants, Inc. (159)
369. Testwell Craig Labs of CT., Inc. (208) (239)
370. Tibbetts Engineering Corp. (365)
371. Tikon Maine, Inc. (191)
372. T. J. Campbell Construction Co. (64)
373. Trap Rock Industries, Inc. (23)

374. Triad Engineering (50) (84) (337)
375. T. R. Valentine & Assoc., Inc. (108)
376. Valley Asphalt Company (314) (390)
377. Valley Asphalt Corporation (55)
378. Valley Forge Laboratories, Inc. (447)
379. Valley Sanitation Co., Inc. (164)
380. Vanderburgh County Engineering (334)
381. Vantage Paving, Inc. (49) (109)
382. Vermont Testing (236)
383. VHB Associates (404)
384. Viking Coal Company, Inc. (25)
385. Watts Contractors, Inc. (69)
386. Wehran Engineering (288)
387. Weldon Asphalt Co. (182)
388. West Penn Asphalt Paving Co., Inc. (292)
389. West Virginia Division of Highways (183)
390. West Virginia Testing, Inc. (205)
391. Whitman & Howard (328)
392. Whitworth-Muench Co. (414)
393. Widmer Engineering, Inc. (357)
394. Wightman Environmental, Inc. (368)
395. Wilbur Smith Associates (372)
396. William F. Loftus Assoc. (331)
397. William Beaudoin & Sons, Inc. (48)
398. William A. Green Assoc. (340) (525)
399. Wine Construction Inc. (402)
400. Whitta Construction Co. (21)
401. Windsor Service, Inc. (24)
402. Wolverine Engineers (431)
403. Woodward-Clyde Consultants (270) (385)
404. Wyandet Dolomite Assoc. (89) (91)
405. Wyoming Sand & Stone Co. (201)
406. Zannino Engineering (115) (306)

Federal Agencies

1. Department of Army (506)
2. Department of Energy (498) (499)
3. Department of Veterans Affairs (456)
4. U.S. Department of Agriculture (432)

State Agencies and Their Representatives

1.	Minnesota Department of Health	(440)
2.	Organization of Agreement States	(468)
3.	State of Colorado	(513)
4.	State of Florida	(469)
5.	State of Hawaii	(426)
6.	State of Illinois	(462)
7.	State of Washington	(470)
8.	Texas Radiation Advisory Board	(479)

FY 1993 Fees Related To
Fairness and Equity Concerns
($ In Millions)

	Total	Current Allocation	
		Power Reactors	Other Licensees
Activities Not Related to an Existing NRC Licensee			
International	$8.4	$8.4	--
Low-Level Waste	9.2	6.7	2.5
Agreement State Oversight	3.8	3.1	0.7
Subtotal	$21.4	$18.2	$3.2
Activities Not Assessed To Direct Beneficiary Due to Legislative or Policy Constraints			
Part 170 Exemption for DOE and Other Federal Agencies	5.7	5.2	.5
Non-Profit Educational Exemption	7.1	7.1	--
Small Entity Subsidy	5.4	4.6	0.8
Subtotal	$18.2	$16.9	$1.3
Share of NRC Regulatory Activities that also Support Agreement State Licensees	15.0[1/]	--	15.0
Total	$54.6	$35.1	$19.5

[1/]Represents 70 percent of the cost for generic regulatory activities (e.g., rulemaking, research, program development, and operating experience evaluations) that support both NRC and Agreement State material licensees.

LISTING OF NRC RULES, CY 1984-1998

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1984	NRC Export Licensing Authority; Interpretation (Part 110)	January 28, 1984; 49 FR 2881	January 24, 1984	A
	General Statement of Policy and Procedure for Enforcement Actions (Part 2)	March 8, 1984; 49 FR 8583	March 8, 1984	A
	Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions and Related Conforming Amendments (Parts 2, 30, 40, 50, 51, 61, 70, 72, 110)	March 12, 1984; 49 FR 9352	July 7, 1984	A
	Codes and Standards for Nuclear Power Plants (Part 50)	March 15, 1984; 49 FR 9711	May 14, 1984	S
	Financial Protection Requirements and Other Agreements; Facility Form Policy (Part 140)	March 26, 1984; 49 FR 11146	April 23, 1984	A
	Office of Investigations (Part 1)	April 20, 1984; 49 FR 16760	April 20, 1984	A
	Information Collection Requirements; Display of OMB Control Numbers (Chapter I)	May 9, 1984; 49 FR 19623	May 9, 1984	A
	Regional Licensing Program: Further Implementation (Parts 30, 40, 70)	May 9, 1984; 49 FR 19630	April 2, 1984	A
	Revision of License Fee Schedule (Part 170)	May 21, 1984; 49 FR 21293	June 20, 1984	M
	Abolition of the Position of Appeal Panel Vice Chairman (Part 2)	June 12, 1984; 49 FR 24110	June 12, 1984	A

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1984 cont.	Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions and Related Conforming Amendments (Parts 2, 30, 40, 50, 51, 61, 70, 72, 110)	June 14, 1984; 49 FR 24512	June 7, 1984	A
	Change in Mailing Address for Submittal of personnel Monitoring Reports (Part 20)	June 14, 1984; 49 FR 24513	June 14, 1984	A
	Tritium and Source Material Reports (Parts 30, 40, 150)	June 15, 1984; 49 FR 24705	July 16, 1984	BR
	Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants (Part 50)	June 26, 1984; 49 FR 26036	July 26, 1984	S
	Emergency Planning and Preparedness (Part 50)	July 6, 1984; 49 FR 27733	August 6, 1984	BR
	Consolidation of Materials License Applications on Form NRC 313 (Parts 30, 33, 34, 35, 40)	July 9, 1984; 49 FR 27923	July 9, 1984	A
	Charges for the Production of Records (Part 9)	July 31, 1984; 49 FR 30457	July 31, 1984	A
	Revised Access Authorization Fees for Licensee Personnel (Pat 25)	August 13, 1984; 49 FR 32171	August 13, 1984	A
	Requirements for Licensee Actions Regarding the Disposition of Spent Fuel Upon Expiration of Reactor Operating Licenses (Parts 50 and 51)	August 31, 1984; 49 FR 34688	November 29, 1984	S

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1984 cont.	Glass Enamel and Glass Enamel Frit Containing Small Amounts of Uranium (Part 40)	September 11, 1984; 49 FR 35611	September 11, 1984	S
	Financial Qualifications of Electric Utilities in Operating License Reviews and hearings for Nuclear power Plants; Elimination of Review (Parts 2 and 50)	September 12, 1984; 49 FR 35747	October 12, 1984	S
	Training and Qualifications of Civilian Nuclear Power Plant Personnel and Operator's Licenses (Part 55)	October 24, 1984; 49 FR 42693	November 23, 1984	S
	Environmental Qualification of Electrical Equipment; Removal of June 30, 1982 Deadline (Part 50)	November 19, 1984; 49 FR 45571	November 19, 1984	A
	Export and Import of Nuclear Equipment and Material (Part 110)	December 3, 1984; 49 FR 47191	December 3, 1984	BR
1985	Hydrogen Control Requirements (Part 50)	January 25, 1985; 50 FR 3498	February 25, 1985	S
	Criteria and Procedures for Determining the Adequacy of Available Spent Nuclear Fuel Storage Capacity (Parts 1 and 53)	February 11, 1985; 50 FR 5548	March 13, 1985	S
	Amended Material Control and Accounting Requirements for Special Nuclear Material of Low Strategic Significance (Parts 70 and 74)	February 25, 1985; 50 FR 7575	March 27, 1985	BR

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1985 cont.	Implementation of the Convention on Physical Protection of Nuclear Material (Parts 40, 70, 73, 110)	March 28, 1985; 50 FR 12221	30 days after 21st country ratifies the Convention on the Physical Protection of Nuclear Material	M
	Exceptions to Notice and Comment Rulemaking Procedures (Part 2)	April 2, 1985; 50 FR 13006	May 3, 1985	A
	Regional Nuclear Materials Licensing for Certain federal Facilities (Parts 30, 40, 70)	April 15, 1985; 50 FR 14692	April 1, 1985	A
	Emergency Planning and Preparedness (Part 50)	May 8, 1985; 50 FR 19323	May 8, 1985	M
	Delegation of Subpoena Authority (Part 1)	May 20, 1985; 50 FR 20741	June 19, 1985	A
	Export of Reprocessing Plant Components (Part 110)	May 20, 1985; 50 FR 20742	May 21, 1985	A
	Government in the Sunshine Act Regulations (Part 9)	May 21, 1985; 50 FR 20889	May 21, 1985	A
	Update of NRC Addresses and Copying Charges for Environmental Documents (Parts 1 and 51)	May 22, 1985; 50 FR 21036	May 22, 1985	A
	Charges for the Production of Records (Part 9)	June 18, 1985; 50 FR 25204	June 18, 1985	A
	Conduct of Employees; Minor Amendments (Part 0)	June 21, 1985; 50 FR 25697	June 21, 1985	A

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1985 cont.	Public Records; Freedom of Information Act; Granting Appeals (Part 9)	July 2, 1985; 50 FR 27214	July 1, 1985	A
	Disposal of High-Level Radioactive Wastes in Geologic Repositories (Part 60)	July 22, 1985; 50 FR 29641	July 22, 1985	S
	Analysis of Potential Pressurized Thermal Shock Events (Part 50)	July 23, 1985; 50 FR 29937	July 23, 1985	S
	Minor Clarifying Amendments; Definitions (Parts 1, 20, 50)	August 23, 1985; 50 FR 34085	August 23, 1985	A
	Physician's Use of Radioactive Drugs (Part 35)	September 10, 1985; 50 FR 36866	September 10, 1985	BR
	Access to and Protection of National Security Information and Restricted Data (Parts 25 and 95)	September 11, 1985; 50 FR 36983	October 11, 1985	A
	Procedures for Protection or Disclosure of Records or Information in Response to Subpoenas or Demands of Courts or Other Authorities (Part 9)	September 17, 1985; 50 FR 37642	October 17, 1985	A
	Revision of Backfitting Process for Power Rectors (Parts 2 and 50)	September 20, 1985; 50 FR 38097	October 21, 1985	A
	Codes and Standards for Nuclear Power Plants (Part 50)	September 26, 1985; 50 FR 38970	October 28, 1985	S
	Criteria and Procedures for Determining Eligibility for Access to or Control over SNM (Part 11)	September 27, 1985; 50 FR 39076	October 28, 1985	BR

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1985 cont.	Minor Clarifying Amendments (Part 9)	October 9, 1985; 50 FR 41127	October 9, 1985	A
	Regional Licensing Program; Fort St. Vrain Nuclear Generating Station (Part 50)	October 9, 1985; 50 FR 41128	October 4, 1985	A
	Hybrid Hearing Procedures for Expansion of Spent Nuclear Fuel Storage Capacity at Civilian Nuclear power Reactors (Parts 2 and 72)	October 15, 1985; 50 FR 41662	November 14, 1985	M
	Uranium Mill Tailing Regulations: Conforming NRC Requirements to EPA Standards (Parts 40 and 150)	October 16, 1985; 50 FR 41852	November 15, 1985	M
	Statement of Organization and General Information (Part 1)	October 18, 1985; 50 FR 42145	October 18, 1985	A
	General Statement of Policy and Procedure for Enforcement Actions (Part 2)	November 20, 1985; 50 FR 47716	February 18, 1986	A
	Miscellaneous Amendments (Part 9)	December 10, 1985; 50 FR 50283	December 10, 1985	A
	Specific Exemptions; Clarification of Standard (Part 50)	December 12, 1985; 50 FR 50764	January 13, 1986	A
1986	Limiting the use of Highly Enriched Uranium in Domestically Licensed Research and Test Reactors (Part 50)	February 25, 1986; 51 FR 6514	March 27, 1986	S

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1986 cont.	Final Procedures and Standards on No Significant Hazards Considerations (Parts 2 and 50)	March 6, 1986; 51 FR 7744	May 5, 1986	M
	Material Balance Reports of Source Material and Special Nuclear Material (Parts 40, 51, 74, 150)	March 26, 1986; 51 FR 9763	April 21, 1986	BR
	Modification of General Design Criterion 4 Requirements for Protection Against Dynamic Effects of Postulated Pipe Ruptures (Part 50)	April 11, 1986; 51 FR 12502	May 12, 1986	S
	Licensing Requirements for the Export of Nuclear Equipment and Material (Part 110)	April 14, 1986; 51 FR 12598	April 14, 1986	A
	Criteria for Reopening Records in a Formal Licensing Proceeding (Part 2)	May 30, 1986; 51 FR 19535	June 30, 1986	A
	Industrial Radiography Radiation Surveys and Licensee's Performance Inspection Programs (Part 34)	June 16, 1986; 51 FR 21736	July 16, 1986	S
	Enforcement of Nondiscrimination on the Basis of Handicap in Federally Conducted Programs (Part 4)	June 23, 1986; 51 FR 22880	August 22, 1986	M
	Disposal of High-Level Radioactive Wastes in Geologic Repositories: Amendments to Licensing Procedures (Parts 2 and 60)	July 30, 1986; 51 FR 27158	August 29, 1986	A

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1986 cont.	Miscellaneous Amendments Concerning Physical Protection of Nuclear Power Plants (Parts 50 and 73)	August 4, 1986; 51 FR 27817	September 3, 1986	S
	Searches of Individuals at Power Reactor Facilities (Part 73)	August 4, 1986; 51 FR 27822	September 3, 1986	S
	Licensing Requirements for the Export of Tritium (Part 110)	August 4, 1986; 51 FR 27825	August 4, 1986	S
	Annual Fee for Power Rector Operating Licenses and Conforming Amendment (Parts 51 and 171)	September 18, 1986; 51 FR 33224	October 20, 1986	M
	Amendments to Access Authorization Fee Schedule; Publication for Licensee Personnel (Parts 11 and 25)	October 2, 1986; 51 FR 35206	October 2, 1986	A
	Nomenclature Changes to Implement Consolidation of OGC and OELD (Parts 0, 1, 9, 10, 14, 51, 110)	October 8, 1986; 51 FR 35997	October 8, 1986	A
	Regional Nuclear Materials Licensing for the United States Air Force (Parts 30, 40, 70)	October 8, 1986; 51 FR 35999	October 1, 1986	A
	Medical Use of Byproduct Material (Parts 30, 31, 32, 35, 40)	October 16, 1986; 51 FR 36932	April 1, 1987	S

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1986 cont.	Domestic Licensing of Production and Utilization Facilities; Communications Procedures Amendments (Parts 50 and 51)	November 6, 1986; 51 FR 40303	January 5, 1987	A
	Access Authorization for Licensee Personnel (Parts 25 and 95)	December 31, 1986; 51 FR 47204	December 31, 1986	A
	Imports of Uranium from South Africa (Part 11)	December 31, 1986; 51 FR 47207	December 31, 1986	M
1987	Revision of Specific Exemptions (Part 9)	January 9, 1987; 52 FR 759	January 9, 1987	A
	Bankruptcy Filing; Notification Requirements (Parts 30, 40, 50, 61, 70, 72)	January 12, 1987; 52 FR 1292	February 11, 1987	A
	Functions of Atomic Safety and Licensing Appeal Board (Part 2)	January 30, 1987; 52 FR 2993	January 30, 1987	A
	Improved Personnel Dosimetry Processing (Part 20)	February 13, 1987; 52 FR 4601	February 12, 1988	S
	Requirements for Criminal History Checks (Part 73)	March 2, 1987; 52 FR 6310	April 1, 1987	A
	Licenses and Radiation Safety Requirements for Well Logging (Parts 19, 20, 21, 30, 39, 40, 51, 70, 71, 150)	March 17, 1987; 52 FR 8225	July 14, 1987	S
	Operators' Licenses and Conforming Amendments (Parts 50 and 55)	March 25, 1987; 52 FR 9453	May 26, 1987	S

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1987 cont.	Implementation of the Convention on the Physical Protection of Nuclear Material (Parts 40, 70, 73, 110)	March 26, 1987; 52 FR 9649	March 25, 1987	M
	Material Control and Accounting Requirement for Facilities Licensed to Possess and Use Formula Quantities of Strategic Special Nuclear Material (Parts 70 and 74)	March 30, 1987; 52 FR 10033	April 29, 1987	S
	Restriction Against Ownership of Certain Security Interests by Commissioners, Certain Staff Members, and Other Related Personnel; Vested Pension Interests (Part 0)	April 7, 1987; 52 FR 11026	April 7, 1987	M
	Production and Utilization Facilities; Timing Requirements for Full Participation Emergency Preparedness Exercises for Power Rectors Prior to Receipt of an Operating License (Part 50)	May 6, 1987; 52 FR 16823	May 6, 1987	A
	Reporting of Special Nuclear Material Physical Inventory Summary Results (Parts 70 and 74)	May 22, 1987; 52 FR 19303	June 22, 1987	A
	Changes to Safeguards Reporting Requirements (Parts 70, 72, 73, 74)	June 9, 1987; 52 FR 21651	October 8, 1987	A
	Nondiscrimination on Basis of Age in Federally Assisted Commission Programs (Part 4)	July 7, 1987; 52 FR 25355	July 7, 1987	M

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1987 cont.	Manufacturers' Registration of Radiation Safety Information for Certain Devices and Sealed Sources (Parts 30 and 32)	July 24, 1987; 52 FR 27782	August 24, 1987	S
	Changes in Property Insurance Requirements for NRC-Licensed Nuclear Power Plants (Part 50)	August 5, 1987; 52 FR 28963	October 5, 1987	A
	Charges for the Production of Records (Part 9)	August 10, 1987; 52 FR 29504	July 9, 1987	A
	Standards and Procedures for Case-by-Case Exemptions for *de minimus* Interests from Prohibition Against Employee's Participation in Particular Matter Affecting Employee's Financial Interests (Part 0)	August 18, 1987; 52 FR 30902	August 18, 1987	A
	Statement of Organization and General Information (Parts 0, 1,2, 7,9, 10, 11, 15, 19, 20, 21, 25, 30, 35, 40, 50, 51, 60, 61, 70, 71, 72, 73, 74, 75, 95, 150, 170)	August 21, 1987; 52 FR 31601	August 19, 1987	A
	Telephone Reporting of Significant Events Involving Byproduct, Source, or Special Nuclear Material (Part 20)	September 9, 1987; 52 FR 33916	September 9, 1987	A
	Policy and Procedure for Enforcement Actions; Policy Statement (Part 2)	September 28, 1987; 52 FR 36215	September 28, 1987	A
	Regional Nuclear Materials Licensing for the United States Navy (Parts 30, 40, 70)	October 16, 1987; 52 FR 38391	December 1, 1987	A

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1987 cont.	Modification of General Design Criterion 4 Requirements for Protection Against Dynamic Effects of Postulated Pipe Ruptures (Part 50)	October 27, 1987; 52 FR 41288	November 27, 1987	S
	Minor Nomenclature Amendment; Statement of Organization and General Information (Part 150)	October 30, 1987; 52 FR 41699	October 30, 1987	A
	Evaluation of the Adequacy of Off-Site Emergency Planning for Nuclear Power Plants at the Operating License Review Stage Where State and/or Local Governments Decline to Participate in Off-Site Emergency Planning (Part 50)	November 3, 1987; 52 FR 42078	December 3, 1987	A
	Uranium Mill Tailings Regulations; Ground-Water Protection and Other Issues (Part 40)	November 13, 1987; 52 FR 43553	December 14, 1987	M
	Access Authorization Fee Schedule for Licensee Personnel (Parts 11 and 25)	November 20, 1987; 52 FR 44593	November 20, 1987	A
	Domestic Licensing of Byproduct, Source, and Special Nuclear Material; Revision of List of Non-Agreement States in Region III (Parts 30, 40, 70)	December 18, 1987; 52 FR 48092	December 18, 1987	A
	Revision of Freedom of Information Act Regulations; Conforming Amendments (Parts 2 and 9)	December 31, 1987; 52 FR 49350	February 1, 1988	A

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Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1987 cont.	Completeness and Accuracy of Information (Parts 2, 30, 40, 50, 55, 60, 61, 70, 71, 72, 110, 150)	December 31, 1987; 52 FR 49362	February 1, 1988	A
1988	General Criteria for Security Personnel (Part 73)	January 7, 1988; 53 FR 403	February 8, 1998	A
	Revision of Headquarters Office Locations (Part 1)	January 22, 1988; 53 FR 1744	January 22, 1988	A
	Change of Region I Address (Parts 1, 20, 30, 40, 55, 70, 73)	February 10, 1988; 53 FR 3861	February 10, 1988	A
	Relocation of NRC Offices - NMSS, OI, and GPA (Parts 30, 40, 60, 61, 70, 71, 72, 73, 74, 110)	February 12, 1988; 53 FR 4109	February 12, 1988	A
	Relocation of Office of Nuclear Reactor Regulation (Parts 4, 15, 19, 20, 21, 50, 53, 55, 73, 75 81, 140, 150, 170)	March 1, 1988; 53 FR 6137	March 1, 1988	A
	Reconsideration of Enforcement Policy Revision Involving Reopening Closed Cases (Part 2)	March 23, 1988; 53 FR 9429	March 23, 1988	A
	Revision to *ex parte* and Separation of Functions Rules Applicable to Formal Adjudicatory Proceedings (Parts 0 and 2)	March 31, 1988; 53 FR 10360	April 29, 1988	M
	Revision of Telephone Numbers for Environmental Inquires (Part 51)	April 25, 1988; 53 FR 13399	April 25, 1988	A

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1988 cont.	Codes and Standards for Nuclear Power Plants (Part 50)	May 5, 1988; 53 FR 16051	May 5, 1988	S
	Addresses for Personal Delivery of Communications (Parts 1, 110, 171)	May 19, 1988; 53 FR 17915	May 19, 1988	A
	Retention Periods for Records (Parts 4, 11, 25, 30, 31, 32, 34, 35, 40, 50, 60, 61, 70, 71, 73, 74, 75, 95, 110)	May 27, 1988; 53 FR 19240	July 26, 1988	A
	Revision of Backfitting Process for Power Reactors (Part 50)	June 6, 1988; 53 FR 20603	July 6, 1988	A
	Diagnostic Misadministration Report Form (Part 35)	June 9, 1988; 53 FR 21627	June 9, 1988	A
	Access Authorization Fee Schedule for Licensee Personnel (Parts 11 and 25)	June 13, 1988; 53 FR 21979	June 13, 1988	A
	Station Blackout (Part 50)	June 21, 1988; 53 FR 23203	July 21, 1988	S
	General Requirements for Decommissioning Nuclear Facilities (Parts 30, 40, 50, 51, 70, 72)	June 27, 1988; 53 FR 24018	July 27, 1988	S
	Control of Aerosols and Gases (Part 35)	July 22, 1988; 53 FR 27665	August 22, 1988	S
	Revision of Fee Schedule (Part 171)	August 12, 1988; 53 FR 30423	September 12, 1988	M
	Implementation of the Use of SF-86, "Questionnaire for Sensitive Positions" (Parts 11 and 25)	August 16, 1988; 53 FR 30829	September 15, 1988	A

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1988 cont.	Facility Form Nuclear Liability Insurance Policy; Miscellaneous Amendments (Part 140)	August 18, 1988; 53 FR 31282	September 19, 1988	A
	Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste (Parts 2, 19, 20, 21, 51, 70, 72, 73, 75, 150)	August 19, 1988; 53 FR 31651	September 19, 1988	S
	Restrictions Against Ownership of Certain Security Interests by members of Advisory Committee on Nuclear Waste; Gifts, Entertainment, and Favors (Part 0)	September 13, 1988; 53 FR 35301	September 13, 1988	A
	Emergency Core Cooling Systems; Revisions to Acceptance Criteria (Part 50)	September 16, 1988; 53 FR 35996	October 17, 1988	S
	Emergency Planning and Preparedness Requirements for Nuclear Power Plant Fuel Loading and Low-Power Testing (Part 50)	September 23, 1988; 53 FR 36955	October 24, 1988	S
	Licensee Announcements of Inspectors (Part 50)	October 25, 1988; 53 FR 42939	October 25 1988	A
	Relocation of NRC's Public Document Room; Other Minor Nomenclature Changes (Parts 1, 2, 7, 9, 15, 19, 20, 21, 30, 35, 40, 50, 51, 53, 55, 60, 61, 70, 71, 72, 73, 74, 75, 81, 100, 110, 140, 150, 170, 171)	October 27, 1988; 53 FR 43419	October 27, 1988	A

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1988 cont.	Safeguards Requirements for Fuel Facilities Possessing Formula Quantities of Strategic Special Nuclear Material (Parts 2, 70, and 73)	November 10, 1988; 53 FR 45447	December 12, 1988	S
	Alternative Method for Leakage Rate Testing (Part 50)	November 15, 1988; 53 FR 45890	November 15, 1988	S
	Revision of Fee Schedules (Parts 170 and 171)	December 29, 1988; 53 FR 52632	January 30, 1989	M
	Reorganization of Functions Within the Office of Administration and Resources Management and Minor Corrective Amendments (Parts 1, 2, 9 and 73)	December 30, 1988; 53 FR 52993	December 30, 1988	A
1989	Criteria and Procedures for Emergency Access to Non-Federal and Regional Low-level Waste Disposal Facilites (Part 62)	February 3, 1989; 54 FR 5409	March 6, 1989	M
	Centralization of Material Control and Accounting Licensing and Inspection Activities for Non-Reactor Facilities (Parts 70 and 74)	February 15, 1989; 54 FR 6876	February 15, 1989	A
	Licensee Action During National Security Emergency (Part 50)	February 17, 1989; 54 FR 7178	March 20, 1989	A
	Issuance or Amendment of Power Reactor License or Permit Following Initial Decision (Part 2)	February 23, 1989; 54 FR 7756	March 27, 1989	A

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1989 cont.	Informal Hearing Procedures for Materials Licensing Adjudications (Part 2)	February 28, 1989; 54 FR 8269	March 30, 1989	A
	Freedom of Information Act; Appeal Authority for Deputy Executive Director (Part 9)	March 10, 1989; 54 FR 10138	March 10, 1989	A
	Extension of Time for the Implementation of the Decontamination Priority and Trusteeship Provisions of Property Insurance Requirements (Part 50)	March 17, 1989; 54 FR 11161	March 17, 1989	A
	Flow Control Conditions for the Standby Liquid Control System in Boiling Water Reactors (Part 50)	April 3, 1989; 54 FR 13361	May 3, 1989	S
	Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees (Parts 30, 40, and 70)	April 7, 1989; 54 FR 14051	April 7, 1990	S
	Submission and Management of Records and Documents Related to the Licensing of a Geologic Repository for the Disposal of High-Level Radioactive Waste (Part 2)	April 14, 1989; 54 FR 14925	May 15, 1989	A
	Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Reactors (Parts 2, 50, 51, 52, and 170)	April 18, 1989; 54 FR 15372	May 18, 1989	S
	Access to Safeguards Information (Part 73)	April 25, 1989; 54 FR 17703	May 25, 1989	M

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1989 cont.	Disposal of Radioactive Wastes (Part 61)	May 25, 1989; 54 FR 22578	June 26, 1989	S
	Financial Protection Requirements and Indemnity Agreements; Miscellaneous Amendments Necessitated by Changes in the Price-Anderson Act (Part 140)	June 6, 1989; 54 FR 24157	July 1, 1989	M
	Fitness-For-Duty Programs (Parts 2 and 26)	June 7, 1989; 54 FR 24468	July 7, 1989	S
	Manner of Service of Pleadings Upon the Secretary of the Commission (Part 2)	June 26, 1989; 54 FR 26730	July 26, 1989	A
	Advisory Committee; Policies and Procedures (Part 7)	June 27, 1989; 54 FR 26947	June 27, 1989	A
	NEPA Review Procedures for Geologic Repositories for High-Level Waste (Parts 2, 51, and 60)	July 3, 1989; 54 FR 27864	August 2, 1989	A
	Rules of Practice for Domestic Licensing Proceedings-Procedural Changes in the Hearing Process (Part 2)	August 11, 1989; 54 FR 33168	September 11, 1989	A
	Duplication Fees (Part 9)	September 5, 1989; 54 FR 36757	September 5, 1989	A
	Access Authorization Fee Schedule for Licensee Personnel and Implementation of the Standard Form 312 (Parts 11, 25, and 95)	October 4, 1989; 54 FR 40859	October 4, 1989	A
	Palladium-103 for Interstitial Treatment of Cancer (Part 35)	October 12, 1989; 54 FR 41819	October 12, 1989	BR

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1989 cont.	Change in Commercial Telephone Number for Region III Office (Parts 20, 21, and 73)	October 16, 1989; 54 FR 42287	November 11, 1989	A
	Clarifying Amendment Relating to Enforcement Activities (Part 51)	October 26, 1989; 54 FR 43576	October 26, 1989	A
	Statement of Organization and General Information; Minor Amendments (Parts 0, 1, 2, 9, 10, 15, 25, 51, and 95	December 28, 1989; 54 FR 53312	December 28, 1989	A
1990	Suspension of Access Authorization and/or Employment Clearance; Delegation of Authority to Deputy Executive Directors (Part 10)	January 2, 1990; 55 FR 4	January 2, 1990	A
	Sequestration of Witnesses Interviewed Under Subpoena/Exclusion of Attorneys (Part 19)	January 4, 1990; 55 FR 243	February 5, 1990	A
	Safety Requirements for Industrial Radiographic Equipment (Parts 2 and 34)	January 10, 1990; 55 FR 843	January 10, 1991	S
	Fingerprint Cards; Increase in Fee (Part 73)	January 30, 1990; 55 FR 3039	March 1, 1990	A
	Centralization of Material Control and Accounting Licensing and Inspection Activities for Nonreactor Facilities (Parts 70 and 74)	February 21, 1990; 55 FR 5978	February 21, 1990	A
	Preserving the Free Flow of Information to the Commission (Parts 30, 40, 50, 60, 70, 72, and 150)	March 21, 1990; 55 FR 10397	April 20, 1990	A

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1990 cont.	Credit Checks - Expanded Personnel Security Investigative Coverage (Parts 11, 25, and 95)	March 29, 1990; 55 FR 11572	April 30, 1990	A
	Stabilization and Decontamination Priority and Trusteeship Provisions (Part 50)	April 2, 1990; 55 FR 12163	April 2, 1990	A
	Revision of Fee Schedules; Radioisotope Licenses and Topical Reports (Part 170)	May 23, 1990; 55 FR 21173	July 2, 1990	M
	Standard Specifications for the Granting of Patent Licenses (Part 81)	June 8, 1990; 55 FR 23422	June 8, 1990	A
	Storage of Spent Fuel in NRC-Approved Storage Casks at Power Reactor Sites (Parts 50, 72, and 170)	July 18, 1990; 55 FR 29181	August 17, 1990	S
	Export of Components for Use in Gaseous Diffusion Enrichment Plants (Part 110)	July 26, 1990; 55 FR 30449	July 26, 1990	M
	Debt Collection Procedures (Part 15)	August 9, 1990; 55 FR 32375	September 10, 1990	M
	Freedom of Information Act, Privacy Act, Production or Disclosure in Response to Subpoena or Demands of Courts or Other Authorities; Office of the Inspector General (Part 9)	August 17, 1990; 55 FR 33645	August 17, 1990	A

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1990 cont.	Authorization to Prepare Radiopharmaceutical Reagent Kits and Elute Radiopharmaceutical Generators; Use of Radiopharmaceuticals for Therapy (Parts 30 and 35)	August 23, 1990; 55 FR 34513	August 23, 1990 to August 23, 1993 (Interim rule)	BR
	Fingerprint Cards; Increase in Fee (Part 73)	August 31, 1990; 55 FR 35563	October 1, 1990	A
	Informal Hearing Procedures for Nuclear Reactor Operator Licensing Adjudications (Part 2)	September 7, 1990; 55 FR 36801	October 9, 1990	A
	Consideration of Environmental Impacts of Temporary Storage of Spent Fuel After Cessation of Reactor Operations (Part 51)	September 18, 1990; 55 FR 38474	October 18, 1990	A
	Submitting Applications for the Licensing of Test and Research Reactor Operators Directly to Headquarters (Part 55)	October 11, 1990; 55 FR 41334	November 13, 1990	A
	Interim Procedures for Agency Appellate Review (Part 2)	October 24, 1990; 55 FR 42944	October 25, 1990	A
	Custody and Long-Term Care of Uranium and Thorium Mill Tailings Disposal Sites (Part 40)	October 30, 1990; 55 FR 45591	November 29, 1990	M
	Statement of Organization and General Information; Minor Amendments (Parts 0 and 1)	November 15, 1990; 55 FR 47740	November 15, 1990	A

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1990 cont.	Enforcement of Nondiscrimination on the Basis of Handicap in Federally Assisted Programs (Part 4)	December 9, 1990; 55 FR 52136	January 18, 1991	M
1991	Operations Center Area Code Telephone Number Change (Parts 20 and 50)	January 10, 1991; 56 FR 944	January 10, 1991	A
	Access Authorization Fee Schedule for Licensee Personnel (Parts 11 and 25)	February 14, 1991; 56 FR 5926	February 14, 1991	A
	Procedures Applicable to Proceedings for the Issuance of Licenses for the Receipt of High-Level Radioactive Waste at a Geologic Repository (Part 2)	February 26, 1991; 56 FR 7787	March 28, 1991	A
	Assistance to Prospective Petitioners (Part 2)	March 12, 1991; 56 FR 10359	March 12, 1991	A
	ASNT Certification of Industrial Radiographers (Part 34)	March 19, 1991; 56 FR 11504	April 18, 1991	S
	Access Authorization Program for Nuclear Power Plants (Part 73)	April 25, 1991; 56 FR 18997	May 28, 1991	S
	Change in Commercial Telephone Number for Region V (Parts 20, 21, and 73)	April 26, 1991; 56 FR 19253	April 26, 1991	A
	Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events (Part 50)	May 15, 1991; 56 FR 22300	June 14, 1991	S
	Standards for Protection Against Radiation (Parts 2, 19, 20, 30, 31, 32, 34, 35, 39, 40, 50, 61, and 70)	May 21, 1991; 56 FR 23369	June 20, 1991	S

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1991 cont.	Return of Topaz II Reactor to Soviet Union (Part 110)	May 31, 1991; 56 FR 24682	May 31, 1991	A
	Procedures for Direct Commission Review of Decisions of Presiding Officers (Parts 0, 1 and 2)	June 27, 1991; 56 FR 29403	July 29, 1991	A
	Monitoring the Effectiveness of Maintenance at Nuclear Power Plants (Part 50)	July 10, 1991; 56 FR 31306	July 10, 1996	S
	Revision of Fee Schedules; 100% Fee Recovery (Parts 52, 71, 170 and 171)	July 10, 1991; 56 FR 31472	August 9, 1991	M
	Operators' Licenses (Parts 2, and 55)	July 15, 1991; 56 FR 32066	August 14, 1991	S
	Duplication Fees (Part 9)	July 15, 1991; 56 FR 32070	July 15, 1991	A
	Standards for Protection Against Radiation; Monitoring Reports (Part 20)	July 15, 1991; 56 FR 32071	July 15, 1991	A
	Quality Management Program and Misadministration (Parts 2 and 35)	July 25, 1991; 56 FR 34104	July 25, 1991	S
	Criteria and Procedures for the Reporting of Defects and Conditions of Construction Permits (Parts 21 and 50)	July 31, 1991; 56 FR 36081	October 29, 1991	S
	Imports from South Africa (Part 110)	August 13, 1991; 56 FR 38335	August 13, 1991	M
	Emergency Response Data System (Part 50)	August 13, 1991; 56 FR 40178	September 12, 1991	A

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1991 cont.	Revisions to Procedures to Issue Orders; Deliberate Misconduct by Unlicensed Persons (Parts 2, 30, 40, 50, 60, 61, 70, 72, 110 and 150)	August 15, 1991; 56 FR 40664	September 16, 1991	A
	Notifications of Incidents (Parts 20, 30, 31, 34, 39, 40, and 70)	August 16, 1991; 56 FR 40757	October 15, 1991	A
	Change in commercial telephone Number for Region V (Parts 20, 21, and 73)	August 21, 1991; 56 FR 41448	September 2, 1991	A
	Fitness-for-Duty Programs (Part 26)	August 26, 1991; 56 FR 41922	September 25, 1991	S
	Program Fraud Civil Remedies (Part 13)	September 18, 1991; 56 FR 47132	October 18, 1991	M
	Salary Offset Procedures for Collecting Debts Owed by Federal Employees to the Federal Government (Parts 15 and 16)	October 16, 1991; 56 FR 51829	November 15, 1991	M
	Material Control and Accounting Requirements for Uranium Enrichment Facilities Producing Special Nuclear Material of Low Strategic Significance (Parts 2, 40, 70, and 74)	October 31, 1991; 56 FR 55991	December 2, 1991	S
	Revision of Fee Schedules; 100% Fee Recovery; Clarification of Size Standards (Part 171)	November 13, 1991; 56 FR 57587	November 13, 1991	M
	Nuclear Power Plant License Renewal (Parts 2, 50, 54 and 140)	December 13, 1991; 56 FR 64943	January 13, 1992	S

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1991 cont.	Exclusion of Attorneys From Interviews Under Subpoena (Part 19)	December 19, 1991; 56 FR 65948	January 21, 1992	A
1992	Reorganization of the Office of Governmental and Public Affairs (Part 1)	January 15, 1992; 57 FR 1638	January 15, 1992	A
	DOE-L or DOE-Q Reinvestigation Program for NRC-R Access Authorization Renewal Requirements (Part 11)	January 22, 1992; 57 FR 2441	February 21, 1992	A
	NRC Licensee Reinvestigation Program (Part 25)	January 31, 1992; 57 FR 3719	March 31, 1992	A
	Revision to Procedures to Issue Orders (Parts 2 and 15)	February 4, 1992; 57 FR 4152	February 4, 1992	A
	Fingerprint Cards; Resubmittal Procedure Change (Part 73)	March 4, 1992; 57 FR 7645	April 3, 1992	A
	Limited Revision of Fee Schedules (Parts 170 and 171)	April 17, 1992; 57 FR 13625	May 18, 1992	A
	Uranium Enrichment Regulations (Parts 2, 40, 50, 51, 70, 75, 110, 140, 150 and 170)	April 30, 1992; 57 FR 18388	June 1, 1992	M
	Revisions to Procedures to Issue Orders; Challenges to Orders that are made Immediately Effective (Part 2)	May 12, 1992; 57 FR 20194	June 11, 1992	A
	Acquisition Regulation (NRCAR); Debarment-(48 CFR Chapter 20)	July 1, 1992; 57 FR 29220	July 31, 1992	A

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1992 cont.	Decommissioning Funding for Prematurely Shut Down Power Reactors (Part 50)	July 9, 1992; 57 FR 30383	August 10, 1992	S
	Revision of Fee Schedules; 100% Fee Recovery, FY 1992 (Parts 170 and 171)	July 23, 1992; 57 FR 32691	August 24, 1992	M
	Minor Amendments to the Physical Protection Requirements (Parts 70, 72, 73 and 75)	July 29, 1992; 57 FR 33426	August 28, 1992	A
	Codes and Standards for Nuclear Power Plants (Part 50)	August 6, 1992; 57 FR 34666	September 8, 1992	S
	Standards for Protection Against Radiation; Extension of Implementation Date (Parts 19 and 20)	August 26, 1992; 57 FR 38588	September 25, 1992	A
	Reducing the Regulatory Burden on Nuclear Licensees (Parts 20 and 50)	August 31, 1992; 57 FR 39353	October 1, 1992	BR
	Access Authorization Fee Schedule for Licensee Personnel (Parts 11 and 25)	September 10, 1992; 57 FR 41375	October 13, 1992	A
	Quality Management Program and Misadministrations; NRC Override of OMB Disapproval of NRC Information Collection Request (Part 35)	September 10, 1992; 57 FR 41376	September 10, 1992	A
	Minor Modifications to Nuclear Power Reactor Event Reporting Requirements (Part 50)	September 10, 1992; 57 FR 41378	October 13, 1992	BR

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1992 cont.	Departures From Manufacturer's Instructions; Elimination of Recordkeeping Requirements (Parts 30 and 35)	October 2, 1992; 57 FR 45566	October 2, 1992	BR
	Receipt of Byproduct and Special Nuclear Material (Part 50)	October 21, 1992; 57 FR 47978	November 20, 1992	A
	Clarification of Statutory Authority for Purposes of Criminal Enforcement (Parts 11, 19, 20, 21, 25, 26, 30, 31; 32, 33, 34, 35, 40, 50, 52, 53, 54, 55, 60, 61, 70, 71, 72, 73, 74, 75, 95, 110, 140 and 150)	November 24, 1992; 57 FR 55062	December 24, 1992	A
	Fitness-for-Duty Programs: NRC Partial Withdrawal of NRC Information Collection Requirements (Part 26)	November 25, 1992; 57 FR 55443	December 28, 1992	A
	Disposal of Waste Oil by Incineration (Part 20)	December 7, 1992; 57 FR 57649	January 6, 1993	BR
	Revised Standards for Protection Against Radiation; Minor Amendments (Part 20)	December 8, 1992; 57 FR 57877	December 8, 1992	A
	Combined Construction Permits and Operating Licenses; Conforming Amendments (Part 52)	December 23, 1992; 57 FR 60975	January 22, 1993	M
	Acquisition Regulation (NRCAR) (48 CFR Chapter 20)	December 23, 1992; 57 FR 61152	January 22, 1993	A
	Exclusion of Attorneys From Interviews Under Subpoena (Part 19)	December 29, 1992; 57 FR 61780	March 1, 1993	A

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1992 cont.	Material Approved for Incorporation by Reference; Maintenance and Availability (Parts 34, 35, 50, 73, 110)	December 29, 1992; 57 FR 61785	December 29, 1992	A
1993	Conduct of Employees; Conforming Amendments (Part 0)	January 12, 1993; 58 FR 3825	February 3, 1993	A
	Licenses and Radiation Safety Requirements for Irradiators (Parts 19, 20, 30, 36, 40, 51, 70, 170)	February 9, 1993; 58 FR 7715	July 1, 1993	S
	Export and Import of Nuclear Equipment and Material; Clarifying Amendments (Part 110)	March 9, 1993; 58 FR 12999	March 9, 1993	M
	Clarification of Physical Protection Requirements at Fixed Sites (Part 73)	March 15, 1993; 58 FR 13699	April 14, 1993	S
	List of Approved Spent Fuel Storage Casks: Additions (Part 72)	April 7, 1993; 58 FR 17948	May 7, 1993	BR
	Training and Qualification of Nuclear Power Plant Personnel (Parts 50 and 52)	April 26, 1993; 58 FR 21904	May 26, 1993	M
	Nuclear Regulatory Commission Acquisition Regulation; Minor Amendments (48 CFR Parts 2012, 2015, 2030, 2052)	May 3, 1993; 58 FR 26253	May 3, 1993	A
	Licensees' Announcements of Safeguards Inspections (Part 73 and 74)	May 21, 1993; 58 FR 29521	June 21, 1993	A
	Repeal of NRC Standards of Conduct Regulations (Part 0)	May 25, 1993; 58 FR 29521	June 21, 1993	A

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1993 cont.	Fitness-for-Duty Requirements for Licensees Authorized to Possess, Use, or Transport Formula Quantities of Strategic Special Nuclear Material (Parts 26, 70, 73)	June 3, 1993; 58 FR 31467	November 30, 1993	S
	Licensing Requirements for Land Disposal of Radioactive Wastes (Part 61)	June 22, 1993; 58 FR 33886	July 22, 1993	A
	Monitoring the Effectiveness of Maintenance at Nuclear Power Plants (Part 50)	June 23, 1993; 58 FR 33993	July 10, 1993	BR
	Duplication Fees (Part 9)	July 20, 1993; 58 FR 38665	July 20, 1993	A
	FY 1991 and 1992 Final Rule Implementing the U.S. Court of Appeals Decision and Revision of Fee Schedules; 100% Fee Recovery, FY 1993 (Parts 170 and 171)	July 20, 1993; 58 FR 38666	August 19, 1993	M
	Decommissioning Recordkeeping and License Termination: Documentation Additions (Parts 30, 40, 70, 72)	July 26, 1993; 58 FR 39628	October 25, 1993	S
	Adjustment of the Maximum Standard Deferred Premium (Part 140)	August 12, 1993; 58 FR 42851	August 20, 1993	A
	Access Authorization Fee Schedule for Licensee Personnel (Parts 11 and 25)	August 23, 1993; 58 FR 44435	September 22, 1993	A
	FSAR Update Submittals (Parts 50 and 54)	August 27, 1993; 58 FR 45243	September 27, 1993	A

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1993 cont.	Day-Firing Qualification Courses for Tactical Response Team Members, Armed Response Personnel, and Guards at Category I Licensees (Part 73)	August 31, 1993; 58 FR 45781	February 28, 1994	S
	Nuclear Regulatory Commission Acquisition Regulation; Minor Amendments (48 CFR Parts 2017 and 2052)	September 8, 1993; 58 FR 47220	September 8, 1993	A
	List of Approved Spent Fuel Storage Casks; Additions (Part 72)	October 5, 1993; 58 FR 51762	November 4, 1993	A
	Whistleblower Protection for Employees of NRC-Licenced Activities (Parts 19, 30, 40, 50, 60, 61, 70, 72, and 150)	October 8, 1993; 58 FR 52406	November 8, 1993	M
	Export and Import of Nuclear Equipment and Material; Export of High-Enriched Uranium (Part 110)	October 28, 1993; 58 FR 57962	November 29, 1993	M
	NRC Region III Telephone Number and Address Change (Parts 1, 20, 30, 40, 70, 73)	December 6, 1993; 58 FR 64110	December 13, 1993	A
	Standards for Protection Against Radiation; Removal of Expired Material (Parts 2 19, 20, 30, 31, 32, 34, 35, 36, 39, 40, 50, 61, 70, 72)	December 22, 1993; 58 FR 67657	January 1, 1994	A
	Self-Guarantee as an Additional Financial Assurance Mechanism (Parts 30, 40, 50, 70, and 72)	December 29, 1993; 58 FR 68726	January 28, 1994	BR

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1993 cont.	Standards for Protection Against Radiation; NRC Operations Center Telephone Number (Part 20)	Decmeber 30, 1993; 58 FR 69219	December 30, 1993	A
1994	Modifications to Fitness-for-Duty Program Requirements (Part 26)	January 5, 1994; 59 FR 502	January 1, 1994	BR
	Fingerprint Cards: Change in User Fee (Part 73)	January 6, 1994; 59 FR 661	February 7, 1994	A
	Minor Clarifying Amendments (Parts 1, 21, 30, 32, and 50)	February 7, 1994; 59 FR 5519	February 7, 1994	A
	Renewal of Licenses and Requalification Requirements for License Operators (Part 55)	February 9, 19094; 59 FR 5934	March 11, 1994	BR
	Notification of Spent Fuel Management and Funding Plans by Licensees of Prematurely Shut Down Power Reactors (Part 50)	March 4, 1994; 59 FR 10267	April 4, 1994	A
	Restoration of the Generic Exemption from Annual Fees for Nonprofit Educational Institutions (Part 171)	March 17, 1994; 59 FR 12539	April 18, 1994	A
	NRC Operations Center Commercial Telephone Number Change (Parts 20, 21, 30, 35, 40, 50, 70, 72, and 73)	March 25, 1994; 59 FR 14085	May 31, 1994	A
	Emergency Planning and Preparedness Exercise Requirements for Nuclear Power Plants (Part 50)	March 25, 1994; 59 FR 14087	June 23, 1994	A

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1994 cont.	Supplemental Standards of Ethical Conduct for Employees of the Nuclear Regulatory Commission (Part 0)	April 13, 1994; 59 FR 17457	July 12, 1994	A
	Consolidation of the NRC Region V Office with the Region IV Office (Parts 1, 20, 30, 40, 55, 70, and 73)	April 13, 1994; 59 FR 17464	April 4, 1994	A
	Equal Access to Justice Act: Implementation (Part 12)	May 5, 1994; 59 FR 23119	June 6, 1994	M
	Establishment of Revised FY 1991 and FY 1992 Annual Fee Surcharges (Part 171)	May 19, 1994; 59 FR 26097	May 19, 1994	A
	Uranium Mill Tailings Regulations; Conforming NRC Requirements to EPA Standards (Part 40)	June 1, 1994; 59 FR 28220	July 1, 1994	M
	Informal Hearing Procedures for Materials Licensing Adjudications (Part 2)	June 6, 1994; 59 FR 29187	July 6, 1994	A
	Licensee Submittal of Data in Computer-Readable Form (Parts 40, 72, 74, 75, and 150)	July 13, 1994; 59 FR 35618	October 11, 1994	A
	Timeliness in Decommissioning of Materials Facilities (Parts 2, 30, 40, 70, and 72)	July 15, 1994; 59 FR 36026	August 15, 1994	S
	Revision of Fee Schedules; 100% Fee Recovery, FY 1994 (Parts 170 and 171)	July 20, 1994; 59 FR 36895	August 19, 1994	M

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1994 cont.	Annual Physical Fitness Performance Testing for Tactical Response Team Members, Armed Response Personnel, and Guards at Category I Licensees (Part 73)	July 28, 1994; 598 R 38347	August 29, 1994	A
	Temporary Access to Safeguards Information (Part 73)	July 29, 1994; 59 FR 38553	August 29, 1994	A
	Protection Against Malevolent Use of Vehicles at Nuclear Power Plants (Part 73)	August 1, 1994; 59 FR 38889	August 31, 1994	S
	Standards for Protection Against Radiation; Clarification (Parts 19, 20, 35, and 40)	August 15, 1994; 59 FR 41641	August 15, 1994	A
	Summary Report on the Status of Petitions for Rulemaking; Frequency (Part 2)	August 31, 1994; 59 FR 44894	September 30, 1994	A
	Certification of Gaseous Diffusion Plants (Parts 19, 20, 21, 26, 51 70, 71, 73, 74, 76, and 95)	September 23, 1994; 59 FR 48944	October 24, 1994	S
	Specific Licensing of Exports of Certain Alpha-Emitting Radionuclides and Byproduct Material (Part 110)	September 26, 1994; 59 FR 48994	November 10, 1994	M
	NRC Library; Address Change (Parts 34, 35, 50, 73, and 110)	October 5, 1994; 59 FR 50688	October 5, 1994	A
	Change in Organizational Title and Telephone Numbers (Part 2)	November 25, 1994; 59 FR 60551	November 25, 1994	A

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1994 cont.	Preparation, Transfer for Commercial Distribution, and Use of Byproduct Material for Medical Use (Parts 30, 32, and 35)	December 2, 1994; 59 FR 61767	January 1, 1995	BR
	Statement of Organization and General Information; Agency Consolidation and Minor Amendments (Part 1)	December 12, 1994; 59 FR 63881	December 12, 1994	A
	Notification of Events (Part 72)	December 14, 1994; 59 FR 64283	January 13, 1995	A
	List of Approved Spent Fuel Storage Casks: Addition (Part 72)	December 22, 1994; 59 FR 56898	January 23, 1995	BR
1995	Preparation, Transfer for Commercial Distribution, and Use of Byproduct Material for Medical Use (Part 35)	January 4, 1995; 60 FR 322	January 1, 1995	BR
	Requirement to Report Transfers of Devices to Generally Licensed Persons (Part 32)	January 19, 1995; 60 FR 3735	December 31, 1994	BR
	Frequency of Medical Examinations for Use of Respiratory Protection Equipment ((Part 20)	February 10, 1995; 60 FR 7900	March 13, 1995	BR
	Reduction of Reporting Requirements Imposed on NRC Licensees (Parts 50, 55, and 73)	March 14, 1995; 60 FR 13615	April 13, 1995	BR
	Low-Level Waste Shipment Manifest Information and Reporting (Parts 20 and 61)	March 27, 1995; 60 FR 15649	March 1, 1998	S

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1995 cont.	NRC Size Standards; Revision (Part 2)	April 11, 1995; 60 FR 18344	May 11, 1995	A
	Standards for Protection Against Radiation; Clarification (Part 20)	April 25, 1995; 60 FR 20183	April 25, 1995	BR
	Interim Storage of Spent Fuel in an Independent Spent Fuel Storage Installation at a Reactor Site; Site-Specific License to a Qualified Applicant (Parts 2 and 72)	April 28, 1995; 60 FR 20879	May 30, 1995	A
	Nuclear Power Plant License Renewal; Revisions (Parts 2, 51, and 54)	May 8, 1995; 60 FR 22461	June 7, 1995	BR
	Changes to NRC Addresses and Telephone Numbers (Parts 2, 19, 20, 30, 32, 40, 50, 51, 60, 61, 70, 71, 72, 73, 74, 76, and 150)	May 9, 1995; 60 FR 24549	May 9, 1995	A
	NRC License Renewal/Reinvestigation Program (Parts 11 and 25)	May 17, 1995; 60 FR 26355	June 16, 1995	BR
	Performance Requirements for Radiographic Equipment (Part 34)	May 31, 1995; 60 FR 28323	June 30, 1995	BR
	Revision of Fee Schedules: 100 Percent Fee Recovery, FY 1995 (Parts 170 and 171	June 20, 1995; 60 FR 32218	July 20, 1995	M

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1995 cont.	Emergency Planning Licensing Requirements for Independent Spent Fuel Storage Facilities (ISFSI) and Monitored Retrievable Storage Facilities (MRS) (Part 72)	June 22, 1995; 60 FR 36038	September 20, 1995	BR
	Radiation Protection Requirements; Amended Definitions and Criteria (Parts 19 and 20)	July 13, 1995; 60 FR 36038	August 14, 1995	BR
	Technical Specifications (Part 50)	July 19, 1995; 60 FR 36953	August 18, 1995	BR
	Import and Export of Radioactive Waste (Part 110)	July 21, 1995; 60 FR 37556	August 21, 1995	S
	Clarification of Decommissioning Funding Requirements (Parts 30, 40, 70, and 72)	July 26, 1995; 60 FR 38235	November 24, 1995	A
	Changes to Nuclear Power Plant Security Requirements Associated with Containment Access Control (Part 73)	September 7, 1995; 60 FR 46497	October 10, 1995	BR
	Procurement of Commercial Grade Items by Nuclear Power Plant Licensees (Part 21)	September 19, 1995; 60 FR 48369	October 19, 1995	BR
	Medical Administration of Radiation and Radioactive Materials (Parts 20 and 35)	September 20, 1995; 60 FR 48623	October 20, 1995	BR
	Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors (Part 50)	September 26, 1995; 60 FR 49495	October 26, 1995	BR

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1995 cont.	Compatibility with the International Atomic Energy Agency (IAEA) (Part 71)	September 28, 1995; 60 FR 50248	April 1, 1996	A
	Physical Security Plan Format Changes (Parts 50, 70, and 72)	October 16, 1995; 60 FR 53505	November 15, 1995	BR
	Revision of Specific Exemptions Under the Privacy Act (Part 9)	December 13, 1995; 60 FR 63897	January 12, 1996	A
	Fracture Toughness Requirements for Light Water Reactor Pressure Vessels (Part 50)	December 19, 1995; 60 FR 65456	January 18, 1995	S
1996	One-time Extension of Certain Byproduct, Source, and Special Nuclear Materials Licenses (Parts 30, 40, and 70)	January 16, 1996; 61 FR 1109	February 15, 1996	BR
	Employee Protection Policies; Minor Amendments (Parts 19, 30, 40, 50, 60, 61, 70, and 72)	February 22, 1996; 61 FR 6762	April 22, 1996	A
	Minor Correcting Amendments (Parts 19, 30, 51, 52, and 55)	March 12, 1996; 61 FR 9901	March 12, 1996	A
	Revision of Fee Schedules; 100 Percent Fee Recovery, FY 1996	April 12, 1996; 61 FR 16203	June 11, 1996	M
	Termination or Transfer of Licensed Activities: Recordkeeping requirements (Parts 20, 30, 40, 61, 70, and 72)	May 16, 1996; 61 FR 24669	June 17, 1996	A
	Environmental Review for the Renewal of Nuclear Power Plant Operating Licensees (Part 51)	June 5, 1996; 61 FR 28467	September 5, 1996	BR

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1996 cont.	Minor Amendments to Miscellaneous Cross-References (Parts 30, 40, 70, and 72)	June 12, 1996; 61 FR 29636	June 12, 1996	A
	Production and Utilization Facilities; Emergency Planning and Preparedness Exercise Requirements (Part 50)	June 14, 1996; 61 FR 30129	July 15, 1996	BR
	Export of Nuclear Equipment and Materials (Part 110)	July 8, 1996; 61 FR 35600	August 7, 1996	A
	Removal of 10 CFR Part 53 - Criteria and Procedures for Determining the Adequacy of Available Spent Fuel Nuclear Storage Capacity (Part 53)	July 9, 1996; 61 FR 35935	August 8, 1996	BR
	Decommissioning of Nuclear Power Reactors (Parts 2, 50, and 51)	July 29, 1996; 61 FR 39278	August 28, 1996	BR
	Codes and Standards for Nuclear Power Plants: Subsection IWE and Subsection IWL (Part 50)	August 8, 1996; 61 FR 41303	September 9, 1996	S
	Deletion of Outdated References and Minor Changes (Parts 2 and 51)	August 22, 1996; 61 FR 43406	October 21, 1996	A
	Adjustment of Civil Monetary Penalties for Inflation (Parts 2 and 13)	October 11, 1996; 61 FR 53554	November 12, 1996	M
	Disposal of High Level Radioactive Wastes in Geological Repositories; Design Basis Events (Part 60)	December 4, 1996; 61 FR 64257	January 3, 1997	A

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1996 cont.	Resolution of Dual Regulation of Airborne Effluents in Radioactive Materials; Clean Air Act (Part 20)	December 10, 1996; 61 FR 65120	January 9, 1997	BR
	Reactor Site Criteria Including Seismic and Earthquake Engineering Criteria for Nuclear Power Plants (Parts 21, 50, 52, 54, and 100)	December 11, 1996; 61 FR 65157	January 10, 1997	BR
	Environmental Review for Renewal of Nuclear Power Plant Operating Licenses (Part 51)	December 18, 1996; 61 FR 66537	January 17, 1997	BR
1997	Recognition of Agreement State Licenses in Areas Under Exclusive Federal Jurisdiction Within an Agreement State (Parts 150 and 170)	January 13, 1997; 62 FR 1662	February 27, 1997	BR
	Duplication Fees (Part 9)	January 28, 1997; 62 FR 3984	January 28, 1997	A
	Criteria for the Release of Individuals Administered Radioactive Material (Parts 30 and 35)	January 29, 1997; 62 FR 4120	May 29, 1997	BR
	Fissile Material Shipments and Exemptions (Part 71)	February 10, 1997; 62 FR 5907	February 10, 1997	BR
	USEC Privatization Act: Certification and Licensing of Uranium Enrichment Facilities (Parts 2, 40, 70, and 76)	February 12, 1997; 62 FR 6664	April 14, 1997	M
	Conduct of Employees; CFR Part Removal (Part 0)	April 4, 1997; 62 FR 16053	April 4, 1997	A

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1997 cont.	Access to and Protection of Classified Information (Parts 25, 50, 54, and 95)	April 11, 1997; 62 FR 17683	May 12, 1997	A
	NRC Region II Telephone Number and Address Change (Parts 1, 20, 30, 40, 70, and 73)	April 28, 1997; 62 FR 22879	April 28, 1997	A
	Standard Design Certification for the U.S. Advanced Boiling Water Reactor Design (Part 52)	May 12, 1997; 62 FR 25800	June 11, 1999	BR
	Informal Small Entity Guidance (Part 2)	May 13, 1997; 62 FR 26219	May 13, 1997	A
	Environmental Reports- Materials Licensees (Part 51)	May 14, 1997; 62 FR 26730	July 14, 1997	BR
	Facsimile Telephone Number and Address Change for the NRC's Office of the Secretary (Parts 2 and 110)	May 20, 1997; 62 FR 27494	May 20, 1997	A
	Standard Design Certification for the System 80+ Design (Part 52)	May 21, 1997; 62 FR 27840	June 20, 1997	BR
	Licensees for Industrial Radiography and Radiation Safety Requirements for Radiographic Operations (Parts 30, 34, 71, and 150)	May 28, 1997; 62 FR 28948	June 27, 1997	S
	Revision of Fee Schedules: 100 Percent Fee Recovery, FY 1997 (Parts 170 and 171)	May 29, 1997; 62 FR 29194	July 28, 1997	M

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Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1997 cont.	Radiological Criteria for License Termination (Parts 20, 30, 40, 50, 51, 70, and 72)	July 21, 1997; 62 FR 39056	August 20, 1997	BR
	Program Fraud Civil Remedies; Technical Amendment (Part 13)	July 29, 1997; 62 FR 40427	July 29, 1997	A
	Definition of Safety-Related Structures, Systems, and Components; Technical Amendment	September 8, 1997; 62 FR 47268	November 7, 1997	A
	Employees; Minor Amendment (Part 19)	September 15, 1997; 62 FR 48165	September 15, 1997	A
	Information Collection Requirements: Statutory and Technical Amendments (10 CFR Chapter I)	October 6, 1997; 62 FR 52184	October 6, 1997	A
	Codes and Standards; IEEE National Consensus Standard (Part 50)	October 17, 1997; 62 FR 53932	January 1, 1998	A
	Minor Correcting Amendments (Parts 13, 32, 50, 51, 55, 60, 72, and 110)	November 3, 1997; 62 FR 59275	November 3, 1997	A
	Exempt Distribution of a Radioactive Drug Containing One Microcurie of Carbon-14 Urea (Parts 30 and 32)	December 2, 1997; 62 FR 63634	January 2, 1998	BR
	Changes to Nuclear Power Plants Security Requirements (Part 73)	December 3, 1997; 62 FR 63825	February 17, 1998	BR

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1998	Deliberate Misconduct by Unlicensed Persons (Parts 30, 32, 40, 50, 52, 60, 61, 70, 71, 72, 110, and 150)	January 13, 1998; 63 FR 1890	February 12, 1998	A
	Electronic Freedom of Information Act (Part 9)	January 20, 1998; 63 FR 2873	February 19, 1998	A
	Statement of Organization and General Information (Parts 1, 2, 4, 7, 9, 15, 16, 76, and 110)	April 1, 1998; 63 FR 15740	April 1, 1998	A
	Access Authorization Fee Schedule for Licensee Personnel (Parts 11 and 25)	May 7, 1998; 63 FR 25156	May 7, 1998	A
	Physical Protection for Spent Fuel Nuclear Fuel and High-Level Radioactive Waste (Parts 60, 72, 73, 74, and 75)	May 15, 1998; 63 FR 26955	November 12, 1998	BR
	Self-Guarantee of Decommissioning Funding by Nonprofit and Non-Bond Issuing Licensees (Parts 30, 40, 50, 70, and 72)	June 1, 1998; 63 FR 29535	July 1, 1998	BR
	License Term for Medical Use Licensees (Part 35)	June 10, 1998; 63 FR 31604	July 10, 1998	BR
	Revision of Fee Schedules: 100 Percent Fee Recovery, FY 1998 (Parts 2, 140, 170, 171)	June 10, 1998; 63 FR 31840	August 10, 1998	M
	Requirements for Shipping Packages Used to Transport Vitrified High-Level Waste (Part 71)	June 15, 1998; 63 FR 32600	July 15, 1998	BR

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Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1998 cont.	License Applications for Certain Items Containing Byproduct Material (Part 32)	June 17, 1998; 63 FR 32969	August 17, 1998	BR
	Adjustment of the Maximum Retrospective Deferred Premium (Part 140)	July 21 , 1998; 63 FR 39015	August 20, 1998	A
	Minor Corrections, Clarifying Changes, and a Minor Policy Change (Parts 20, 32, 35, 36, and 39)	July 23, 1998; 63 FR 39477	October 26, 1998	A
	Physical Protection for Spent Nuclear Fuel and High-Level radioactive Waste; Technical Amendment (Part 73)	September 16 1998; 63 FR 49413	November 12, 1998	A
	Transfer for Disposal and Manifests; Minor Technical Conforming Amendment (Part 20)	September 21, 1998; 63 FR 50217	November 20, 1998	A
	Financial Assurance Requirements for Decommissioning Nuclear Power Reactors (Parts 30 and 50)	September 22, 1998; 63 FR 50465	November 23, 1998	BR
	Minor Revision of Design Basis Accident Dose Limits for Independent Spent Fuel Storage and Monitored Retrievable Storage Installations (Part 72)	October 13, 1998; 63 FR 54560	November 12, 1998	BR
	Criticality Accident Requirements (Parts 50 and 70)	November 12, 1998; 63 FR 63127	December 14, 1998	BR

Year	Title/ 10 CFR Part Number	Date Published/ FR Citation	Effective Date	Rule Category
1998 cont.	Streamlined Hearing Process for NRC Approval of License Transfers (Parts 2 and 51)	December 3, 1998; 63 FR 66721	December 3, 1998	A
	Transfer of Rulemaking Functions (Part 1)	December 17, 1998; 63 FR 69574	December 17, 1998	A
	Procedures Applicable to Proceedings for the Issuance of Licenses for the Receipt of High-Level Radioactive Waste at a Geologic Repository (Part 2)	December 30, 1998; 63 FR 71729	January 29, 1999	A

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Enclosure 3

SUMMARY OF NRC RULES: CY 1984-1998

YEAR	A	M	S	BR	TOTAL
1984	14	1	6	3	24
1985	19	4	5	3	31
1986	8	4	7	1	20
1987	20	4	6	0	30
1988	18	3	9	0	30
1989	16	3	5	1	25
1990	15	5	2	1	23
1991	14	5	11	0	30
1992	19	3	2	4	28
1993	14	5	5	3	27
1994	19	4	3	4	30
1995	6	1	3	16	26
1996	7	2	1	8	18
1997	12	2	1	9	24
1998	11	1	0	8	20
TOTAL	212	47	66	61	386
%	54.9%	12.2%	17.1%	15.8%	100%

A - Administrative
M - Mandatory (required by statute, court decision, treaty, Executive Order)
S - Safety
BR - Burden reduction/adds flexibility

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