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S. HRG. 107–355, PT. 7

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2002

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

FIRST SESSION

ON

S. 1416

AUTHORIZING APPROPRIATIONS FOR FISCAL YEAR 2002 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 7
STRATEGIC

APRIL 25; JUNE 26; JULY 11, 25, 2001

Printed for the use of the Committee on Armed Services

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2002—Part 7 STRATEGIC

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2002

WEDNESDAY, APRIL 25, 2001

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

THE FISCAL YEAR 2002 BUDGET REQUEST OF THE NATIONAL NUCLEAR SECURITY ADMINISTRATION

The subcommittee met, pursuant to notice, at 2:30 p.m. in room SR–232A, Russell Senate Office Building, Senator Wayne Allard (chairman of the subcommittee) presiding.

Committee members present: Senators Allard, Thurmond, Reed, Akaka, and E. Benjamin Nelson.

Committee staff members present: Scott W. Stucky, general counsel; L. David Cherington, counsel; and Ann M. Mittermeyer, assistant counsel.

Professional staff members present: Mary Alice A. Hayward and George W. Lauffer.

Minority staff member present: Madelyn R. Creedon.

Staff assistants present: Beth Ann Barozie and Thomas C. Moore.

Committee members' assistants present: Margaret Hemenway, assistant to Senator Smith; Douglas Flanders, assistant to Senator Allard; Terrence E. Sauvain, assistant to Senator Byrd; Elizabeth King, assistant to Senator Reed; and Davelyn Noelani Kalipi, assistant to Senator Akaka.

OPENING STATEMENT OF SENATOR WAYNE ALLARD, CHAIRMAN

Senator ALLARD. I want to welcome all of you this afternoon to this hearing of the Strategic Subcommittee, and we look forward to hearing all of your comments. We are going to have two panels: The first panel will be General Gordon, Administrator of the National Nuclear Security Administration (NNSA). The second panel consists of seven of you and when we get to the second panel, we are going to have 5-minute limit on your testimony. The staff will help me a little bit. If we do not, we will run out of time. I want to give everybody an opportunity to say their piece as far as communicating with the subcommittee. So, we will handle those two panels just a little bit differently.

Today, the Strategic Subcommittee will learn about the progress that the National Nuclear Security Administration is making to provide for safe, secure, and reliable nuclear weapons programs.

As we consider NNSA's fiscal year 2002 budget request, our second such request since the agency's formation, we want to make sure that NNSA is putting together the best possible program to continue to ensure a strong national deterrent.

I know General Gordon has been working tirelessly to bring together his team at the NNSA and to reorganize the Department of Energy's (DOE) Defense Programs to provide a cohesive management structure that avoids the pitfalls that have plagued these programs in the past.

Over the past 2 years, there have been several reports examining programs now in the NNSA. These reports were critical of DOE's management, security failures, infrastructure, of personnel retention and replacement policies, as well as specific campaigns or projects.

The underlying theme through virtually all of the reports was the enormity of the challenges facing NNSA. Although there was agreement that we have the best and brightest people working on the world's most impressive science program, there were also deep reservations about the general health of the program.

With the formation of the NNSA, we sought, and continue to seek, a new chance to provide a world-class, science-based nuclear weapons program and matching world-class operations, infrastructure, and workforce to carry us well into the 21st century.

As we hear from our witnesses today, I hope we can learn how to move beyond the system that in some places seems to be repaired with a short-term fix instead of a comprehensive program which at the end of 10 years will still provide a durable infrastructure and a lasting legacy.

I hope we can learn how to make sure we have a highly skilled workforce equal to our existing scientists, engineers, and technicians. Our Cold War warriors need to see an increase in apprentices whose training has occurred since the end of the Cold War. Perhaps more importantly, our next generation of workers needs some onsite training alongside experienced weapons designers.

Our seasoned workforce offers unique expertise that is of great value, and such a resource should not be wasted. Challenges to our Nation's weapons programs, infrastructure, and workforce expose us to a variety of vulnerabilities now and in the future. Although some of the fixes will require additional funding, many of the existing problems may be fixable with innovation, better management practices, and disciplined funding plans, not more money.

The subcommittee also would like to hear about specific issues pertaining to how the NNSA is meeting its national security requirement. Accordingly, the subcommittee is interested in hearing about the progress with our capability to produce replacement tritium.

Additionally, we are interested in hearing about our progress with plutonium and pit production, including both short- and long-term solutions. We are interested in knowing about our major campaigns, including the National Ignition Facility (NIF) and the Advanced Simulation and Computing Initiative (ASCI).

General Gordon, you should feel free to comment on any of the issues I have raised. Then, the second panel of distinguished witnesses can reply specifically to those issues or programs that impact them.

Several of these issues will also be raised in the question-and-answer portion of the hearing. Again, I want to thank our witnesses for being here today and I look forward to hearing your comments on these vital programs.

Senator Reed, I yield time to you for an opening statement.

STATEMENT OF SENATOR JACK REED

Senator REED. Thank you very much, Mr. Chairman, and good afternoon. I would like to join Senator Allard in welcoming you, General Gordon, and our many witnesses this afternoon.

It's a pleasure to see you here today. This is your first opportunity to testify before the Strategic Subcommittee and your first budget for the National Nuclear Security Administration. We look forward to discussing with you this afternoon many important programs with respect to NNSA, and also your progress over the last year in getting this organization up and running.

We have a large number of witnesses today and a lot of ground to cover. If you will let me just highlight those points that I think I would like to see responded to and stressed.

First, I would note the sad state of many of the NNSA facilities and the infrastructure overall, the ability of NNSA to meet its commitments to the Department of Defense (DOD), and maintain a robust Stockpile Stewardship Program (SSP) within the requested budget, the impact of the significant reductions in the nonproliferation programs, including the Russian program, as well as the research and development accounts, the status of the pit manufacturing and certification program, the ongoing DOD strategic review, and DOE's role in that review, particularly as it relates to the overall future size of the nuclear weapons stockpile, the ability of the DOE and its contractors to attract and retain the necessary employees and the progress of your organizational efforts.

I look forward to the continued success of the NNSA, General Gordon, and for your continued leadership. I'm interested in hearing your plans for the future. Thank you very much, Mr. Chairman.

Senator ALLARD. Thank you. Any other comments from committee members? Senator Thurmond?

STATEMENT OF SENATOR STROM THURMOND

Senator THURMOND. In order to save time, I ask that my statement be included in the record.

[The prepared statement of Senator Thurmond follows:]

PREPARED STATEMENT BY SENATOR STROM THURMOND

Thank you, Mr. Chairman,

General Gordon, I join Chairman Allard in welcoming you to your first hearing before the subcommittee in your role as the administrator of the National Nuclear Security Administration. Your tenure as the administrator has reinforced my confidence in your ability to reinvigorate our Nation's nuclear security program and provide the inspiration to the dedicated and highly professional workforce that toils in our nuclear weapons complex.

Mr. Chairman, I also want to take this opportunity to welcome the distinguished members of our second panel. They do a superb job under challenging circumstances in providing our Nation the research and testing necessary to ensure the viability and safety of our strategic nuclear weapons.

Mr. Chairman, last month the subcommittee received testimony from the Panel to Assess the Reliability, Safety, and Security of the United States Nuclear Stockpile. The panel painted a no-nonsense picture of the state of our strategic arsenal and facilities that are responsible for maintaining the stockpile. Their report highlighted just how much work needs to be done to guarantee our Nation's nuclear deterrent and, more importantly, the deteriorating state of our nuclear facilities. In this regard Dr. Schlesinger, a member of the panel, stated: "It troubles this panel to report that portions of the weapons complex infrastructure are defective and that the production capabilities that remain are fragile. We see an increasingly urgent need for a coherent vision, a comprehensive plan, and a programmatic commitment to reverse these adverse trends. Where is this vision? If action is not taken soon, I believe a crisis in the weapons program is inevitable."

Mr. Chairman, despite these dire warnings, the Fiscal Year 2002 National Nuclear Security Administration budget request has serious shortfalls. I hope that under your leadership we will be able to amend the budget to ensure that the administration will have the critical funding required to provide the reliability of the stockpile and, more importantly, provide for the repair and upgrade of the infrastructure that supports the stockpile. I look forward to working with you in the coming weeks as you formulate a realistic funding level not only for the coming year, but also as we look toward the future.

Thank you, Mr. Chairman.

Senator ALLARD. Without any objection, we will do that. General Gordon, proceed if you would, please.

STATEMENT OF GEN. JOHN A. GORDON, USAF (RET.), ADMINISTRATOR, NATIONAL NUCLEAR SECURITY ADMINISTRATION

General GORDON. Mr. Chairman, thank you very much for the opportunity to come up and meet with you all today and discuss the fiscal year 2002 budget and how we're doing in NNSA itself.

As you mentioned, we have the leadership of the organization, including the field organizations that actually do the work, with us today. If there's any reason we can't answer your questions, it's probably going to be because of lack of time rather than the folks we have here.

But, one point I would make is that because there are so many issues that are of interest, if we touch on them too lightly, we would, of course, be delighted to come back and offer specific briefings on any one of those subjects on which you might like to go into in more detail.

Senator ALLARD. We appreciate that offer.

General GORDON. I do want to thank the members of the subcommittee for their continuing support for the mission of the NNSA and for the people who really make it happen. In Washington, in the field, among the Federal workforce, among the contract workforce, there are some 37,000 people in all that take on these tasks.

If I could speak for a few minutes about NNSA broadly before we turn to the budget issues, I would tell you that we're making, in my judgment, steady, albeit slow, progress towards the goals that I think we share of having an efficient and effective organization to lead and manage the national security and nuclear security enterprise that has been entrusted to us.

I'm not satisfied with where we are. What we've been able to do is establish NNSA, if you will, as an organization with the unique identity and clear lines of authority that we all seek. We're moving forward, and I believe we're actually making remarkable progress

when measured against the barriers and the bureaucracy that we sometimes confront.

Even though it's been difficult to move dramatically on organizational issues, we have gotten well beyond some of the issues of dual-hatting. We've begun to set up a new framework for the management of the NNSA. We've brought on board critical staff for vital issues such as counterintelligence, security, and contracting. We've made real progress in each of those areas.

We have on board two senior advisors of immense capability for science and for policy, a director of congressional affairs with a proven track record, an environmental safety and health (ES&H) advisor with great professional experience who comes to us from Naval Reactors, a senior military assistant, and a strong chief of staff who knows the system in great detail. We established an Office of Policy Planning Assessment and Analyses that should really help us work better in the intra-agency process, and work better to make sure that our views are considered as we move into the policy arenas.

Mr. Chairman, I elected to spend a huge proportion of my time in the early months on the very critical issues, the very critical mission-related issues, that were squarely on my desk when I arrived last summer, and therefore a little less time on the organization itself.

But, from my perspective, there's been real progress in this area. In particular, with morale at the labs and at the plants. When we began this organization last summer, this was really the biggest problem facing us. Some situations were almost desperate.

I wouldn't want to go so far as to say we've turned that around, but we certainly stopped the fall of morale. If you go out to the labs and into the facilities, it is a very different feel from what was going on out there in the recent past. People are now turning to real work and we have some of the security issues behind us. There's a very different feel in how each of the organizations work. I would encourage you to prod the other witnesses toward that point and get their firsthand views.

We've made significant steps in security. Again, if nothing else, we're off the front pages of the newspapers on those issues. We've asked John Hamre, the former Deputy Secretary of Defense, to form a commission to help me think through the issues of how we make sure that we can do both security and science. We've got into some habitual talk, I think, about the balance between security and science and I don't want to approach it that way.

Balance implies that if you do more security you do less science, or if you do more science you do less security. We really need to be able to do both. I've said on several occasions, if it really is a cultural problem with the scientists who actually make and design these weapons not understanding and not being willing to step up to the security that we ask of them, then we are on a fool's errand that will never come together.

I just don't accept that there's a cultural indifference that keeps us from being able to do security. We've made good progress in that area. We've put a moratorium on new policies. We've begun a full review of the policies that have been in place and we are involving the people who have to live with the policies.

We've begun a program called Integrated Safeguards and Security Management where we try to reach out and bring in the individuals involved to help us make the decisions rather than tell them exactly, from Washington, how to run their security on a day-to-day basis.

We've had good success in counterintelligence. We're better balanced on foreign visitors. The National Academy of Science is running a polygraph study for us with respect to how we deal with polygraphs. So, we're sharpening up our policies on that and I expect to come back to Congress and ask for some perfections in the legislation that exists while maintaining the very highest standards of security.

I can report to you that we have a renewed and very positive relationship with the Department of Defense, our principal partner in our endeavor. The Nuclear Weapons Council (NWC) has been revitalized. It meets regularly. It makes decisions and it's working well.

We've begun to work carefully on requirements together, and we've agreed upon, for the first time I think, a Stockpile Life Extension Program (SLEP) with the military, the user, which consists of what systems need to be fixed, in what order, and in what time frame. That's quite a remarkable undertaking.

We have developed a 5-year program on how we would fund this project. It's a very important management tool. It's hardly perfect by any means on its first go round of this issue. There's more work to do. But it gives us a solid look ahead, and it's a real tool for making sure we know how we're going to fund the programs we start and how we'll follow up on them.

We've rebaselined the National Ignition Facility (NIF) program with a clear way ahead. I can report on my visits out there and report that we've turned a corner on how we manage the program. My first visits out there were hand waving, in some ways, talking about the very good science that's going to come out of it.

When we go out there now, there's a discussion of "Here's what I've done last week, here's what we're going to do next week, here's the program, here's the money I've spent, here's what my problems are, here's what my relationships are." It's really being run as a project now.

As has been mentioned in the opening statements, we've begun the development of a major infrastructure initiative to begin to correct what I think is really a crisis now in the facilities.

Finally, in this area, we hope to get in place a series of new contracts for the people who are working with us and for us. There're two new contracts at the University of California to manage Los Alamos and Livermore National Laboratories with significant, different, and stronger provisions in them. We have new contracts and new contractors at the Y–12, and Pantex Plants, and extended, revised contracts at Kansas City and Savannah River.

Representatives from all of those locations are here with me today. I will report that all of those are going very well. We're making real and measurable improvements at every location, and you can hear from them directly on the second panel.

If I could switch to the broad area of nonproliferation, I would argue that we have been equally successful in those areas with re-

spect to detection research and development, the detection of nuclear, chemical, and biological systems with everything from the development of a full-up thermal imaging satellite to hand-held detectors for first responders, with programs in Russia with the Russian Navy, and the Materials Protection, Control, and Accounting (MPC&A) program. We've strengthened security on several thousand Russian warheads and 220 metric tons of highly enriched uranium (HEU) and plutonium.

The second line of defenses is where we're deploying detectors at sensitive Russian border crossings. The Nuclear Cities Initiative (NCI) and the Initiatives for Proliferation Prevention (IPP) are providing opportunities for Russian scientists to turn to commercial activities, and providing opportunities for us to help reduce the footprint of the Russian nuclear complex.

With the Russian HEU purchase, we've now monitored the conversion of some 110 metric tons of that material to reactor-grade fuel or low-enriched uranium (LEU).

We've strengthened the safety of Soviet-era reactors. We are beginning to convert unneeded material here and in Russia. We've completed canning and helped with the safeguarding of some 8,000 nuclear fuel rods, plutonium bearing fuel rods, from the reactors in Nyongbyon, North Korea.

The third area that falls under NNSA is naval reactors, and I won't say much about that program today, Mr. Chairman, other than to report that my friend, Admiral Skip Bowman, is doing an absolutely fantastic job by every measure. His organization operates 102 active naval nuclear reactor plants, within one or two of the number of commercial reactors that are operating in this country today, and they do so safely, effectively, and efficiently, providing propulsion to something like 40 percent of the warships of this country. Again safely and reliably.

They also are developing the next-generation reactor for the *Virginia*-class submarines, and the next reactor for the new CVNX Aircraft Carrier. These all are included in the budget that's been submitted for fiscal year 2002.

Equally important, I would add that naval reactors continues to make real progress in improving business practices and operating at the highest environmental standards. In this regard, Mr. Chairman, I have asked my staff to learn from them in this area for our work.

Mr. Chairman, the total budget request for NNSA from the administration is $6.8 billion: $5.3 billion is for stockpile stewardship and Defense Programs; $774 million is for defense nonproliferation; $688 million is for naval reactors; and $15 million is for NNSA operations.

Mr. Chairman, it's very likely that the numbers for NN and DP, (Nuclear Nonproliferation and Defense Programs) are not final. President Bush has asked the Secretary of Defense, in coordination with the Secretary of Energy, to conduct several reviews to create a new vision for the role of the Nation's military in the 21st century. One of those will review the role of nuclear deterrence in the post-Cold War security environment, including determining the size of the future nuclear weapons stockpile and, potentially, new and different requirements.

NNSA is an active part of that review, and its outcome will have a major impact on the workload of the national defense laboratories and the production plants for many years to come.

Another review is examining the U.S. nonproliferation programs with Russia. At the end of this review, I hope we will have a strong and new strategy for our threat-reduction activities in Russia. Again, NNSA is a major participant in that review as well.

The administration will finalize fiscal year 2002 and outyear funding requests for both defense and national security-related activities when these reviews are complete. Following those reviews, we will work with you, and with your staff, to provide timely information on the results and any changes to the budget, both now and in the outyears.

Knowing that our schedule and your schedule for this year's budget is already compressed, I wish I could provide you a firm timetable on that, but I think I would only be speculating if I did so.

Notwithstanding the uncertainty about the details of the strategic reviews, I look ahead to the challenges and the opportunities in front of us and the steps we need to take to effectively accomplish and focus on these missions.

Mr. Chairman, our formal submission defines the details. I would now like to make some broad points. The requested budget goes a long way to support Defense Programs and the Stockpile Stewardship Program (SSP), and actually includes an increase of 4.6 percent from last year. $5.3 billion is a significant amount of money and is, I believe, the only real increase in the DOE budget for fiscal year 2002. It will support most of our major campaigns and the technology building blocks for stockpile stewardship.

Two national assets, our secure transportation and nuclear weapon incident response resources, remain high priorities in the funding request. Weapon safeguards and security, a separate budget category, also meets all of its known requirements.

At the requested level, we will support the ongoing refurbishment of the W87 warhead and begin the much needed work on the B61 bomb, which should deliver the first production unit in 2004.

At the requested level, we will be able to handle the ongoing work of the W87, and we will begin the much needed refurbishment, consonant with the plan approved by the Nuclear Weapon Council, on the B61. We will not, under those current plans, be able to support the full life extension plans for the W80 or W76, but we want to begin with the preliminary engineering development. At the requested level of funding, we will proceed with our testing program in 2004. I don't think we would be able to certify the W88 pit in the time period we just discussed, at least without significantly rebalancing the program.

At the requested level, we would not aggressively attack the infrastructure problems that I alluded to before.

Mr. Chairman, the underlying approach in our budget is to keep all our campaigns in balance while correcting the major problems of the past such as pit certification and manufacturing, and second, to begin the funding of needed refurbishments of those four weapons systems not included in the earlier concept of stockpile stewardship.

Mr. Chairman, the administration is conducting a review of each program, and we await the completion of those reviews. From my perspective, we manage a series of programs, and I've already highlighted most of them for you. It's appropriate that the administration review our programs and come to their own conclusions about their merits. We're mindful of how difficult it is to operate in this environment. The ongoing reviews and policy development activities must specifically deal with Russian attitudes, the relationship with proliferants, issues of access, and issues of sustainability.

Mr. Chairman, some days I think I have the best job in America, in public service. Some days I'm not quite so convinced. We are making progress. We're making progress on our mission. We're making progress on the organization. We need to correct the shortfalls of the past and focus on the future. This in turn requires that we attract and retain the very best people. That concludes my oral statement. Mr. Chairman, I offer a rather lengthy written statement and ask you to put that in the record.

Senator ALLARD. I will make that a part of the record.

[The prepared statement of General Gordon follows:]

PREPARED STATEMENT BY GEN. JOHN A. GORDON, USAF (RET.), ADMINISTRATOR, NATIONAL NUCLEAR SECURITY ADMINISTRATION

Mr. Chairman and members of the subcommittee, thank you for the opportunity to testify on the Department of Energy (DOE) National Nuclear Security Administration (NNSA) fiscal year 2002 budget request. The overall request—including Defense Programs, Defense Nuclear Nonproliferation, Naval Reactors, and the Administrator's Office—totals $6.8 billion.

The Defense Programs (DP) fiscal year 2002 budget request is $5.3 billion, an increase of 4.6 percent over the comparable appropriated fiscal year 2001 level. This budget will support (1) all scheduled maintenance, evaluation, and certification activities for the current stockpile, while deferring some decisions on the future refurbishment workload; (2) manufacture of a certifiable W88 with a newly manufactured pit in fiscal year 2003, with no commitment to a certification schedule or to production quantities; (3) maintenance of all current facilities and sites at approximately the current level of funding; (4) maintenance of current management and operating (M&O) contractor employment levels for ongoing programs; (5) maintenance of secure transportation and nuclear weapon incident response assets at approximately their current levels; (6) current requirements for weapons safeguards and security, while undertaking a limited cyber security initiative; and (7) maintenance of Federal staffing levels at the current, on-board level, including re-consolidation of NNSA Federal landlord, safeguards, and security staffs. Specific line items include: Directed Stockpile Work ($1,043,791,000), Campaigns ($1,996,413,000), Readiness in Technical Base and Facilities ($1,446,988,000), Secure Transportation Asset ($121,800,000), Safeguards and Security ($448,881,000), and Program Direction ($271,137,000).

The Defense Nuclear Nonproliferation (NN) fiscal year 2002 request is $773.7 million. This is a decrease from the fiscal year 2001 budget, but this does not represent a lessening of our commitment to meeting the ever-growing challenges faced in the international nonproliferation or threat reduction arena. The request does cover the funding needed to support a broad range of nonproliferation goals. These include: (1) international nuclear safety; (2) detecting the proliferation of weapons of mass destruction; (3) preventing the spread of nuclear materials, technology, and expertise; and (4) eliminating inventories of surplus fissile materials usable for nuclear weapons. Specific line items include Nonproliferation and Verification Research and Development ($206,102,000); International Nuclear Safety ($13,800,000); Highly Enriched Uranium (HEU) Transparency Implementation ($13,950,000); Arms Control and Nonproliferation ($101,500,000); International Materials Protection, Control and Accounting ($138,800,000); Fissile Materials Disposition ($248,089,000); and Program Direction ($51,459,000).

The Naval Reactors (NR) fiscal year 2002 budget request is $688,045,000, an increase of 0.1 percent over the comparable appropriated fiscal year 2001 budget. This budget will support planned activities for Naval Reactors Development, including

Plant Technology, Reactor Technology and Analysis, Materials Development and Verification, Evaluation and Servicing, and Facility Operation and Construction. The small amount of the overall increase from fiscal year 2001 to fiscal year 2002 reflects progress toward completing major Kesselring Site inactivation work in both the S3G and D1G plants, along with the final phase of Windsor Site inactivation work. Specific line items include Naval Reactors Development ($665,400,000) and Program Direction ($4,100,000).

The fiscal year 2002 budget request for the Office of the Administrator of the NNSA is $15 million. The Department of Energy is required by various laws to enhance U.S. national security through the military application of nuclear technology, and to reduce the global danger from proliferation of weapons of mass destruction. The NNSA, a semi-autonomous administration within the Department, carries out these responsibilities. Established in March 2000, pursuant to Title 32 of the National Defense Authorization Act for Fiscal Year 2000 (Public Law 106–65), the NNSA is structured to provide clear and direct lines of accountability and responsibility for the management and operation of the Nation's nuclear weapons, naval reactors, and nuclear nonproliferation activities.

In January 2001, President Bush asked the Secretary of Defense, in coordination with the Secretary of Energy, to conduct a Strategic Defense Review to create a new vision for the role of the Nation's military in the 21st century. Completion of this review will certainly impact the fiscal year 2002 and outyear budgets for defense and national-security-related activities. The administration plans to determine the final fiscal year 2002 and outyear funding requests when the Strategic Defense Review is complete. As Secretary Abraham indicated in his statement on April 9, 2001, concerning the DOE fiscal year 2002 budget request to Congress, "While awaiting the policy shaped by the Strategic Defense Review, we will refocus funding to meet vital national security needs, including investments to maintain our nuclear weapons arsenal, shore up an aging weapons infrastructure, and improve safeguards and security at all DOE facilities." I am here today to describe those efforts and the progress we have made since the NNSA was created.

STANDING UP THE NNSA

The NNSA has formed in just over 1 year. As the NNSA Administrator, this is my first opportunity to appear before the subcommittee to discuss the NNSA budget request. Before providing a detailed presentation of our budget, based on our key goals and strategies for attaining those goals, let me share with you my observations about the Nation's nuclear security enterprise and some of the accomplishments the NNSA has achieved during its short existence.

I begin by emphasizing that our focus is on our mission, as Congress defined it in the NNSA enabling legislation—Title 32 of the the National Defense Authorization Act for Fiscal Year 2000. Title 32 contains six mission objectives:

1. To enhance United States national security through the military applications of nuclear energy.
2. To maintain and enhance the safety, reliability, and performance of the United States nuclear weapons stockpile, including the ability to design, produce, and test, in order to meet national security requirements.
3. To provide the United States Navy with safe, militarily effective nuclear propulsion plants and to ensure the safe and reliable operations of those plants.
4. To promote international nuclear safety and non-proliferation.
5. To reduce the nuclear danger from weapons of mass destruction.
6. To support United States leadership in science and technology.

The NNSA's mission is to strengthen national security and reduce the global threat from weapons of mass destruction, through the application of science and technology. While standing up the NNSA has proceeded more slowly than I would have liked, we are fulfilling our mission every day in our laboratories, production facilities, test sites, and, yes, even in remote parts of the world where we pursue our nonproliferation goals. My friend Admiral Bowman oversees 102 naval nuclear reactors, helping underwrite American military presence and deterrence around the globe.

OBSERVATIONS

Over the last 6 months, I have traveled to all of the national defense laboratories, the production plants, and the Federal field offices. I have met many of the men and women who make up the NNSA. Based on my observations and interactions, I am very impressed with the dedication our team brings to their work and our mission; the intelligence and creativity they apply to the highly complex scientific and engineering problems that confront them; and the technical skills they use to maintain the safety, security, and reliability of this nation's aging nuclear weapons stock-

pile, while addressing the risks of proliferation and use of weapons of mass destruction, and developing the most efficient, safest nuclear reactors ever conceived.

As long as nuclear deterrence remains the cornerstone of our national security strategy and we continue to face the risk of weapons of mass destruction, we must ask nothing less than the continued excellence these people have delivered for more than 50 years. In fact, we must continue to demand more—more security, improved health and safety for our workers, more environmentally benign processes, and higher efficiency. They, in turn, deserve our support and our advocacy.

As we discuss budgets, programs, and projects, it is imperative that we not lose sight of the fact that the success of the NNSA depends on these talented and patriotic Americans—the technicians, administrative staff, scientists, guards, engineers, maintenance crews, managers, and all the others who contribute to the Nation's nuclear defense. One of my jobs is to make certain that none of us lose sight of this simple fact we must not jeopardize the success of these programs by making decisions that unnecessarily hinder our people from performing their best work or stifle their creativity or limit their initiative.

I assumed this job at a moment in which the enterprise, as a whole, was struggling with security concerns and questions about its future, and the morale of our people was at an all-time low. While hard to quantify, I sense, and I believe my colleagues and the leadership at the laboratories and production plants would agree, that morale has begun to improve. People are starting to feel better about themselves, their work, their institutions, and the direction in which they see the NNSA moving, especially at the laboratories.

MISSION ACCOMPLISHMENTS

Last year, our overall budget saw its first real growth in many years, and, for that, I thank Congress. This tangible commitment to our mission by Congress has sent a strong signal that the mission is importatnt and enduring, and has allowed all of us in the enterprise to begin to really look to the future. With these additional funds, we have begun to make marginal improvements. These additional funds will make it easier to attract and retain the next generation of scientists and engineers, to continue to build the needed experimental and computational facilities, and to begin to correct our aging infrastructure at the production sites and laboratories. Congress authorized an increase in Laboratory Directed Research and Development (LDRD). In fiscal year 2001, we have established a new research and development program, dedicated to improving the efficiency and effectiveness of our production plants.

That said, the NNSA enterprise is still very fragile, and there is much more to do. We are making aggressive, pro-active management decisions to improve our stewardship of the resources provided by Congress.

The NNSA completed the fifth annual certification of the nuclear weapons stockpile, with the Secretaries of Defense and Energy, who signed their certification letter on January 11, 2001, for transmission to the President.

Activities are on track to restore the capability of producing tritium, which is required for proper operation of all nuclear-weapon types in the stockpile. On January 1, 2000, a 30-year interagency agreement with the Tennessee Valley Authority (TVA), making three of its reactors available to begin irradiation of tritium production absorber rods, as early as October 2003 was completed. On July 27, 2000, ground was broken for the Tritium Extraction Facility (TEF) at the Savannah River Site. Delivery of new tritium gas is expected to commence in February 2006.

In concert with the Department of Defense, and through the Nuclear Weapons Council, we now have an agreed upon program to refurbish the B61 bomb and the W76 and W80 warheads, which constitute a significant portion of the stockpile. This work, in addition to the ongoing refurbishment of the W87 intercontinental ballistic missile warhead, is a clear demonstration that stockpile stewardship *is* working, and a clear measure of a renewed, much improved relationship with the Department of Defense. At the same time, this planned workload demands resources that are not included in the original Stockpile Stewardship Program (SSP) and demand long-delayed improvements in plant infrastructure as well.

There are new contracts in place that give NNSA better oversight at our plants and laboratories at Y–12, Pantex, Kansas City, and Los Alamos and Lawrence Livermore National Laboratories.

The approach to solving infrastructure issues is also moving in the right direction. We have begun a recapitalization initiative to develop an integrated, prioritized list of maintenance and infrastructure activities that, when completed, will significantly increase the operational efficiency and effectiveness at all of our sites. It is a long-term plan that will allow us to create a weapons complex that is properly sized,

using modern technologies to protect the health and safety of our workers and communities, without creating a legacy of hazardous waste and distrust that we do not want, nor can we afford. This plan will increase the operational readiness of facilities, reduce non-productive facility downtime and high costs associated with unplanned corrective maintenance, arrest the continuing deterioration of facilities, and extend the useful lifetimes of current facilities.

NNSA has rebaselined the work at the National Ignition Facility (NIF). There has been a major turnaround in the management of this once-troubled program, and I have recently certified to Congress that the program is on-schedule and within budget. We are making progress in plutonium pit manufacturing and certification, although there are serious issues ahead of us. Directed Stockpile Work (DSW) has made enormous leaps, and is providing the thousands of parts needed to keep the nuclear stockpile safe, secure, and reliable. The Advanced Simulation and Computing program (formerly the Accelerated Strategic Computing Initiative [ASCI]) is continuing, on track, to provide the world-class computing and simulation tools required to maintain the stockpile, now and into the future. The Nevada Test Site continues to conduct experiments, subcritical and others, that are providing valuable data on the health of the nuclear weapons stockpile, and are exercising skills necessary to maintain test readiness.

We have begun implementing "Integrated Safeguards and Security Management" in the NNSA. ISSM, as it is known, will build safeguards and security considerations into management and work practices, at all levels, so missions are accomplished securely. It is designed to involve the individuals performing work in the process of establishing appropriate safeguards and security practices. Subject-matter experts are available to provide guidance and information, but we must place the responsibility for securely working squarely on the shoulders of every individual in our complex—the scientists, technicians, production workers, and professionals performing and managing our missions.

NNSA has been hard at work to secure and dispose of nuclear warhead materials, at home and abroad. We are establishing methods to help prevent the unthinkable from happening—the use of weapons of mass destruction in an attack on this country or our citizens. NNSA's world-class expertise at its national laboratories is vital to the success of this effort.

Since 1993, the Materials Protection, Control and Accounting (MPC&A) program has formed a first line of defense by working with Russia to improve the security of weapons-usable material at 95 sites. By the end of the current fiscal year, the program will have completed rapid security upgrades for nearly 4,000 Russian Navy nuclear warheads and an additional 220 metric tons of HEU and plutonium located in Russia and the Newly Independent States—enough material to make roughly 20,000 nuclear devices. In addition, our Second Line of Defense (SLD) Program is improving Russia's ability to detect and interdict nuclear smuggling, by installing radiation detection equipment at key Russian border crossings, including three seaports and two airports.

NNSA is helping to prevent the proliferation of weapons-usable material, while significantly reducing long-term storage costs for these materials in the United States. Under the materials disposition program, the U.S. and Russia are implementing an agreement, signed in September 2000, to permanently dispose of 68 metric tons of weapons-grade plutonium (34 metric tons on each side).

We continue to transfer quantities of surplus U.S. highly enriched uranium—more than 34 metric tons to date—to the U.S. Enrichment Corporation (USEC), for downblending to low-enriched uranium nuclear-reactor fuel. We recently signed an agreement with the TVA to dispose of another 33 metric tons of highly enriched uranium. This agreement with the TVA will save U.S. taxpayers nearly $600 million over the cost of disposing of it as waste.

Under the HEU Purchase Agreement with Russia, we have overseen the conversion of 110 metric tons of Russian weapons-grade HEU to low enriched uranium, for commercial sale to the United States for our nuclear power plants. This amount is equivalent to roughly 4,400 nuclear weapons.

NNSA employees are also training civilian nuclear reactor workers in Russia and the Newly Independent States to increase safety standards and prevent another accident, such as the one that occurred at Chernobyl. On December 15, 2000, the government of Ukraine permanently shut-down the last remaining operational reactor at the Chernobyl Nuclear Power Plant, on schedule. NNSA experts were instrumental in making certain this historic achievement was possible.

The Multi-spectral Thermal Imager satellite was launched on March 12th, 2000. This small research satellite was designed and built by a team of NNSA laboratories and industry partners, to develop and test remote sensing concepts that will add to our country's ability to monitor nuclear proliferation. Additionally, this unique

satellite is being used by a wide number of civil, environmental, and defense scientists to conduct a broad array of government research.

The Nuclear Cities Initiative (NCI) aims to prevent and reverse the threat of proliferation of nuclear weapons expertise, by redirecting weapons scientists in Russia's nuclear cities to sustainable, non-weapons activities. The NCI also enhances U.S. national security by assisting Russia in reducing the overall size of its nuclear weapons production complex. Last year, this program achieved a historic accomplishment when the Russians moved a concrete fence at the Avangard weapons facility, creating an open "Technopark" for commercial businesses. This is the first time that a Russian weapons facility has reduced its footprint, as part of the nuclear weapons complex downsizing they have committed to undertake.

All of this said, we face a period of uncertainty in our cooperative programs with Russia to reduce the threats of weapons of mass destruction. Recently, Russian President Putin dismissed the head of the Ministry of Atomic Energy, Minister Adamov, and replaced him with Alexandr Rumyantsev, from the Kurchatov Institute. We are uncertain what this change will mean for our programs. We remain concerned about access required to ensure that our cooperative threat reduction (CTR) programs are implemented properly and that our financial contributions are well spent. We are also mindful of Russia's cooperation with Iran.

Naval Reactors has compiled an unparalleled record of success, including:

- Nuclear-powered warships have safely steamed more than 122 million miles, equivalent to nearly 5,000 trips around the Earth.
- Naval reactor plants have accumulated 5,200 reactor-years of operation, compared to approximately 2,540 for the U.S. commercial industry. In addition, our operating experience is approximately half that of the entire commercial power industry, worldwide (our 5,200 reactor-years, compared to approximately 9,660 worldwide, including the U.S.).
- Naval Reactors' outstanding, and fully public, environmental record enables our ships to visit more than 150 ports around the world, which is critical to our nation's forward-presence strategy and ability to project power.

Policy Reviews

As mentioned above, the new administration has chartered several reviews to create a new vision for the role of the Nation's military in the 21st century. These reviews will examine the appropriate national security strategy for this country. One of the reviews will encompass the role of nuclear deterrence and a position on the size of the future U.S. nuclear stockpile. A second review will evaluate all U.S. nonproliferation programs with Russia. At the end of this review, we may have a new strategy for our threat reduction activities with Russia. The Department and the NNSA are active participants in these reviews. The administration will finalize fiscal year 2002 and outyear funding requests for defense when these reviews are complete.

IMPROVEMENTS ARE STILL NEEDED

No matter the outcome of these strategic reviews, we recognize the need for change in the business practices of the Nation's nuclear security enterprise.

While we are making steady progress, the NNSA still has work to do to get security right. Our people must see that there is value added in new or additional security requirements. We want to make sure that what we do actually improves security, and that security measures do not unnecessarily impede accomplishing our mission. We have stressed the concept of science AND security, rather than science OR security. We must make sure that the scientific culture and the security culture mesh. Our scientists must understand the need for classification and security, as they advance science. Similarly, our security officers must be sensitive to the environment in which we operate, and help further our mission. Our scientists, engineers, technicians, and our security and counterintelligence personnel must see themselves on the same team.

We must focus on revitalizing our infrastructure, which has long been neglected. This is key for the organization to improve morale, increase recruitment, and retain people. No one wants to work in a facility where weeds grow through the cracks in the buildings, or where you have to wear a hard hat, not for normal safety requirements, but because the concrete in the roof may fall down at any time. Revitalizing our infrastructure will take additional funding, but it will be incumbent upon us to set priorities so this job is done in the most cost-effective way in future years.

NNSA, as an organization, must continue to sharpen its project management skills. Just 2 weeks ago, I was at Lawrence Livermore National Laboratory's National Ignition Facility. The people there are making great strides in focusing on the

project, completing conventional-facility construction, and maintaining a schedule that will see this project to fruition.

At Los Alamos National Laboratory, Defense Programs must ensure that the capability to manufacture plutonium pits is reestablished, and we must come to grips with the long-term requirements for pit manufacture. We have recently established a full-time office in DP that focuses solely on pit production and certification. This pit project office sets schedules and milestones to ensure that we can produce pits, and that they can be certified by the laboratory for use in the stockpile.

A key to many of the management challenges facing the NNSA is implementing a planning, programming, budgeting, and evaluation process. This new management system will: (1) improve discipline in program and project management; (2) ensure that each program and project receives appropriate consideration, as tradeoffs are made in establishing the integrated budget; and (3) create meaningful performance measurement and feedback systems. We will measure the value of this system through improvement in our mission performance.

As a first step in the implementation of this process, we have begun a strategic planning process to identify key goals of the NNSA, strategies for attaining those goals, and measures for tracking progress on our goals. In addition to ensuring that NNSA is in compliance with the Government Performance and Results Act (GPRA), this effort has helped foster a recognition of the benefits of managing nuclear security programs on an enterprise-wide basis. We have organized our budget testimony this year to track the key goals and strategies identified by our senior managers. Our six primary goals are:

1. Maintain and enhance the safety, security, and reliability of the Nation's nuclear weapons stockpile, meeting military requirements designed to counter threats of the 21st century.
2. Assure the safe and secure management of nuclear facilities, materials, and expertise worldwide.
3. Detect, deter, and impede the proliferation and the use of weapons of mass destruction.
4. Provide the Navy with safe, militarily effective nuclear propulsion plants, and ensure their continued safe and reliable operation.
5. Ensure the vitality and readiness of the NNSA's scientific and technical enterprise, for the next decade and beyond.
6. Create a well-managed, responsive and accountable organization by employing effective business practices.

GOAL 1: STOCKPILE STEWARDSHIP

We turn first to a discussion of the *Stockpile Stewardship Program (SSP) that is designed to maintain and enhance the safety, security, and reliability of the Nation's nuclear weapons stockpile, and meeting military requirements designed to counter threats of the 21st century.* To ensure that the U.S. stockpile of nuclear weapons remains safe, secure, and reliable, the NNSA will continue to advance the Stockpile Stewardship Program. This program was established by the Fiscal Year 1994 National Defense Authorization Act, which directed the Secretary of Energy "to establish a stewardship program to ensure the preservation of the core intellectual and technical competencies of the United States in nuclear weapons." The Stockpile Stewardship Program must: (1) predict, detect, and evaluate potential problems, due to the aging of the stockpile; (2) refurbish and re-manufacture warheads and components, as required; (3) support focused, multi-faceted efforts to increase the understanding of the stockpile; and (4) maintain the science and engineering institutions needed to support the Nations's nuclear deterrent, now and in the future.

Surveillance and assessment activities, including many aboveground experiments, the manufacture of limited-life components and replacement parts, the reestablishment of a capability to fabricate plutonium pits, weapon refurbishments to extend the lifetimes of the weapons in our aging stockpile, securing a source of tritium, and providing secure transportation of nuclear materials are all necessary, whether we're conducting nuclear tests, or not. In addition, we must maintain our nuclear weapons complex, which has been downsized significantly during the last decade and is in dire need of repair; ensure that we have a workforce with the necessary skills; and see to the safety and security of both our facilities and workforce, the communities in which we work, and the environment in which we live.

We are annually conducting hundreds of experiments at our national laboratories and the Nevada Test Site (NTS) to increase our understanding of what happens when a nuclear weapon detonates. The software being validated by these experiments is already making significant contributions to the maintenance of the nuclear stockpile. Early versions of the three-dimensional weapon performance codes are re-

solving previously unexplained phenomena from past underground test data and are contributing to the resolution of issues that have been raised by our surveillance program. Simulations have also enabled us to qualify, for the first time without nuclear tests, a radiation-hardened component and a replacement neutron generator for the W76.

Experiments in facilities now under development, such as the National Ignition Facility (NIF), and those that are on-line, such as the Z Accelerator and the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT), will greatly expand our knowledge of what happens in a nuclear detonation. The closer our scientists and engineers get to duplicating in the laboratory the phenomena that occur in nuclear detonation, the greater our chances are of being able to continue to certify that our stockpile is safe, secure, and reliable, without the need to return to nuclear testing. But, even if there were no moratorium on nuclear testing, most activities encompassed by the Stockpile Stewardship Program would still be necessary to assess, certify, and maintain the safety, security, and reliability of the stockpile.

Stockpile Certification

A cornerstone of the Stockpile Stewardship Program is the certification to the President, by the Secretaries of Defense and Energy, whether any safety or reliability concerns exist that would require a return to nuclear testing. At his confirmation hearing, Secretary Abraham stated that, in his judgment, "one of the most sobering and important responsibilities vested in the Secretary of Energy is the duty to certify to the President each year that the U.S. nuclear stockpile is safe, secure, and reliable. . . ." In a like manner, I believe my most important responsibility, as the Administrator of the NNSA, is to facilitate that process.

Certification is based on a yearly, rigorous technical review of the condition of the stockpile by the directors of the three nuclear weapons laboratories, the Commander in Chief of the U.S. Strategic Command, and the Nuclear Weapons Council. The most recent assessment concludes that the stockpile is safe and reliable, and that no nuclear testing is needed at this time.

This certification is made possible by activities within the Stockpile Stewardship Program, through an extensive set of activities and tests assessing and qualifying the myriad of components and subsystems of each of our weapon system types. Data and test results must be analyzed, assessed, and evaluated before conclusions can be drawn regarding the safety and reliability of stockpiled warheads. A significant imperative of assessment and certification is to develop the necessary tools to accurately baseline warheads in the existing stockpile, while designers with nuclear-test and warhead-design experience remain to mentor the next generation of stockpile stewards.

The key to accurate assessments is the expert judgment of our weapons scientists and engineers. Confidence in the accuracy of their judgment and confidence in the safety, security, and reliability of the warheads in our stockpile are more closely linked than ever before. In the past, a weapon steward's judgment was developed and validated through new warhead design and nuclear testing. Today, our Stockpile Stewardship Program is honing and demonstrating expert judgment of the next generation of stockpile stewards through integrated use of surveillance, computational simulations, applied scientific experimentation, material and aging studies, and nonnuclear experiments.

In the absence of nuclear testing, a variety of experiments and tools provide data relevant to nuclear warhead performance. Some of the older tools, designed to complement nuclear testing, are not, in and of themselves, sufficient to provide the needed information. A suite of enhanced capabilities and facilities, to fill in the knowledge gaps and provide enhanced data relevant to various stockpile concerns, has been identified and is being developed through our campaigns, described later in my testimony.

We are implementing stockpile stewardship through two strategies: a program of Directed Stockpile Work, and development of a suite of science, engineering, and readiness campaigns.

Directed Stockpile Work

The first strategy for maintaining the safety, security, and reliability of the Nation's nuclear stockpile is our program of Directed Stockpile Work, developed in concert with the DOD. This program applies the improved tools and technologies developed by all elements of the Stockpile Stewardship Program, and consists of three important elements: maintenance and evaluation, refurbishments, and dismantlements.

Stockpile Maintenance and Evaluation

The budget submission for fiscal year 2002 will support all scheduled maintenance and evaluation activities for the current stockpile. Each year, 11 weapons of each type in the stockpile are returned from the active force and are disassembled, examined, tested, and analyzed for defects. One is destructively tested. If defects are found, their effect on reliability and safety is assessed. We conduct flight and laboratory tests on systems and components, including the destructive testing of pits. In fiscal year 2002, we expect to conduct 30 flight tests, 72 laboratory tests, thousands of component tests, and we will destructively analyze nine pits. The current budget request will allow us to continue to reduce the backlog of laboratory tests resulting from other priorities during past years. The additional $23 million over our request in fiscal year 2001 that Congress provided for reducing the testing backlog was instrumental in reducing the backlog this year. The additional $17 million that Congress provided for the Enhanced Surveillance Campaign in fiscal year 2001 enabled us to initiate and accelerate the deployment of advanced diagnostic tools, for early identification of warhead aging problems that otherwise may not be detectable until too late.

Scheduled maintenance also includes the replacement of limited-life components, such as neutron generators and tritium reservoirs. In fiscal year 2002, we expect to produce and fill 1,695 tritium reservoirs, produce 1,445 new tritium reservoirs, re-certify 854 neutron generators, and produce 296 new neutron generators. In fiscal year 2001, the complex accomplished the exchange of nearly 4,500 limited-life components. We also expect to achieve first production of replacement tritium reservoirs for the W62 and W87, and continue production of the replacement neutron generator for the W76.

As our nuclear weapons continue to age, we expect more parts to require replacement. Manufacturing replacement parts sounds straightforward, but in the time that has elapsed since the current weapons in the stockpile were originally manufactured, some of our production plants have closed, manufacturing processes, techniques, and standards have changed, and there are more stringent health, safety, and environmental standards. Under these conditions, manufacturing exact replacement parts is difficult, if not impossible and, because nuclear testing can no longer be used to qualify the replacements, extensive testing and analyses must be conducted to ensure that the replicated components are acceptable.

At present, we have nine weapons alterations underway to meet higher safety standards or to replace faulty components in various systems. We are currently on schedule with all nine alterations, and the fiscal year 2002 budget supports those schedules. In addition, we have reached agreement, with the Department of Defense, on a comprehensive plan for refurbishing the nuclear stockpile over the coming decade. Implementation of that plan awaits decisions from the Strategic Defense Review, and the current fiscal year 2002 budget submission supports only limited execution of that plan.

Refurbishments

Following cessation of production at the Rocky Flats Plant in 1989, the U.S. has not produced a new nuclear warhead since 1991, nor have we had any requirement to build a new warhead. Prior to 1991, major refurbishment of a warhead to extend its life was not an issue, because new weapon types were continually being introduced into the stockpile. Currently, the average age of warheads in the stockpile is 18 years, and signs of aging have been identified through stockpile evaluation and enhanced surveillance. As the stockpile ages, we are working closely with the DOD to finalize detailed plans to extend the lifetime of each warhead type. These life extensions, or refurbishments, include the detection and correction of problems, and provide and maintain safety improvements and use control.

The budget submission continues the major refurbishment of the W87 warhead, deployed on land-based intercontinental ballistic missiles. This is the first major retrofit of any warhead in nearly a decade. Delivery of the first production unit to the Air Force, in May 1999, as scheduled, 6 years after conception of the project, was a major success. The safety concerns and production-line problems that occurred at our Pantex Plant are lessons learned that will be applied in future refurbishments.

Last year, the Nuclear Weapons Council reached final agreement on the technical scope of the refurbishments needed for the B61 bomb and for the W76 and W80 warheads. Together, these systems comprise a substantial portion of the current U.S. stockpile, and the additional funding received for research and development in fiscal year 2001 was used for W76 refurbishment design and W88 dynamic experimentation. The fiscal year 2002 request will support laboratory activities to complete the ongoing studies to refurbish the B61 (some components of which are more than 30 years old), to initiate development engineering to support a first production

unit in fiscal year 2004, and to begin the development of a plan for certification of the B61, with a refurbished canned subassembly. We plan to work with the Department of Defense to determine a schedule and, possibly, revised scopes for the W76 and W80 refurbishments, pending completion of the Strategic Defense Review. The current budget request does not support the original schedule developed with DOD.

Warhead Dismantlement

Since the end of the Cold War, the United States has reduced its nuclear weapons inventory by approximately 60 percent. NNSA is currently disassembling two types of warheads, and is committed to the safe disassembly of any warheads retired, as a result of the ongoing national security strategy review or future decisions. Disassembly of the W79 Artillery-Fired Atomic Projectile will be complete in fiscal year 2003, and disassembly of the W56 Minuteman II intercontinental ballistic missile warhead will be complete in fiscal year 2005.

Campaigns

The second stockpile stewardship strategy is to maintain and develop the scientific, engineering and manufacturing capabilities needed for the continued certification of the stockpile, including the ability to design new weapons and conduct underground nuclear tests. This strategy is being implemented through a series of campaigns, which are focused, scientific and technical efforts to develop and maintain critical capabilities needed to enable continued certification of the stockpile for the long-term. They are technically challenging, multifunctional in nature, and have definitive milestones, specific work plans, and specific deliverables. The campaign approach was initiated in fiscal year 2001 as part of a new program planning and budgeting framework, to facilitate integration within the Stockpile Stewardship Program. There are currently 17 campaigns:

- Primary Certification;
- Dynamic Materials Properties;
- Advanced Radiography;
- Secondary Certification and Nuclear Systems Margins;
- Enhanced Surety;
- Weapons System Engineering Certification;
- Nuclear Survivability (formerly Hostile Environments Certification);
- Enhanced Surveillance;
- Advanced Design and Production Technologies;
- Inertial Confinement Fusion and High Yield (includes NIF);
- Advanced Simulation and Computing (formerly the Accelerated Strategic Computing Initiative);
- Pit Manufacturing and Certification (formerly Pit Manufacturing Readiness);
- Secondary Readiness;
- High Explosives Manufacturing and Weapons Assembly/Disassembly;
- Nonnuclear Readiness;
- Materials Readiness; and
- Tritium Readiness.

Today, I would like to discuss, in detail, a few of these campaigns.

Pit Manufacturing and Certification

We have not manufactured plutonium pits for use in the stockpile since 1989, when the Rocky Flats Plant stopped production of W88 pits, due to facility safety and environmental concerns. As a result, there are not enough W88 pits to meet future surveillance destructive-testing requirements. The budget request for fiscal year 2002 continues to reestablish a capability to fabricate a limited number of plutonium pits at Los Alamos National Laboratory. The plan is to complete the fabrication of a certifiable W88 pit in fiscal year 2003, within this budget request, with no commitment to a certification schedule or to production quantities. As we proceed, we will continue to work closely with the Navy to ensure that military needs for the W88 are met.

The additional $25 million, provided by Congress in fiscal year 2001, was instrumental in developing momentum in pit manufacturing. The NNSA completed a report for Congress earlier this month, as requested by the conference report accompanying the Energy and Water Development Appropriations Act for fiscal year 2001. The recently submitted report contains project schedules and cost estimates for production and certification of W88 pits.

The magnitude of the challenge to reestablish a pit production capability at Los Alamos National Laboratory can, perhaps, best be illustrated by the fact that approximately 18,000 activities and 350 individual work packages have been identi-

fied, to complete production and certification of the W88 with a newly manufactured pit. To date, we have produced eight W88 development pits, and are on schedule to reestablish the technology and manufacture a certifiable W88 pit in fiscal year 2003. A detailed and rigorous set of engineering and physics certification tests has been defined, to achieve certification without nuclear testing.

A pit project office was established this past year within Defense Programs, to provide oversight of all pit production and certification related activities. In addition to near-term activities, such as the W88, this new office is responsible for long-term pit production readiness planning. For future readiness, we are using the $2 million provided by Congress this fiscal year to conduct pre-conceptual design studies, sufficient to enable a decision for conceptual design planning of a modern pit facility in fiscal year 2002. In fiscal year 2004, new information from pit-aging studies is expected to provide further insight into pit lifetimes. This information, coupled with the requirements for the numbers and types of weapons in the stockpile resulting from the President's Strategic Defense Review, will drive sizing decisions for a modern pit facility. The Nuclear Weapons Council will continue to monitor our work in this area.

Tritium Readiness

Every U.S. nuclear warhead requires tritium to function as designed. Because tritium, a radioactive isotope of hydrogen, decays at the rate of 5.5 percent per year, it must be periodically replenished within each nuclear warhead. We have not produced tritium since 1988, and our inventory, depending on the results of the Strategic Defense Review, is sufficient only until approximately 2005, after which time the 5-year tritium reserve we maintain may begin to be drawn down. In May 1999, the Department announced that TVA commercial light water reactors would be used to produce tritium, and that accelerator production of tritium (APT) technology would be developed as backup, by completing preliminary design and engineering development and demonstration activities.

A 30-year interagency agreement with TVA went into effect on January 1, 2000, making three of its reactors, Watts Bar and Sequoyah 1 and 2, available to begin irradiation of tritium production absorber rods, as early as October 2003. This month, TVA submitted a request to the Nuclear Regulatory Commission (NRC) to amend its operating license for the Watts Bar and Sequoyah reactors, to permit irradiation of tritium producing absorber rods. The NRC committed to expediting the approval of these requests.

On July 27, 2000, ground was broken for the new Tritium Extraction Facility (TEF) at the Savannah River Site and, during fiscal year 2001, site preparation and detailed design for the facility is expected to be completed. Originally, construction of TEF was to have begun in early fiscal year 1999, but language in the National Defense Authorization Act for fiscal year 1999 prohibited any tritium construction activities during fiscal year 1999. Because of this delay in schedule, we project that the TEF will not begin delivering tritium gas from irradiated absorber rods until February 2006. Depending on the results of the Strategic Defense Review, about 1 year of the 5-year tritium reserve may be consumed. The capacity of TEF to extract tritium from the absorber rods will be sufficient to restore the reserve, within 2 to 3 years.

Congress appropriated additional funding for APT in fiscal year 2001, and the preliminary design of APT is expected to be completed this year. However, the current fiscal year 2002 budget request does not include sufficient resources to complete the engineering development and demonstration activities in fiscal year 2002, as previously planned. In addition, an Advanced Accelerator Applications Program that is being planned by Defense Programs and the Office of Nuclear Energy, Science and Technology, may be put on hold. This multi-mission accelerator program is to include waste transmutation, isotope production, and tritium production. An Accelerator Demonstration Test Facility is being planned that would have the capability to be upgraded to produce tritium, if required.

Advanced Simulation and Computing

Senator Bingaman indicated, in the preface to a question following Secretary Abraham's confirmation hearing, that he was disturbed that, following the hearing held last Fall on the Stockpile Stewardship Program, as part of the hearings on the Comprehensive Test Ban Treaty, many of his "colleagues seemed to get the impression . . . that the Stockpile Stewardship Program is a sort of computer simulation exercise. . ." I want to dispel that impression.

Computer modeling and simulation are important elements of the Stockpile Stewardship Program, but the ultimate goal of our Advanced Simulation and Computing Campaign (ASC), formerly referred to as the Accelerated Strategic Computing Ini-

tiative (ASCI), is to have the ability to perform three-dimensional, high-fidelity simulations of the performance of all aspects of the operation of a nuclear warhead. By integrating the findings of our experimental and engineering R&D programs, as well as data from past nuclear tests, such simulations are providing our scientists with sufficient confidence to make it unnecessary to use underground nuclear testing at this time.

To fully achieve our goal, it is estimated that we must have a computer system operating at a minimum of 100 trillion operations per second (teraOPS), and computer software, validated by experimental data that provides a much greater understanding of the physics of nuclear explosions than we possess today. We are making remarkable progress toward achieving our goals in this area.

In December 1999, a three-dimensional simulation of the primary explosion of a nuclear warhead was successfully completed, for the first time, at Lawrence Livermore National Laboratory. This proof-of-principle simulation was performed on an ASC Campaign system operating at 3.89 teraOPS and took 20 days. On a Cray-class supercomputer, if sufficient memory were available, this simulation would have taken 80 years.

Soon thereafter, Sandia successfully completed the first-ever, three-dimensional computer simulations of a weapon warhead exposed to hostile radiation and blast environments. As part of this milestone, Sandia also completed a series of three-dimensional simulations of the performance of a neutron generator in a radiation field. These weapon simulations collectively required about 500,000 megabytes of memory and used 2,000 computing processors for 45 days.

In April 2000, 8 months ahead of schedule, a proof-of-principle, three-dimensional simulation of the secondary explosion of a nuclear warhead was completed at Los Alamos National Laboratory. This simulation was performed on two ASC Campaign systems, operating at approximately 3 teraOPS each, at Los Alamos and Sandia, and took 42 days. None of these simulations were possible, prior to the development of ASCI-scale computational platforms and software. We expect to meet the next milepost, a proof-of-principle three-dimensional simulation of a full weapon, including both primary and secondary operation, by the December 2001 scheduled date.

The ASC Campaign contributes to all elements of the nuclear weapons life cycle. It is providing the tools that are needed by weapons designers to maintain a nuclear weapon design capability. ASC Campaign computers are being used to help address issues associated with the manufacture of replacement parts for nuclear warheads, transportation and storage of weapons and components, certification of weapons, dismantlements, and the safety of weapons in various accident scenarios. The ASC Campaign is an integral and vital element of the Stockpile Stewardship Program. It provides the integrating simulation and modeling capabilities and technologies needed to combine new and old experimental data, past nuclear test data, and past design and engineering experience into a powerful tool for future design, assessment and certification of nuclear weapons and their components.

The success of the computer modeling and simulation program has been, in no small measure, due to the budgetary support it has received, since its inception. The computing speed, power, and level of physics detail existing today was simply undreamed of a few years ago. The current budget request, however, will slow the scheduled progress of the campaign, and delay our previously announced commitment to reach a computing capability of 100 teraOPS from fiscal year 2004 to fiscal year 2005. This will delay, by at least a year, our major deliverable to Directed Stockpile Work—the ability to perform a high-fidelity simulation, in three-dimensions, of the performance of a full nuclear warhead.

Completion of three ASC Campaign construction projects will also be delayed for at least 1 year with this budget. These projects are the Distributed Information Systems Laboratory at Sandia National Laboratories in Livermore, the Joint Computational Engineering Laboratory at Sandia in Albuquerque, and the Terascale Simulation Facility at Lawrence Livermore National Laboratory. Two other ASC Campaign program elements will also be scaled back in fiscal year 2002. These are the Path Forward program, which funds computer hardware and software companies to develop products needed to meet the aggressive ASC Campaign schedule, and the DisCom2 program, which provides remote access to the large computing platforms, enabling sharing of these resources among our production plants and laboratories.

These deferrals in meeting ASC Campaign milestones are consistent with the possible refurbishment schedules that are achievable with the fiscal year 2002 budget request.

Our commitments to selected groups in the university community through our Academic Strategic Alliances Program will not be affected, nor will the operation of the 12-teraOPS machine at Lawrence Livermore National Laboratory, which was re-

cently made available for software development and warhead simulations. It is already fully utilized.

Inertial Confinement Fusion and the National Ignition Facility

The National Ignition Facility, under construction at the Lawrence Livermore National Laboratory, is a vital element of the Stockpile Stewardship Program. It will allow us to study issues that affect aging and refurbishment of the stockpile, validate advanced simulation software being developed by the ASC Campaign, and help in attracting and retaining the exceptional scientific and engineering talent needed by the Stockpile Stewardship Program, over the long term.

The National Defense Authorization Act for Fiscal Year 2001 required the submission of a revised project baseline for NIF, in response to substantial cost increases and schedule slippage, caused by problems in assembling and installing the laser and target system infrastructure. The revised baseline, submitted in final form to Congress last September, retains the full NIF design capability of 192 beams, with completion of the project scheduled in fiscal year 2008, and experiments with the first eight laser beams beginning in fiscal year 2004. It is important to understand that we will be conducting many experiments at NIF, well before all 192 beams are available in fiscal year 2008. Between fiscal year 2004 and fiscal year 2008, approximately 1,500 experiments will be conducted at NIF. The project goals are to achieve early light in 2003, with four laser beams, and to meet our "First Light" milestone, with eight laser beams, in 2004.

I believe the progress at NIF reflects several management decisions that have been made during the past year and half. These include: (1) the hiring of an industrial contractor with a proven record of constructing similarly complex facilities, to manage and install the laser and target system; (2) the creation of a NIF Project Office that reports directly to the Deputy Administrator for Defense Programs; (3) the appointment by the laboratory director of an associate director with line responsibility for the NIF Project; and (4) the selection of a new project manager, with extensive project management experience, to oversee daily NIF Project activities.

As required by the Fiscal Year 2001 Energy and Water Development Appropriations Act, I recently certified to Congress that the NIF Project milestones, for the revised schedule, are being met within the revised budget. The project is making significant progress. We expect to complete construction of conventional facilities this fiscal year. Laser bays are now under clean room protocols, and installation of laser systems has begun. Our glass manufacturers have delivered more than 1,700 of the required 3,500 laser glass slabs that meet our specifications.

The Conference Report accompanying the Energy and Water Development Appropriations Act for Fiscal Year 2001 also directed the NNSA to assess the role of NIF, to consider the requirement for the full 192-beam configuration, and determine if alternatives to the full NIF could meet the safety and reliability needs of the nuclear weapon stockpile. To meet this requirement, the NNSA initiated a broader study to examine its entire High-Energy-Density Physics Program. NNSA brought together laboratory leadership and technical staff, DP management, and a number of nuclear-weapon-knowledgeable advisors from a variety of Federal organizations. Alternatives that were considered included pauses in NIF construction at 48, 96, and 120 beams, a refurbishment of the Z accelerator at Sandia, and the addition of an engineering demonstration milestone to the NIF Project at first light. The principal recommendation of this study, which was submitted to Congress on April 6, was that the NNSA should continue with the current High-Energy-Density Physics Program, including the Omega, the Z Accelerator, and the 192-beam NIF, with the goal of achieving ignition.

Experiments on the Atlas pulsed-power machine at Los Alamos National Laboratory will begin later this year and will continue in fiscal year 2002. Relocation of the facility to the Nevada Test Site will be deferred, due to higher priorities of the stockpile and limitations imposed by the current fiscal year 2002 budget. In fiscal year 2001, we also expect the completion of the Z-backlighter project at Sandia, in which the Beamlet, a technology demonstration for NIF, is being adapted as a diagnostic tool for use on the Z accelerator. A variety of experiments with this technology, planned to begin in fiscal year 2002 to study hydrodynamics, materials properties, and inertial confinement physics, may also be deferred.

Other Campaign-Specific Experimental Activities

Other experimental activities are underway, across the complex, in support of the Nation's nuclear deterrent. At Los Alamos National Laboratory, physics experiments using the first-axis of the Dual Axis Radiographic Hydrodynamic Test Facility (DARHT) have been conducted, providing valuable weapons data. DARHT provides us the capability to take freeze-frame photos of materials imploding at speeds great-

er than 10,000 miles an hour, allowing scientists to study solids and metals as they flow like liquids, when driven by the detonation of high explosives. We expect the second arm of DARHT to be completed in fiscal year 2002, allowing simultaneous views from two directions, as well as several separate views over the time of the implosion.

Subcritical experiments at the Nevada Test Site continue to be successful. To date, thirteen have been conducted. These experiments are helping us to assess the stockpile by providing understanding of aspects of weapons physics and the aging properties of plutonium. They also help us to certify pits manufactured at Los Alamos National Laboratory, for use in the nuclear weapons stockpile. In addition, subcritical activities are a major contributor to underground nuclear test readiness at the Nevada Test Site. To support related materials research, we have also begun acceptance tests on the JASPER (Joint Actinide Shock Physics Experimental Research) gas gun at the Nevada Test Site. We expect to begin obtaining data on plutonium late this year.

During this next year, we will look hard again at improving test readiness, and will review whether an apporpriate level of resources is being applied to this vital element of stockpile stewardship.

GOAL 2: SECURING NUCLEAR FACILITIES, MATERIALS, INFORMATION, AND EXPERTISE WORLDWIDE

Our second goal is to ensure the safe and secure management of nuclear facilities, materials, and expertise, worldwide. While maintaining and enhancing the safety, security, and reliability of the Nation's nuclear weapons stockpile, the NNSA has a custodial responsibility to ensure that all U.S. nuclear-deterrent assets—information, facilities, and people—are safeguarded and secured to prohibit unwanted damage or unauthorized release of these key U.S. national security assets. The NNSA also works in parallel to address international threats to U.S. national security interests from the potential proliferation of weapons of mass destruction. These new international threats derive largely from the Soviet Union's production of enormous quantities of nuclear materials and weapons, and from potential actions by rogue nations or terrorist organizations with interests contrary to those of our nation. The NNSA is pursuing a balanced and comprehensive approach to nonproliferation that seeks to reduce or eliminate these threats to U.S. national security interests, particularly threats in Russia and countries of the Former Soviet Union (FSU).

Integrated Security Action Plan

A key strategy for preventing proliferation is effectively managing and protecting the NNSA nuclear weapons, materials, and information. The NNSA is pursuing an Integrated Security Action Plan to protect U.S. nuclear assets. While we are making steady progress, NNSA still has work to do to get security right. We have commissioned a group of eminent Americans, known as the Hamre Commission, to review the entire issue of science and security to help us make sure we get the right picture and perspective. I have warned them to be careful with their recommendations, because many of them are likely to be implemented.

I have called for a 6-month moratorium on implementing any *new* safeguards and security policies. We are using this time to review past policies, identify policy improvements, and determine how policy can most effectively be implemented within NNSA. We are emphasizing the importance of personal commitment and individual responsibility in the protection of our Nation's vital assets, and we are seeking to involve employees at all levels of our enterprise in improving safeguards and security.

The NNSA is *ensuring that people working on our nuclear deterrent are aware and accountable for their national security responsibilities.* In that regard, on March 26, 2001, I announced plans for implementing "Integrated Safeguards and Security Management" in the NNSA. ISSM, as it is known, will build safeguards and security considerations into management and work practices, at all levels, so that missions are accomplished securely. Individuals performing the work will be involved in the process of establishing appropriate safeguards and security practices. Subject-matter experts are available to provide guidance and information, but we must place the responsibility for working securely squarely on the shoulders of every individual in our complex—the scientists, technicians, production workers, and professionals performing and managing our missions.

The counterintelligence polygraph program has raised concerns among scientists and others within the NNSA community. We are sponsoring a scientific study by the National Academy of Sciences (NAS) on the validity and reliability of polygraphy. The NAS study will include what is known about the effects of medications, sleep deprivation, and illness on the physiological responses measured

through polygraph examinations. The 15-month study began on January 1, 2001. The study's final report is to be released next year and should help us improve upon the Department of Energy's polygraph program.

Safeguards and Security

The NNSA is *protecting U.S. nuclear facilities.* The NNSA conducts a rigorous Safeguards and Security program to protect the physical assets of the NNSA enterprise. These efforts are an integral part of the administration's mission of being a responsible steward of the Nation's nuclear weapons. In fiscal year 2001, safeguards and security activities were appropriated as direct costs, rather than as allocated costs within indirect and overhead funding, as in the past. We are managing the safeguards and security as a line responsibility in the NNSA. My Chief of Defense Nuclear Security is responsible for establishing safeguards and security policy throughout the NNSA. We will administer the weapons safeguards and security budget for facilities where NNSA is the landlord, through our new Facilities and Operations organization, which I will discuss later in this testimony.

In 1999, a multitude of corrective actions and enhancements to upgrade the safeguards and security posture at all Defense Programs sites resulted from a program named "Safeguards and Security Goal Posts." By the beginning of fiscal year 2001, all final corrective actions and enhancements resulting from this program had been completed for all sites, except the Y–12 Plant, which was the only site not rated "satisfactory." The ability of the Y–12 Plant to attain an overall satisfactory rating hinges on the availability of funds to correct deficiencies in material control and accountability for the highly enriched uranium operations. The fiscal year 2002 budget request will maintain physical security functions at our production plants, the Nevada Test Site (NTS), and the national security laboratories, at their current security ratings.

The NNSA is *protecting vital nuclear deterrent information.* The Integrated Safeguards and Security Management program is designed to systematically integrate safeguards and security into management and work practices, at all levels, so that missions are accomplished securely. Implementation of the "Higher Fences" initiative, to enhance protection of certain restricted weapons data within DOE and DOD, by establishing an additional sigma category, requires few resources and is moving forward.

The nuclear weapons complex has always used secure computing systems and networks. However, the need for significant improvement in the protection of nuclear weapon data across the entire complex has been well documented in the past 2 years. An increased number of countries and organizations are attempting to obtain nuclear weapon data and are using increasingly sophisticated techniques.

In response, Congress provided supplemental funding in fiscal year 2000, to begin developing the Integrated Cyber Security Initiative (ICSI) Plan. Implementing this plan will sustain the operations and maintenance of cyber security activities throughout the complex, providing solutions for the most critical vulnerabilities revealed through risk assessments of the current network. Also, as called for in the ICSI plan, we will implement and demonstrate a testing network for evaluating and testing products and proposed solutions, complete the design of a new complex-wide network, and identify and catalog all electronic information that is exchanged in the complex.

The fiscal year 2002 budget request will move us forward on the Integrated Safeguards and Security Management program and the "Higher Fences" initiative, and will allow us to sustain the maintenance and operation of cyber security activities across the complex, and to provide upgrades where the highest vulnerabilities are assessed, but will not allow us to address the long-term solutions set forth in the Integrated Cyber Security Initiative (ICSI) Plan that was submitted to Congress in March of this year.

Transportation Safeguards System

The NNSA is *protecting the U.S. movement of nuclear materials, components and nuclear weapons.* The NNSA operates a Transportation Safeguards System to move nuclear weapons, components, and special nuclear materials, throughout the country, in a safe and secure manner, precluding theft or diversion. This unique transportation system has operated with an impeccable record of safety and security for more than 25 years. Although its primary mission has been in support of the nuclear weapons program, the system provides transportation services for all DOE programs that require nuclear materials to be protected while in transit. This summer, the Office of Environmental Management will begin to remove nuclear materials from Rocky Flats. Other programs have also projected increases in their requirements for secure shipment of nuclear materials. The Transportation Safeguards Sys-

tem resources will have to be increased during the next 5 years to meet the projected demand for secure shipment of nuclear materials. Headquarters and the Albuquerque Operations Office, in collaboration with other program offices, have initiated a coordinated planning and scheduling process to improve the optimum usage of our assets, to establish NNSA authority to certify Type B shipping packages, and to expand our capabilities by hiring and training special Federal agents and enlarging the fleet of trailers, tractors, and escort vehicles.

Defense Nuclear Nonproliferation Activities

With respect to NNSA's international nuclear security responsibilities, the NNSA develops and implements critical U.S. nonproliferation programs. Its role is due, in large measure, to the unique expertise in nuclear weapons and nuclear material handling that it draws from the National laboratories. The NNSA's goal is to ensure the close integration of technical talent and policy expertise with the efforts of other U.S. agencies working in the nonproliferation arena. Our goal is to address this complex, multifaceted issue in a comprehensive way, with specific, realistic goals for each part of the program. The Office of Defense Nuclear Nonproliferation's programs address different types of problems, and they are designed to do different things, while working to achieve the overall goal of reducing the threat of proliferation of weapons of mass destruction. All of these programs, together, offer a synergy of effect that is greater than the sum of the parts.

The NNSA is *pursuing strategies to protect or eliminate vulnerable weapons-usable nuclear material or infrastructure, and redirect excess weapons expertise to civilian enterprises in Russia and other nations that possess vulnerable materials.* The Office of Defense Nuclear Nonproliferation is responsible for these nuclear security programs, along with other programs that seek to prevent, detect, and deter proliferation of weapons of mass destruction and the materials needed to produce them. Key programs within NN that deal with vulnerable weapons materials and the nuclear complex infrastructure in Russia include: (1) Materials Protection, Control, and Accounting; (2) Fissile Materials Disposition; (3) HEU Transparency Implementation; (4) the Nuclear Cities Initiative; and (5) Initiatives for Proliferation Prevention. NN's other nonproliferation and arms control programs will be discussed in the next section. The three-fold threat of unsecured materials, widely available technology, and underemployed expertise following the breakup of the Soviet Union makes these issues of paramount importance and urgency.

Materials Protection, Control, and Accounting

The NNSA conducts effective programs in Russia to *protect vulnerable weapons and weapons-usable nuclear materials.* The NNSA's Materials Protection, Control, and Accounting program (MPC&A) is working rapidly to complete its mission, and estimates in its Strategic Plan that comprehensive security upgrades will be complete at all of the warhead storage locations that the Russian Navy has requested, as early as 2007, and for 603 metric tons of weapons-usable nuclear material by 2011. Since 1993, the program has completed rapid upgrades for nearly 4,000 warheads and 220 metric tons of fissile material. The unprecedented degree of cooperation and access shown by the Russian Navy to NNSA employees has facilitated the advancement of our work at a number of very sensitive Russian sites, allowing us to focus our personnel and funds on promptly securing the items in Russia that are most attractive to diversion. One programmatic goal for fiscal year 2002 is to complete security upgrades at 13 nuclear sites, bringing the total number of completed sites to 50.

Another goal is to promote sustainable security improvements. "Sustainability" is critical to the long-term mission of the program, because we must ensure that installed MPC&A systems are maintained and operated over the long term. Sustainability also entails fostering the ability of our Russian counterparts to operate and maintain the MPC&A systems unilaterally. To ensure sustainability, we are establishing training centers, identifying credible Russian suppliers of MPC&A equipment, helping draft national regulations and security force procedures, and establishing a Federal information accounting system to track amounts and locations for all of Russia's nuclear material. Specifically, in fiscal year 2002, we will conduct 50 training courses in MPC&A design, operation, and maintenance for more than 2,400 students, bringing the total number of Russian personnel trained in MPC&A concepts to greater than 6,000. Furthermore, we have developed and implemented a program to consolidate material into fewer buildings and fewer sites, and to convert excess highly attractive material to a form that is less attractive to potential proliferant nations. In fiscal year 2002, this program will convert an additional 1.8 metric tons of highly enriched uranium to low-enriched uranium (LEU), raising the total converted to four metric tons. This program reduces costs to the U.S. by limit-

ing the number of buildings requiring security upgrades. It also reduces the Russia-borne costs of maintaining installed security upgrades once NNSA's funds are no longer provided.

The NNSA conducts two separate, yet complementary, programs to *eliminate vulnerable weapons and weapons-usable nuclear materials in Russia,* so that it will never again be used for weapons purposes. We estimate that there are roughly 150 metric tons of plutonium and more than 1,000 metric tons of highly enriched uranium in Russia. These programs are the first step in what is sure to be a lengthy process.

Fissile Materials Disposition

The Fissile Materials Disposition program is responsible for disposing of inventories of surplus U.S. weapon-grade plutonium and highly enriched uranium, for reducing the significant costs associated with long-term storage of these materials in the U.S., as well as for providing the technical support for, and ultimate implementation of, efforts to obtain reciprocal disposition of surplus Russian weapon-grade plutonium. This disposition program is among the nonproliferation programs that is currently undergoing a National Security Council review of U.S.-Government nonproliferation assistance programs to Russia.

The fiscal year 2002 budget request will fund the completion of the mixed oxide (MOX) Fuel Fabrication Facility design and proceed with related MOX fuel qualification activities. We will continue the design of the Pit Disassembly and Conversion Facility at a reduced rate, and we will suspend the design of the Plutonium Immobilization Plant. These changes are necessary, to reduce the anticipated future-year peak funding requirements associated with plans for simultaneously building three plutonium disposition facilities at the Savannah River Site. Despite these schedule changes, the NNSA continues to pursue the irradiation of MOX fuel in existing reactors and immobilization for the disposition of surplus U.S. weapon-grade plutonium. This will enable us to meet the commitments called for in the recently signed U.S.-Russia Plutonium Management and Disposition Agreement and to support the continued consolidation, cleanup, and shut down of DOE sites where surplus plutonium is stored.

Other activities planned for fiscal year 2002 involve providing limited support for the development of facilities in Russia for disposition of surplus plutonium, and continuing surplus U.S. HEU disposition, including capital improvements at the Savannah River Site to support the off-specification blend-down project with the TVA. This project will eliminate tons of surplus weapons material, by converting it to reactor fuel for use in TVA's reactors, which provide electric power throughout the Southeast. Equally important, this work will also save the taxpayers $600 million by avoiding the cost to dispose of this surplus material as waste.

HEU Transparency Implementation

The NNSA is working to convert Russian surplus HEU from the Russian military stockpile into a non-weapon-usable form. The 1993 U.S.-Russia HEU Purchase Agreement remains one of the more impressive nonproliferation achievements of the last decade. The NNSA's HEU Transparency Implementation program is designed to provide assurance that surplus HEU from dismantled Russian nuclear weapons is downblended in Russia to LEU and fabricated into fuel for sale and use in U.S. commercial power reactors.

The program monitors the conversion and processing of this material at Russian facilities, subject to the terms of the agreement. Over the course of the program thus far, 73 teams—the equivalent of more than 4,000 monitoring hours—have visited these facilities to monitor conversion operations. During the past year, the NNSA installed a Blend-Down Monitoring System (BDMS) at one Russian facility, to provide continuous monitoring data in support of our transparency objectives. The fiscal year 2002 budget request will allow the NNSA to continue its blend-down monitoring activities, but at a slightly reduced level. Through the end of 2000, more than 111 metric tons of weapons grade uranium—enough for roughly 4,400 weapons—had been removed from the Russian military program, under this agreement, and converted to LEU for commercial sale. Our goal for 2001 is to convert another 30 metric tons. This program is a major source of income for the Russian government. Approximately $2.2 billion has been paid to the Russian Federation under this agreement, and some of this money is to be used for the conversion of defense enterprises and for enhancing the safety of Russian nuclear facilities.

Redirecting Excess Weapons Expertise and Eliminating Weapons Infrastructure

The NNSA conducts two programs focused on *redirecting excess weapons expertise in Russia to civilian enterprises and eliminating their weapons infrastructure.* The Nuclear Cities Initiative and the Initiatives for Proliferation Prevention Program

are programs that work together with the International Science and Technology Centers and the Civilian Research and Development Foundation to address all aspects of this issue.

Nuclear Cities Initiative

NNSA's unique "brain drain" program, the Nuclear Cities Initiative (NCI), was created in 1998, to assist the Russian Federation in: (1) diversification of the economy within the closed nuclear cities to attract commercial investors; (2) enhancement of U.S. national security by assisting Russia in reducing the overall size of its nuclear weapons production complex; and (3) prevention and reversal of the threat of proliferation of nuclear weapons expertise, by redirecting weapons scientists in Russia's nuclear cities to sustainable non-weapons activities. We are striving to accomplish this task, working closely with the Russians, to: (1) facilitate transition from weapons research to civilian business and commercial projects; (2) develop joint plans for accelerated downsizing of the Russian nuclear complex; (3) develop local infrastructure to support economic diversification and job creation; (4) conduct targeted training and other activities to improve marketing and management capabilities; and (5) leverage funding and encourage non-U.S. Government investment.

The fiscal year 2002 budget request will allow the NNSA to focus its commitments in only Sarov, Russia. In an effort to make the closed nuclear cities in Russia more amenable to international businesses, the NNSA has facilitated the creation of two International Business Development Centers, two Open Computing Centers, and two Nonproliferation Centers for research and training new nonproliferation experts. Additionally, we have expanded and upgraded telecommunications capabilities, to enable remote work to be done from those geographically isolated cities. Thus far, with a limited budget, NNSA has facilitated initiation of more than 25 commercial and infrastructure projects in the cities, with more than $8 million spent in Russia. With our help, loan officers of the European Bank for Reconstruction and Development loan officers are now established in each city, making more than $1 million in small-business loans to local non-weapons businesses in the closed cities. We are pleased that there are now 24 business training courses in those three cities, with hundreds of participants. Looking to the future, we are hopeful that negotiations involving more than 10 potential commercial investors will soon bear fruit.

Initiatives for Proliferation Prevention

The Initiatives for Proliferation Prevention (IPP) program was established in 1993, to prevent the proliferation of weapons technologies and expertise, by engaging former Soviet weapon scientists in cooperative research projects with DOE national laboratories and U.S. industry partners, especially in areas that have a strong potential for non-military commercialization. This program enhances U.S. national security by engaging former Soviet weapons scientists in civilian work, to prevent the spread of technologies related to weapons of mass destruction and also to increase access to, and transparency at, former Soviet weapons facilities. We have developed a rigorous process of screening all projects for potential dual-use activities or efforts, relying on other parts of the U.S. Government to bring their expertise to bear on this issue. At the same time, NNSA's activities in this arena also provide U.S. industry with technology and research talent from the former Soviet military establishment. Since its inception, the IPP program has engaged more than 8,000 scientists, engineers, and technicians in the Newly Independent States, and is supporting 64 cooperative research projects at 65 institutes. These efforts realized seven commercial projects and generated $9.4 million of commercialized products.

International Nuclear Safety and Cooperation

Another strategy for enhancing nuclear security is to improve operational safety and safety systems at nuclear facilities of concern. The NNSA is working to reduce safety risks at the 66 operating, Soviet-designed nuclear-power reactors in nine countries, through the International Nuclear Safety and Cooperation program. We plan to complete safety upgrades for these reactors by 2006. There are three reactors in Russia that are to be shut down, as part of DOD's program to eliminate the production of weapons-grade plutonium. These three high-risk reactors, at secured sites, are the oldest operating reactors in Russia, and have not received any safety upgrades under foreign cooperation. Safety upgrades at these production reactors, prior to their planned shutdown in 2006, are among our highest priorities. However, the scope of activities for improved safe operation will be limited.

We are encouraged not just by our progress to address nuclear safety at operating reactors, but by the early closure of older reactors as well. The Ukrainian government shutdown Chornobyl's sole operational reactor—Unit 3—in December 2000, as

planned. Our efforts to support the construction of a replacement heat plant at Chornobyl, for decontamination and decommissioning purposes, are also proceeding well. We were pleased when Kazakhstan also made the tough decision to shut down its BN–350 reactor. Our attention is now focused on plans for decommissioning and decontaminating the reactor's sodium coolant, which will ensure that this reactor can never be restarted. The fiscal year 2002 budget request will allow us to complete one full-scope, nuclear plant training simulator, each, in Russia, Ukraine, and Slovakia. We will also strive for the completion of operational safety improvements at all plants in Russia and Ukraine. Safety procedure and reactor in-depth safety assessments will proceed, albeit at a delayed pace.

GOAL 3: DETECTING, DETERRING, AND IMPEDING PROLIFERATION

Our third goal is to detect, deter, and impede proliferation and the use of weapons of mass destruction. As mentioned in the previous section dealing with nuclear material security, the NNSA develops and implements critical U.S. nonproliferation programs. In addition to the programs already described, NN has extensive efforts in research and development (R&D) and arms control arenas. Our active role in the U.S. nonproliferation interagency community derives, in large measure, from the nuclear expertise found in the national laboratories. NN supports U.S. national, bilateral, and multilateral efforts to reduce the threat posed by the proliferation of weapons of mass destruction.

Research and Development Programs

A key part of our nonproliferation strategy is to enhance the capability to detect weapons of mass destruction. The NNSA goal of integrating technical talent and policy expertise is evident in the Nonproliferation and Verification R&D Program, which enhances U.S. national security through needs-driven R&D, with an emphasis on developing technologies to detect nuclear, chemical, and biological proliferation, and to monitor nuclear explosions.

The following accomplishment is just one indication of the type of activities NNSA is involved with in the R&D area. NNSA was proud that, last year, we achieved a significant milestone in one of our R&D programs: The Multispectral Thermal Imager satellite was launched in March 2000. This small research satellite, designed and built by a team of NNSA laboratories and industry partners, will develop and test remote-sensing concepts that will add to our country's ability to monitor nuclear proliferation. Originally designed for a 14-month research mission (with an expectation of 3 years of useful operation), the satellite has already achieved most of its design objectives. The MTI program has developed the sensor technology and data processing methodology to make extremely precise multispectral remote sensing measurements from space, and to use these measurements to extract important proliferation monitoring information about observed sites. The engineering required to achieve these precise measurements and complex algorithms, to extract the useful information, is being validated through experiments with the satellite. Additionally, the satellite has been used to support numerous civil, environmental, defense, and space science researchers throughout the government. The satellite has collected more than a thousand images and approximately one third of these were at the request of non-DOE experimenters.

The *Proliferation Detection* program will develop the requisite technologies to detect nuclear proliferation. Our unchallenged lead responsibility for nuclear nonproliferation technology derives from the expertise and knowledge base resident in our nuclear weapons complex, and it provides a technology template for the detection of activities related to all weapons of mass destruction. The objectives of the detection program are:

- to produce technologies that lead to prototype demonstrations and resultant remote proliferation detection systems;
- to strengthen our detection capabilities to respond to current and projected threats to national security and world peace posed by the proliferation of nuclear, chemical, and biological weapons; and
- to develop technologies that are subsequently made available to a wide range of government users, including DOD and the intelligence community.

The separate, yet closely related, *Proliferation Deterrence* program seeks to develop technical options to prevent and deter proliferation of nuclear weapon technology and fissile materials. Research is focused on developing integrated sensor systems that will improve the accuracy and timeliness of information. Our NNSA experts are working hard to build robust technical deterrence capabilities that include the development of unattended and handheld technologies designed to shape U.S. diplomatic efforts that rely upon verification or confidence building measures,

in addition to the development of technical means to defend the homeland against lost or stolen, foreign weapons or fissile materials. We are also improving our forensic capability to identify the origin of fissile material that might be associated with a nuclear threat.

With the fiscal year 2002 budget, we will continue to develop and demonstrate innovative remote sensing, sampling, and analysis technologies needed to improve early detection of a proliferant nation's nuclear weapons program or non-compliance with international treaties and agreements, as well as tracking foreign special nuclear materials.

The *Nuclear Explosion Monitoring Program* is designed to provide the U.S. with the technical capability to detect nuclear explosions. Specifically, NNSA technical experts are working to develop and deploy sensors and algorithms that enable the U.S. to meet its national requirements for detecting, locating, identifying, and characterizing nuclear explosions in the atmosphere, in space, underground, or underwater. Additionally, we are transitioning technologies to, and providing operational support for, U.S. national nuclear explosion monitoring agencies, including the Air Force Technical Applications Center, in partnership with other Air Force elements, the United States Geological Survey, and other government agencies. The program seeks to:

- enable detection of very low-yield events, especially those that might arise from proliferant nation efforts;
- deliver ground-based systems comprising state-of-the-art hardware and software products for seismic, hydro-acoustic, infrasound, and radionuclide technologies; and
- develop, engineer, and deliver satellite-based systems to the Air Force.

During the next 5 years, we will develop, demonstrate, and begin deliveries of a new generation of optical, electromagnetic pulse, and direct-radiation sensors for Global Positioning System Block II–F satellites.

In fiscal year 2002, the Nuclear Explosion Monitoring program will continue to develop enabling technology, operational hardware and software, and expertise to detect, locate, identify, characterize, and attribute nuclear detonations through both ground-based and satellite-based systems.

To meet threats posed by chemical and biological agents, the NNSA draws upon the diverse and extensive expertise of its national laboratories. The goal of the *Chemical and Biological National Security Program* is to develop, demonstrate, and deliver technologies and systems that will lead to major improvements in U.S. capability to prepare for, and respond to, chemical or biological attacks against civilian populations. This program will continue to focus emerging science and technology on the threat of chemical and biological attack against U.S. civilian populations. The NNSA is the primary agency developing non-medical technical solutions for this challenge. Our experts are involved in a broad interagency program to develop sensors that could detect the terrorist use of a biological agent at a large outdoor event, such as the Super Bowl or the Olympics. While we do not have the lead on this activity, NNSA brings to the table superb technical experience in this field. The NNSA is providing the underpinning biological information necessary for biological detection that would support analyses for attribution and event reconstruction purposes, and would aid other agencies in the development of medical and public health countermeasures. The goals of this program are to develop and demonstrate:

- chemical and biological detection, identification, and warning systems for domestic, high-risk areas or conditions;
- hand-portable chemical and biological detectors, to provide real-time detection to increase situational awareness during crises; and
- modeling and simulation capabilities, to enable accurate prediction of the effects from chemical and biological attacks in urban areas, to guide preparation and response efforts, chemical and biological decontamination, and restoration techniques for use in civilian settings.

The construction of the Nonproliferation and International Security Center at Los Alamos will continue with funding of $36 million in fiscal year 2002, allowing for its completion in this same fiscal year.

Arms Control and Nonproliferation

Another key strategy is promoting arms control and nonproliferation treaties, promoting agreements, and regimes, and developing the associated technologies to support them. The mission of the Office of Arms Control and Nonproliferation is to detect, prevent, and reverse the proliferation of weapons of mass destruction (WMD) materials, technology, and expertise. It is the focal point within the NNSA for activities that support the President's nonproliferation and international security policies,

goals, and objectives, as well as those activities mandated by statute. The program provides policy and technical expertise and leadership for NNSA and the Department in interagency, bilateral, and multilateral fora involved in nonproliferation and international security matters. Several projects that had been initiated last year are not proceeding currently. The NNSA will not be proceeding with the Separated Civil Plutonium activities, due to Russian nuclear cooperation with Iran. Funding for Spent Fuel Storage and Geological Repository in Russia are on hold, to allow time for the new administration's interagency policy review. At the current budget level for fiscal year 2002, further assistance to Kazakhstan, in implementing the secure long-term storage of the BN–350 plutonium-rich fuel, will be curtailed.

Russia-Focused Programs

The Second Line of Defense program was created in 1998. It is designed to help the Russians detect and prevent nuclear proliferation or terrorism through the installation of radiation detection equipment at strategic transit and border sites in Russia. It also helps to strengthen Russia's ability to detect and deter illegal nuclear transfers, thus adhering to its international nonproliferation commitments. In fiscal year 2002, this program will be expanded slightly, to increase our cooperation with the Russian Customs Committee. This program's objectives include:

- equipping vulnerable border and transit sites with radiation detection equipment;
- utilizing a "systems" approach to equipment installation, including rigorous vulnerability assessments, site survey, and design of candidate sites, and acceptance testing and data evaluation of installed equipment; and
- ensuring sustainability through training for equipment use and procedures for response, using Russian-manufactured and U.S.-tested detection equipment, and providing mobile training stations for use in remote regions.

To date, this program has been quite successful on a limited budget of several million dollars per year. Equipment has been installed at the airports in Moscow and St. Petersburg, and at a port on the Caspian Sea. Eight sites are fully-equipped and installation at three additional sites is underway. This relatively young program already has reached significant achievements, including 90 customs officers trained, training manuals distributed to 30,000 front-line officers, passive searches of roughly 120,000 vehicles, 11,000 railroad cars, and greater than 750,000 pedestrians, using radiation detectors installed under our joint program.

Policy and Analysis

The Policy and Analysis office provides analytical support and technical expertise for arms control and nonproliferation treaties, and for agreement policy formulation, negotiation, and implementation at DOE and NNSA facilities and for regional security initiatives. In the next fiscal year, the NNSA will continue to promote arms control and nonproliferation activities, both under formal treaty-related mechanisms and under less formal mechanisms, including the Warhead Safety and Security Exchange (WSSX) Agreement, negotiations on Russian plutonium oxide measurements, under the Plutonium Production Reactor Agreement, and testing, evaluating, and demonstrating technologies, in accordance with the Joint DOE–DOD Integrated Technology Plan. These technologies would support transparency negotiations for several initiatives, including the monitoring regime, to be implemented at the Fissile Material Storage Facility being built by the DOD at the Mayak Production Association in Ozersk, Russia, the 1996 Plutonium Production Reactor Agreement implementation, and U.S.-Russian Federation-IAEA (International Atomic Energy Agency) Trilateral Initiative negotiations.

The U.S. and Russian Federation have declared their commitment to pursuing transparent and irreversible reductions in nuclear arms. The mission of the NNSA Warhead and Fissile Material Transparency Program is twofold. First, we are comprehensively evaluating the impact of a warhead monitoring regime on the NNSA nuclear weapons complex, to ensure that there is no adverse impact on the U.S. requirement to maintain a safe, secure, and reliable nuclear weapons stockpile, and to ensure that no classified information is revealed. Second, NNSA experts are developing and implementing technical measures that can be applied at Russian nuclear weapons facilities, to provide confidence that Russian nuclear weapons are being dismantled, and that excess fissile materials removed from dismantled Russian nuclear weapons cannot be used again for weapons purposes. This program reduces the potential for theft and diversion of Russian warheads and fissile material, by increasing the safety and security of Russian warheads. It also obtains access to Russian scientific and technical information, and gains access and provides transparency in the Russian nuclear weapons complex.

The Warhead Safety and Security Agreement/Laboratory-to-Laboratory Transparency Program is intended to provide a greater understanding of the Russian nuclear warhead dismantlement process, while encouraging advocates for transparency in Russia. The Laboratory-to-Laboratory program is implemented through contracts signed between U.S. and Russian national laboratories. Upon receipt of deliverables from Russian institutes, U.S. laboratories provide funds to Russian scientists, who worked on the deliverables. This program is conducted under the auspices of the extended Nuclear Warhead Safety and Security Agreement. Strict guidelines and oversight are used by the U.S. and Russian Federation to ensure that only unclassified information is exchanged. Areas of work include radiation measurement technology, tags and seals, remote monitoring, and other topics related to nuclear weapons transparency.

The "Agreement between the United States of America and the Government of the Russian Federation, on the Exchange of Technical Information in the Field of Nuclear Warhead Safety and Security," more commonly referred to as the Warhead Safety and Security Exchange Agreement (WSSX), was signed on December 16, 1994, entered into force in June 1995, and was extended for an additional 5-year term last year. Participants in the Agreement are DOE and DOD for the U.S. and MinAtom and the Ministry of Defense for Russia. The June 2000 extension incorporated any ongoing or future DOE/MinAtom Laboratory-to-Laboratory activities concerning the transparency associated with dismantlement of nuclear weapons under the WSSX Agreement. As established under the original WSSX Agreement, a Joint Steering Committee and Joint Coordinating Group approve new Laboratory-to-Laboratory topics/projects for program technical exchange consideration and provide oversight to Agreement implementation.

The Monitoring Warhead Inventories and Dismantlement Program focuses on identifying technical measures and technologies to monitor warhead inventories and dismantlement under future monitoring regimes. Future initiatives involving the monitoring of nuclear warheads, nuclear warhead dismantlement, or fissile material, resulting from dismantled nuclear warheads, will have a significant impact on the NNSA nuclear weapons complex. The NNSA Warhead and Fissile Material Transparency Program comprehensively evaluates the issues associated with potential monitoring regimes, to ensure that there is no adverse impact on the U.S. requirement to maintain a safe, secure, and reliable nuclear weapons stockpile, and that no classified information is revealed. In fiscal year 1999, DOE and DOD agreed to combine resources in support of a joint DOE–DOD Integrated Technology Plan to comprehensively develop, test, and "red-team" technologies that could be used to support Mayak transparency, the U.S.-Russia-IAEA Trilateral Initiative, Plutonium Production Reactor Agreement, and potential future initiatives.

The Plutonium Production Reactor Agreement (PPRA), signed in 1996, commits the Russian government to cease production of weapon-grade plutonium at three reactors that also provide heat and electricity to two cities and their surrounding regions in Siberia. As part of the PPRA, both sides agreed to allow teams from the other side to monitor the shut-down reactors, as well as the plutonium storage facilities. NNSA and Russian technical experts are developing jointly technologies and mechanisms that will enable our monitors to perform their transparency activities, without revealing any sensitive information.

The Trilateral Initiative began in 1996. Its goal is to provide international confidence that excess U.S. and Russian weapons plutonium is not returned to weapon use. Technical experts from Russia, the U.S., and the International Atomic Energy Agency (IAEA) have been working diligently during the past 4 years to devise technologies and methods to allow IAEA verification of the material, without revealing sensitive information. IAEA inspections at the Mayak Fissile Material Storage Facility will verify that Russian excess plutonium remains removed from weapons programs. The U.S. will place its excess plutonium under IAEA verification at the K-Area Material Storage Facility at the Savannah River Site.

Non-Russia-Focused Programs

While the bulk of our nonproliferation activities take place in Russia, the NNSA is also involved in nonproliferation and arms-control-regime projects in many other parts of the world. For instance, since 1995, the U.S. and Kazakhstan have been working to reduce proliferation risks associated with three tons of weapons-grade plutonium. This material, which is located at the BN–350 fast-breeder reactor in Aktau, Kazakhstan, contains enough plutonium to manufacture hundreds of nuclear weapons. Furthermore, unlike most spent fuel, the majority the BN–350 spent fuel material poses no significant radiation hazard to a would-be thief. The project has:

- reduced the threat to U.S. national security posed by the vulnerability of the weapons-grade material;

- significantly enhanced physical protection and material control measures at the plant;
- utilized a former weapons-related complex in Kazakhstan, which was converted to peaceful uses under the Cooperative Threat Reduction program, to manufacture most of the storage canisters;
- instilled a safety and security culture, by conducting all U.S.-sponsored activities in a cost-effective manner, consistent with international safeguards, security, and safety standards; and
- packaged the nearly 3,000 fuel assemblies in welded and evacuated 1½-ton steel canisters in such a way that "hot" assemblies are combined with "cool" assemblies, to provide a radiation barrier to theft, while also stabilizing the spent fuel for long-term storage. This phase will be complete this summer, securing three metric tons of very high-grade plutonium.

The Aktau project will, as funding allows, continue to support the IAEA in the implementation of internationally accepted safeguards measures over the material, continue to provide non-weapons-related employment for nuclear scientists in Kazakhstan, and provide security and international safeguards measures for the transportation and long-term dry storage facility for the BN–350 material.

NNSA experts are also actively working in North Korea to reverse and prevent proliferation of nuclear weapons, by securing approximately 30 kilograms of weapon-grade plutonium contained in Nyong Byon 5 megawatt reactor spent fuel. Similar to the objectives of the Aktau project, NNSA technicians have:

- packaged the 8,000 assemblies in canisters and placed those canisters under IAEA monitoring; and
- performed field operations to maintain packaged spent fuel in a safe condition, appropriate for future shipment.

We are also supporting the IAEA in the implementation of verification and international safeguards of the material, while helping to prepare plans to support future shipment and disposition of spent fuel.

In an effort to impede the use of weapons of mass destruction, the NNSA supports several projects targeted at reducing the amount of fissile material that could be available to potential proliferators to fashion into a nuclear device. In the Reduced Enrichment for Research and Test Reactors (RERTR) Program, NNSA continues to work to reduce international commerce in civil HEU, by developing technologies to convert foreign and domestic research and test reactors from HEU to LEU. To accomplish this, the program continues to:

- develop denser LEU fuels that can be used to convert most, if not all, research reactors to LEU fuel;
- develop LEU targets and chemical processing methods that can be used for production of medical radioisotopes;
- perform design and safety analyses, and transfer technology to assist conversion of research reactors to use of to LEU fuel and targets; and
- provide support to the Russian RERTR program, to develop high-density fuels and to complete the design and safety analyses needed for LEU conversion of Russian-designed research reactors.

Along those same lines, and based on its own experience with the RERTR program, NNSA experts have begun cooperation with Russia to establish a Research Reactor Fuel Take-Back Program, to prevent proliferation of nuclear weapons, by repatriating to Russia civil HEU fuel, from Soviet/Russian-supplied research reactors in 16 countries, many of which are located in regions of proliferation concern. This program is in its early stages, and is working closely with the IAEA.

NNSA is also active in strengthening regional security and nonproliferation, not only on the Korean peninsula, but also throughout East Asia, South Asia, and the Middle East. We are doing this by participating in U.S. policymaking, promoting regional security dialogues, and sharing with key states in these regions the expertise of the national laboratories on technical measures to implement nonproliferation agreements. Under a program to strengthen the Biological and Toxin Weapons Convention (BWC) regime, NNSA supports the U.S. in its efforts to negotiate a legally binding protocol to the 1972 BWC. This protocol is part of a larger effort to deter noncompliance with the BWC and to reinforce the global norm against the proliferation of biological weapons. Our technical experts facilitate U.S. commerce through implementation of bilateral peaceful nuclear cooperation agreements with our nuclear trading partners.

GOAL 4: PROVIDING NAVAL NUCLEAR REACTORS

Our fourth goal is to provide the Navy with safe, militarily effective nuclear propulsion plants, and ensure their continued safe and reliable operation. Naval Reactors (NR) is a highly successful semi-autonomous organization inside of the NNSA. Admiral Bowman, the Program's director, is responsible for providing the U.S. Navy with safe, militarily effective nuclear propulsion plants, and ensuring their continued safe and reliable operation.

The responsibilities and authority of the director of this unique dual agency organization were set forth in Executive Order and in Public Laws. This cradle-to-grave responsibility begins with technology development and continues through reactor operation and, ultimately, reactor plant disposal.

With 102 operating Naval reactor plants in warships comprising 40 percent of the Navy's major combatants, primary emphasis and most effort is placed on ensuring the safety and reliability of these plants. Naval Reactors is developing the next-generation reactor for the Navy's new *Virginia*-class attack submarines and a reactor for the Navy's new CVNX class of aircraft carriers.

I will continue to support and promote this unique Program that produces the "culture of excellence" that NR is known for.

GOAL 5: VITALITY AND READINESS OF THE NNSA ENTERPRISE

Our fifth goal is to ensure the vitality and readiness of the NNSA's scientific and technical enterprise, for the next decade and beyond. We are particularly concerned about attracting and retaining a preeminent workforce and revitalizing our aging infrastructure.

Nuclear Expertise

A key strategy for ensuring the readiness of the enterprise is to attract and retain the best workforce possible, in today's highly competitive market for technical talent, by providing a challenging and rewarding work environment. Within a decade, most of our weapons designers with nuclear testing experience will be eligible for retirement and may have left our workforce. This means that when our newest system, the W88, reaches the end of its original, expected design life in 2014, we may no longer have anyone with test-based job experience to help evaluate modifications that may be required, due to aging. As part of the Stockpile Stewardship Program, we are using the remaining critical staff to train and mentor the next generation of stockpile stewards, who will use the new stockpile stewardship tools, along with existing nuclear test data and the weaponization database.

As I indicated in the beginning of this testimony, our people are our most important asset. But our experienced cadre of scientists, engineers, and manufacturing personnel is dwindling, as workers retire. Attracting and retaining the critically skilled people we need is one of the major problems faced by the nuclear weapons complex today.

We provided a report to Congress last year, in response to section 3163 of the National Defense Authorization Act for Fiscal Year 2000, that describes the situation at each of our contractor sites, with regard to their current and projected critical skills status and their plans for maintaining essential nuclear weapons expertise. At present, we believe the situation is manageable, but we will carefully monitor the implementation of each site plan. We are also currently reviewing our policy with our management and operating contractors to ensure that it promotes effective recruitment and retention. The three new contracts with our production plants, awarded in fiscal year 2000, contain a new clause that states it is our policy not to inhibit recruitment and retention. The new contracts with the University of California for the Los Alamos and Lawrence Livermore National Laboratories include maintenance of critical skills as one of the key improvement areas that will receive focused evaluation by the NNSA.

One might think that recruiting and retaining the critically skilled people we need could be solved by simply paying higher salaries. Certainly that is true in some instances, but not all. One of the problems in cyber security is that once we have trained individuals in the latest techniques, we often lose them to private industries that are paying higher salaries. Of course, a number of the critically skilled people that are needed in the complex have less direct application in private industry, for example, plutonium metallurgists. This raises the problem of encouraging individuals to enter these fields in the first place, and it is here that our new experimental facilities and capabilities come into play.

A significant element in attracting and retaining personnel at the national defense laboratories has always been the Laboratory-Directed Research and Development (LDRD) Program. I would like to thank Congress for removing the restrictions

against allowing our contractors to set aside up to 6 percent of their weapons activities appropriations for Laboratory-Directed Research and Development. The central objective of the LDRD program is to enhance the scientific and technical capabilities of the national laboratories, by investing in fundamental science and technology to meet long-term national needs. Sustained support for this program is essential, as it impacts recruitment. Overall, the personnel pool is still low which reflects the time it takes to recruit individuals. A similar program, authorized by Congress for the production plants, began in fiscal year 2001.

Although Laboratory and Plant Manager Directed Research and Development Programs are essential elements in attracting people to the nuclear weapons program, the enduring attraction and retention of these people is fundamentally related to three issues: national importance of the mission, technical challenge of the program and advanced experimental, computational, and manufacturing capabilities.

Maintenance of the Complex

Another key strategy for assuring the vitality of our enterprise is to provide state-of-the-art scientific and technical tools and facilities, in a safe and secure environment. The current budget request for fiscal year 2002 will provide approximately the same level of funding available to our facilities and sites, as it has during the past several years. As I indicated in my testimony before the Senate Energy and Water Development Appropriations Subcommittee on March 13th, that level of funding has focused maintenance activities each year on those facilities necessary to carry out the immediate workload. We have not been able to make a significant investment for sustained, preventive maintenance or investments to reduce the risk of equipment failures, to increase operational efficiency and effectiveness, or to extend facility lifetimes. As a result, our aging nuclear weapons complex more than half of our structures are greater than 50 years old is deteriorating at an accelerating rate. The assessment Defense Programs conducted last year indicated that, in just the last 5 years, the percent of the complex found to be in either excellent or good condition had fallen from roughly 56 percent to only 26 percent.

The condition of our facilities and infrastructure is certainly not a new story, having been documented in a number of studies over the past decade, and addressed by various construction-oriented initiatives, including Utilities and Equipment Restoration, the Facilities Capability Assurance Program, R&D Revitalization, Non-Nuclear Reconfiguration, and the Stockpile Management Restructuring Initiative, during the past 3 decades. The condition of our facilities and infrastructure has also been recognized by Congress, which, since fiscal year 1998, has earmarked $86 million above requested levels, specifically for infrastructure improvements at Y–12, Pantex, Kansas City, and Savannah River. Certainly, increased funding is vital, but it is only one part of the solution. Excellent facility management is a standard business practice of most major organizations and I have already taken steps to establish an office within NNSA to manage the facilities and infrastructure of the nuclear weapons complex. This office will focus on long-term planning, establishing the processes absent too long that will institutionalize the procedures, standards, and expectations for the complex.

A Recapitalization Initiative has been developed to redress infrastructure problems throughout the complex in response to a recent comprehensive study of facilities and infrastructure. This multiyear initiative to correct maintenance deficiencies, with the goals of stabilizing the infrastructure, increasing availability of our current facilities, and extending their useful lives will be reviewed as part of the strategic review of national security programs.

GOAL 6: CREATING A WELL-MANAGED ORGANIZATION

Our sixth goal is to create a well-managed, responsive and accountable organization, by employing effective business practices. On March 14, 2001, I announced my plans for realigning the NNSA's organizational structure to improve performance of our core mission of strengthening national security and reducing the global threat from weapons of mass destruction, through applications of science and technology.

This past January, after listening to the findings of my two organizational options teams, I concluded that NNSA should be realigned into "product" and "support" divisions, as is the practice in many major private sector enterprises.

Our "product" divisions, Defense Programs and Defense Nuclear Nonproliferation, will focus on defining and advocating for the most effective means of accomplishing our mission. On the other hand, key support functions have received less-than-adequate attention in the past. Security and safety management, infrastructure and project management, the personnel system, and the planning and budgeting process all need focus and dedicated management attention. In creating two new Associate Administrators, one focused on facilities and operations and the other on manage-

ment and administration, we will establish the advocates for many of the functions that Congress recognized as needing attention in the crafting of Title 32. By taking these functions off the plates of my Deputy Administrators, I am freeing these managers to focus more intensively on program concerns and mission accomplishment.

We have no intention of realigning Naval Reactors within this reorganization they will remain separately managed as specified in Title 32. We have made use of this program's record of success and their many lessons-learned in the shaping of the NNSA.

The two new Associate Administrators will support the mission organizations. The Associate Administrator for Management and Administration will be tasked to ensure efficient management of budget, finance, procurement, information, and people, to make them serve the needs of the product divisions. The Associate Administrator for Facilities and Operations will ensure responsible stewardship of our facilities and will be successful only if these facilities are available to the program organizations for performing our missions. These changes are designed to consolidate responsibility for security, safety, and environmental issues at NNSA sites; to establish clear and direct lines of communication for laboratory directors and plant managers; establish greater personal accountability; and to improve productivity and morale.

The Deputy Administrator for Defense Programs will focus on maintaining the safety, security, and reliability of the nuclear stockpile. Significant strides have been made in that area with the Department of Defense, in that we are implementing plans for detailed, requirements-driven stockpile life extension and refurbishment. Defense Programs will direct planning and set goals for production at the plants and for the science-based stockpile stewardship activities at the national laboratories. Defense Programs will retain responsibility for major program-oriented construction and facility initiatives.

The Defense Nuclear Nonproliferation organization will continue to reduce the threats posed by weapons of mass destruction, strengthen nonproliferation institutions and norms, develop technologies to prevent nuclear smuggling, detect proliferation, respond to possible chemical or biological weapons use, and reduce the danger posed by unsafe operation of Soviet designed reactors worldwide.

I recognize that establishing these "product" and "support" divisions creates a degree of tension within the organization, but I expect that this tension will evolve into cooperation and support as each element begins to work with the others to accomplish our mission. This organizational structure works, if we are able to adopt a corporate approach to accomplishing the mission. Each Deputy and Associate Administrator must recognize that their personal and organizational success is tied to the success of the overall organization. We are creating a Management Council consisting of the Deputies and Associates that will be tasked with resolving cross-cutting issues and disputes. These issues will be referred to the Administrator, only if the Council cannot resolve them. Also, I will seek establishment of a Principal Deputy Administrator to help me resolve operational issues among NNSA elements and to assist in the day-to-day management of the enterprise. In sum, we are trying to develop a corporate approach to decision making.

Mindful of the legislative mandate to provide the Armed Service Committees with a plan by May 1, 2001, "for assigning roles and responsibilities to and among the headquarters and field organizational units of the NNSA," we divided the effort into two phases. The first phase addressed headquarters elements. In January, we assembled 10 teams to tackle these issues for the headquarters elements. The reports of these teams formed the basis for the recently-announced reorganization. The May 1, 2001 interim plan is the first step in a multiphased effort, and will include mission and function statements for each major element of our realigned headquarters organization; it will describe relationships between each NNSA element; and it will discuss relationships between NNSA elements and those organizations external to the NNSA. The report will also contain an implementation plan for making this organizational transition by October 1, 2001, describing anticipated changes to organizational units and presenting a strategy for making the staffing transition. A final report will be transmitted to Congress in October. I have made a commitment that, in this initial reorganization phase, everyone currently employed will either be retained in a job similar to their current position or be placed in a new job within NNSA. We need to retain our Federal talent for this to be a success!

Realigning the field structure is the second phase of our efforts to establish an effective and efficient NNSA enterprise. Our May 1 plan will include a design outline for allocating roles and responsibilities between headquarters and the field. As the next step, I intend to charter a neutral group of experts to advise me on options for addressing key structural issues uncovered in by previous studies of this issue. This group will be asked to gather information and develop options over the next 6 months, with a view to resolving field-structure issues by the end of the year.

My focus in these organizational adjustments is on making measured, thoughtful changes that improve NNSA's effectiveness in accomplishing our mission and then seeking to improve our efficiency through a structured process that does not disrupt current mission performance.

Detailed Budget Proposals and Multiyear Plans

One of the key strategies for creating a well-managed organization is to adopt an integrated business management system that links strategic planning, programming, budgeting, execution, and evaluation. On the budgeting front, the good news is that NNSA submitted a Future-Years Nuclear Security Budget to the Office of Management and Budget (OMB) on March 2, 2001. OMB intends to carefully evaluate our future-year budget, over the next few months, in conjunction with the administration's strategic review.

Internally, our focus within NNSA is on improving our planning, programming, budgeting, and execution (PPBE) process. Our first future-year budget request was constructed while we began to implement a systematic process for connecting and integrating our plans, programs, funding requests, and performance evaluation processes. At the moment, these processes are not as well synchronized as we want. We expect that the fiscal year 2003 budget process will be a transition year in our implementation of a PPBE system. The system should be fully implemented during the fiscal year 2004 process. The graphic attached to my testimony presents a picture of how we expect the process to operate when the system is fully implemented.

The NNSA PPBE system will: (1) establish standardized business management processes where feasible and will provide flexibility for programs as appropriate; (2) improve discipline in program and project management; (3) assure that each program and project receives appropriate consideration as tradeoffs are made in establishing the integrated budget; and (4) create meaningful performance measurement and feedback systems. We hope to demonstrate the value of this system through measurable improvement in our mission performance.

The system is divided into four phases:

1. Long-Range Planning for the fiscal year 2004 cycle, this will be performed between June and October of fiscal year 2001.

2. Programming guidance for fiscal year 2004 will be issued early in 2002, and program decisions will be reached by June 2002.

3. Budgeting NNSA senior managers will review the budget in June or July of 2002 and will then participate in the Department's process, tied to the preparation of the President's budget, which is released in January or February of 2003.

4. Execution and Evaluation execution year funding will cascade down through program and implementation plans. Program managers will perform periodic reviews and report the results to appropriate officials.

With the help of the Institute for Defense Analysis, NNSA has developed a detailed plan for implementing this system. NNSA's near-term priorities include:

- communicating our plans throughout our enterprise;
- establishing and implementing an Integrated Priority List and resource prioritization process;
- improving the quality, timeliness, and integration of future-year program and implementation plans;
- establishing and implementing a formal change control process;
- conducting periodic, formal evaluations; and
- reviewing and establishing NNSA information technology requirements for the process.

Development of a future-years defense budget process that brings us more in line with the needs of our missions, plants, and national laboratories is an important step. We have established momentum toward reaching that goal and we are making slow but steady progress. Your continued support for our efforts will be needed to reach this objective.

Improving Personnel Management

Another key strategy for improving business processes is to stress accountability at all levels of the organization. We must hold managers and contractors accountable for program and service results, hold individuals accountable for meeting performance goals, and reward individuals, units, and contractors accordingly. Finally, we must foster an orientation toward self-development.

Title 32 contains limited, but important authority for the NNSA Administrator to begin revitalizing the Federal staffing of our Nation's nuclear security enterprise. Review of our interim policy for implementing excepted service appointments and compensation authority for no more than 300 scientific, engineering, and technical

positions within the NNSA is nearly completed. We expect to begin exercising this authority by the beginning of July 2001.

The policy was developed by NNSA staff, in consultation with other agencies, that use similar authorities. Indeed, our team leader was the architect and implementer of the excepted service authority granted to the Defense Nuclear Facilities Safety Board by Congress. His expert advice was invaluable in establishing this interim policy.

Our interim policy is designed to provide NNSA managers with sufficient flexibility to attract and retain key personnel needed to meet our demanding mission, while ensuring that NNSA uses this special authority with due regard for the Merit Systems principles of Federal personnel management. An integral element of the policy is the Pay-For-Performance feature, allowing for performance increases and performance bonus pools. Implementation of this Pay-For-Performance feature will be deferred until a uniform performance appraisal system can be established for our excepted service employees, and until our managers can be trained to develop fair and accurate measures of staff performance.

We see this interim policy as just the first step in revitalizing our Federal staffing process. We urgently need to begin hiring staff at entry and mid-career tiers to avoid future gaps in staffing and leadership. As you may be aware, almost 50 percent of our staff is within a decade of retirement. We intend to outline a more complete plan for improving personnel management and continuity in the May 1 report to the Armed Services Committees.

CONCLUSION

I believe that NNSA is on the right course. The NNSA enjoys the support and endorsement of Secretary of Energy Spencer Abraham. It is the right idea to bring together the national security missions of DOE, and to focus our work with clear goals and plans, clean lines of authority, and a strong view to the future. We are on a good path to improve on our management and performance, to manage our programs efficiently and effectively, and to plan our future.

The culmination of all the stockpile stewardship activity of all our surveillance, maintenance, refurbishment, research and development, and construction is annual certification of the stockpile. The Stockpile Stewardship Program has, for the past 5 years, given the Secretaries of Energy and Defense the necessary confidence to inform the President that a return to nuclear testing is not required to maintain the safety, security, and reliability of the nuclear weapons stockpile. With appropriate resources, we will be able to continue to provide that confidence for the foreseeable future, maintaining a credible nuclear deterrent for as long as we should need it.

This confidence—and I cannot emphasize this enough—is largely the product of expert judgment, the expert judgment of some of America's best and brightest men and women, in both Federal service and throughout the Nation in our laboratories and plants. Their judgment is only meaningful because of their experience in pursuing the highest standards of excellence in science, engineering, manufacturing, and management. If we offer these people anything less—if we continue asking some to work in substandard facilities with aging equipment, if we burden them with unnecessary bureaucratic requirements and politics, if we fail to give them challenging work—then they will go elsewhere, our confidence in our weapons will suffer, and, under such circumstances, our nuclear deterrence will fail.

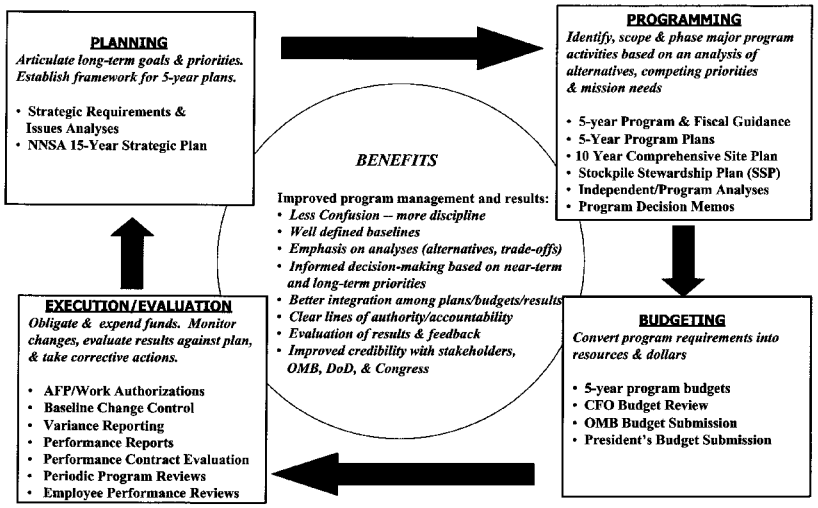
The scientists and engineers that are stewards of our nuclear arsenal have also been making important technical contributions to controlling, detecting, and deterring the use of weapons of mass destruction. NNSA's unique contribution is evident in the caliber of personnel working on these complex, interrelated threat reduction programs. Their expertise resident in our national laboratories has been honed by years of working in support of the U.S. nuclear complex. Our technical experts are ready and willing to share their nonproliferation and counterproliferation experience with their counterparts in Russia. Mr. Chairman and members of this subcommittee, I think we can all agree that as a nation, we may face no greater challenge than preventing weapons or weapons usable materials from falling into the hands of those who would use them against the U.S. or our allies. It has been more than a decade since the Berlin Wall fell, opening a new era in history. In many ways, we live in a more dangerous world now, since the demise of the Soviet Union. The threat to our safety and international security is more diffuse, which makes it harder to defend against. Rather than one monolithic threat, we must be prepared against rogue nations or terrorist organizations with interests inimical to ours. I am very proud of the nonproliferation programs that are rightfully part of the defense nuclear security enterprise. The review being conducted at the present time by the

White House is timely and I am confident it will reveal that the NNSA's programs are making solid contributions to the national security of the United States.

Again, I thank the members of this Panel for their commitment and support of our mission, and for your support of the people of NNSA who actually do the work and accomplish the mission: scientists, engineers, technicians, policy planners, administrators at headquarters, in the field, at our laboratories, plants and the test site.

Simply stated, NNSA has great people and a great mission. Thank you again for the opportunity to appear here today.

Planning, Programming, Budgeting and Execution System (PPBES)



National Nuclear Security Administration
FY 2002 Congressional Budget Request

	FY 2000 Comparable Approp.	FY 2001 Comparable Approp.	FY 2002 Request to Congress	FY 2002 vs.	FY 2001
Weapons Activities	4,563,505	5,069,289	5,300,025	+230,736	+4.6%
Defense Nuclear Nonproliferation	712,672	873,884	773,700	-100,184	-11.5%
Naval Reactors	669,637	687,560	688,045	+485	+0.1%
Office of the Administrator	350	9,978	15,000	+5,022	+50.3%
Total, NNSA	5,946,164	6,640,711	6,776,770	+136,059	+2.0%

Dollars in Millions

Senator ALLARD. General, I have a question on the Stockpile Stewardship Program. Your budget request of $5.3 billion hopefully included enough funding to the Stockpile Stewardship Program, which is currently addressing a variety of concerns, including infrastructure, workforce retention and replacement, production capability, and test readiness. Does your budget request fully support all of these?

General GORDON. As I indicated in my statement, Mr. Chairman, at the requested level, we will have considerable difficulty completing the pit certification on time. We will not begin an aggressive attack on the infrastructure problems which face us. So, again, we're very hopeful that when the defense reviews are completed that they will result in additional funding.

Senator ALLARD. What about the safety, reliability, and security of the Stockpile Stewardship Program? Are we going to be able to maintain that with the funding provided in this year's budget?

General GORDON. I think we're going to do a pretty good job on the safety and security of the systems, yes, sir. Where we will come up short in the long term, at this funding level, will be the ability to do the refurbishment of a portion of the stockpile to keep up its reliability.

Senator ALLARD. Let me move over to the tritium production issue. Do you see any showstoppers that would prevent tritium from being delivered in fiscal year 2006?

General GORDON. No, Mr. Chairman. I don't see any showstoppers. We're working hard on that. That stays very much in front of all of us in the program. The work on licensing and the work with Nuclear Regulatory Commission (NRC) is a month or 2 later than we would have hoped it to be. But, in all other areas, we're moving ahead very well. The chairman of the NRC is committed to an expeditious review of this area.

With respect to work on the Tritium Extraction Facility (TEF) that is under construction at Savannah River, South Carolina, that work is well underway. Schedules will be tight, but we expect to be both on-schedule and on-cost.

The work at the Sequoia and Watts Bar reactors seems to be on-track. I would point out, and I think it's known to all, this is the single approach that we're on, we're running down this one approach. But, everything is stacking up pretty favorably right now.

Senator ALLARD. That is good news. Now, if there are delays, and your plan is to deliver tritium in 2006, does that prevent NNSA from fulfilling our tritium requirements?

General GORDON. Somewhere in the 2006 time frame, depending upon what changes might come out of the reviews that are being conducted by the Department of Defense, the requirement for more tritium might go up or might, perhaps, go down a little bit. We would be eating into the 5-year reserve, but it would not, in that period of time, affect the quality of the deterrent.

Senator ALLARD. Now, on pit production, are we currently meeting our pit-production requirements with the 20-pit-per-year production facility at Los Alamos National Laboratory?

General GORDON. Pit production is a complicated story and I would actually like to talk about it in two phases. One is manufac-

turing and one is certification. We're doing a very good job in the manufacturing portion of what's going on at Los Alamos. I was just up there last week with Secretary Abraham, looking into that part of the program. We've made great progress in the manufacturing of the pits. I think we're on either number 7 or number 8 that have been manufactured there. Everything looks positive in that direction. I think there are 20 or so developmental pits that will actually be made. The manufacturing part is going very well.

Where I have some continuing concerns, with respect to schedule and funding, is the very complicated question of whether those pits that we are manufacturing are as good and will operate exactly the same way as the pits for the W88 that were made at Rocky Flats. That work has lagged a bit. It's very complicated. We're putting the entire pit production and certification program on a project basis.

I've alluded to what we're doing with NIF. Similarly, we've attacked the problems with pits by finding someone to be in charge here and someone to be in charge at Los Alamos who manages the program with clear delivery and accountability dates. So, we have projectized, to make a word up, the pit part of that effort. I'm very comfortable with where we're going in manufacturing.

Everything we're doing in pit certification looks positive. There are no signs whatsoever, and I'll see if John Browne nods, there are no signs whatsoever that they won't be able to certify the pit. Everything is going in the right direction, but there are a lot of steps before we get to the very end.

Senator ALLARD. What is the status of our long-term plan for pit production capabilities?

General GORDON. Congress, the Foster Panel, and others have suggested, to put it mildly, that we get on with that a lot more quickly than we have. I think we've gone a bit more slowly within the organization for a couple reasons.

One is there's so much on our plate. But, frankly, we wanted to get the Los Alamos experience a bit behind us before we jumped in with both feet. We've been looking carefully at this now, especially the reviews with Los Alamos where the manufacturing side of that work is going so well. We're ready now to become very serious about how to lay out the plans for long-term production.

I think if we had started a year or 2 ago in that area, we would have been less comfortable in exactly how to design the facility and what the equipment requirements would be. But, the work is going on in Los Alamos and we're moving in the right direction now. Again, as I mentioned in my statement, we will be making that a much higher priority beginning with this year. Thank you.

Senator ALLARD. Thank you. Senator Reed, my time has expired.

Senator REED. Thank you very much, Mr. Chairman. Thank you for your testimony, General Gordon. As I recall, the legislation that created the NNSA required the submission of a 5-year plan for nuclear security programs along with a budget. I am not aware that that plan has been submitted. Has that plan been prepared?

General GORDON. Senator, we did develop a 5-year plan. It is a comprehensive look at our programs. It's not perfect yet. If you look at how the Defense Department does its Future Years Defense Program (FYDP), there's a huge number of people managing this process, which has been in place for years. But, we've made a good

start in that area and I think it's a good solid document. We have submitted it to the Office of Management and Budget (OMB), along with our request for this year's funding.

Senator REED. All right. Do you anticipate that this plan will become available in the near future?

General GORDON. I anticipate that the OMB and the administration will review it in the context of the defense reviews that are underway and I would hope that it would be available after that.

Senator REED. It is my understanding, and I could be wrong, that this is a fairly explicit legislative directive to provide the plan, not one that was subject to approval by OMB or the White House. Am I mistaken?

General GORDON. I feel that it is my obligation to submit my plan to the White House and I have left it in their hands.

Senator REED. In the context of that plan, I am sure you have an idea of additional funding that is necessary for infrastructure going forward over 5 years. Do you have an estimate of that spending?

General GORDON. Yes, sir. I'd say it is encompassed in that plan and I have given separate testimony in the Senate in that area. The infrastructure is a very important issue to me personally. It's very important just to be able to do our work.

In fact, I would particularly urge Members who have an interest in this to let us give you a very detailed briefing on it. If you would like, I would even offer some photographs and some stories today and, if you would like to see those now to, flip through it.

We believe that we could easily justify, and that we will spend as much as $300 million this first year to begin to attack this area. We could safely and confidently spend about half a billion dollars for as many as 10 years to get back on the right track with respect to the needed changes in the infrastructure. We need to build the overall capacity and capability that we need to support the future stockpile and the work we know will come out of this. It's a program of significant magnitude.

If you will bear with me for just a second, there are a couple of stories I cannot resist telling at every opportunity I have. The worst facility overall, and you might wish to discuss it in more detail with John Mitchell later on, is the Y–12 Plant at Oak Ridge, Tennessee. It's the poster child for our needed facility upgrades.

Y–12 is a place where they make lithium deuteride and lithium hydride materials, where we, in fact, require the workers in that area to wear hard hats, not because anything in the process requires them to wear hard hats, but because the ceiling was constructed in the 1940s. The vintage building and ceiling are falling down in chunks.

I demanded that the contract manager, retired Admiral Mitchell, operate his factory safely. We hold his fee at risk and tell him that you be safe by making sure those personnel wear their hard hats when they go into that unsafe facility. Now, that's one extreme end of how we're operating.

We have found, however, for the first time, in our discussions at Los Alamos National Laboratory, that our labs are in better shape than the plants. But, there are individuals at the working level, and focus groups, that are starting to say that the quality of their

work environment is affected. Their quality of life is affected, their ability to work is affected by the environment in which they live.

Not all facilities are that way. We have built a few new facilities and we're trying not to build gold-plated facilities. We're trying to build them as places where no one would decide not to go to work because of the facility.

At Los Alamos again, just to pick one location, the chemical metallurgy research building is 500,000 square feet. We use about 100,000 of it. It has contamination issues. It looks like a Russian laboratory with its concrete block walls, and old equipment. Graduate students come in and say, "I don't think I want to work here, I have better equipment at my university." People came to work in the labs 20 years ago because they had better equipment than anyplace else. Now, we're struggling to get back on that track. So, it's very important to me personally and it's very important to people who work in the program.

I think 10 years ago, or even 8 years ago, or whenever, the decisions were made to take a limited budget and put it into the science side of the Stockpile Stewardship Program and really give that a boost. I might have made the same decisions in that time frame. We didn't know exactly where we were going to go on the science side and resources were particularly limited. I might well have made the same decision. But, that decision now has come home to roost. If we don't correct these issues, I'm going to start closing buildings and we will not be able to meet the agreed stockpile life extension program work that the military asks for.

Senator REED. It seems to me that these are all obvious needs. They are not avoidable. That is different from the strategic review where you can look at changing threats and different ways to deal with threats.

My conclusion, based on what you have said, is that these are costs that must be addressed, ultimately, and that is why I am a bit confused that there is no recognition of those costs right now in the context of your release of the 5-year plan or specific budget allocations that we should be speaking about and debating about at this moment.

General GORDON. I understand, sir.

Senator REED. Let the record show a nod. My time has expired. Thank you.

Senator ALLARD. Senator Thurmond, you are up.

Senator THURMOND. Thank you very much. General Gordon, the Savannah River Site (SRS) is the crown jewel of the weapons facilities and industrial complex. Beyond that, when one considers the tremendous pool of talented and skilled professionals that work at that facility, it is an asset that is not duplicated anywhere else in the world.

Do you share my concern that if we do not nurture and manage the SRS that we risk decaying an asset that we cannot afford to lose?

General GORDON. Senator, I have the highest regard for the Savannah River Site, for the people that work there, and the vital contribution that they make to the defense of our country every day and that they will make for decades to come.

Senator THURMOND. General Gordon, your fiscal year 2002 budget discusses producing a certifiable pit by 2003. This is the first time we have heard of this term. What is the difference between the requirement for a certified pit and a certifiable pit?

General GORDON. Senator, a certifiable pit is one that will have gone through the manufacturing process to our satisfaction. It will be the best we could do in that process, but we will have not completed all the scientific research to be assured that it operates exactly as one that was produced years ago with different processes in a different factory.

Senator THURMOND. General Gordon, I recently spoke with Secretary Abraham and gained his assurance that mixed-oxide plutonium (MOX) is his number one nonproliferation priority. Do you also view MOX as your top nonproliferation priority?

General GORDON. Senator, the Plutonium Disposition Program as a whole is, of course, one of the programs that are being reviewed in the nonproliferation review. The MOX portion of that program is a very high priority for the NNSA. In fact, we protected its funding even at the reduced level of funding that went into NN both because of its relationship to the Russian programs and because of its importance to the ultimate disposition of plutonium in this country. The immobilization program was in fact put on hold so that we could fund and support the MOX program fully. Yes, sir. MOX is a very high priority for the NNSA.

Senator THURMOND. General Gordon, in preparing to assess the reliability, safety, and security of the United States nuclear stockpile, the Department of Energy estimates a backlog of $700 to $800 million in critical maintenance at weapons facilities.

In addition, another $300 to $500 million per year will be needed for the next 10 years to readjust shortfalls in production capabilities of both plants and laboratories. Do you agree with this assessment? If so, what is your long-term plan to resolve this matter?

General GORDON. Yes, sir. I agree with those numbers. We have a backlog of deferred maintenance across the complex approaching $800 million and we could easily spend $500 million a year to get the place back up on its feet as it needs to be.

We have developed a major infrastructure initiative that lays out specific programs. We have formed an office to manage the programs. You can be assured not only that, if you appropriate and authorize the money, that we will actually spend it wisely and carefully using the highest principles of project management.

Senator THURMOND. General Gordon, in your prepared statement, you refer to changes in Russia's administration of atomic energy. When coupled with other changes in Russia's government and society, this change would suggest a more closed society reminiscent of the Soviet Union. Based on this assumption, what is the future of our threat reduction program?

General GORDON. That's a great question, Senator, and I think it's one we just have to watch and nurture and take head on and see where it goes. I would hate to try to predict exactly how that would come out.

I agree with your assessment that in some ways it looks like it's going to be more closed. In some ways, it's going to be more difficult to deal with them. I would not think, though, that that di-

minishes the threat. It may only make our problem a little harder to deal with.

Senator THURMOND. Thank you, Mr. Chairman.

Senator ALLARD. Thank you, Mr. Chairman. The Senator from Nebraska, Senator Nelson.

Senator BEN NELSON. Thank you, Mr. Chairman. General, the effort to find recruits with degrees in physics is encountering a lot of difficulty, apparently there are not many graduating in that arena. What has caused this drop in the number of people and their interest in physics?

As a science-club president when I was in high school, I do not think of myself as a physicist or a scientist. But there seemed to be more interest a few years ago than today. Do you have any thoughts about why that is the case?

General GORDON. Only from an amateur perspective, sir. I would suggest that this looks in some ways like the century of the biologist or something coming up where there is so much more attention given to those areas. You might want to check with John Browne and Bruce Tarter when they come up later on for the next panel.

Actually, in the last 6 to 9 months, I have begun to see some changes in our ability to recruit. Now, that's not to say that we're not losing people at the back end at perhaps too high a rate. But, we're actually beginning to attract more and more people at the younger end. Maybe changes in the environment or changes in the economy affect this.

We don't need a lot of people in our business. We need a few of the right people that will stay with us long enough to make a difference. We still have the ability to offer them some of the most exciting challenges that they can find anyplace. When you go out to the labs, particularly the labs, but even in the plants, they're having some success in hiring the right kind of engineers right now.

If you go out to the labs and sit down with the mid-career scientists, the 30-year-olds, you will find, they're excited about what they're doing because they're doing cutting edge work. They're able to do it in a cooperative environment that reaches more broadly than in many of the university settings, and they can do it on incredibly hard, difficult problems.

Just before you came in, I think I talked about how bad some of the facilities were. At the labs, they get to work on the biggest, fastest computers in the world doing physics on nuclear ignition that looks like the sun. It's never been done before.

I don't need a lot. I need a few. I think John and Bruce can give you a better answer. But, they're actually seeing a slight change in our ability to recruit. I'm still worried about the ability to keep the older individuals.

Senator BEN NELSON. In that regard, quite often in business when you encounter inadequate labor force, you begin to figure out ways to go train the labor force you have. I wondered if that had been considered. In other words, grow your own, cultivate your own, help provide the kind of education necessary. It would help you on the retention, but it certainly might help on the recruitment.

General GORDON. It does, Senator. It helps a lot. We do that at the laboratories and the plants through work-study programs that bring people in, sometimes at the high-school level. So many people that now are the design physicists, and the senior engineers in these laboratories, came to work as summer interns and post-docs. One of the most successful programs for John Browne and Bruce Tarter has been the post-doctoral program. Actually, several hundred post-docs are in that environment. It gives the lab a chance to look at them. It gives them a chance to look at the lab. The concept is to expose these individuals to work in a variety of exciting research fields and to have the opportunity to interact with other talented staff and be able to successfully move from one area to another. So, we actually do grow our own in that sense and we use other ways to entice them as well.

The ASCI program, the Accelerated Strategic Computing Initiative, has been particularly successful in that area too in terms of fostering relationships between the labs and universities, pushing the edge in scientific computing.

Senator BEN NELSON. Thank you. There has been a lot of talk, at least I have heard some, about designing a low-yield nuclear weapon that would be designed to fight hardened and deeply buried targets. How much work has been accomplished on that subject and do we know if we are successful in developing and deploying that kind of a weapon and what effect on the environment it might have?

General GORDON. We have been fairly moribund over the last couple of years in new development. For awhile there was a prohibition against doing any work in that area. There was some relief with respect to how we could think about it and what research we might want to do. What I fall back on now is to find out what requirements are going to come out from the defense reviews.

But Senator, I would say that one of the areas in which we have not been doing enough work over the last few years is the broad question of advanced concepts and thought. We have put that on a back burner as we've attacked some of these other problems. I have begun discussions with the lab directors very recently on the suggestion that they begin to think about forming a small concepts group that can tackle very preliminary work and do that. With that said, Senator, I want to be the one who meets requirements, not the one who defines requirements.

Senator NELSON. Thank you. With respect to the infrastructure deterioration, a person might not be too cynical to think that if you're building new weapons, if you are on the cutting edge with research and development, if you are out of the box into new areas, is it safe to say that it is easier to get funding for infrastructure and keeping things better maintained?

Or do you find that it may be more difficult to get that kind of funding when it is just in a holding pattern on what your, if you will, the maintenance of existing warheads and not new development therefore less interest in making the commitment that is necessary to infrastructure?

General GORDON. I'm not sure we face the question quite like that. As I understand what happened in the past number of years in a resource-constrained environment, decisions were made, and I

suggest that I probably would have made the same decision, to take the available resources and really emphasize the stockpile science because we didn't know where we were going in that environment. We didn't know what we were going to be able to do without testing. To really make a hard run at it and with limited resources we put our resources in that one area.

We didn't push the infrastructure very hard. I don't want to say we walked away from it, but rather deferred it. That's literally come home to roost now.

I cannot, I will not be able to do the weapons life extension programs that we've agreed with the military to do in 5, 6, and 7 years if we don't start now on infrastructure.

Senator NELSON. I see my time is up. It always worries me when they tell me my time is expired. I worry about the word expiring. But, thank you very much, General.

General GORDON. Thank you, Senator.

Senator ALLARD. Senator Akaka, the Senator from Hawaii.

Senator AKAKA. Thank you very much, Mr. Chairman. I want to add my welcome to General Gordon.

I wanted you to know that I strongly support the Stockpile Stewardship Program and believe its success is necessary for the United States to continue its role as a leader in global nonproliferation efforts.

We must be able to ensure the safety and reliability of our nuclear deterrent. Sufficient funding, and a strong commitment from Congress and the administration are necessary for the Stockpile Stewardship Program to succeed. I hope that SSP will continue to have success.

General, according to the Russia task force report published in January 2001, funding for the Nuclear Cities Initiative was decreased in fiscal year 2001 by 50 percent. The Department of Energy was requested to demonstrate the results before being provided with additional funding.

This year's budget request decreases funding for the program by $20 million, and refers only to one of the 10 host nuclear cities in Russia. If we are concerned about nuclear proliferation, General, should not our focus continue to be on discouraging Russian nuclear scientists from selling their expertise to rogue nations? Let me add another question: What is the reason for limiting the program to one city in Russia?

General GORDON. The overall budget for the Nuclear Nonproliferation Program was reduced by $100 million this year. We had to make the cuts somewhere, that is the short answer to your question.

When it gets down to the kind of numbers you're talking about, where there's a few million dollars, we decided that if it's going to be at that level, we would emphasize one location where we could attempt to make a difference rather than spread a small amount of money across a wide range of activities.

Senator AKAKA. Was there a city selected?

General GORDON. It's Sarov, I believe.

Senator AKAKA. The risk of chemical and biological weapon terrorism has been highlighted in a number of reports and studies. The fiscal year 2002 budget request decreases funding for chemical

and biological national security by $12 million. Can you tell me what the basis is for this decrease in funding?

General GORDON. Again Senator, I would tell you that the overall budget for the Nuclear Nonproliferation Program was reduced $100 million. We tried, as best we could, to spread that reduction while keeping the important programs going as best we could.

Again, I would suggest, sir, that we do have a full set of program reviews underway. I remain hopeful on two accounts, one that when these programs are looked at on individual merit, which has not yet been done by the administration, and that they will look at and evaluate them in the particular context and may suggest changes to that area.

The other part is that these reviews result in an integrated and more comprehensive approach to nonproliferation and reducing the threat in Russia than we perhaps have had heretofore.

Senator AKAKA. Thank you, Mr. Chairman.

Senator ALLARD. If we do not have any questions from the rest of the committee members, maybe we should just move right on to the next panel? Yes, Senator Reed.

Senator REED. Mr. Chairman, if I may? Just one final question, General Gordon. You have now been a year or so in standing up your organization. I presume that within that year you have found some constructive criticism of existing legislation which might require new legislative initiatives.

Do you plan to submit to us any suggested changes in legislation that we should consider this Congress?

General GORDON. Yes, sir. I hope to be able to bring up a few that to me are relatively minor changes in the not too distant future. I, for example, would like to have a confirmed deputy. I feel like I'm home alone a lot and there's a lot to do in that regard.

There are some minor adjustments that seem to be appropriate with respect to how I'd like to have the organization set up. There's a detail within Title 32 that has a lab director report to DP. I'd like to suggest that we just simply strike that language. It needs to be figured out where they should report on a daily basis. There are one or two other items of that nature. From my perspective, they're relatively minor, but would be perfecting and would be helpful.

Senator REED. Thank you, Mr. Chairman.

Senator ALLARD. OK. Very good.

General GORDON. Mr. Chairman, thank you very much.

Senator ALLARD. Thank you, General, for being here. I know it is not always easy to break free from your duties to come and testify before us.

General GORDON. This is an important one.

Senator ALLARD. We appreciate it. OK. Thank you very much. We will move to the next panel. [Pause.]

I would like to welcome our second panel to the witness table. We are pleased to have the weapons laboratory directors and plant managers here to testify on the fiscal year 2002 budget and how it would impact their specific facilities.

These gentlemen represent national security through world-class science and technology. But they also represent a weapons programs that in many places is showing signs of wearing, some to the point of disrepair.

We welcome you to each provide a brief opening statement, if you wish, and I ask you to limit your opening statements to no more than 5 minutes because of the size of this panel. Your written statements will be included in the record in their entirety, if you so wish.

Then, we look forward to the question-and-answer period to discuss the strength of our Stockpile Stewardship Program, but also its challenges. I will call on each laboratory here individually and have you give us a brief 5-minute presentation, then we will move onto the questions and answers.

I will start with Ambassador Paul Robinson, President of Sandia National Laboratories.

STATEMENT OF DR. C. PAUL ROBINSON, PRESIDENT OF SANDIA LABORATORIES

Dr. ROBINSON. Mr. Chairman, and members of the Strategic Subcommittee, it is a pleasure to be here with you today. The strong support from this committee, and indeed the whole Congress, has been a key factor in my mind. I believe we come before you today in a much improved position than where we were a year ago.

Science-based stockpile stewardship is still an unprecedented challenge, but I think we are making significant progress. In my prepared statement, I listed a great many of the problems which we have tackled and some of the advancements made.

In summarizing for you now on behalf of all the people at Sandia, I must tell you I'm proud of what they have been able to deliver over the large breadth of the responsibilities of our laboratory for the Nation's nuclear weapons.

With respect to all of the major issues that have arisen in the stockpile, those seen in surveillance, in the significant findings process of the military, or through flight testing, we are indeed on top of them and solutions to all of these problems are either completed during the year or we are well along in the work to do so.

I also think there is a new attitude in the weapons program, particularly with the decision by the Navy to request a new arming-fusing-firing set to be designed and engineered to replace that in the Trident I submarine-launched ballistic missile (SLBM) warheads.

This has been the first major system that we've undertaken in 9 years. I must tell you, when you have the responsibility as a system integrator for something with many thousands of parts, and you haven't actually integrated a new design in 9 years, it leads to the question are you capable of doing this still?

I think there is now a new attitude among the people. We're very happy to be in the business of improving the safety, security, and the reliability of the U.S. nuclear stockpile. There is real-life blood being pumped in by these refurbishment programs.

We're also deep into the transition in science-based stockpile stewardship to replace nuclear testing. One of the keys over the past year has been applying some of the investments you made earlier. With the Accelerated Supercomputing Initiative, we have now the world's largest computers by far in our laboratories, and we are using them to solve critical problems.

For us, there is no better example than the design and certification of the new neutron generator for the Trident system. A completely new software was put on the trillion operation (tera op) per second computer. It demonstrates the performance of the generator in a hostile radiation environment and the performance is better than we did in any other previous device, even though this device has more stressing performance specs.

I've outlined in my statement several areas of what are indeed still another challenging budget year. Three major dilemmas that we face are the pacing of the Microsystems Engineering Systems Application (MESA) facility, which is a cornerstone facility for our microelectronics and microsystems to keep the U.S. stockpile components at the state of the art in radiation-hardened circuitry.

Also, the Distributed Information Systems Laboratory at our California site, and its companion the Joint Engineering Computational Lab at the New Mexico site, provides connectivity to our classified computing environment with the cyber security built in. These are key facilities that and we worry whether they will have to be postponed within the budget level we have.

The last is a proposal we've made to refurbish the Z Machine. This is the world's largest flash x-ray facility, a unique tool for all three weapon labs to carry out high energy density physics. We need to raise the operating level and get two-shift operations to meet the experimental needs. It performs the closest conditions to that that go on within a nuclear weapon that exist on the Earth today. It's a critical facility.

With that, I would like to thank you for the support you have given us. We ask for your support again this year. I think there is no more important job in the Nation than working to try and maintain our most important defense capability, the nuclear deterrent. I look forward to your questions.

[The prepared statement of Dr. Robinson follows:]

PREPARED STATEMENT BY AMBASSADOR C. PAUL ROBINSON

INTRODUCTION

Mr. Chairman and distinguished members of the subcommittee, thank you for the opportunity to testify today. I am Paul Robinson, Director of Sandia National Laboratories. Sandia is managed and operated for the U.S. Department of Energy (DOE) by Sandia Corporation, a subsidiary of the Lockheed Martin Corporation.

Sandia National Laboratories is a multiprogram laboratory of DOE and is one of the three National Nuclear Security Administration (NNSA) laboratories with research and development responsibility for nuclear weapons. Sandia's job is the design, development, qualification, and certification of nearly all of the non-nuclear subsystems of nuclear weapons. Our responsibilities include arming, fuzing, and firing systems; safety, security, and use-control systems; engineering support for production and dismantlement of nuclear weapons; and surveillance and support of weapons in stockpile. We perform substantial work in programs closely related to nuclear weapons, including intelligence, nonproliferation, and treaty verification technologies. As a multiprogram national laboratory, Sandia also performs research and development for DOE's energy and science offices, as well as work for other national security agencies when our special capabilities can make significant contributions.

I will begin my statement with a discussion of my general concerns regarding the budget submission for fiscal year 2002. I will then present an overview of three major planned investments that are necessary for advancing Sandia's capability to support programmatic deliverables in the future. Following that, I will discuss in detail Sandia's responsibilities in NNSA's Stockpile Stewardship and Nonprolifera-

tion missions. As requested, I will also comment on the proposed NNSA realignment.

CONCERNS OVER THE FISCAL YEAR 2002 BUDGET

During the last several months, the Defense Programs laboratories have worked closely with the NNSA to construct a future-years requirements profile for the nuclear security program. The funding levels of the multiyear estimates in that plan reflected our consensus estimate of stockpile stewardship requirements under the guidance then available as defined by Presidential directives and Department of Defense (DOD) requirements. The President's budget for NNSA Defense Programs released on April 9 was $863 million less than what we had estimated would be required in fiscal year 2002 to meet the requirements of that program plan ($6.163 billion).

I understand, of course, that the National Defense Review, the Quadrennial Defense Review, and the Nuclear Posture Review are still in progress. The results of those studies may cause changes in defense policy that could affect the Nation's nuclear security program one way or another. Pending new guidance that may result from those reviews, we will have to consider how to adjust current program requirements to the budget resources provided.

Against that backdrop, it is also clear—as the Foster Panel testified to this committee—that the infrastructure of our Nation's nuclear weapons complex has eroded significantly over the last two decades. In addition, significant changes will be required to weapons systems that may remain in the stockpile for several decades. Consider just two examples of emerging design and production needs: Life extension activities for the W76 and the W80 will require significant resources—people, facilities, and materials. In addition, the annual production target for neutron generators has more than doubled, from 600 to 1,550 units, and will require additional capacity and staff. These and other evolving stockpile requirements will demand their share of resources from a program that is already "wound too tight."

The current proposed budget for the NNSA would almost certainly result in a significant deferral or curtailment of several infrastructure activities required for the NNSA complex of the future. It is also almost certain that deliverables in directed stockpile work (DSW) would have to be rescheduled. Possible tradeoffs would include delays in the life extension programs for the W76 and W80 and delays in major new construction projects, such as the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory, the Microelectronics and Engineering Sciences Application (MESA) complex at Sandia, and several other line-item projects. Upgrades to laboratory programs in physical and cyber security; and refurbishments to existing facilities could also be affected. Significant changes to these activities and projects may be required to accomplish the mission objectives of the NNSA. It will be critical for the NNSA to strike a proper balance among its program elements to establish the right priorities and schedule resources in a way that meets stockpile deliverables while allowing for prudent investments in future capabilities.

MAJOR CAPABILITY INITIATIVES

Sandia continues to plan for and invest in capabilities to meet the anticipated mission requirements of the NNSA. Three key initiatives are especially important for supporting the programmatic needs of the Stockpile Stewardship Program and are at the forefront of our investment planning.

Microsystems and Engineering Sciences Application (MESA) Complex

Sandia's Microsystems and Engineering Sciences Application (MESA) complex is the cornerstone of our initiative to address the need for microelectronics and integrated microsystems to support a certifiable stockpile for the future. Advances in computation and microtechnologies during the past several years will be applied to stockpile modernization in MESA. MESA will provide essential facilities and equipment to enable teams of weapon component designers, subsystem designers, computational analysts, and microsystems specialists to design, integrate, and qualify components and subsystems for nuclear weapon system assemblies.

Microelectronic components are critical to the NNSA Defense Programs mission. Such components largely determine the reliability of weapon systems, the precision of weapon function at the target, and the operability of weapons in the severe environments encountered during delivery. Several key components in deployed nuclear weapons will need to be replaced within the decade. In most cases, components cannot be replaced with replicas of the originals because they are technologically obsolete and the supplier base, materials, and design tools to support them no longer exist. Moreover, competent designers would not elect to use decades-old electronic

technology, even if it were available. Because of space and weight constraints in all stockpiled weapon systems, Sandia has little choice but to meet component replacement needs using new microsystem technologies.

In addition, Sandia has an obligation to preserve critical capabilities in radiation-hardened microelectronics for defense and space hardware, including those satellite systems that monitor international arms control treaties. In 1998 Congress authorized the National Defense Electronics Partnership, which mandates that Sandia retain the institutional memory for radiation-hardening technology and sustain the supporting infrastructure for developing radiation-hardened microelectronics. MESA will provide the required infrastructure to meet that mandate for future decades. MESA is a major system project with a total estimated construction cost of $374 million. The construction start for MESA was deferred in fiscal year 2001, and it appears that construction may again be deferred in fiscal year 2002.

Facilities Supporting NNSA's Accelerated Strategic Computing Initiative

Sandia plays a major role in NNSA's Accelerated Strategic Computing Initiative (ASCI), also known as the Defense Applications and Modeling Campaign. ASCI is developing the advances in computational science that will enable the shift from test-based methods to computational methods for stockpile assessment and qualification.

Sandia will support ASCI with construction of two key facilities at its major laboratory sites: The Distributed Information Systems Laboratory (DISL) at Sandia's site in California will develop distributed information systems required to enable collaborative design and manufacturing across the nuclear weapons complex utilizing ASCI-scale tools. The Joint Computational Engineering Laboratory (JCEL) at Sandia's site in New Mexico will be a state-of-the-art facility for research, development, and application of multi-physics code development on massively parallel computer platforms.

Under a tri-laboratory agreement, allocations for JCEL and DISL have been deferred in past fiscal years. Unless additional funds are provided, it appears that construction starts for JCEL and DISL may again have to be deferred in fiscal year 2002.

Z Accelerator Refurbishment

NNSA's Z Accelerator at Sandia National Laboratories provides critical experimental data for the Stockpile Stewardship Program. Z produces over 50 times the x-ray energy and a factor of five more x-ray power than any existing, non-explosively driven, laboratory facility, making it the closest approximation to the conditions created in nuclear explosions. It is a major resource for ensuring the safety, security, and reliability of the Nation's stockpile. Yet, Sandia faces an unfunded need to refurbish Z to extend its lifetime and improve its performance, reliability, and shot rate.

In May 2000 an independent review committee chaired by Dr. Richard Garwin (Fellow Emeritus of IBM's Thomas J. Watson Research Center and a recipient of DOE's Fermi Award) and composed of experts from the nuclear weapons laboratories, DOD, academia, and industry overwhelmingly endorsed both the programs and the refurbishment of Z: "The Committee was unanimous in its belief that an incremental, cost-effective upgrade of Z . . . is worth pursuing."

The refurbishment will produce higher quality experimental data from increased precision and reproducibility at even higher energies than the world-record levels that have already been attained by Z alone. It will also support significantly more experiments per year.

Refurbishment of this national asset could be completed in 3 years at the comparatively modest cost of $60 million for design, procurement, and fabrication of hardware and equipment. An increase of $10 million per year in operating funds would also permit us to conduct double-shift operations to meet the demand for experiments. NNSA, DOD, and Sandia's partners at Lawrence Livermore and Los Alamos national laboratories will benefit from this investment.

Specifically, the refurbished Z Accelerator will provide the following benefits to the NNSA Stockpile Stewardship Program:

- Accurate material property data at higher pressures for weapon-relevant materials for four of the Stockpile Stewardship Program campaigns: Dynamic Materials Properties, Advanced Simulation and Computing, Secondary Certification, and Inertial Confinement Fusion.
- An enhanced environment to evaluate radiation flow for the Secondary Certification Campaign.
- More energetic radiation sources to test non-nuclear components for the Nuclear Survivability Campaign.

• Insight and confidence in sealing parameters to a next-generation facility for the Inertial Confinement Fusion Campaign.

We believe that coupling an ultra-high-power laser to the refurbished Z would add significant capability for the Stockpile Stewardship Program at modest additional cost. A collaborative effort between Sandia and several other laboratories funded with an additional $5 million in fiscal year 2002 would be useful for examining the scientific utility and technical feasibility of this combination.

The requirement to maintain a pulsed power capability over the interim during which the National Ignition Facility is constructed is paramount to our ability to fully support a Stockpile Stewardship Program. It is important not to lose sight of the extraordinary capability of the Z Accelerator and its significance to the Stockpile Stewardship Program.

STOCKPILE STEWARDSHIP ACTIVITIES

Stockpile stewardship activities include directed stockpile work, campaigns to advance the scientific and engineering capabilities required for weapons stockpile qualification and certification, and readiness programs for the NNSA's technology base and facilities. A major effort of the Stockpile Stewardship Program is directed to the annual certification process for assessing nuclear weapons in the stockpile. As a result of work during the past year by Sandia's technical experts and their colleagues at the other NNSA laboratories, I am able to report that the U.S. nuclear weapons stockpile today is safe and reliable. I recently affirmed this technical judgment—with respect to the nuclear weapon components and subsystems that are Sandia's responsibility—in my annual certification letter to the secretaries of Energy and Defense, who in turn certify the stockpile to the President. As part of the assessment process, the laboratories conduct reliability and safety investigations and prepare a report for each weapon type in the stockpile. We at Sandia National Laboratories see no need to conduct an underground nuclear test at this time to validate our assessment.

Directed Stockpile Work

Directed Stockpile Work encompasses all activities that directly support specific weapons in the nuclear stockpile. These activities include current maintenance and day-to-day care as well as planned refurbishments. Additionally, this work includes research, development, engineering, and qualification activities in direct support of each weapon type both in the present and future. Directed stockpile work maintains a balanced effort of near-term weapon activities and long-term research and development supported in campaigns.

Stockpile Research and Development

Stockpile Research and Development includes the exploratory and engineering research and development necessary to support near and long-term requirements of the nuclear weapons stockpile. This activity includes development of new weapon designs when needed and authorized; preproduction design and engineering activities; design and development of weapon modifications; and safety studies and assessments. Sandia's efforts focus on the continuing application of tools and hardware to be used to further our mission responsibilities in stockpile assessment and certification, maintenance, surveillance, and refurbishment in accordance with the schedule, as well as general supporting research and development.

Specific focal areas anticipated for the next 2 fiscal years include support for refurbishment of several existing stockpile systems; system studies and surety assessments; development and qualification of specific components and subsystems; development of improved and modernized engineering business practices and information systems; development of improved flight test assemblies and instrumentation; and exploration of potential future system concepts.

Engineering Development. The bulk of the engineering development planned in stockpile research and development will support the life extension refurbishments of the B61, W80, and W76. The objective of the stockpile life extension effort is to improve and extend the safety and reliability of U.S. nuclear weapons 20 to 30 years by upgrading or replacing components and subsystems rather than entire warheads. That challenge requires detailed, integrated planning for design, development, and production throughout the nuclear weapons complex. Sandia has been identified by NNSA to be the systems integrator for refurbishments.

To upgrade or replace degraded components and subsystems within budget, on schedule, and with zero defects, Sandia is making the most of existing facilities by improving its own business, engineering, and manufacturing processes. With NNSA and its production agencies, we are identifying future life extension options and scheduling them to plan level workloads and avoid fluctuations in labor costs. We

have adopted the DOD's approach of "Cost As an Independent Variable" and are defining DOD and DOE requirements up-front rather than negotiating trade-offs between design options and cost later. We have baselined design and production of the W88 arming, fuzing, and firing (AF&F) system and used that data to commit to cost targets for replacing the W76 AF&F system. Where possible, we buy commercial off-the-shelf parts. When no commercial equivalents exist, we design and build custom parts. Computational simulations, balanced with developmental nonnuclear tests, are minimizing design iterations, thereby reducing the time and cost to qualify new components. Consistent with efficient, effective commercial manufacturing, we are moving toward process-based quality techniques and are improving our quality monitoring and acceptance processes.

Sandia is acutely aware of cost as a principal concern, and we are working diligently to keep costs to a reasonable minimum. But as a laboratory director who signs the final weapon development report for systems when they are first delivered to DOD and annually reports on the safety and reliability of the stockpile to the secretaries of Energy and Defense, I cannot allow cost to over-constrain design and development activities and potentially compromise mission success. Ultimately, our goal is the cost-effective safety, security, and reliability of the Nation's nuclear defense.

We are helping NNSA and DOD implement the new "Phase 6.x process" for producing and maintaining weapons in the stockpile. This is the formal process by which we plan and authorize the effort needed to extend the life of an existing warhead. (It should not be confused with DOD's phase 6 numbering system for its cycle of research and development.)

Sandia is involved with two Phase 6.3 refurbishment designs, and we are in Phase 6.2 with a third system. The W76/Mk 4 (Trident I) entered Phase 6.3 formal refurbishment design engineering last year with a first production date of fiscal year 2007. The W80 warhead for Air Force and Navy cruise missiles also entered Phase 6.3 for refurbishment with scheduled first production in 2006. We are also engaged in a Phase 6.2/2A study for the refurbishment of the B61 strategic bomb, with first production scheduled for fiscal year 2004. These refurbishments will replace critical components to ensure decades of life extension. At the same time, they will upgrade the component technologies to ensure maintainability and cost efficiency while enhancing safety and reliability.

As part of the W87 life extension program, Sandia enhanced the structure of nonnuclear components in the warhead and requalified existing components, extending the warhead's service life for at least another 20 years. This work required us to reproduce a number of components that were used during flight testing in order to ensure adequate hardware for the extended years.

Beginning in 1996, Sandia worked with DOD to convert a set of B61–7 gravity bombs into B61–11 earth penetrators. Early tests revealed a design issue. We used computer simulations developed under the Defense Applications and Modeling Campaign to understand the issue and perform a redesign, which was performed with fewer, more useful experiments at less cost than in the past. In August, 2000, we presented the design and qualification results to the DOD Design Review and Acceptance Group. We expect final Nuclear Weapon Council Standing and Safety Committee acceptance soon.

We are developing the new B61–3/4/10 Realistic Weapon Trainer for use in Europe, with first delivery expected in October. These new trainers look identical to the war Reserve bombs, and they incorporate features that simulate all the safety and use-control attributes of actual bombs. The new trainers will replace older units and allow personnel to improve their proficiency in moving, handling, loading, and electrically interfacing with weapons. By reducing the need to access actual war Reserve bombs for training, the Realistic Weapon Trainer will also improve the safety and security of European-based U.S. nuclear weapons.

Sandia is developing a code management system that will employ modern, National Security Agency-approved, encrypted code control features, which will also be delivered to the European Command and U.S. Air Force in Europe beginning in October. This new system will replace older equipment that can no longer be maintained with modern, man-portable equipment that will make the transfer of codes to the field more secure and error-free. The equipment will become standard for the U.S. Strategic Command, U.S. Air Force depots, the NNSA Pantex plant, and other entities.

As these examples show, Sandia is alert to short-term and long-term needs of the stockpile, makes good use of NNSA's investments in stockpile stewardship technologies, and is a vigilant steward of the Nation's nuclear weapons stockpile.

Exploratory Research and Development. One particular concern I want to bring to your attention today is the current state of health of exploratory research and devel-

opment within the nuclear weapons program at all three laboratories. I recently had the opportunity to review the state of health of these efforts, and I was deeply disturbed at what I found. There is little fundamental thinking and exploration of new concepts that could fundamentally change and improve the Nation's defense posture, nor are there efforts focused on avoiding technological surprise by adversaries of the United States. Such efforts appear to have been the victims of the extensive budget cutting over the past decade.

You in Congress are certainly aware of the crucial and historical role that advanced science and technology have played in keeping the United States preeminent in defense and national security. I believe that our scientific leadership has itself been a major part of our deterrent against conflicts, large and small; therefore I am greatly troubled by the present sorry state of this work. In the past, the existence of efforts to explore newly-created technology to seek future advantage for the United States has been a critical factor in attracting and keeping the best scientists and engineers in defense work. Each generation is driven to make its own contributions to America's strength and, by doing so, to help ensure a more peaceful world. Restoring the exploratory research and development effort is vital to everyone's interests, and I urge your support to correct the present situation.

Stockpile Maintenance

Sandia's efforts in stockpile maintenance include production design and actual production of some of the components needed in system life extension operations and repairs associated with life extension programs, limited-life component exchange, and development and engineering activities that directly support the maintenance of the stockpile. For each weapon in the existing inventory, attention must be paid to understanding and resolving defects (called "significant findings"), maintaining use-control equipment, and replacing hardware needed for the surveillance function. Because the service lives of many nuclear weapons have been extended well beyond their original intent, we are exhausting the supply of surveillance units. More surveillance units must be produced, but the instrumentation to measure performance in joint flight tests with DOD must be redesigned using the electronics technology available today.

Sandia has the production mission for neutron generators, an essential component. Sandia manages two pieces within its production mission: (1) Neutron generator production, including both the recertification of neutron generators from the field that have remaining service life and the new neutron generator build; and (2) the Manufacturing Development Engineering (MDE) production assignment. As neutron generator production ramps up and the MDE program grows to support the W76 and W80 life extension programs, production operating funds will require an increase over fiscal year 2001 of approximately $50 million by fiscal year 2005. (Estimates are still being generated since the refurbishment programs are currently defining the MDE components they will need.) Unfortunately, no clear methodology exists within the nuclear weapons complex today for assessing new production requirements and their priorities relative to existing requirements.

Neutron Generator Production. In 1994, DOE forecasted that 600 neutron generators per year would be sufficient to support the active stockpile. When the Defense Programs' neutron generator production facility in Pinellas, Florida, closed in 1994, Sandia built its production facility to meet that requirement. Sandia-manufactured neutron generators first entered the inventory in August 1999. In 1997, DOE revised the requirement to 1,550 neutron generators per year by fiscal year 2004 to support both the active and inactive stockpiles. That new requirement exceeded Sandia's capacity. To meet the increased demand, Sandia is reconfiguring its facility through the Rapid Reactivation Project during fiscal years 1999 through 2002. To meet this schedule, Sandia is buying materials and hiring and training additional production operators. For fiscal year 2002, Sandia requires an increase over the planned target of $9.7 million for materials, tooling, and additional operators. Changes to the DOE Directive Schedule now require a level loaded production capacity of 1,350 neutron generators per year with the final ramp up to full production by fiscal year 2008.

Manufacturing Development Engineering (MDE) Production. Sandia's MDE production assignment includes critical components in microelectronics, power sources, and magnetics, with high complexity in design and manufacture that are not available commercially as off-the-shelf items. Approximately 50 MDE-procured components per year are required to support the stockpile. These components are to support limited life component exchange, the surveillance program, and refurbishments.

As system life extension programs shift into production, the MDE program will support delivery of components for each weapon as it undergoes refurbishment. It is projected that by fiscal year 2005, in preparation for the W80 and W76 life exten-

sion programs, MDE workload costs will increase almost threefold. For fiscal year 2002, Sandia requires an increase over the planned appropriation of $4.9 million.

Stockpile Evaluation

Stockpile evaluation includes laboratory tests, flight tests, quality evaluations, special testing, and surveillance of weapon systems to assess the safety and reliability of the nuclear weapon stockpile as a basis for the annual certification to the President.

Surveillance testing frequently results in recommendations for repairs and upgrades to the stockpile. Last year, following Sandia procedures, DOD replaced limited-life components in several weapon systems to add what we believe will be significant periods of maintenance-free service while the weapons are in DOD custody.

Congress approved a construction line item that will replace a 40-year-old facility, the Weapons Evaluation Testing Laboratory, at NNSA's Pantex Plant. This new construction will provide a state-of-the-art facility for testing weapon components and implementing advanced diagnostic techniques developed by the Enhanced Surveillance Campaign. We are separately working to design and build new system test equipment that will both update our aging equipment and incorporate further enhancements from the Enhanced Surveillance Program. Both of these projects are important for maintaining confidence in the safety, reliability, and performance of the stockpile without nuclear testing.

Last year Sandia introduced new, non-destructive, acoustic laboratory testing of stronglinks, a major safety component in our warheads, into the core surveillance program. This year we have added a second development from our Enhanced Surveillance Program into this core surveillance test gear that will allow us to evaluate the electrical current carrying potential of these safety devices. Both of these new tests have allowed us to better predict the useful lifetime of this critical component and enhance our replacement planning strategy.

To evaluate weapons in the active stockpile, Sandia annually conducts between seven and nine laboratory tests on each type of weapon and between two and four flight tests of each type of weapon. On average, 11 weapons per system are sampled. Tests that identify deviations from requirements lead to thorough investigations that may, in turn, result in repairs and retrofits or in recommendations for stockpile improvement programs. From June to December of last year, Sandia participated in the DOE-wide strategic review of the surveillance program that puts DOE and Sandia on a course to improve our surveillance capabilities in the 21st century. The surveillance program remains a key tool in our planning process for system improvements in the Stockpile Life Extension Programs.

DOD and DOE annually conduct joint flight tests on weapons of each weapon type. Historically, flight tests have uncovered about 22 percent of the defects recorded in surveillance data-bases. We continue to be concerned about budgetary constraints and other issues that inhibit DOE laboratory and military service support of the joint DOE/DOD Stockpile Surveillance Program. For example, the possibility of shortfalls to Air Force ICBM strategic missile testing could impact reliability assessments of the Minuteman III W62 and W78 warheads and the Peacekeeper W87 warheads. In addition, implementation of the terms of the START–II treaty will change reentry configurations from multiple to single vehicles while holding the number of missile test flights each year constant, thus reducing both the number of warheads that can be flown on each test and the opportunities to gather data on reliability and possible problems. We are working with the military services to address these important long-term issues related to flight testing.

To help compensate for shortfalls in flight tests and a dramatic reduction in the number and variety of reentry vehicles that can be flown if the W87 is deployed on Minuteman III, on-board instruments must be improved to provide additional performance information in fewer tests. This past year, we successfully flight tested an enhanced-fidelity instrumentation package in the W87 reentry vehicle.

The surveillance program is the foundation for maintaining the aging stockpile. We believe the surveillance program should maintain an adequate number of flight tests each year using military personnel, procedures, and hardware. Therefore, I urge you to assure an appropriate level of support for the joint surveillance flight test program, for both DOE and the DOD, to sustain confidence in the reliability of our strategic nuclear deterrent.

Dismantlement and Disposal

Sandia performs technical analysis and technology development to support dismantlement and safe storage of weapons being removed from the stockpile. Dismantlement and disposal includes activities associated with weapon retirement, disassembly, component characterization, and disposal or reclamation of materials and

components; the engineering, development, testing, qualification, certification, procurement, and refurbishment of containers required for interim storage; and the staging and storage of weapons, components, and materials awaiting dismantlement. Sandia's efforts focus on tools and processes for safe disassembly, staging and storage, and component processing and characterization.

Field Engineering, Training, and Manuals

As the U.S. nuclear ordnance engineering center, Sandia has unique responsibilities for training DOD personnel who handle nuclear weapons, including explosive ordnance disposal teams. Training covers the proper handling, storage, maintenance, and potential use of the nuclear deterrent. Our efforts in these areas focus on military liaison and support to the field, training, and maintenance of weapon manuals and reference materials.

Stockpile Stewardship Science and Technology Campaigns

Campaigns are multifunctional efforts across the NNSA Defense Programs laboratories, the production plants, and the Nevada Test Site that, in aggregate, constitute an integrated weapons science and technology program for developing critical capabilities for weapons qualification and certification. The goal of the Defense Programs campaigns is to address current or future issues by employing the best scientists and engineers and using the most advanced sciences and technologies. Many of the campaigns are interrelated and establish a foundation for future deliverables in directed stockpile work. Without a robust campaign program, our ability to support stockpile stewardship would be seriously harmed.

Sandia makes significant contributions in twelve of the seventeen Defense Programs campaigns. I will discuss Sandia's contributions to several of them.

Dynamic Materials Properties

This campaign includes efforts to develop experimentally validated data and models of all stockpile materials under a broad range of dynamic conditions found in nuclear explosions. In the past, dynamic material properties were often inferred from test data on a descriptive and empirical basis. Without the availability of nuclear tests, the materials models developed by this campaign are essential for establishing predictive relationships between material properties and stockpile performance, safety, and reliability.

Secondary Certification and Nuclear Systems Margins

Sandia's efforts in this campaign will improve the theoretic and computational capabilities and support the development of computational models required to predict the performance of nominal, aged, and rebuilt secondaries and thus help certify the stockpile in the absence of nuclear testing. A specific Sandia activity in this campaign is the development and characterization of radiation environments that are required for the campaign's major technical efforts.

Inertial Confinement Fusion Ignition and High Yield

This campaign pursues high-yield target designs on pulsed power systems. Sandia's efforts in this area will validate the baseline for a high-yield capsule design and will use the Z Accelerator to support other campaigns and nuclear weapon program priorities.

Certification in Hostile Environments

This campaign develops certification tools and microelectronic technologies required in the absence of nuclear testing to ensure that refurbished weapons meet the stockpile-to-target sequence requirements for hostile environments. Sandia's involvement in this campaign consists both of work on radiation-hardened electronics and other nonnuclear components and on experimentally validated computational tools needed to design and certify them. This campaign is vital to the life extension programs for the W76 and W80 and other systems to be refurbished in the future.

Defense Applications and Modeling

To achieve simulations with the required complexity and fidelity to support stockpile stewardship, NNSA must increase computational capability tremendously. The Accelerated Strategic Computing Initiative (ASCI), mentioned earlier, will hasten advances in computational science to enable the shift from test-based methods to computation-based methods.

ASCI campaign activities at Sandia consist of work in applications, problem solving environments, maintenance of sufficient on-site computational networking and communication capabilities, and alliances with academic research germane to ASCI goals. We are working on new mathematical methods, algorithms, and software for the solution of large-scale problems on massively parallel, often distributed systems.

Areas of importance include shock physics, chemically reacting flows, electromagnetics, and the computational analysis and design of materials, all with application to accident scenarios, weapons performance and safety, materials aging, manufacturing, or infrastructure surety. As these techniques are developed, they are incorporated directly into codes and applications relevant to nuclear weapon system design and certification, weapons system response prediction, weapons life spans, and virtual prototyping for the requalification and replacement of components and subsystems.

Weapon System Engineering Certification

Supporting both certification and directed stockpile work, the Weapon System Engineering Certification Campaign develops science-based engineering methods to increase certification confidence through validated simulation models and high-fidelity experimental test data. We develop validated engineering computational models and tools that directly support certification of the B61, W76, and W80 stockpile life extension programs.

Enhanced Surety

Over the past 50 years, Sandia has played a key role in designing and improving the safety, security, and reliability—the surety—of our nuclear weapons stockpile. As stewards of the stock-pile, we identify deficiencies, assess security and use-control using probabilistic risk techniques, and take into account increased international and domestic terrorist threats. As a result of these efforts, we believe improvements can and should be made to the security of the warheads. Knowing the surety of the stockpile in detail, including its day-to-day status, gives us higher confidence and indicates where significant long-term improvements are warranted.

In past years, DOE and DOD have continuously improved stockpile surety. Early improvements like permissive action links (weapon security locks), encryption, active protection, insensitive high explosives, and enhanced nuclear detonation safety architectures entered the stockpile as improvements to warheads. Operations also improved, for example, as DOD introduced weapon storage vaults, coded control, safe transport, and enhanced procedures-all of which Sandia developed.

Over the last decade, stockpile surety has improved, but primarily as a consequence of the retirement of older warheads such as the B53 and W69 that did not incorporate modern surety features and through selected surety upgrades. Improvements to stockpile surety had leveled off during the 1990s. However, NNSA's plans for life extension programs will offer rare opportunities to improve surety significantly.

Enhanced Surveillance

The Enhanced Surveillance Campaign develops tools, techniques, and models to measure, qualify, calculate, and predict the effects of aging on weapon materials and components and to understand how these effects impact weapon safety and reliability. Weapon surveillance will be augmented with new diagnostics for early detection of potential defects. The campaign will provide valuable information for long-term capability development, such as when new manufacturing facilities (e.g., pit production) will be needed. Enhanced surveillance techniques will protect the credibility of the deterrent by warning of manufacturing and aging defects in time to schedule weapon refurbishment before performance is impaired.

Advanced Design and Production Technologies

The Advanced Design and Production Technologies (ADAPT) campaign provides technology maturation and integration of modern product realization tools and methods across NNSA's product realization enterprise, including both laboratories and plants. The program is presently focused on deploying integrated planning tools across the complex that will support load-leveling and program optimization given budget and capacity constraints. Additionally, ADAPT supports the complex-wide integration of model-based engineering and manufacturing tools and concurrent engineering methods that represent commercial best practices.

Budget challenges within the weapons programs have historically been amplified for such engineering infrastructural elements. Given the anticipated stockpile refurbishment workloads for the next 20 years, the W71 and W80 programs must provide the requirements focus to drive modernization of our full product realization processes.

Readiness in Technical Base and Facilities

Readiness in Technical Base and Facilities provides infrastructure and operational readiness at NNSA facilities.

Facilities and Infrastructure Revitalization Initiative

Like other sites across the NNSA complex, Sandia has a number of aging facilities in need of refurbishment, repair, or replacement that fall below the level of line-item construction and are insufficiently supported by general plant projects (GPP) or other infrastructure funding programs. Infrastructure problems at this level are chronically understated and deferred, and they accumulate with the passage of years. Ultimately, this can lead to capability limitations that impair the mission.

NNSA recognized that this problem must be addressed, rather than be allowed to worsen. NNSA's Facilities and Infrastructure Revitalization Initiative is an effort to inventory and prioritize unaddressed infrastructure repair and improvement projects across the complex. The initiative was intended to support an appropriation request of $300 million in fiscal year 2002 to help bridge the gap for essential infrastructure repairs that are unfunded. The multiyear effort would require a continuous infusion of funds on the order of $400–$600 million annually for the following 5 years.

We identified approximately $300 million in items at Sandia National Laboratories that would be carried out under the Facilities and Infrastructure Revitalization Initiative during the course of the next few years. We submitted a list of 30 candidate projects for a recent inventory conducted by NNSA that can be effectively addressed in fiscal year 2002. The aggregate estimated cost of those items is $114 million. These projects would normally be funded through standard infrastructure programs such as GPP, maintenance, capital equipment, decontamination and demolition, and infrastructure planning-areas that were perennially deferred for lack of sufficient funding. Some of these items were aggregated with line-item projects in the past, but because construction line items are subject to long lead times, such projects have often been delayed.

Top priority items on our inventory for NNSA's Facilities and Infrastructure Revitalization Initiative are sufficiently urgent that failure to fund them soon will impact weapon program deliverables. For example, qualification of weapon components for the W76, B61, and W88 could be affected by failure to address these top revitalization priorities in a timely manner.

Another priority item for the Facilities and Infrastructure Revitalization Initiative is Sandia's Electromagnetic Test Facility. The existing facility is deteriorating; its 20-year-old diagnostic equipment has limited capability to support data acquisition for the development and validation of simulation codes. This modernization project will improve our capability to perform electromagnetic tests to qualify the W76 and W80 in accordance with their life extension plans.

NNSA's Facilities and Infrastructure Revitalization Initiative will perform a very important service to the Defense Programs mission if it succeeds in restoring the appropriate balance in funding for infrastructure improvements that are critical to sustaining mission capabilities. A carefully constructed revitalization initiative will help Sandia and the rest of the Defense Programs complex deal with longstanding infrastructure challenges. We must also have a more viable decontamination and demolition program to dispose of obsolete facilities; we must make a stronger commitment to major renovations and deferred maintenance; we must actively use General Plant Projects to maintain and revitalize our sites. Typically, a great deal of this work is deferred to the outyears, usually with no guarantee that adequate funding will be available then. It is essential that additional infrastructure revitalization funding be made available if we are to maintain the nuclear weapons laboratories at the level of capability necessary to support the Stockpile Stewardship Program.

NONPROLIFERATION ACTIVITIES

Sandia's support for the NNSA Office of Defense Nuclear Nonproliferation includes research and development for a variety of systems for detecting proliferation of weapons of mass destruction, verifying international agreements, enhancing the protection of nuclear material and nuclear weapons in Russia, eliminating inventories of surplus fissile materials useable for nuclear weapons in Russia, and providing mechanisms to enhance regional stability.

I am quite concerned that the fiscal year 2002 budget proposes substantial cuts in NNSA's programs for nonproliferation and verification research and development and arms control. I know there is some concern about whether these programs are truly effective in promoting U.S. non-proliferation objectives. However, I believe an analysis of the laboratories' contributions to nonproliferation technology will argue strongly for maintaining strong support for them.

Nonproliferation and Verification Research and Development

Sandia is developing a new generation of satellite-based sensors to detect low-yield nuclear explosions in the atmosphere. We also are developing seismic data processing technology to enhance detection of underground nuclear explosions. Our activities are part of a multilaboratory effort focused on developing affordable, deployable, and flexible sensors for seismic, hydro-acoustic, radionuclide, and infrasound data acquisition and processing. These activities are being coordinated and, in many cases, co-funded by DOD, which has the operational nuclear test monitoring responsibility within the U.S. government.

We are also developing airborne and satellite-based systems for detecting and characterizing proliferation-related activities involving chemical weapons, biological weapons, and missiles. Sandia coordinated the integration of NNSA's Multispectral Thermal Imager Satellite research project, which has recently completed its first year of successful operation and research. With other national laboratories, we are developing laser-based techniques for remote detection and identification of chemical species in effluent plumes. We have made impressive progress in developing specialized chemical microsensors, bioinformation systems, and decontamination technologies for nuclear, biological, and chemical weapons and for detecting nuclear material smuggling.

Sandia has significantly advanced the state of the art in synthetic aperture radar systems for national security applications that require all-weather, day-and-night capabilities in real time. We have recently transferred that technology to industry for incorporation into DOD's unmanned aerial reconnaissance vehicles.

Arms Control

Based on our experience in engineering nuclear weapons, Sandia assists with the evaluation of export licenses for technology with possible application for weaponization activities. We also help develop technology for International Atomic Energy Agency remote monitoring and inspections.

NNSA's Cooperative Monitoring Center at Sandia National Laboratories assists a number of countries and agencies in evaluating the applicability of arms control technologies and procedures for regional security issues. Prototype monitoring equipment allows representatives of regional parties (from areas such as south Asia, the Middle East, the Balkans, and the Korean peninsula) to perform hands-on evaluation of various products and technologies and use models to simulate the application of technical solutions to specific regional problems. The Cooperative Monitoring Center supports technical analysis of policy options for DOE and provides national security insight to other organizations. We also provide technical advice to U.S. negotiating delegations.

Sandia has been an active participant in the International Proliferation Prevention Program, which engages weapons scientists, engineers, and technicians from the former Soviet Union in nonmilitary projects. The Proliferation Prevention Program provides seed money for research activities and provides links with U.S. industry to commercialize the new activities.

In a particularly effective case, an engineer from Sandia worked with counterparts at the Russian nuclear weapons laboratory Chelyabinsk–70 to create a capability for designing foot and knee prostheses for landmine victims. The program attracted the assistance of a U.S. prosthetics manufacturer which defined the requirements for parts and performed final laboratory and clinical testing. The Russian engineers designed a titanium housing, and Sandia robotics engineers designed the knee's internal workings and electronics. The program provided employment opportunities in an area of civilian need for Russian technical personnel.

International Materials Protection, Control, and Accounting

Since 1993, Sandia has participated in the multilaboratory Materials Protection, Control, and Accounting Program to reduce the threat of nuclear weapons proliferation in the former Soviet Union. This program, which originally included projects in Russia and a number of the newly independent states, now focuses on Russia in the areas of nuclear material and nuclear facilities operated by the Ministry of Atomic Energy, the Russian Ministry of Defense, and smaller independent ministries. Activities include training, hardware installations, and maintenance.

Highly Enriched Uranium Transparency Program

In February 1993, the United States and Russia signed an agreement to convert highly enriched uranium from dismantled Russian nuclear weapons into low-enriched uranium for fuel to be used in commercial nuclear reactors. The United States agreed to purchase 500 tons of highly enriched uranium for use in the Nation's reactors after conversion to low-enriched uranium fuel. The agreement also es-

tablished measures to fulfill nonproliferation, physical security, material accounting and control, and environmental requirements for highly enriched uranium and low-enriched uranium. The Highly Enriched Uranium Transparency Program is intended to develop confidence that certain U.S./Russian nonproliferation objectives are being met—i.e., that highly enriched uranium from Russian nuclear weapons is blended into low-enriched uranium, shipped to the United States, and fabricated into commercial reactor fuel.

Sandia provides technical, administrative, and management support for the program in several areas, including on-site monitoring, data authentication and tamper indication for special monitoring equipment, vulnerability assessments, and advanced technology development to support the transparency regime.

COMMENTS ON NNSA REALIGNMENT

Under the leadership of General John A. Gordon, the NNSA made significant progress during the past year toward establishing its own identity as a semi-autonomous agency. I am very pleased that General Gordon solicited inputs from the laboratory directors as he considered structural alternatives for the NNSA. The lab directors spent a fair amount of time discussing with him how their organizations work and exploring other successful models of enterprise management and organization.

On March 14, General Gordon announced his decision for realigning the NNSA structure. The organizational arrangement selected by General Gordon is both a common corporate model and one that is successfully employed at the laboratories. I am hopeful that the new structure, when fully staffed with qualified managers, will help NNSA elements work more effectively as a team supporting the agency's mission.

NNSA Headquarters Realignment

The most significant change at the headquarters level is the creation of two associate administrator positions, one for facilities and operations and the other for management and administration. These posts will provide the infrastructural and administrative support for NNSA missions.

The practice of high-level support organizations furnishing services to lines of business is common in industry. A requirement for the success of this arrangement is a strong sense of commitment and teamwork. In the NNSA, the associate administrators will understand that it is their job to support and facilitate the missions of the enterprise. The new NNSA headquarters organization is essentially a teamwork structure that involves all the associates and deputies in the job of accomplishing the mission. I believe General Gordon's organizational changes can permit a strong executive team to take root at NNSA headquarters and provide clear and unambiguous leadership without the bureaucratic infighting and empire-building that all too often characterizes government agencies.

Key to the success of the new NNSA headquarters organizational structure is the realization that all members of the executive team have a responsibility and accountability to support the line managers who are responsible for overall program performance. All positions in the top organizational structure must regard the program managers not only as subordinates whom they direct, but also as customers whom they serve.

An analogy can perhaps be drawn with how the U.S. military conducts operations: Command elements don't just issue commands: they also actively support the soldiers and commanders in the field. All command organizations—whether they be operations, logistics, maintenance, or supply—are focused on supporting the combat organizations. Infighting at the command level would be counterproductive to that effort. It is essential that all elements of an executive or command structure function as a team supporting first-line operations.

Unfortunately, these positive attributes of effective command or executive management were not always present in the former DOE organization because of confusion of authority and responsibility among various offices and levels across the extensive DOE structure. I am very hopeful that the congressionally mandated autonomy of the NNSA and the new headquarters organizational structure established by General Gordon will replace the former confusion and counterproductivity with clear lines of authority and a strong sense of teamwork.

NNSA Field Organizations Realignment

The second phase of General Gordon's realignment plan will consider the realignment of field office roles and responsibilities. General Gordon has tasked a team to make recommendations for this second phase, and he indicated that he will make decisions on their recommendations in July.

There are those who argue that the NNSA field offices are no longer needed and that their functions should be moved to headquarters. I believe that point of view is uninformed about the complexity and magnitude of the tasks performed by the field offices. Mission management and constructive oversight require close ties with those doing the work. This fact argues for placement of the mission offices in the field in order to have decisions made as close as possible to the areas where those decisions have effect. The direct administration of the nuclear weapons program (including functions such as contract administration; site management; environment, safety, and health; quality assurance; and product acceptance) should be left to the NNSA's field elements.

Decentralized management of research and development (R&D) is widely practiced in industry. These days, a corporate office would be very unlikely to pull R&D management up to the corporate level and away from the business units. On the other hand, business units are accountable to the corporate office for the results of their R&D activities. The analogy for NNSA is to think of the NNSA Albuquerque Operations Office as the business unit responsible for the stockpile, and NNSA headquarters as the corporate office. Further, responsibility for day-to-day operation of the weapons production complex should be performed from a single field office, rather than from Washington.

The decentralized structure of the DOE operations offices is a proven concept, but there is room for improvement. Rather than moving day-to-day management of the weapons program to NNSA headquarters, we should devote attention to streamlining the field management system. NNSA nuclear weapons work should report to a single field operations office. Oversight activities should be coordinated between the field and headquarters to avoid burdensome duplication. In general, the Albuquerque Operations Office oversees stockpile production, maintenance, and dismantlement while headquarters deals directly with the laboratories for research initiatives. The field office adjusts the production and maintenance-related pieces of this complex, and the laboratories themselves adjust the research and development support for stockpile stewardship. This flexibility has been especially important when it was necessary for the laboratories to respond to urgent stockpile problems or plan for future stockpile requirements.

I hope and expect that the upcoming realignment of the NNSA field organization roles and responsibilities will clarify the appropriate roles of both headquarters and the field offices with respect to their functions and relationships with the laboratories. If the realignment eliminatesredundant and confusing lines of authority in oversight and program management, both among various field offices and between the field and headquarters, then it will accomplish a very useful purpose.

Subsequent attention then needs to be paid to achieving the best governance structure possible between the Federal responsibilities and those assigned to the contractor organizations. There has been considerable confusion growing over the past two decades as to how the roles and responsibilities should be assigned within the unique government-owned, contractor-operated partnership that comprises the nuclear weapons complex. Rather than the characteristic jockeying for power that has too often characterized the DOE system, it is important to regain a "systems view," with every organization understanding its role and where it fits into the whole. I am confident that John Gordon will seek changes that are both effective and workable.

CONCLUSION

I am very concerned that the proposed fiscal year 2002 budget for the NNSA may result in deferral or curtailment of several important infrastructure projects and program deliverables. Depending on what new policy guidance may result from the defense reviews currently underway, NNSA and the laboratories may have to consider how to adjust current program requirements to the budget resources provided.

I believe the NNSA has made significant progress during the past year. The agency is beginning to function with more coordination and teamwork, attributes that will surely be strengthened even more as the Administrator's realignment proposal is implemented. Success of the NNSA is not assured, however. The agency needs strong support from Congress and adequate resources to meet the formidable requirements of stockpile stewardship in the decades ahead.

Senator ALLARD. Thank you, Ambassador Robinson. We will now proceed to Dr. Bruce Tarter, Director of the University of California Lawrence Livermore National Laboratory. Welcome, Doctor.

STATEMENT OF DR. C. BRUCE TARTER, DIRECTOR, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. TARTER. Thank you very much, Mr. Chairman. I have a detailed written statement which I would like to submit for the record.

Senator ALLARD. We will make all of your detailed written statement a part of the record.

Dr. TARTER. I would like to speak to three specific topics and then make a comment or two about the new NNSA effort's first year in operation.

First, I think we had an event at Livermore a few weeks ago which was a very important one for the entire post-Cold War nuclear weapons program, which is the Stockpile Stewardship Program. We had General Gordon. We had Admiral Mies, the Commander of the Strategic Command, out to Livermore to commemorate the introduction into the stockpile of one of Livermore's originally designed warheads, which went through a stockpile life extension program, the W87.

I formally signed the certification for that warhead several weeks ago. We had a ceremony to commemorate the work of the people who had actually done this job.

I think you have heard with great candor and great accuracy the difficulties in much of the infrastructure. I think what you also can get is a sense, and I would make a particular comment, I think General Gordon noted that Y–12 was his poster child. John Mitchell will talk about that later.

But, I think our biggest partner, we had partners almost throughout the complex, the other laboratories, and plants' work, but our crucial partner in bringing W87 in its stockpile extension program phase back into the stockpile was the work of Y–12, despite all of the obstacles at that facility.

I think it is a tribute to the entire complex and the system that we were able to do this. I think there is a great deal of pride among all the people. So, I think that's a thing that we feel very proud about this year.

Each of our laboratories has some common responsibilities and we have some individual responsibilities in the stewardship program itself. One, we share with the two other laboratories, and Dr. Robinson has mentioned this, what I would call extreme computing. We really are the best in that area of the world.

We, by conscious choice, said we had to jump far ahead and we have done it. We at Livermore brought in just last summer what is at the moment the most extreme form of computing, a machine we called ASCI White, which will run at about 12 trillion calculations per second. I think the notable thing is not how many calculations it runs per second, but the fact, as I think Dr. Robinson said, we have used each other's computers, we are doing calculations that we could never even conceive of a decade ago.

We are doing something close to full simulation of the major parts of a weapon, soup to nuts. Again, there are areas where almost every area needs continued experimental validation of that computing result. But, nonetheless, we are doing these 500-hour enormous calculations to try to understand the aging of weapons

in the stockpile. I think those are real successes in bringing on this computing power.

Livermore has the special responsibility, as you've mentioned Mr. Chairman, for the National Ignition Facility (NIF). We had budget and schedule difficulties, which we reported back to the Department about 2 years ago. We went through a great deal of internal soul searching.

We changed out the management team at our laboratory. We have made a much greater reliance on private industry to construct much of this facility. I am pleased to report to you that for the past year we have had outstanding technical progress. We have all our industrial contracts in place and we have passed, I think with very good marks, all of the very extensive and appropriate reviews that are being done to that project.

So, I feel very good about its future. But, I also think that this is one where each day is one you have to ask that question again. We are doing that in a continuous fashion.

Finally, let me mention an issue which I think came up in a number of the Senators' questions about the nonproliferation program. I think at all three of our laboratories, we feel that is a equally important area of the world in which we participate and do work. I think as you've heard, our activities are distributed over a wide array of things, from Russian programs to technology.

As General Gordon indicated, the initial budget request from the administration is down a little over 10 percent. Appropriately, many of those programs will need to be reviewed by the new administration to put them in the context they desire. But I think our biggest concern at my laboratory, and I think it's a concern shared with the other laboratories, is that some of those cuts have been taken, are initially proposed to be taken, in the research and development line.

That's a very hard thing for us because we have spent several years in specific projects developing the expertise and proof testing it. If those programs go away, you will lose an investment of several years. I would hope the committee would help your staff, and our staffs, examine those programs very carefully, particularly in the light of the strategic reviews, because those are serious issues.

Finally, I think as General Gordon said, I think all of the lab directors have had enormous access to General Gordon. He gets a lot of advice. He gets more advice than I think anyone could possibly use, but I think we have been all made to feel very much part of his team.

I think any organization starting up has both good days and bad days, as he indicated. But, I think we all feel very positive and confident that the NNSA will help make the bureaucratic part of our jobs as effective as possible. I think with the support the committee has had in the past and the future, I think we can provide you with what the country needs in these areas. Thank you very much.

[The prepared statement of Dr. C. Bruce Tarter follows:]

PREPARED STATEMENT BY DR. C. BRUCE TARTER

OPENING REMARKS

Mr. Chairman and members of the committee, thank you for the opportunity to appear before you. I am the Director of the Lawrence Livermore National Labora-

tory (LLNL). Livermore is committed to maintaining confidence in the U.S. nuclear weapons stockpile as a principal participant in the Nation's Stockpile Stewardship Program. The Laboratory also contributes to vital national programs to reduce the growing threat posed by the proliferation of weapons of mass destruction.

My testimony discusses Livermore's accomplishments in the National Nuclear Administration (NNSA) programs as well as the technical and programmatic challenges we face. But first, I want to thank Congress for your strong support of the Stockpile Stewardship Program and our threat reduction activities. I believe we are making exceptional technical progress so far. Looking ahead, a strongly supported and sustained Stockpile Stewardship Program is clearly needed to ensure that this nation can maintain the safety, security, and reliability of the stockpile over the long term. Likewise strong and sustained support is needed for our activities in threat reduction—that is, nonproliferation, counterproliferation, and counterterrorism activities. Threat reduction is the "other side of the national security coin" to deterrence and stockpile stewardship. Scientific and technological superiority is the bedrock of both sides of the coin. The contribution of science and technology to stockpile stewardship is well understood. However, the role of science and technology in nonproliferation and threat reduction is not as well articulated and I hope that my remarks today provide a better understanding of this critical element of our national security work.

INTRODUCTION

On April 10, 2001, General John Gordon, head of the National Nuclear Security Administration (NNSA), and Admiral Richard Mies, commander in-chief of U.S. Strategic Command, were at Livermore to celebrate the certification of the refurbished W87 ICBM warhead. Speaking as the "customer," Admiral Mies called the occasion an "historic event" and "the first real test of stockpile stewardship." The W87 Life-Extension Program was a challenge to all elements of the Stockpile Stewardship Program. Devising the engineering improvements to the warhead, going into production in a less than fully functional weapons complex, and certifying the performance of the refurbished warheads without nuclear tests were all major accomplishments. It is an important early success story, but in the words of General Gordon, "we still have a long ways to go." More challenging technical issues are on the horizon as the needs to refurbish other weapon systems emerge.

Weapon refurbishment decisions and actions bring into play the spectrum of capabilities that we are striving to attain through the Stockpile Stewardship Program. First, to recognize and evaluate aging problems (and other defects) in weapons and devise remedies, we must understand in detail the science and technology that governs all aspects of nuclear weapons. We are making progress, but we need even better investigative tools. Second, the nuclear weapons production complex must be able to remanufacture parts and refurbish weapons as needed. Currently the complex is far from fully functional. Third, we must be able to certify with confidence the performance of the refurbished warheads as well as the other weapons in the stockpile. That requires expert judgment and application of the experimental and computational tools that we also use to improve our fundamental understanding of nuclear weapons. Finally, acquisition of this spectrum of capabilities is time urgent to meet existing requirements for weapon refurbishment and to deal with other weapon performance issues that might arise.

As a consequence, a principal goal of the Stockpile Stewardship Program has been to expeditiously put in place a set of vastly improved scientific tools and modern manufacturing capabilities: 100-teraops supercomputers; advanced radiography capabilities to take three-dimensional images of imploding mock primaries; a high-energy-density research facility, the National Ignition Facility, to study the thermonuclear physics of primaries and secondaries; and efficient, flexible manufacturing facilities. These investments are very demanding of resources. Other demands on the program have added stress. To date direct support of the stockpile has required more attention and resources than we initially anticipated to meet Department of Defense requirements. In addition, investments are needed to meet new security requirements and to recapitalize the nuclear weapons complex. Finally, yet other demands may arise out of the Presidentially mandated reviews of the U.S. military in the 21st century and in particular, the role of nuclear weapons and force requirements. When the ongoing national security reviews are completed and the full scope of our requirements is clear, we may need to readdress whether the proposed budget will be sufficient to carry out all necessary programmatic activities.

Livermore has major responsibilities within the Stockpile Stewardship Program, and the Laboratory's successes in 2000—as well as the challenges that lie ahead—provide a snapshot of the overall program. I have mentioned the certification of the

W87 warhead, refurbished through a life-extension program, as one outstanding accomplishment. Lawrence Livermore and Sandia/California are starting a life-extension program for the W80 cruise missile warhead, designed by Los Alamos. The effort builds upon a modern baseline understanding of the W80 and its performance, which was developed cooperatively by the New Mexico and California laboratories to support a formal DOD/DOE study in 2000 to define refurbishment options. Meeting the directed date for the first production unit (fiscal year 2006), will greatly stress the resources requested in fiscal year 2002 for this life-extension effort

Lawrence Livermore is also responsible for a number of state-of-the-art experimental and computer facilities—in operation and in development—that are essential for stockpile stewardship. Construction of the National Ignition Facility (NIF) at Livermore is now more than 50 percent complete. I am pleased to report that progress has been excellent on all technical fronts. The new baseline for the NIF project was developed by a restructured project management team that includes many of the Laboratory's most outstanding people including especially those with large-project experience. They worked with experts from U.S. industry to develop the plans, and private industry has a very prominent role in completion of the project. General Gordon provided certification of the NIF project to Congress on April 6, 2001. Construction is proceeding well with "First Laser Light" scheduled for fiscal year 2004 and project completion with all lasers in fiscal year 2008. Work is currently proceeding on a schedule that is constrained by the annual budget, not by what is now technically possible.

The Accelerated Strategic Computing Initiative (ASCI) is central to many of the success stories of the Stockpile Stewardship Program. Last summer, we took delivery from IBM of ASCI White, the world's most powerful computer, capable of 12.3 teraops (trillion operations per second). This machine and ASCI Blue Pacific (4 traops) are being used to support stockpile stewardship through a variety of applications. For example, at the end of 1999, we conducted the first-ever three-dimensional simulation of a nuclear primary explosion, which is an important program milestone, and we are close to completing a simulation of a nuclear weapons secondary. We are earmarked to take delivery of our next ASCI computer in fiscal year 2004, a machine that will be capable of 60 to 100 teraops. The Terascale Simulation Facility (TSF) is needed to house it. Funding in fiscal year 2002 is required to make the building available and fully equipped to accept an ASCI-scale system in 2004.

During their visit to the Laboratory, General Gordon and Admiral Mies also recognized the success of our Counterproliferation Analysis and Planning System (CAPS). They both cited CAPS as a "great partnership" among the DOD, the NNSA and the Laboratory that "shows we can successfully operate in the interagency environment." A dynamic partnership between Livermore and the military commands, CAPS is now part of the counterproliferation planning process for the U.S. Strategic Command, Special Operations Command, and other regional military commands. CAPS exemplifies how the idea of a researcher can be developed by a multidisciplinary team into prototype, which is then picked up by a major sponsor to become a product that has significant impact on national security.

Despite these notable accomplishments in CAPS and many of our other threat reduction programs, a number of these programs are facing major funding cuts. The future of some of these activities will depend on high-level reassessments currently underway by the administration. Others will depend on establishment of a better understanding of their importance in the overall threat reduction strategy and our confidence in overcoming the sheer difficulty of the technical challenges they entail.

Of greatest concern are the nonproliferation and verification research and development (R&D) programs. These programs provide the science and technology base for the U.S. agencies with operational responsibility for characterizing foreign weapons programs and detecting proliferation-related activities, for detecting and mitigating the use of weapons of mass destruction (WMD) against U.S. civilians, and for negotiating and monitoring compliance with arms-reduction and other agreements. Because the threat is continually evolving, as adversaries employ more sophisticated denial and deception and as more detailed treaties are negotiated, we must continually push the technical state of the art to develop new capabilities. The importance of these programs has been recognized by Congress in the last 2 years, when it markedly increased funding for these activities above the President's request. For fiscal year 2002, however, this budget line is slated for a 25 percent cut in operating funds, which will have a significant impact on delivery of the capabilities that are being developed by these programs.

The cooperative U.S.-Russian programs have been extensively reviewed by various panels and committees. Almost without exception, the reviews concur as to the valuable work being done by these programs—securing at-risk Soviet-legacy nuclear material, disposing of excess highly enriched uranium and plutonium, and assisting in

the downsizing of the Russian weapons complex through civilian job creation for displaced weapons workers. The reviews also concur as to the enormity of the undertaking, the difficulty of working with the Russian bureaucracy, and the need for continued involvement. We have made important progress in these program areas; however, it has been nearly 10 years since the first Russian programs were initiated, and it is certainly appropriate to reassess the programs against current needs and U.S. national security objectives. In the meantime it is important to avoid disrupting high priority programs. One such Livermore program currently at risk is our work with the Russian Navy to enhance the protection and control of fresh nuclear fuel for their nuclear powered vessels. This work involves direct interactions with Minatom and the Russian Ministry of Defense, an activity that would have been inconceivable during the Cold War.

I am concerned that funding cuts proposed for fiscal year 2002 will result in not only the termination of critical threat reduction projects but also the loss of essential personnel. Livermore faces this possibility most particularly in proliferation detection, WMD response, and plutonium disposition. We need to retain this cadre of people who have both the necessary technical expertise and the on-the-ground experience with these specialized programs, people whose experience base is irreplaceable.

THE STOCKPILE STEWARDSHIP PROGRAM

The Stockpile Stewardship Program is designed to ensure the safety and reliability of the U.S. nuclear weapons stockpile required to meet national security needs of the 21st century. Confidence in the safety and reliability of the weapons is to be maintained through an ongoing and integrated process of stockpile surveillance, assessment and certification, and refurbishment. Stockpile stewardship is a principal mission of the National Nuclear Security Administration (NNSA). NNSA began operation in March 2000.

General John Gordon, Administrator of NNSA, recently announced organizational changes to enhance NNSA's performance in core mission areas. The changes realign and separate programmatic and operational functions within the agency. The organizational and other positive changes adopted by General Gordon will clarify lines of communication and authority, which should improve overall efficiency and performance. Execution of the Stockpile Stewardship Program remains the primary responsibility of the NNSA Deputy Administrator for Defense Programs (NNSA/DP).

The changes being made at NNSA will facilitate long-range planning and the preparation of a comprehensive 5-year budget, which are critically important. The Stockpile Stewardship Program faces many competing demands for available resources. Difficult trade-off decisions will have to be made. NNSA must balance evolving requirements for directed stockpile work, the need for vigorous campaigns to prepare stockpile stewards for the more challenging issues that will arise as weapons continue to age, and required investments in research and production facilities and people.

We will greatly benefit from enhanced 5-year planning because it will establish future expectations at each of the laboratories and production facilities, which greatly helps in resource, workforce, and facility planning. Also important to our activities will be the results of the high-level review under way of the role of nuclear weapons and nuclear force requirements, part of the administration's broader review of the U.S. military in the 21st century. Lawrence Livermore's expertise in many nuclear-weapons issues is a national resource to contribute to these deliberations. As discussed below, enhanced 5-year budget planning and the outcome of high-level reviews are also important for the future of our Laboratory's nonproliferation and arms control programs.

Integrated Program Management and Execution

Integrated program management and execution is critical to the success of the Stockpile Stewardship Program. The three major program elements—surveillance, assessment and certification, and refurbishment—are tightly interconnected. So are the activities of the three laboratories, the production plants, and the Nevada Test Site. Livermore has many close partnerships and working relationships with other sites in the weapons complex. As one of the two nuclear design laboratories, we have particularly important formal certification responsibilities. The Laboratory also operates a number of unique, state-of-the-art experimental and computer facilities that are essential for both assessment of stockpile performance and certification of refurbishment actions.

The Stockpile Stewardship Program is formally managed by NNSA/DP through three overarching sets of activities: Directed Stockpile Work, Campaigns, and Readiness in Technical Base and Facilities. NNSA/DP uses this breakout to make evident

program integration, establish more clearly program goals and budget priorities, and help to identify program risks if there are budget shortfalls. The integrated program activities include:

- **Directed Stockpile Work.** Directed Stockpile Work supports the readiness of weapons and includes activities to meet current stockpile requirements. The effort includes weapon maintenance, comprehensive surveillance, weapon baselining, assessment and certification, supporting research and development, and scheduled weapon refurbishments. It also includes other stockpile commitments, such as dismantlement and information archiving.
- **Campaigns.** Campaigns are directed at making the scientific and technological advances necessary to assess and certify weapon performance now and over the long-term. They develop and maintain specific critical capabilities that are needed to sustain a viable nuclear deterrent. Each campaign has milestones and specific end-dates designed to focus advanced basic and applied science, computing, and engineering efforts on well-defined deliverables related to the stockpile. The current set of 18 campaigns provide a planning framework for the program's research and development activities.
- **Readiness in Technical Base and Facilities.** "Readiness in Technical Base and Facilities" ensures that necessary investments are made in people and their supporting infrastructure. Readiness includes the fixed costs and the investments of the Stockpile Stewardship Program, and it aims to ensure the presence of: (1) high-quality, motivated people in the program with the needed skills and training; (2) a well-maintained, modern infrastructure—to support the activities of these people—that is operated in a safe, secure, and environmentally responsible manner; and (3) special experimental and computational facilities that must be developed and brought on line for stewardship to be successful in the long term.

A rigorous planning process has been established to clearly define programmatic milestones to be achieved within each of these program areas. The Stockpile Stewardship Program is now defined by a series of 5-year plans, one for each program element, describing goals and objectives. The 5-year plans, which were developed with participation by the laboratories, plants, and the test site, are accompanied by annual implementation plans with detailed milestones.

ACCOMPLISHMENTS AND CHALLENGES IN DIRECTED STOCKPILE WORK

Livermore is the design laboratory for four weapon systems in the stockpile: the W87 and W62 ICBM warheads, the B83 bomb, and the W84 cruise missile warhead. They are expected to remain in the stockpile well past their originally anticipated lifetimes; the W62 already has. Significant effort is being expended on weapons surveillance and baselining, on assessing the weapons' performance, and on maintenance and selective refurbishment. We are just completing a major effort to extend the stockpile life of the W87 warhead, and Livermore and Sandia/California have been assigned the responsibility for the engineering development work to refurbish the W80, a Los Alamos-designed weapon.

Stockpile Surveillance and Baselining

Our stockpile surveillance efforts focus on Livermore designs in the stockpile and on understanding the effect of aging on weapons in the stockpile. Aging is important because it affects the physical characteristics of materials, and we must determine how these changes impact weapon safety and performance. With a better understanding of aging, our stockpile surveillance can be more predictive, making possible systematic refurbishment and preventative maintenance activities to correct developing problems.

As we gather more data and gain experience, we review and upgrade our surveillance programs—refining sampling plans, measuring additional attributes, introducing new diagnostic tools, and improving analysis methods. We are also taking on responsibility for surveillance of pits from Livermore-designed weapons in the stockpile to better balance the workload. These activities had been conducted at Los Alamos.

In addition, we are improving the sensors and techniques used to inspect all stockpiled weapons. These efforts, developed in the Enhanced Surveillance Campaign, contribute to surveillance activities that are part of Directed Stockpile Work. For example, Livermore has completed development of a solid phase micro-extraction diagnostic to detect and characterize the presence of minute quantities of chemicals in warheads. The system is now deployed at Pantex. We are also complet-

ing development of high-resolution x-ray tomography for imaging weapon pits, and deployment at Pantex is in progress. Furthermore, development continues of high-energy neutron radiography for nondestructively detecting small voids and structural defects in weapon systems. Working with Y–12, AlliedSignal, and Savannah River, we are also pursuing micro-sensors for evaluation of materials degradation and corrosion in weapon systems.

Stockpile Performance Assessments

Annual certification of the stockpile is fully reliant on the laboratories' assessment capabilities. Demonstration-based assessments also underpin Livermore's W87 stockpile life extension work (discussed below) and our contributions to W76 Dual Revalidation and the Submarine Launched Ballistic Missile (SLBM) Warhead Protection Program. Assessments of the performance of stockpiled weapons and modification actions must be demonstration based—that is, grounded on existing nuclear test data, component-level experiments and demonstration, and simulations using detailed, validated computer models. To the extent possible, non-nuclear experiments are used to assess weapon component performance. Together with past nuclear test results, they also are used to validate computer simulations. Once validated to the extent possible, weapon physics simulations guide expert judgment about integral stockpile issues at this time.

Annual Stockpile Certification. Formal review processes for certification of weapon safety and reliability in the absence of nuclear testing have been established as part of the Stockpile Stewardship Program. It is essential that judgments and decisions made by the stockpile stewards are credible among themselves, to DOD and others in the nuclear weapons community, and to the administration and Congress. In April 2000, the Secretaries of Energy and Defense certified to the President that the U.S. nuclear stockpile is safe and reliable and that no nuclear tests are needed at this time.

Annual certification is based on the technical evaluations made by the NNSA laboratories and on advice from the laboratory Directors, the commander-in-chief of U.S. Strategic Command, and the Nuclear Weapons Council. To prepare for annual certification, our Laboratory collects and analyzes all available information about each stockpile weapon system, including physics, engineering, and chemistry and materials science data. This work is subjected to rigorous, in-depth review by managers and scientists throughout the program.

W76 Dual Revalidation. The W76 Dual Revalidation Program was a 4-year-long intensive effort to reaffirm the soundness of the W76 SLBM using two independent teams—the Original Design Team (Los Alamos and Sandia/New Mexico) and the Independent Review Team (Livermore and Sandia/California). The W76 Project Officers Group (POG) managed and coordinated the process. The California W76 team submitted its final report in March 2000. Among its accomplishments, Livermore conducted the first-ever hydrodynamic test of the late-time implosion history of the W76 primary, and we performed an extensive series of engineering tests to examine mechanical response and possible component aging phenomena. Nuclear design calculations with the newest codes have provided a re-evaluation of the system performance margins. The results of the dual revalidation provide the basis for planning the W76 life-extension program.

Stockpile Maintenance and Refurbishment

Each year, the Nuclear Weapons Stockpile Plan sets the requirement to maintain a safe and reliable nuclear weapons stockpile, and it specifies the number of weapons of each type to be in the stockpile. Among other responsibilities, the DOD establishes military requirements, which are incorporated into the plan. These requirements drive the Directed Stockpile Work workload for DOE, particularly in the resource-intensive area of refurbishment activities and life-extension programs. The W87 life-extension program is in its production phase and activities are planned for the W76 and the W80 systems.

The W87 Life Extension Program. Earlier this month, Admiral Richard Mies (commander-in-chief of U.S. Strategic Command) and General Gordon visited Livermore to celebrate certification of the life-extension refurbishment of the W87 ICBM warhead. They signed the Final Weapon Development Report. This first completed certification of the engineering design and production processes for a life-extension program (LEP) is a groundbreaking milestone for the Stockpile Stewardship Program. It demonstrates the laboratories and the production facilities working together to overcome physics, engineering, and manufacturing challenges to meet DOD requirements without conducting a nuclear test. Assessment of nuclear performance is based on computer simulation, past nuclear tests, and new above-

ground experiments that addressed specific physics questions raised by the engineering alterations and computer simulations.

The objective of the W87 LEP was to enhance the structural integrity of the warhead so that it may remain part of the enduring stockpile beyond the year 2025 and will meet anticipated future requirements for the system. The W87 warhead/Mk21 re-entry vehicle (RV) is a candidate for a single RV option for the Minuteman III ICBM. The development activities have included extensive flight testing, ground testing, and physics and engineering analysis. High-fidelity flight tests, incorporating the latest technological advances in onboard diagnostic instrumentation and telemetry, provide added confidence in the reliability of the design modifications. The first production unit was completed at the Pantex Plant in February 1999, and the final production unit is scheduled for 2003.

Life Extension of the W80. Under the direction of the Nuclear Weapons Council, the W80 POG is pursuing a LEP for the W80 cruise missile warhead, which was developed by Los Alamos and Sandia/New Mexico. A formal study that defined refurbishment options and their feasibility (known as a 6.2 study) was completed in 2000. Livermore and Sandia/California participated as an Interlaboratory Peer Review team. In this role, the California team evaluated proposed modifications to the warhead for feasibility, aging effects on the modifications, impact to the DOE complex, and production issues. Working closely together, the New Mexico and California teams established a modern baseline understanding of the W80 and its performance.

The W80 POG has selected a final refurbishment option for the LEP, and NNSA has assigned the associated engineering development task to Livermore and Sandia/California. This assignment better balances the workload among the laboratories and provides a vehicle for the Laboratory to develop the skills of the next generation of stockpile stewards. The California laboratories will also be the design agencies for certifying the safety and reliability of the refurbished warheads, the W80 Mods 2 and 3. Los Alamos and Sandia/New Mexico will continue to be responsible for certification of the W80 Mods 0 and 1. Meeting the currently directed date for the first production unit (fiscal year 2006), would require $30 million for Lawrence Livermore in fiscal year 2002 that is not in the President's budget.

ACCOMPLISHMENTS AND CHALLENGES IN STOCKPILE STEWARDSHIP CAMPAIGNS

As I have earlier described, stockpile stewardship campaigns are focused, technically challenging, multifunctional efforts that address critical capabilities that will be needed to achieve certification of stockpiled weapons as more challenging issues arise. Eight campaigns are aimed at providing the scientific understanding needed to certify the nuclear weapons stockpile and to support required weapon modernization in life extension programs. Three additional campaigns focus on weapon engineering. They provide specific tools, capabilities, and components in support of weapon maintenance, modernization, and refurbishment, as well as certification of weapon systems. The final seven campaigns support readiness by focusing on sustaining the manufacturing base within the weapons complex. The campaigns are multilaboratory, and examples of Livermore's major contributions are highlighted below.

Experiments, Theory, and Modeling to Better Understand Plutonium

One of the major success stories of the Stockpile Stewardship Program is the significant improvement we are making in understanding the properties of plutonium. This is a very important issue—we need to understand aging in plutonium and the effect of aging-related changes on the performance of an imploding pit of a stockpiled weapon. The required capacity of the production complex depends on the anticipated lifetime of plutonium pits in the stockpile. An accurate assessment is necessary. If we underestimate the lifetime of pits, we may overinvest in facilities to remanufacture plutonium parts. If we overestimate the lifetime of pits, the Nation could find itself critically short of capacity for plutonium operations when it is vitally needed.

Laboratory Experiments and Modeling. Available information indicates that plutonium used in pit applications is stable; however, we must assess the effects of long-term aging. Plutonium's properties are among the most complex of all the elements. To study the subtleties of plutonium, we have combined advances in theoretical modeling with the use of sophisticated experiments. For example, we are using old pits and accelerated-aging alloys to determine the lifetime of pits. Accelerated-aging samples are plutonium alloys with a mixture of isotopes to increase the rate of self-irradiation damage so that the material "ages" faster.

Data from our materials, engineering, and dynamic experiments show, so far, that pits are stable. Livermore has conducted important experiments on old pits using

advanced materials characterization tools such as our Transmission Electron Microscope, the most powerful such instrument in the NNSA complex. Using the Transmission Electron Microscope, we have discovered nanoscale (10^{-9} inch) bubbles that are likely filled with helium in the microstructure of aged plutonium. The plutonium appears to be accommodating the helium, which is created through self-irradiation, in a stable form. The presence of these bubbles was predicted theoretically using computer simulations of the radiation damage process.

Experiments at the Nevada Test Site. Livermore is conducting sub-critical experiments at the Nevada Test Site to investigate the properties of plutonium shocked and accelerated by high explosives. Matter can be ejected from the free surface of materials that undergo shock. The experiments characterize ejecta, which is thought to affect the performance of primaries in weapons. Performance is being studied as a function of plutonium age as well as surface finish and manufacturing technique. Results will affect estimates of pit lifetime and decisions about future production of replacement pits, and improve our fundamental understanding of performance.

Unlike our first three subcritical experiments, tests in the current Oboe series are performed inside individual confinement vessels. Six of the eight planned Oboe experiments have been completed, four of them in 2000. By using small expendable vessels, up to 12 separate experiments can now be conducted in the same underground test chamber—the zero room—over several years. Following the test, after the chamber is determined to be contamination-free personnel are allowed to enter the zero room to retrieve films and data. The use of the vessels for subcritical experiments is resulting in significant cost reduction and improved data return. In the past, each subcritical experiment followed a complex schedule and time-consuming preparations, and after each test, the zero room, with all its diagnostic equipment, was permanently contaminated and could not be reused.

In addition, we are bringing into operation the Joint Actinide Shock Physics Experimental Research (JASPER) Facility at the Nevada Test Site, a two-stage gas gun for performing shock tests on special nuclear materials. JASPER experiments, which are planned to start in fiscal year 2001, will complement other experimental and modeling activities by providing scientists more precise equation-of-state data at extreme conditions than can be obtained from other types of experiments.

Modeling and Experiments to Probe Primary Performance

The Contained Firing Facility/Flash X-Ray Facility. Hydrodynamics testing is the most valuable experimental tool we have for diagnosing device performance issues for primaries in stockpiled weapons. Through hydrodynamics experiments conducted at Livermore's Site 300 and the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) at Los Alamos, weapon scientists are able to characterize the energy delivered from the high explosives to a mock pit, the response of the pit to hydrodynamic shocks, and the resulting distribution of pit materials when they are highly compressed. These three pieces of information are critical for baselining weapons, certifying stockpile performance, and validating hydrodynamics simulation codes.

Over the past decade, we have made tremendous advances in the development of diagnostics capabilities and experimental techniques used in hydrodynamic testing. We are now able to gather far more revealing data from hydrodynamic tests than was possible when we developed the weapons that are now in the stockpile. In 1998, we carried out the first "core punch" experiments, in which scientists use high-energy radiography to record a digital image of the detailed shape of the gas cavity inside a pit when it is highly compressed. We examined two important stockpile primary devices: the W76 SLBM warhead and the B83 strategic bomb.

The Flash X-Ray Facility was shut down in 1999 and work began on an upgrade that will contain the debris created by explosive testing. Construction of the Contained Firing Facility is now finished, and the facility is undergoing qualification testing to assure its ability to contain debris from experiments that use up to 60 kilograms of high explosives. When hydrodynamic testing resumes in late 2001, Livemore will be able to conduct these critically important experiments in an even more environmentally-benign manner.

Three-Dimensional Simulation of a Nuclear Primary Explosion. Our hydrodynamic testing of mock primaries is complemented with a vigorous simulation program that achieved a remarkable milestone in December 1999. The first-ever three-dimensional simulation of a nuclear weapon primary explosion was completed using the ASCI Blue Pacific computer at Livermore. Demonstrating the ability to simulate the explosion of a primary in three dimensions is a major milestone in the Stockpile Stewardship Program and an important step forward in the full-system modeling of weapon performance. Three-dimensional simulation is critically important be-

cause phenomena during a nuclear explosion are in many cases not symmetric due to aging and manufacturing variations.

The complex computer model that was used, called a "burn code," employs tens of millions of zones—hundreds of times more than a comparable two-dimensional simulation. The work was completed through an intense, sustained effort that involved weapons code developers and computer support personnel. It required innovative three-dimensional algorithms able to represent the relevant physical processes and run efficiently on the machine's parallel architecture. The simulation ran a total of 492 hours of computer time on 1024 processors and used 640,000 megabytes of memory on the Blue Pacific computer. During the calculation, six million megabytes of data were written in a total of 50,000 graphics files. Analyzing and preparing the data for visualization again requires the parallel processing capability of Blue Pacific. This post-processing is enabling weapon scientists to get a more accurate and detailed picture of the primary explosion process as it occurs.

Modeling and Experiments of High-Explosive Detonation. By linking two previously separate physics models, Livermore scientists now have a much better capability to simulate the detonation of high explosives (HE). One of the codes, CHEETAH (which is linked the ARES hydrodynamics code), models the chemical kinetics and thermodynamics involved in a detonation. In the resultant simulation, as ARES determines the motion of the materials, CHEETAH provides at each time step the state of chemical reactions and equation-of-state data for the relevant intermediate and final reaction products, which affects subsequent hydrodynamic performance.

We are also obtaining improved equation-of-state data for the materials produced by HE detonation, such as carbon dioxide. Better data increases the accuracy of simulation models. Researchers used Livermore's diamond anvil cell to study carbon dioxide at extreme conditions (millions of Earth atmospheres). They created two forms of solid carbon dioxide that were never before seen in the laboratory (CO_2–IV and CO_2–V). What is especially interesting about CO_2–V is that it shows nonlinear optical behavior, which may eventually lead to a new class of generating materials for high-power lasers.

High-Energy-Density Weapon Physics (HEDP) Calculations and Experiments

To determine the performance of thermonuclear weapons, we need to accurately model how various types of radiation interact with their surroundings. The fundamental physical processes are particularly complex in the dynamic high-energy-density conditions present during the functioning of a weapon. Materials behave very differently at star-like pressures and temperatures. Modeling performance is made even more difficult by the fact that many of the issues we need to consider are inherently three dimensional. Weapons have been designed as one- or two-dimensional objects but they age three dimensionally. Furthermore, problems that could arise in weapons (e.g., cracks or other irregularities) are also typically three dimensional. High-fidelity three-dimensional modeling demands the computing power that ASCI promises to deliver. It also demands experimental capabilities that can be used to generate data to validate the models.

High-Energy-Density Physics Experiments. When the Nova laser ceased operations at Livermore in 1999, we began using the Omega laser at the University of Rochester and the Z machine at Sandia to conduct high energy-density experiments. These facilities are able to approach the high energy densities produced in nuclear detonations, albeit only momentarily and in only very small volumes. Hence, they are useful for generating data and validating simulation codes near—but not at—weapon-physics conditions. The National Ignition Facility (NIF) will provide much greater capability to perform these types of experiments—it is capable of delivering nearly 60 times the energy of the Omega laser. Livermore researchers have been carefully examining the many possible types of experiments that can be conducted on NIF in support of stockpile stewardship. They presented an extensive set of materials at a High-Energy-Density Physics (HEDP) Workshop held at Sandia/California on January 30-February 2, 2001. The presentations showed that extraordinary progress has been made toward developing quantitative metrics for stockpile assessment and certification and in defining a detailed experimental weapons-physics program to be conducted at HEDP facilities. Although the certification approaches of the National laboratories differ, they all require an enhanced understanding of HEDP weapon behavior as an essential component of the Stockpile Stewardship Program.

High-Energy-Density Physics Modeling. As mentioned, Livermore researchers achieved a major milestone in late 1999 with the first-ever three-dimensional simulation of a nuclear-weapon primary explosion. The next step in the full-system modeling of weapon performance is a three-dimensional simulation of the thermo-

nuclear burn of a weapon secondary. Work is currently in progress at the Laboratory using the ASCI White supercomputer. In addition to the codes developed to simulate nuclear weapon performance, the Laboratory has developed the code HYDRA, which was used in 2000 to simulate in three dimensions the performance of targets that might be used in the National Ignition Facility to achieve ignition and thermonuclear burn. The simulations were run on 1,680 processors of the ASCI Blue Pacific computer using a mesh of more than 16 million zones. HYDRA has also modeled the results of hydrodynamic instability experiments performed on our Nova laser and the University of Rochester's Omega laser.

ACCOMPLISHMENTS AND CHALLENGES IN TECHNICAL BASE AND FACILITIES

Assessments of weapon performance and certification of weapon refurbishments must be based on scientific and engineering demonstration to be credible. In the absence of nuclear testing, we rely on data from past nuclear tests as a benchmark, component-level experiments and demonstration, and advanced simulations for an integrated assessment of weapon performance and safety. This approach has enabled us to successfully certify the W87 life-extension refurbishment and address stockpile issues that have emerged to date. However, as the stockpile ages, we anticipate that more difficult issues will arise.

These needs—to be able to assess and certify both weapon performance and refurbishment actions—drive the Stockpile Stewardship Program's investments in much more capable experimental facilities, such as the National Ignition Facility (NIF), the Dual Axis Radiographic Hydrodynamic Test Facility and even more advanced hydro-test capabilities, and greatly enhanced numerical simulation tools developed through the Accelerated Strategic Computing Initiative (ASCI). We are not progressing as quickly as we could to acquire these greater capabilities because of competing needs for Stockpile Stewardship Program resources that must be balanced. The program must meet requirements for Directed Stockpile Work (e.g., life-extension programs) and pursue vigorous Campaigns. In addition, the nuclear weapons complex is in need of infrastructure recapitalization to support all of these activities. Program success requires both efficient, flexible, and modern manufacturing facilities and a work environment at the laboratories and production facilities that makes it possible to attract and retain an exceptional staff. Here, the discussion focuses on two areas where much more capable research facilities are required—NIF and ASCI—and on the need for infrastructure reinvestment. Workforce issues will be discussed later.

The National Ignition Facility

Construction is under way at Livermore of the National Ignition Facility (NIF), a major research facility housing a 192-beam laser and associated experimental capabilities. NIF will be the world's largest laser, delivering 60 times more energy than the Omega laser at the University of Rochester (and the previous NOVA Laser at Lawrence Livermore), currently the largest laser in the Inertial Confinement Fusion (ICF) program. NIF will provide 1.8 Megajoules of ultraviolet laser energy that can be used to compress and heat a small capsule filled with deuterium and tritium to conditions at which thermonuclear fusion occurs. NIF is a cornerstone and essential element of the Stockpile Stewardship Program. It will also provide scientific and technical information that may eventually lead to practical fusion energy production.

The baseline plan and schedule for NIF is included in General Gordon's certification of the NIF project, provided to Congress on April 6, 2001. He concluded that "The NIF Project should continue along the approved 192-beam baseline at a Total Project and Related Cost of $3,448 million and project completion at the end of fiscal year 2008. The goal for the NIF is to achieve ignition in the laboratory." With this certification, the full $199 million appropriated by Congress for fiscal year 2001 has been made available for execution of the NIF project. The fiscal year 2002 budget provides $245 million for continued NIF construction. The pace of construction is now constrained by available annual funding in the overall NNSA/DP budget, and the project could be completed significantly earlier at a lower total cost if more funding were available in the near term.

The Importance of NIF to Stockpile Stewardship. NIF is vital to the success of stockpile stewardship. It will be the only facility capable of well-diagnosed experiments to examine thermonuclear ignition and burn and to study the high-energy-density properties of primaries and secondaries in nuclear weapons. We need the facility for experimental study of key issues related to the effect of aging on weapons and for certification of the performance of refurbished weapons. In addition, NIF experiments provide the only available means for advancing critical elements of the underlying science of nuclear weapons. NIF experiments will provide necessary data

for sophisticated computer simulation models being developed for stockpile stewardship, and the models themselves need to be tested in the physical conditions that only the NIF can provide. Finally, NIF will help to attract and train the exceptional scientific and technical talent that is required to sustain the Stockpile Stewardship Program over the long term.

The findings of NNSA/DP's High-Energy-Density Physics (HEDP) Workshop, held January 30-February 2, 2001, reconfirmed NIF's essential role in the Stockpile Stewardship Program and recommended that NIF be completed to its full 192-beam configuration on its baseline schedule. The Workshop Panel included representatives from DOE, NNSA, DOD, the three NNSA laboratories, and Argonne National Laboratory. They reviewed presentations by experts in weapons design, HEDP, and Inertial Confinement Fusion (ICF) from the three laboratories that discussed options for NIF deployment, other HEDP facilities that can complement NIF, and Stockpile Stewardship Program needs for HEDP and weapons experiments/calculations for future stockpile certification.

NIF Project Technical Progress and Accomplishments. The NIF project is more than 50 percent complete. Major progress continues to be made and at a rapid pace. The NIF conventional facilities are 97 percent done, with completion expected in September 2001.

- Over 1,000 tons of special equipment has been installed in the two laser bays, which are now operating under cleanroom protocols. Jacobs Facilities, Inc. (JFI) is responsible for the integration, installation, and commissioning of all beampath infrastructure systems, which form the exoskeleton of the NIF laser. Awarded the NIF project's Integration Management and Installation contract in August 2000, JFI brings significant expertise in clean construction practices to the project. By January 2001, JFI had mobilized their personnel for an early start to installation of laser bay beampath enclosures.
- The Optics Assembly Building (OAB), which contains an 8000 sq. ft. Class 100 cleanroom facility, is in operation cleaning parts to be used in the assembly of NIF. In February 2001 the Project completed acceptance testing of the first OAB workstation for assembly of the line-replaceable units (LRUs)-modular components that comprise the special laser, target, and optical equipment. Over the next year, the other LRU workstations will be installed, tested, and commissioned. This is a key activity in our preparation for building the NIF.

In addition, progress is outstanding on all technological fronts. A few examples are cited:

- With the development of technology to quickly grow optical-quality crystals for NIF, now we can grow in less than 2 months a 300-kilogram crystal that is used to convert laser light from infrared to the ultraviolet color optimized for the target physics experiments. The Laboratory together with an industrial supplier, Cleveland Crystals, have produced 56 percent of the crystals required for NIF.
- With development of technologies to continuously pour laser glass, Hoya Corporation and Schott Glass Technologies, suppliers of high-quality laser amplifier glass, are meeting all of NIF's technical specifications and have now produced roughly 75 percent of the 150 tons of laser glass (about 2,400 out of 3,000 slabs) required for NIF.
- We applied adaptive optics technology to develop deformable mirrors that allows NIF to maintain a very high quality laser beam even after passing through two meters of glass.
- Finally, we have developed an annealing process to increase the damage threshold for the ultraviolet optical elements in NIF and to meet the operational cost requirements of the NIF. We are now working to implement this process in a production setting.

NIF Project Rebaseline and Certification. In his certification of the NIF project, General Gordon concluded that "the NIF project team is capable of managing the project so as to assure a high probability of successful execution." His certification is dependent on final resolution of a 5-year budget plan for NNSA, but as stated in his report, "Funding for the National Ignition Facility will be included in this plan." The certification follows a series of events and actions taken by the Laboratory, DOE and NNSA, and Congress since the summer of 1999 when we began to restructure the NIF project and develop a new baseline.

General Gordon's certification report reflects the very hard work of and outstanding progress made by the revamped NIF project management team. The team includes many of the Laboratory's most outstanding people and staff with large-

project experience, who were brought into the project from other Livermore programs and from outside the Laboratory. To develop the rebaseline plans, the NIF project team combined their collective experience with experts from U.S. industry in extremely large projects that require cleanroom conditions—Jacobs Facilities, Inc., Lockheed Missiles and Space, Intel Corporation, Hewlett-Packard, and others such as United States Navy Strategic Systems. In addition, U.S. industry has a significantly larger role in completion of the project than previously planned with over 99 percent of the cost of procurement now contracted to private industry.

A series of actions by DOE and Congress preceded General Gordon's certification of NIF. On June 1, 2000, Secretary of Energy Richardson provided to Congress his interim report laying out the Department's path forward for NIF. He stated, "The path forward I have selected is based on the following conclusions/results from a very detailed review process. . . . The project is technically sound and based upon good engineering design. There are no known technical showstoppers remaining for project completion." The review process included the work of a specially appointed Laser System Task Force of the Secretary of Energy Advisory Board (SEAB), chaired by Dr. John McTague, which issued an interim report on NIF in May and a final report in November 2000.

In September 2000, Secretary Richardson submitted to Congress a DOE-approved rebaselined cost and schedule for the NIF along with his certification of the project. Prior to the Secretary's submittal, reviews were held following the recommendation of the SEAB Laser System Task Force. One was a thorough, intrusive examination of the NIF project patterned after the highly respected "Lehman" reviews carried out on large high energy-physics and nuclear physics construction projects within the DOE Office of Science. Concurrently, Burns and Roe Enterprises, Inc. conducted a separate Independent Cost Review of the project.

In accordance with the Conference Bill (H.R. 5408, Section 3140 of the Fiscal Year 2001 Defense Authorization Bill), Congress provided $130 million immediately for the project, with $69 million of NIF construction funds held by the NNSA until certification of the project by the NNSA Administrator. To support this certification, NNSA/DP held two additional reviews of the NIF Project. The first, the High-Energy-Density Physics Workshop, is discussed above. The second was the DP Status Review of the NIF Project, held February 27-March 2, 2001. Then on April 6, 2001, General Gordon certified the NIF project, citing the High-Energy-Density Physics Study Report, the Defense Programs NIF status reviews and the Defense Programs Future Years Budget Plan for the Stockpile Stewardship Program.

THE ACCELERATED STRATEGIC COMPUTING INITIATIVE

The Accelerated Strategic Computing Initiative (ASCI) is greatly advancing our ability to computationally simulate the performance of an aging stockpile and to certify the details of refurbishment projects. To make the needed major advances in weapons science and engineering simulation codes, Livermore, Los Alamos, and Sandia national laboratories are obtaining from U.S. industry dramatic increases in computer performance and information management. The ASCI program is integrating the development of computer platforms, simulation applications, and data management technologies. It will take a string of successive investments to achieve ASCI's long-term goals.

Livermore's partnership with IBM has been highly successful. We took delivery of ASCI Blue Pacific in fiscal year 1998 and then ASCI White in fiscal year 2000. Both machines exceeded their performance requirements and are being used to support stockpile stewardship through a variety of applications, some of which I have discussed. The important next step in ASCI at Livermore is a supercomputer capable of 60 to 100 teraops (trillion operations per second). It is planned for fiscal year 2004, and to keep plans on schedule, funding is needed in fiscal year 2002 for construction of the Terascale Simulation Facility.

ASCI White Provides 12.3-teraops. The Laboratory is home to the world's most powerful supercomputer, the IBM ASCI White machine, which is capable of 12.3 teraops. It is the latest step in ASCI's ambitious efforts to rapidly advance the state-of-the-art in computers, computational models, and data management tools needed to simulate the performance of nuclear weapons. In Summer 2000, ASCI White was delivered to Livermore on schedule from IBM's research center in Poughkeepsie, New York, in 28 large moving vans. We worked very closely with IBM to successfully install the machine and bring it up and running with our very complex simulation codes.

ASCI White is based on the next-generation IBM processor, node, and switch technology. It consists of 512 nodes, each with 16 processors. Exceeding its contractual performance requirement of 10 teraops, the machine is about a factor of three

faster than Livermore's Blue Pacific computer, which was used to perform the first ever 3D simulation of the full functioning of a nuclear weapon primary. It is roughly 100,000 times more powerful than a typical desktop computer and requires about the equivalent of two basketball courts of floorspace. The machine also provides over 8 trillion bytes (terabytes) of main memory and about 110 terabytes of global disk space. Calculations are under way to use ASCI White to simulate the performance of the secondary of a nuclear weapon.

Simulation Modeling and the Problem-Solving Environment. ASCI is more than powerful computers; it is the development of advanced simulation techniques as well as data management and visualization tools. Three Gordon Bell Awards, two in 1999 and one in 2000, exemplify the outstanding simulation development capabilities at Livermore and a growing base of expertise in using the machines. Most notable was the 1999 Gordon Bell Award for best performance in supercomputing. A team led by Livermore researchers, with collaborators at the University of Minnesota and IBM, solved a supercomputer problem directly relevant to weapons physics issues and with broad applications including supernova evolution, combustion physics, and supersonic vehicle propulsion and dynamics. In addition, we are making significant progress in the development of very high-performance data visualization capabilities. Two Assessment Theaters that provide wall-size, extremely high resolution images are now available at Livermore. They are helping weapon scientists to comprehend the vast amount of data the ASCI computers generate, and they enable visualization researchers to experiment with capabilities that are among the best in the world.

Beyond ASCI White and the Terascale Simulation Facility. The next supercomputer at Livermore after ASCI White will move us much closer to ASCI's goal of full-scale simulation of weapons performance based on first-principles physics models without resorting to simplified models. The threshold for that capability is 100 teraops, and reaching the goal quickly is vital to success in stockpile stewardship. Plans call for ASCI "Q" (30 teraops) to be operational at Los Alamos in 2002, a 20-teraops machine at Sandia in 2003, and a 60- to 100-teraops machine for Livermore in 2004. At the onset of the Stockpile Stewardship Program, ASCI set as a goal to achieve 100 teraops by 2004. The machine at Livermore will be as close to 100 teraops as can be afforded within budget limitations.

The 60- to 100-teraops machine will be very large, and we need the Terascale Simulation Facility (TSF) to house it. Plans for this $89 million facility have been developed and a Conceptual Design Report has been approved. Title I design is scheduled to be complete in May 2001. The TSF will consist of a two-story computing facility with power and space to accommodate a 100-teraops-class system; assessment areas and networking control areas necessary for direction and assimilation of data; and a four-story office structure for staff to manage and utilize the simulation environment. Essentially all of the planned funding for the TSF has been reallocated in prior years by NNSA/DP to meet other pressing programmatic needs; hence, $32 million is needed in fiscal year 2002. With timely funding, about 24,000 square feet of the machine room (of the 48,000 square feet planned) would be available and fully equipped to accept an ASCI-scale system in 2004. It is important that plans for the 60- to 100-teraops machine not slip.

The two machine rooms in TSF will guarantee our capability to site any system required by the program. The TSF will function more like an experimental facility than a computer center by supporting very close cooperation between staff and analysts. Round the clock support for major runs, restart capability for huge simulations, and on-the-fly trouble shooting will support a mode of operations where "runs" will be viewed as "shots," requiring intense support to succeed. In addition, the TSF will feature the Advanced Simulation Laboratory for the development of visualization capabilities, and it will house the consolidated Networking Operations Center for Livermore's supercomputer systems.

Infrastructure Recapitalization

Stockpile stewardship requires major investments in new facilities and capabilities to make it possible for scientists and engineers to much more thoroughly understand the performance of nuclear weapons. As discussed above, at Livermore these investments include construction of NIF and acquisition of ASCI supercomputers and the TSF. The Stockpile Stewardship Program will not succeed without the new-facility investments that are being made at the NNSA laboratories. Scheduled programmatic work at the laboratories and the plants has also placed exceedingly high demands on provided funding. The cumulative effect of necessary continuing attention to the highest and most immediate priorities over the course of the Stockpile Stewardship Program has been shortage of funds to recapitalize NNSA's underlying

infrastructure. As a result, we are providing input and support to NNSA's Facilities and Infrastructure Recapitalization Plan.

Over the years, Livermore has depended on having special facilities and equipment in an accommodating work environment to attract and retain an exceptional staff. Sustaining the quality of our workforce is a particularly challenging task in view of the high demand in the private sector for skilled people. The task is made more difficult by the continued aging of our facilities without major reinvestment. At Livermore, only 60 percent of our employees currently reside in permanent space, and 70 percent of the temporary office space (trailers and modular buildings) is nearing or beyond end of service life. Overall, 14 percent of Livermore's office and laboratory space is in need of major rehabilitation and nearly 30 percent of the space is in need of minor rehabilitation. Such working conditions are not conducive to retaining and attracting the exceptional workforce that we need to accomplish our mission.

Older facilities typically are more expensive to maintain and usually have higher costs associated with safe and healthy operations. Our overall maintenance backlog is about $330 million if funded with programmatic dollars. Other than funding for line-item construction of major new facilities, since the mid–1990s our infrastructure reinvestments have been in the range of $25 to 50 million per year in programmatic dollars for a site with a plant replacement value of $3.1 billion. We need additional funding to reduce the backlog and/or construct replacement facilities.

Reduction of the maintenance backlog is not the only issue we face. Obsolescent equipment needs to be replaced. For example, the Laboratory struggles to keep pace with rapid advances in telecommunications capabilities, which are critically needed to efficiently and securely use our supercomputers and to upgrade our business operations. In addition, we have legacy facilities from long-discontinued programs as well as unusable or unsafe laboratory space that must be decommissioned, decontaminated (where necessary), and demolished. Our legacy facilities and other excess marginal space require considerable up-front investments to rectify. We also have to invest so that buildings at Livermore meet present-day seismic safety codes and the latest, more demanding safety criteria.

REDUCING THE THREATS POSED BY THE PROLIFERATION OF WEAPONS OF MASS DESTRUCTION

The proliferation and potential use of nuclear, chemical, and biological weapons (collectively referred to as weapons of mass destruction, or WMD) threatens the security of this nation. Continuing economic and political instability in Russia jeopardizes that country's ability to secure its legacy nuclear materials. At least 20 countries, some of them hostile to the U.S., are suspected of or known to be developing WMD. The incipient nuclear arms race between India and Pakistan has grave implications for security in that volatile region. There is no indication that years of intrusive inspections and global censure have halted Iraq's WMD ambitions, and Iran is actively building up its nuclear program. The potential availability of WMD materials and know-how makes terrorist acquisition of such weapons frighteningly possible.

Livermore's Threat Reduction Program

Livermore is applying its nuclear expertise, developed through past work in nuclear weapon development and testing and its continuing stockpile stewardship responsibilities, to the challenge of nuclear threat reduction—that is, nonproliferation, counterproliferation, and counterterrorism. Because the threat of proliferation is not restricted to nuclear weapons, we are also drawing on the Laboratory's broad capabilities in the biological and chemical sciences to develop the technologies, analysis, and expertise needed to deal with the proliferation of chemical and biological weapons.

Scientific and technological superiority is the foundation of national security. Advanced science and technology enable the Nation's military capabilities and lie at the heart of the Stockpile Stewardship Program. In the threat reduction arena, proliferation detection and intelligence collection depend on successive generations of advanced technology to overcome denial and deception and to interpret fragmentary clues amid enormous and expanding volumes of technical data and other information. The strength of international treaties and agreements is based, in large part, on technical capabilities for monitoring compliance.

The central role of science and technology in the Stockpile Stewardship Program is well understood. However, the equally critical role of R&D in nonproliferation and threat reduction has not been articulated with sufficient clarity, as evidenced by the significant cuts in fiscal year 2002 funding proposed for this work. Below I describe the critical problems of threat reduction that require advanced science and tech-

nology solutions, highlight Livermore's activities and achievements in these areas, and note the effect of the proposed budget cuts.

R&D for Threat Reduction

Scientific and technical capabilities are essential for four "grand challenges" of threat reduction: proliferation detection, response to WMD terrorism, worldwide monitoring for nuclear explosions, and protection and control of nuclear weapons and nuclear material. The main sponsor of our work in these areas is NNSA's Office of Defense Nuclear Nonproliferation and its Nonproliferation and Verification Research and Development (R&D) Program. This program provides the technological base for the U.S. agencies with operational responsibility for characterizing foreign weapons programs and detecting proliferation-related activities, for detecting and mitigating the use of weapons of mass destruction against U.S. civilians, and for negotiating and monitoring compliance with arms reduction and other agreements. Because the threat is continually evolving, we must continually push the technical state of the art. I am concerned that the $57 million cut in operating funds proposed for this fiscal year 2002 budget line (a drop of roughly 25 percent), will have a major impact on the program's ability to deliver badly needed new capabilities for proliferation detection and domestic response to WMD terrorism.

Proliferation Detection. The discovery of Iraq's extensive clandestine WMD programs following the 1991 Gulf War demonstrated with chilling clarity the difficulty of detecting proliferation-related activities. This experience also illustrated the need to back up agreements with effective monitoring technology, for despite the fact that Iraq had signed the Nuclear Non-Proliferation Treaty and was subject to IAEA inspections, it managed to completely hide its WMD activities. After the dissolution of the Soviet Union (later in 1991), DOE's Nonproliferation and Verification R&D Program was tasked and funded to develop improved proliferation detection capabilities to meet this critical national security need in the more complicated multipolar world.

The goal of this work is to develop technical means by which signatures associated with the development, production, and testing of weapons of mass destruction can be detected and quantified. Characterization of these signatures will provide clues that, together with other sources of information, can be used to infer the nature of suspicious activities. Because of the technical difficulty of achieving the required proliferation detection capabilities, the optimal approach is not readily apparent. Therefore, a number of different avenues must be investigated and the state of the art advanced in many technical disciplines in order to turn proliferation detection concepts into functioning, field-worthy systems.

In this area more than any other, success requires a long-term focus and sustained effort. Indeed the proliferation detection challenge is increasing. Adversaries continue to acquire more advanced technology for their WMD programs, and they improve their denial and deception techniques as they learn about our detection capabilities.

At Livermore, we take an end-to-end approach to proliferation detection. Our technology developers work hand in hand with signatures experts, all-source intelligence analysts, and the people who develop advanced data-exploitation techniques. This systems-level approach allows us to develop technologies that meet real-world needs, functioning in demanding deployment environments and delivering information that can be readily exploited and used with confidence as the basis for nonproliferation policy and counterproliferation response.

We have developed both passive and active technologies. These technologies have been transitioned from laboratory concepts into prototype fieldable systems and their operational feasibility in complex industrial environments has been demonstrated. The next step would be to work with operational agencies to integrate these detection technologies into their future technical capabilities. However, the funding cuts proposed for fiscal year 2002 will force the termination of Livermore's entire remote sensing effort.

Domestic Response to WMD Terrorism. Events such as the World Trade Center and African embassy bombings, the Tokyo subway nerve-gas attack, and a growing number of bioterrorism scares have galvanized U.S. efforts to combat terrorist use of chemical and biological weapons, particularly attacks against civilian targets. The Chemical and Biological National Security Program (CBNP) was initiated by DOE in fiscal year 1997 to develop new technologies for improved response in the event of a chemical or biological terrorist attack.

At Livermore, our CBNP has grown significantly in the past 4 years. It was initiated as a Laboratory Directed R&D Strategic Initiative in 1996 and has evolved from those roots. Today we have thriving efforts in all four of the national program areas-biological foundations, biodetection, modeling and prediction, and decon-

tamination—with leadership responsibilities in biodetection and modeling and prediction. We have developed the first truly portable, battery-powered, handheld polymerace chain reaction instrument, the Handheld Advanced Nucleic Acid Analyzer (HANAA). The instrument is capable of testing four different samples for two different DNA sequences and reporting the results in less than 10 minutes. This year, HANAA entered real-world beta testing, where it is being used by FDA inspectors to detect pathogenic bacteria in imported seafood, health workers to analyze blood samples for drug-resistant strains of malaria in rural Africa, and emergency response personnel as a detection and diagnostic tool in the event of a domestic bioterrorism incident. HANAA technology has also been licensed to a commercial partner.

To provide biodefense for special events (e.g., governmental assemblies, dignitary visits, major sporting events), Livermore and Los Alamos are jointly developing the Biological Aerosol Sentry and Information System (BASIS). This system is designed specifically for the "detect to treat" mission-detecting a bioterrorism incident within a few hours of attack, early enough for public health agencies to mount an effective medical response. BASIS uses a network of distributed sampling units located in and around potential target sites. Each sampling unit continuously collects, stores, and time-registers aerosol samples. The samples are retrieved and brought to a field laboratory for analysis. If bioagent is detected, authorities are notified and provided with information as to agent type, time and location of "hot" samples, estimated aerosol concentrations, hazard zones, and medical case load estimates. To ensure that BASIS supports real-world operational needs, it is being developed in close cooperation with the public health agencies (Federal, state, and local) responsible for emergency response and medical operations in the event of a bioattack. It was successfully field tested at Salt Lake City in March 2001 and is planned to be ready for deployment in 2002

Nuclear Explosion Monitoring. Livermore has provided seismic research expertise in support of nuclear explosion monitoring for more than 40 years. The U.S. needs to be able to detect, locate, and identify nuclear explosions of any yield, anywhere in the world, under a wide range of possible evasion scenarios. Worldwide monitoring at the required level of sensitivity requires, in turn, a detailed understanding of the propagation of signals (radionuclide, optical, electromagnetic, seismic, acoustic) that differentiate a nuclear explosion from the enormous number of background nonnuclear events like mining explosions, earthquakes, and lightning strikes.

Livermore's contribution to the current program is the development of ground-based nuclear explosion monitoring capabilities in regions of concern (e.g., Middle East, North Africa, Russia, Korea penisula). We develop databases, methodologies, algorithms, software, and hardware systems for the Air Force Technical Applications Center (AFTAC) for their use in collecting and interpreting seismic, acoustic, and radionuclide data. A critical deliverable is the knowledge base which provides regional propagation path corrections to the event processing algorithms in AFTAC's analysis pipeline. This knowledge base is expanded and enhanced as new monitoring stations come on line and are calibrated and as new data and interpretations become available. This past year, we delivered to AFTAC parameter sets covering the Middle East and Southwest Asia. The focus of our current work is on the European Arctic, including the test site at Novaya Zemlya.

Verification and Transparency. The nuclear science and radiation detection technology base resident at Livermore and the NNSA nuclear complex is key to agreements with Russia to reduce the danger from nuclear weapons. During the past decade, the U.S. and Russia have engaged in negotiations on such issues as shutting down plutonium-producing reactors, monitoring nuclear stockpiles, and mutual inspections of material declared excess to defense needs. The sticking point in all of these negotiations is the need to measure attributes of classified objects while preventing the disclosure of sensitive weapons design information.

At Livermore, we conduct R&D to develop novel radiation detection instrumentation, data interpretation algorithms, information barriers, and monitoring procedures for use by U.S., Russian, and IAEA inspection personnel. A prototype detection system, employing our information barrier and autonomous shutter, was successfully demonstrated to Russian technical and security personnel at the Fissile Material Transparency Technology Demonstration, held in August 2000 at Los Alamos. Such demonstrations play an essential role in negotiations, building confidence among the various parties and educating negotiators as to what monitoring technology can and cannot do.

Cooperative U.S.—Russian Programs

Cooperative U.S.-Russian programs overseen by NNSA consist of an integrated set of activities to secure at-risk nuclear material in Russia, dispose of excess highly enriched uranium and plutonium, and assist in downsizing the Russian nuclear weapons complex. These programs draw on the technical capabilities of the Laboratories in areas such as verification and transparency. The programs have been extensively reviewed by various panels and committees and continue to receive significant attention. Here I would like to highlight some of the accomplishments and issues of these cooperative programs.

Material Protection, Control, and Accounting. For the MPC&A Program, Livermore specializes in vulnerability assessment, gamma spectroscopy, access control and security system integration, and information systems. We lead the MPC&A project teams for the Federal Information System, various Russian Navy projects, Chelyabinsk–70, Sverdlovsk–44, Bochvar Institute, and Krasnoyarsk–45 and provide project support for an additional seven site teams. Of the various DOE laboratories involved in the MPC&A program, Livermore is unique in its role with the Russian nuclear navy and nuclear-powered icebreaker fleet. Since the work began in 1997, MPC&A upgrades for the four nuclear refueling ships have been completed and commissioned, two in 1997 and two more in 2000.

The work at the Russian Navy facilities has been some of the most successful of the MPC&A program. Success is attributable to the combination of a highly focused user (the Russian Navy), an excellent subcontractor and system integrator (the Kurchatov Institute), and a highly trained team of NNSA and national laboratory personnel that has built an excellent working relationship with the Russian personnel, facilitating efficient problem solving and rapid system implementation. The success of this approach has resulted in an agreement between NNSA and the Russian Navy to expand MPC&A cooperation to include nuclear weapon storage sites. Work at a number of these sites is underway and meeting with the same success as previous activities with the Russian Navy, however, the funding for this work is being cut by nearly $40 million in fiscal year 2002 (a reduction of 50 percent), slowing these very important risk-reduction efforts.

Plutonium Disposition. Program direction for the disposition of U.S. and Russian surplus plutonium is undergoing review by the National Security Council. Both the U.S. and Russia have agreed to dispose of 34 metric tons of plutonium, but the path forward is complex technically, politically and economically. The U.S. has adopted a dual track approach in its plutonium disposition program that includes fabrication of mixed uranium/plutonium oxide (MOX) fuel to burn plutonium in nuclear reactors and immobilization of impure plutonium in a ceramic matrix for long-term geological disposition. Livermore has led the national plutonium immobilization program, which is responsible for disposing of 13 metric tons of impure plutonium that otherwise might end up as orphan material. This past year, we completed testing of the can-in-canister and finished the conceptual design report for the plutonium immobilization facility in preparation for the full facility design. We also completed testing of two highly-automated plutonium lines with plutonium surrogates and were scheduled to start testing the lines with plutonium this summer. The first line uses hydrogen in a hydride/oxidation process (HYDOX) to transform plutonium from a metal to an oxide powder. The ceramification line then combines the plutonium oxide with ceramic precursors to form, after cold pressing and high temperature sintering, a ceramic suitable for long-term geological disposition in the can-in canister.

This month we were directed to suspend our immobilization activities, while maintaining the ability to restart at a later date, in response to fiscal year 2002 budget guidance and pending the results of the review mentioned earlier. I fully support a review of both the objectives of the program and its implementation costs. However, the difficulty of stopping and restarting such a complex developmental activity should not be underestimated.

Downsizing the Russian Nuclear Weapon Complex

Downsizing the Russian nuclear complex is a high-priority U.S. national security goal. However, such downsizing will eliminate the jobs of thousands of Russian weapons workers. To accelerate the downsizing process, the U.S. and Russia have launched a cooperative program to create self-sustaining civilian jobs for displaced workers in the closed nuclear cities of Sarov, Snezhinsk, and Zheleznogorsk.

Livermore leads the NNSA team working with Snezhinsk and its various civilian entities to develop commercial enterprises. In November 2000, the Strella Open Computer Center for commercial software development and scientific computations was commissioned. Former Ambassador Ronald Lehman, Director of the Center for

Global Security Research at Lawrence Livermore National Laboratory, led the U.S. delegation for the official dedication.

We are also leading a medical technology development project with the Avangard Electromechanical Plant (the equivalent of Pantex) at Sarov. In March 2000, contracts were signed by Livermore, the Avangard Foundation (the commercial element of the Avangard Electromechanical Plant at Sarov), and Fresenius Medical Care (the world's largest provider of products to individuals with chronic kidney failure with six production facilities in the U.S.) for the development of a manufacturing center at Sarov for dialysis machines and related products. In June, fences were moved to place the buildings needed for this facility outside of Avangard's high-security area. Eventually, this project will employ hundreds of former weapons workers in the production of dialysis equipment and treatment kits. This project represents a major milestone in U.S. government efforts to engage a Russian serial production facility.

New Secure Compartmented Information Facility

I am very pleased that the second year of funding for Livermore's new secure compartmented information facility (SCIF) is included in the fiscal year 2002 budget proposal. We have provided technical and analytical support to the U.S. Intelligence Community since the late 1950s. The Laboratory currently supports and collaborates with an extensive set of Intelligence Community agencies, including DOE's Office of Intelligence, the Defense Intelligence agency, The National Security agency, and the Central Intelligence Agency. Technology, together with the increasingly complex national security landscape, is changing the nature of intelligence work. Hardcopy report and film imagery are rapidly giving way to massive digital files, which require high-bandwidth connectivity and modern communications and computing systems to exploit, interpret, and disseminate.

The new SCIF will enable us to take advantage of this digital revolution in the intelligence business, enhancing our contribution to the Intelligence Community. The new SCIF will also allow us to accommodate our expanding programmatic needs for SCIF space. Let me note that the $13 million provided in fiscal year 2002 is the minimum required to maintain the project's schedule and cost. Assuming that funding is provided as requested, Livermore's new SCIF will be completed by early 2004 at a total cost of $24.6 million.

INSTITUTIONAL ISSUES

Laboratory Operations. Safety and security are prime considerations at the Laboratory, and both have received considerable management attention. In 2000, we implemented DOE's operational concept, Integrated Safety Management (ISM) and strengthened our commitment to safety in the workplace. Security at the NNSA laboratories was in the headlines in 1999 and 2000, 2 very stressful years. We have taken strong positive action on security and counterintelligence issues, whether they were anticipated or identified by us or were brought to our attention by others. Substantial progress has been made in many areas. We worked expeditiously to address all issues that arose in self-evaluations or resulted from inspections by the DOE Office of Security Evaluations (OSE). As an outgrowth of these efforts, we are now rated Satisfactory (Green) by DOE/OSE.

Cyber security receives continuing attention because the rapid advance of technology constantly opens up new possible types of threats. We have addressed identified potential weaknesses in the security of some of our unclassified computer systems and we are proceeding to implement our cyber security strategy. Security improvements to keep pace with evolving perceived threats come at a cost, and in the absence of new funds, implementation of mandated upgrades have often been at the expense of other high priority programmatic work.

Laboratory Personnel. Our national security programs are no more and no less than the people that comprise them. Over the years, exceptional scientists and engineers have been attracted to the Laboratory by the opportunity to have access to the world-class facilities, to pursue technically challenging careers, and to work on projects of national importance. Unfortunately, events over the last 2 years have had a negative effect on the workplace environment. As noted in the "30-Day Review" of the Stockpile Stewardship Program of December 1999, morale and employee recruitment and retention are being impacted by new security requirements (e.g., restrictions on interactions with foreign nationals), by budget and program uncertainties, and by the reduction of resources that support innovative scientific inquiry. I have made workforce management and improvements in the workplace one of the highest priority issues for the senior management team at Livermore this year.

In some respects the situation seems to be improving—or at least, not getting worse. Two positive developments are the extension of the Management and Operations contract with the University of California (UC) and the restoration by Congress of Laboratory-Directed Research and Development (LDRD) funding to the 6 percent level. The connection to UC is personally very important to many Laboratory employees and it greatly helps us in recruiting. LDRD funding, which provides scientists the opportunity to conduct innovative research aligned with our core missions is important to the vitality of Livermore and to the talented researchers that we need to attract and retain. We are also very hopeful that the national security reviews being conducted by the administration will lead to a strong reaffirmation of the importance of the Laboratory's work in maintaining the U.S. nuclear deterrent through stockpile stewardship and in developing technologies to reduce the threats posed by the proliferation of weapons of mass destruction.

Predictability and stability in the budget would be very beneficial, and NNSA's 5-year budget planning will help in the long run. However, commitment is needed this year to stabilize the budget for critically important nonproliferation research and development activities and cooperative U.S.-Russian programs. Other changes being made at NNSA will clarify lines of communication and authority, which should help improve both overall efficiency and the work environment.

SUMMARY REMARKS

The introduction of my testimony starts with an event-formal certification of the refurbished W87 ICBM, "the first real test of stockpile stewardship." It is fair to say that "we passed," but the test was not easy. As weapons continue to age, the tests will get harder and our capabilities to answer questions need to improve-better investigative tools to evaluate problems and certify performance, as well as efficient manufacturing capabilities. Acquisition of these capabilities is time urgent to meet existing requirements for weapon refurbishment and to deal with other weapon performance issues that might arise.

As a consequence, there are many demands for resources for stockpile stewardship, which are putting the program under stress. The full scope of requirements on the Stockpile Stewardship Program will be better defined at the conclusion of ongoing national security reviews of the role of nuclear weapons and force requirements. Then the budget needed to carry out the necessary programmatic activities can be more clearly established.

In the face of the challenges, we have many accomplishments to show for our efforts in addition to certification of the W87 warhead. Construction of the National Ignition Facility (NIF) at Livermore is now more than 50 percent complete, progress is outstanding on all technical fronts, and General Gordon provided certification of the NIF project and its baseline plans to Congress on April 6, 2001. The Accelerated Strategic Computing Initiative (ASCI) is central to many success stories. Last summer, we took delivery of ASCI White, the world's most powerful computer. This machine and ASCI Blue Pacific are supporting stockpile stewardship through a variety of applications, and we are earmarked to take delivery of our next ASCI computer in fiscal year 2004, a machine that will be capable of 60 to 100 teraops. These successes and others I could cite are evidence that the Stockpile Stewardship Program has greatly benefited from strong Congressional support and the dedicated efforts of the many people in the program. Additional support in fiscal year 2002 would help relieve a number of stresses that are arising as the program continues mature and face greater tests.

I also urge your vigorous support for the program proposed by the Office of Defense Nuclear Nonproliferation and for the programs and initiatives of other agencies in the areas of WMD nonproliferation, counterproliferation, and counterterrorism. The enormity of the challenge cannot be overstated. Thousands of tons of nuclear materials are stored under questionable levels of protection at hundreds of sites across the former Soviet Union. The smuggling of nuclear materials is a continuing issue. Countries of concern show increasing evidence of their intention to acquire WMD and the means to deliver those weapons, and the threat of WMD terrorism continues to rear its ugly head.

As with stockpile stewardship, the success of U.S. threat reduction efforts depends on R&D. With greater technical capabilities, the U.S. can better monitor compliance with arms-reduction and other agreements. Intelligence collection and proliferation detection have depended on successive generations of advanced technology to identify and interpret fragmentary clues buried amid enormous amounts of data and to overcome adversaries' increasingly sophisticated denial and deception about their WMD activities.

Finally, I hope the summary presented earlier clarifies both the challenges and the critical contributions Livermore is making to reducing the threat posed by the proliferation of weapons of mass destruction. Sustained support for cutting-edge research and development at current funding levels at least is essential to counter the wide range of WMD threats.

Senator ALLARD. Thank you for your statement. Now, Dr. Browne, the Director of the Los Alamos Lab.

STATEMENT OF DR. JOHN C. BROWNE, DIRECTOR OF LOS ALAMOS NATIONAL LABORATORY

Dr. BROWNE. Mr. Chairman, and members of the subcommittee, thank you very much for the opportunity to testify on our programs for the NNSA. I wanted to start by saying that Los Alamos National Lab has rebounded from the security incidents and the Cerro Grande fire last year with a lot of professionalism and, frankly, increased in strength as an institution.

I'm very proud of our people. Throughout those episodes, they have continued to do their jobs and continued to be good public servants throughout that period.

I would just like to make a few points. First of all, stockpile stewardship is a sound program. It's based on our scientific and engineering understanding of over 58 years of nuclear weapons development. It's been successful to date, something that sometimes people forget to consider, but it has been successful. It cannot be guaranteed that it will succeed indefinitely, but we feel very confident about how we're doing.

However, my confidence in our ability to maintain the reliability of the weapons in our stockpile without nuclear testing is being impacted by several trends that we see. First, in terms of the aging of the weapons themselves in our surveillance program, which is a very important part of stockpile stewardship, we're learning more every year about how weapons age. Frankly, in some cases, they're not aging gracefully and that concerns us.

We know that we must do these Stockpile Life Extension Programs (SLEPs) to address a lot of the aging problems. To do the SLEPs, we must have the manufacturing capability, which means we really need the plants to be in good shape, Y–12, and etcetera. But, we also have to recognize that Los Alamos and Sandia are heavily involved in manufacturing, something that is not always considered.

It's plutonium pits at Los Alamos, but it's also tritium loading and the neutron generators that Dr. Robinson referred to earlier. We do beryllium manufacturing at Los Alamos and we do manufacturing of high explosive detonators for the stockpile.

The second area of concern that I have has been mentioned several times throughout, so I'll be very brief. It's the deterioration of the infrastructure both at the plants, Y–12, etcetera, and the labs. We certainly support very strongly General Gordon's Infrastructure Revitalization Initiative. Without it, I'm afraid that we won't be able to do our job for the long term. We won't be able to do the manufacturing and the certification for the long term.

Critical skills were mentioned earlier. It remains a challenge for all of us. We do see some positive signs, as General Gordon said—the new facilities and improvements in the infrastructure. Some new scientific equipment will help us, but it's going to be an area

that we're going to have to continue to focus on to make sure that we have the skills to replace those of the people that leave our laboratories.

The fiscal year 2002 budget does have some serious shortfalls across the board. We feel that the 5-year plan to which General Gordon referred is an excellent step to unwind this program. If you remember last year, or the year before, we talked about a program that was wound too tight. We think it is the direction in which to begin to unwind this program. We hope that Congress will be able to support that direction.

Our highest priority at Los Alamos is pit manufacturing and pit certification. I want to explain, it came up earlier, pit manufacturing and pit certification are two separate activities, although they are coupled together by the nature of the fact that they involve the plutonium pit of the weapon.

We are in the process of remanufacturing the capability to build more reserve pits for the Nation that were traditionally built at Rocky Flats and it has not been done since 1989. We are on schedule to deliver a certifiable pit in 2003.

Senator Thurmond asked the question about what a certifiable pit is. It does mean, as General Gordon said, that we have developed all the processes involved in manufacturing the pit, of which there are over 100 processes. We have to make sure that we understand each of those processes so when I begin to build them one after another, they look the same, they perform the same, and they have the same characteristics. That's a certifiable pit.

Ten years ago, at this point when you had a certifiable pit, we would have gone out to the Nevada Test Site and we would have blown it up and then it would have been certified. We can't do that anymore. So, now we have to take a scientific basis on which we can look at all of the various technical, scientific and engineering characteristics of that to make sure it's as equivalent as we can make it to a Rocky Flats-pit level of perfection.

Certification is the most difficult challenge for stockpile stewardship in my opinion. It's never been done before. It requires computer simulations like ASCI that Dr. Tarter talked about. We are using the Livermore computers, as well as Los Alamos and Sandia computers. It requires a series of small tests, major laboratory tests with facilities like DARHT, and it requires Nevada Test Site's subcritical experiments.

I want to mention one other concern that we have about the program budget as it's formulated right now. We're concerned about the rigidity of the program. We think it's developing a stranglehold on the NNSA and the lab's ability to manage the programs. The number of categories for managing this program was raised from 5 to 30 by Congress.

Between the time when you formulate a budget 2 years ago and the time we execute it, the program changes and it requires reporting reprogramming at levels that are preventing us from actually getting our job done. We would like to recommend that the reprogramming authority increase for the NNSA from its current $5 million threshold to perhaps $15 million.

Let me just conclude by saying we believe that the NNSA was and is the right step to ensure the success of the national security

programs of this country. At Los Alamos, we are committed to supporting General Gordon in his attempt to really formulate the future for stockpile stewardship in a way that ensures the safety and reliability of the stockpile.

Thank you very much. I appreciate the opportunity to make my remarks.

[The prepared statement of Dr. Browne follows:]

PREPARED STATEMENT BY DR. JOHN C. BROWNE

INTRODUCTION

Thank you for the opportunity to provide this statement on the status of Los Alamos National Laboratory, our national security programs, and budget needs. The Laboratory is one of three multi-program scientific institutions supported by the National Nuclear Security Administration (NNSA) in the Department of Energy. The University of California manages Los Alamos, and our mission is to:

- Ensure the safety and reliability of the U.S. nuclear weapons stockpile
- Reduce threats to U.S. security with a focus on weapons of mass destruction
- Provide technical solutions to national security problems in energy, environment, infrastructure, and health.

KEY MESSAGES

Los Alamos has rebounded with strength and professionalism from the unprecedented disrupting and damaging events of the last 2 years. I am extremely proud of the professional response of our people to these crises and of their commitment to serve the Nation through the mission of the Laboratory.

The stockpile stewardship mission is one of the most difficult technical challenges this nation has ever attempted. Success cannot be guaranteed. My confidence in our ability to continue to maintain the reliability of the nuclear weapons stockpile is being seriously impacted by several trends:

- Our nuclear weapons are past their design age and are not aging gracefully. A long-term plan explicitly stating which weapons are needed in the U.S. nuclear deterrent force must guide the timing and priorities of the Stockpile Life Extension Program as well as rebuilding the manufacturing capability to produce weapons.
- We are experiencing an unmitigated deterioration of the infrastructure of the labs and plants in the nuclear weapons complex. We strongly support General Gordon's 10-year Facilities and Infrastructure Revitalization Initiative. Without it, we will not be able to carry out either the manufacturing or certification efforts for the stockpile.
- We are concerned about recruiting and retention of the staff with the critical skills needed for our mission. Outstanding people can be attracted to the public service nature of our mission and the technical challenges of the work. However, improvements in scientific facilities and equipment are needed to help us compete with private-sector recruitment.
- The President's budget for fiscal year 2002 has serious shortfalls to achieve all the requirements of the Stockpile Stewardship Program. The overall direction of the Stockpile Stewardship Program is sound. NNSA has made great strides in its first year to develop needed policy, program and organizational refinements. The Future Years Defense Program (commonly referred to as FYDP) plan proposed by General Gordon is a big step forward. This plan, if supported by the administration and Congress, should help the program maintain the safety and reliability of the stockpile through this decade.
- I wish to note that significant accomplishments were achieved in the nonproliferation area, including development of new systems for detecting proliferation of weapons of mass destruction. The budget cuts outlined for the Nuclear Nonproliferation and nondefense programs will have major long-term programmatic impacts and will cause serious disruptions in our staffing.

Our highest priority at Los Alamos is re-establishing the Nation's capability to manufacture plutonium pits, the heart of nuclear weapons. Los Alamos has built seven development pits and is on schedule to deliver a certifiable W88 warhead pit

in 2003. We have developed an initial project baseline for certifying these pits for War Reserve use without nuclear testing.

We continue to improve the Laboratory's operational performance. We are now applying integrated management methodology to safety, security, and project management. Despite the severe disruption resulting from security events and the fire, the Laboratory continued to improve in safety and to deliver on its manufacturing commitments.

The Laboratory has rebounded from damaging events over the last 2 years. Congressional support has been critical to helping us meet our mission, rebuild the Laboratory, and restoring our town after the Cerro Grande fire. Thank you!

LABORATORY STATUS

Our excellent technical staff at Los Alamos National Laboratory continue their outstanding support of the Nation's security, although everyone at the Laboratory was and to some extent still is profoundly affected by the traumatic events of the last year. We are hard at work sustaining the nuclear weapons stockpile and helping with many of the Nation's most difficult technical national security problems. We have also refined our management processes to address lessons-learned from these events: the discovery of the unauthorized copying of classified information, the Cerro Grande fire in May last year, and misplacing hard drives containing classified data.

In addition to the physical damage to the Laboratory, the fire disrupted Lab operations for months. Although most of the Lab was able to reoccupy work space and resume operations in June, some work areas were not immediately habitable or were declared permanently closed because of the threat of flooding from burned area rain runoff. The DOE, the Army Corps of Engineers, and other agencies with the strong support of Congress have expedited repair and remediation of fire damage. We are extremely grateful for prompt action.

Rebuilding of the Los Alamos townsite, which suffered more damage than the Laboratory, has also been strongly supported. Project Recovery, which had strong participation from many quarters including the University of California, has helped to get our community back on track so that our people can again be fully productive.

Your continued support of our mission will help me to keep rebuilding the confidence and strength of our workforce.

DEFENSE PROGRAMS

Stockpile Certification

The stockpile stewardship mission, particularly maintaining the certification of nuclear weapons without nuclear explosive testing, is one of the most difficult technical challenges this nation has ever attempted. Success cannot be guaranteed. While I am confident of the current safety and reliability of the nuclear weapons stockpile, this confidence is being seriously impacted by several trends. The nuclear weapons in the stockpile are aging past their design lives. Indeed, our stockpile is aging in different ways than we anticipated at the start of the stewardship program. The nuclear weapons infrastructure needed to refurbish the stockpile, including facilities at Los Alamos, are deteriorating with age and have not been sufficiently maintained or revitalized to meet even our immediate needs. We are having difficulty retaining and recruiting qualified personnel. There is great demand for talent in science and technology, especially U.S. citizens. Funding continues to fall short of that needed for the stockpile stewardship mission. However, the Future Years Defense Program (FYDP) plan proposed by General Gordon is a major step toward developing the much-needed plans and policies that support the stockpile.

Our fifth annual stockpile assessment letter, signed in November 2000, is supported by year-round activities for *surveillance* of stockpiled weapons—including destructive disassembly of a weapon for inspection and testing of components, and other less-intrusive inspection techniques. Experienced Laboratory personnel assess the safety and reliability of the weapons based on these surveillance findings and through a wide range of experimental and computational capabilities. I develop my *assessment* from their expert judgment and the documented condition of the weapons. This annual letter to the Secretary of Energy and the Secretary of Defense contains my assessment. The refurbishment of the stockpile is NNSA's *response* to these surveillance findings and assessments.

To develop the certification capability needed as we get farther from the time when weapons were tested, we have continued to enhance our technical capabilities, including new experiments and simulation of weapon performance.

Infrastructure

On March 13, I provided a statement on facilities and infrastructure needs to the Energy and Water Development Subcommittee of the Senate Appropriations Committee. From that statement I will take these summary points:

The general run-down condition of facilities in the nuclear weapons complex has been noted recently in several reviews chartered by Congress and the administration. For example, the Chiles Commission identified the need to "eliminate problems of maintenance of equipment and facilities, and modernization of equipment," in the context of enhancing recruitment and retention of a quality workforce. The Hart-Rudman U.S. Commission on National Security wrote in January 2001 "the physical circumstances in which lab professionals work have also deteriorated, in many instances, to unacceptable levels."

The Laboratory believes that there are three distinct areas that must be addressed to ensure infrastructure sustainability to meet our mission set. Those three areas include:

- Implementing formal facilities consolidation and cost reduction initiatives to reduce facility footprints, which in turn reduces operating costs, and improves safety, security, and scientific interactions;
- Addressing unfunded high-priority facility maintenance backlogs before they become expensive emergency repairs; and
- Investing in new construction projects, where appropriate and economically feasible, to ensure that the Laboratory can meet programmatic mission needs over the next 20 to 40 years.

These all require commitments to achieve positive results, but will realize return on investment through reduced operating costs (maintenance and energy) and increased technical productivity. In addition, each area addresses safety and security needs and allows Laboratory facilities to be sustainable over the next 20 to 40 years.

The best way to ensure that the necessary reinvestment occurs in the facilities, infrastructure, and construction base is to provide the resources through a dedicated budget category. We strongly endorse the NNSA Facilities and Infrastructure funding initiative. We believe the top-priority construction projects must be completed to ensure that the NNSA complex has a safe, secure and reliable infrastructure to ensure that programmatic missions can be accomplished.

Accelerated Strategic Computing Initiative

The NNSA Accelerated Strategic Computing Initiative (ASCI) has been a tremendous success in providing us with the needed computational tools to effect stewardship. We are making rapid advances in the ability to simulate nuclear explosions faster and with greatly increased detail. Computational models and codes under development allow us to investigate complex issues arising in the stockpile. These codes can accomplish phenomenal tasks, modeling asymmetric features such as cracks, gaps, bolts and fixtures that were previously intractable. It is absolutely necessary to be able to model these geometrically complicated details in weapons, and compare the simulations to relevant experimental data.

Last year, Los Alamos completed the first-ever three-dimensional simulation of the explosion of a nuclear weapon secondary, 8 months ahead of schedule, using both the Los Alamos and Sandia ASCI computers. This accomplishment included the transfer of mammoth data files from Los Alamos to Sandia using the distance-computing component of ASCI. At Los Alamos, calculations are now run routinely on thousands of processors. Today, Los Alamos is running the first-ever three-dimensional full-system simulation (primary and secondary) on the 12 teraOPS (trillion operations per second) ASCI platform at Lawrence Livermore National Laboratory.

Los Alamos also signed a contract with Compaq for the next generation ASCI-class computer at Los Alamos, called the "Q Machine," designed to run at 30 teraOPS—which will be the largest and fastest in the world. Q Machine delivery starts this fiscal year. The construction of the Strategic Computing Complex (SCC)—the most modern in the world—to house the Q Machine and approximately 200 weapons scientists is a great project management success story for NNSA and Los Alamos. The SCC is progressing within schedule and budget. This modern facility features an uninterrupted computer floor the size of a football field surrounded by offices with high-speed secure communications links.

As part of our leadership in high-performance technical supercomputing, computer science, and computational science, Los Alamos and Rice University have proposed a national center for computer and computational science research in the form of an Information Technology Laboratory in Santa Fe, New Mexico, that would be operated by Rice University.

Dual Axis Radiographic Hydrodynamic Test Facility

An outstanding achievement in the last year was the application of the first axis (Phase I) of the Dual Axis Radiographic Hydrodynamic Test facility (DARHT) to stockpile-related hydrodynamic testing. This phase of DARHT was completed on time and within budget, has been commissioned, and is now giving us excellent, high-resolution data in support of stewardship. DARHT, and its still-capable predecessor PHERMEX, will be the key hydrodynamic test facilities in the next few years for maintaining stockpile certification as well as supporting stockpile refurbishment activities. DARHT is a great advance in capability, and will only get better as the second axis is completed and commissioned, and as we begin to image dynamic implosions with multiple temporal frames using both axes of the facility.

Nevertheless, we do know that the capabilities of DARHT, advanced as they are, will still be insufficient to meet all of the anticipated challenges of stockpile stewardship. We know that two axes are insufficient to observe key three-dimensional features of weapons implosions. We know that we must observe the time evolution of the implosion—create a motion picture—to develop the all-important validated 3D ASCI codes to certify the stockpile in the future. The path to that capability has been demonstrated by proton radiography.

Proton Radiography and an Advanced Hydrotest Facility

In the future, proton radiography (P-Rad) holds great promise for refined hydrodynamic testing of weapons, beyond the capabilities of DARHT, that will be sufficient to meet our most difficult stockpile certification requirements. The requirements for an Advanced Hydrotest Facility (AHF) could be met using proton radiography to make a very high-resolution motion picture of an imploding warhead made of surrogate nuclear materials with unprecedented detail. This will allow very high-fidelity comparisons with our computational models. We are presently developing proton radiography through dynamic (explosive) tests on small objects at the Los Alamos Neutron Science Center (LANSCE) and static tests on full-thickness assemblies at Brookhaven National Laboratory, confirming the extraordinary fine temporal and spatial resolution. The results of these small-scale dynamic tests are stunning in their resolution and detail and have already helped resolve real stockpile issues.

AHF can provide a very powerful tool for maintaining stockpile certification without nuclear testing. Indeed, obtaining high-fidelity radiographic motion pictures of imploding surrogate warheads will be the next best means of probing weapons implosions, short of testing actual nuclear devices.

Subcritical Experiments

Analysis of data from last year's subcritical experiments at the Nevada Test Site (NTS) has contributed substantially to my current stockpile assessment. Subcritical experiments are an important component of the Stockpile Stewardship Program since they test significant amounts of special nuclear materials (SNM) under implosion-like conditions to measure materials properties. These nuclear-material assemblies remain below nuclear criticality. Subcritical experiments are essential to understanding implosion phenomena. We are doing development experiments and our next "subcrit" is scheduled for fiscal year 2002, with a full schedule of future experiments supporting certification.

Laboratory-Scale Experiments

We know we do not know enough about the aging behavior of materials to confidently certify the stockpile for its projected extended lifetime. We use a wide range of laboratory-scale experiments on special nuclear materials and other weapons materials in our current stockpile assessment activities. These small-scale experiments also support fundamental design assessment and certification issues.

An example is the study of chemical high explosives used to implode the weapon pit. Laboratory personnel must be able to predict how explosives will respond as they age, in extreme environments or under accidental impacts. Experimental work on high explosives done with proton radiography, neutron scattering, laser spectroscopy, and other means is leading to increased understanding of high-explosive performance that we will use to substantiate weapon safety and reliability. Los Alamos remains one of the few places in the world with full-spectrum capability for both high-explosive synthesis and experimental research.

Our unique facilities, including LANSCE and special nuclear materials laboratories, have enabled more precise characterization of the fundamental properties of plutonium and other nuclear materials by static and dynamic neutron scattering, high explosive-driven dynamic experiments, use of diamond-anvil high-pressure cells, gas-gun and subcritical experiments, and other technologies. Last year, new

nuclear data obtained from LANSCE were incorporated into weapons models, improving our understanding of the difference between computationally modeled performance and measured weapons yield from past NTS tests. This will ultimately lead to more accurate models that provide higher confidence in our prediction of weapon performance. These experiments yield information that will be used to strengthen and validate theories, models, and computer codes that will, in turn, be used to assess the condition of the stockpile.

Stockpile Life Extension Programs

As stockpiled weapons age beyond their design lifetimes, which was nominally 20 years, the *surveillance-assessment-response* cycle that we use to sustain the nuclear weapons stockpile must grow to include weapon refurbishment. In fact, since the Nation currently has no plans to introduce new weapons into the stockpile, deployment of most existing weapons systems is expected to continue through 2040, resulting in 60-year service lives. The national program to refurbish aging nuclear weapons over several decades is known as the Stockpile Life Extension Program (SLEP). Findings from stockpile assessment activities are key to determining the SLEP refurbishment details and schedule required. Three Los Alamos-designed weapons, the W76, the B61, and the W80, have authorized refurbishment activities.

Los Alamos contributes strongly to the SLEP through our manufacturing base. The Laboratory is the second largest production plant in the complex. The new Beryllium Technology Facility at Los Alamos will become qualified to make beryllium parts for weapons refurbishment late this year—the only such capability in the Nation. The Laboratory has delivered on its commitments to provide tritium-loaded neutron sources to Sandia National Laboratories and detonators to the Kansas City assembly plant. Our professional and dedicated staff made the special efforts necessary to meet the detonator delivery date, which was close on the heels of the Cerro Grande fire, thus avoiding a delay in the national weapon refurbishment program. Los Alamos is meeting all of our manufacturing commitments.

SLEP activities will span several decades of intense plant activities and will depend on experienced personnel and qualified facilities. However, the number of experienced personnel across the nuclear weapons complex is decreasing every year. National facilities and infrastructure are limited in capacity and are deteriorating as they age. Indeed, important elements of our capability have been degraded, diverted, or lost and must now be reestablished. We critically need a revitalized nuclear weapons infrastructure-personnel as well as facilities-at both plants and labs.

Delay is not an option. The age of the stockpile and the deterioration of the infrastructure have already caught up with us. The decades-long job of refurbishing the stockpile is too much for the existing infrastructure capacity and capability. Further neglect will make the situation much worse. The SLEP workload must be leveled across the facilities to optimize plant capacity and availability and to minimize required investment. SLEP schedules must be coordinated across the weapons types in the stockpile to meet military requirements and to keep the weapons safe and reliable throughout their planned deployment. Moreover, additional money is required in order that Los Alamos continue to support W76 SLEP workloads while also having funding to properly share system information regarding the transfer of the W80 SLEP to Livermore.

It is important that the laboratories remain fully engaged in the care of the stockpile. Our people must learn from real systems to improve their capability to meet the challenge of maintaining and certifying the safety and reliability of these refurbished weapons without nuclear testing.

Pit Fabrication

Our highest priority at Los Alamos is replacing the Nation's capability to manufacture plutonium pits, which are the heart of nuclear weapons. This capability was lost 12 years ago when the Rocky Flats plant was closed.

One warhead type, the W88, has been selected as the crucial prototype for restoring the Nation's nuclear manufacturing capability. Steps taken include moving personnel previously employed at the Rocky Flats pit manufacturing plant and some of their manufacturing equipment to Los Alamos. In fact, we now have about 20 key people from Rocky Flats working at Los Alamos as part of our 220-person pit manufacturing team. With their expertise, we are recovering Rocky Flats fabrication processes and documenting them in detail.

Seven W88 developmental pits have been fabricated in the Los Alamos's Plutonium Fabrication Facility (at Technical Area 55) for process development and qualification. These manufacturing processes will be formally qualified to the rigorous requirements necessary for a certifiable War Reserve W88 product. Pits made with the

new processes will be more uniform and better documented than the pits now in the stockpile. We are on schedule to deliver a certifiable pit in 2003.

Pit Certification

Pit certification may be the most difficult challenge of stockpile stewardship. Our pit certification program is designed to demonstrate that the implosion properties of the Los Alamos pits and the Rocky Flats pits are equivalent. We will execute the complex and broad spectrum of physics and engineering testing necessary to certify the Los Alamos W88 pit. The date at which a qualified W88 Los Alamos War Reserve pit will be ready to enter the stockpile has been delayed to 2009. Let me explain this.

The requirements of stockpile stewardship continue to mature, as is characteristic of highly technical, R&D-based, scientific programs. Last year the NNSA asked us to develop a revised project plan for pit certification. We have carefully examined all the requirements for pit certification and have refined our original plan and completed a new baseline. These were provided to the NNSA in the fall of 2000. This baseline includes our current best understanding of pit certification needs. The present estimated cost and schedule to certify the W88 pit has increased beyond our original 1999 projection which did not include contingency. I believe we now have a comprehensive and achievable plan that includes adequate contingency.

The nation must have the ability to produce replacement pits. We are confident that we can produce qualified replacement pits under our project plan. Although pit fabrication is on track, the challenge we now face is to develop an official NNSA baseline for certification that can deliver a War Reserve pit and to obtain the funding needed to execute it. The resources needed to carry out the proposed baseline for pit certification are contained in the NNSA FYDP. I hope that once the defense policy reviews currently under way in the administration are completed, additional resources necessary to ensure the success of the pit certification program for the NNSA will be provided.

Over the last year and a half, Los Alamos has implemented rigorous project management practices to the pit manufacturing and certification programs. Laboratory management, and myself personally, will intensively monitor execution of these projects assisted by internal and external reviews. We know well the importance of this program to the Nation.

Resources

I am sometimes asked about whether the Stockpile Stewardship Program without nuclear testing will work in the long run, or even whether we are making the right kind of investments. My answer is that the program is solidly based on fundamental scientific principles and continues to evolve with our best understanding of what is and will be required to maintain the safety and reliability of the stockpile. While I cannot guarantee success of the program indefinitely nor avoid every exigency that might arise, the investments now being made are key to ensuring the safety and reliability of the stockpile.

The success of the Stockpile Stewardship Program is more likely if the challenges have commensurate resources provided as laid out in the NNSA Future Years Defense Program (FYDP) plan. We need a long-range commitment to facilities and infrastructure re-capitalization, and funding for the advanced technologies and activities needed for pit and stockpile certification, and for reaching the computing performance goals laid out for ASCI. The FYDP accommodates most of the high-priority needs of the program, including the National Ignition Facility and the beginnings of an Advanced Hydrotest Facility.

Although we support accountability for resources and deliverables in the stockpile stewardship plan, we have concerns about the current budget and appropriations structure. Prior to fiscal year 2001, Defense Programs funds were appropriated in five budget categories. As a result of budget restructuring by the DOE and in appropriations, the 5 categories have become 30. These narrowly defined accounts limit our ability to address changing programmatic priorities across the 2 fiscal years between budget formulation and program execution, ultimately making it more difficult for us to operate efficiently. Emerging issues such as those resulting from weapon surveillance findings as well as evolving institutional needs within a fiscal year, such as safety and security improvements, cannot be addressed in a timely manner under these constraints. Currently the reprogramming process with its $5M internal reprogramming limit severely constrains the ability of NNSA and the Laboratory to respond to compelling programmatic priority changes. We recommend returning to broader budget categories for appropriations, or raising DOE's reprogramming authority, or both. Resource and deliverable accountability to Con-

gress can be accomplished through improved planning, project controls, and reporting requirements. I believe the NNSA FYDP will greatly help this situation.

I look forward to your support toward these ends.

NONPROLIFERATION AND THREAT REDUCTION

Defense Nuclear Nonproliferation R&D

Recent technical achievements in the Laboratory's nonproliferation and threat reduction programs continue to enhance the Nation's capability to deter, detect, and respond to evidence of proliferation or deployment of weapons of mass destruction (WMD). Despite the vital national security capabilities supported through NNSA nonproliferation and verification R&D, this program is facing significant cuts in the administration's fiscal year 2002 budget. These cuts will prevent the development and implementation of new technologies that will allow the Nation to stay ahead of evolving threats.

Detecting nuclear explosions, a key component of the program to support treaty monitoring, has seen major deployment successes of Los Alamos systems this past year, including a network of ten infrasound units fielded to a remote site and the launch of a combined x-ray dosimeter (CXD) sensor onto the GPS constellation. This sensor can detect x-ray emissions from nuclear explosions and x-ray bursts from solar phenomena that can disrupt communications. Los Alamos also recently upgraded the seismic knowledge base for AFTAC to improve monitoring of nuclear explosions in Asia.

Activities in proliferation detection in the past year include the successful launch of the Multispectral Thermal Imager (MTI), a joint effort with Sandia National Laboratories and Savannah River Technology Center. Los Alamos operates the Data Processing and Analysis Center for this instrument to provide images to government and civilian agencies for nonproliferation and environmental applications. Los Alamos has also successfully field-tested the remote ultra low-light imager (RULLI). Los Alamos has developed and transferred to agency users a new data analysis method called GENetic Imagery Exploitation (GENIE) for scanning image data sets for indication of WMD production.

The Chemical and Biological National Security Program element is developing technologies that address the bioterrorism threat through early detection. The Biological Aerosol Sentry and Information System (BASIS) Domestic Demonstration and Application Program (DDAP) provides early warning of airborne biological incidents for special events such as large assemblies and high-visibility meetings. Planned for use in civilian settings, it will detect a biological incident within a few hours of an attack, early enough to mount an effective medical response. Los Alamos is also developing an optical biosensor for the rapid detection of toxins and pathogens that might be used by terrorists. This sensor provides ultra-sensitive pre-symptomatic detection of pathogens or infectious agents in the environment, is adaptable to detect multiple agents, is convenient enough for use by emergency first responders, and has exchangeable sensor elements for reuse.

Russian Programs

In the early 1990s several programs were initiated to deal with the threat of dispersal of Former Soviet Union (FSU) nuclear weapons, weapons materials, and technology. Today the US, with support from the National laboratories, is engaged with Russian and other FSU institutes to protect and to reduce the amounts of nuclear materials and the size of Russia's nuclear complex.

The DOE's Materials Protection, Control and Accountability program (MPC&A) is securing nuclear weapons materials at defense facilities throughout Russia, to date resulting in significant security enhancements for 70 percent of the nuclear materials at Russia's Ministry of Atomic Energy (MINATOM) locations. Los Alamos' expertise in nuclear measurements and computerized accounting systems has been transferred successfully to several Russian nuclear sites.

The fissile materials disposition program is designed to eliminate excess nuclear materials from the U.S. and Russian weapons programs. Los Alamos has developed an environmentally friendly process called the Advanced Recovery and Integrated Extraction System (ARIES) which converts weapon pits into a form suitable for burning in conventional nuclear power reactors. ARIES has been selected as the basis for an industrial-scale conversion plant to be built at Savannah River, which will convert tons of excess U.S. weapon plutonium into non-weapon form. We are working with Russian experts to develop a comparable method for their use.

Under the DOD's Cooperative Threat Reduction (CTR) program, a secure storage facility is under construction at Mayak in Russia to store fissile material no longer needed by Russia's nuclear weapon program. Technical measures are being devel-

oped to ensure that nuclear materials arriving at the site, in fact, come from the Russian nuclear weapon program.

Los Alamos has also been instrumental in implementing programs to convert the vast Russian nuclear infrastructure to civilian pursuits. Hard evidence of the success of these programs include: (1) The Open Computing Center at Sarov provides a pathway for commercialization of Russian nuclear scientist talent in computer science and applications and now employs 100 former defense workers with plans to increase that number to 500 by 2005; and (2) Moving the security fence at the Avangard nuclear production facility to provide more access to existing buildings, converting 500,000 square feet into non-defense work.

Critical Infrastructure/Homeland Defense

Los Alamos programs in threat reduction also include efforts to counter domestic terrorism and provide for defense of the homeland. One of the most significant efforts is aimed at understanding the interdependencies of the Nation's critical infrastructure, an outgrowth of the Lab's expertise developed in metropolitan travel forecasting with the Transportation Analysis and Simulation System (TRANSIMS). Los Alamos is a charter member of a broad initiative, the National Infrastructure Simulation and Analysis Consortium (NISAC), that will provide a decision-support environment for government and industry decision-makers in the areas of infrastructure policy, education, planning and assessment, and crisis response. NISAC is well positioned to provide the technical support function for the principal coordinating agency for national security involving critical infrastructure protection.

The NNSA labs are also expanding our partnership with the DOD for ballistic missile defense. The laboratories are providing innovation and technical assistance in the areas of boost-phase intercept, mid-course discrimination of countermeasures, modeling and simulation to support acquisition and planning methodologies, advanced kinetic kill vehicles, and testing and evaluating component designs. We expect this cooperative partnership to grow significantly in fiscal year 2002 and beyond.

STRATEGIC AND SUPPORTING RESEARCH

Effective execution of the Laboratory's national security tasks is enabled and supported by including a broad range of activities in basic science and technology. This was wisely recognized by Congress when Mission 6, "To support United States leadership in science and technology," was included in the NNSA charter (PL 106–65). I will illustrate the value of these activities with a few examples of recent achievements.

The first I will cite—only briefly because it is already described above-is proton radiography. The personnel and enabling technology came from our work supported by the DOE Office of Science and had an incubation period helped by Laboratory Directed Research and Development (LDRD). This very brief mention should not leave unstated the importance of proton radiography to the future of Stockpile Stewardship Program and the high level of synergy between basic and defense sciences that brought it into practice.

The second example I will cite is quantum information technology. Los Alamos is helping lead development of the use of information bits at the quantum (atomic) level for computing and information security. These technologies are truly revolutionary and appear to be on track to enabling new frontiers in computing power and communications security. Again, the people and the technologies came largely from Office of Science-supported programs.

My final example is from the Human Genome Project. Hardly any Laboratory program has had a longer history of contributing to both civilian and defense needs. Many of the advancements in genomics that fill the newspapers had origins in, and continue to receive benefit from, DOE-supported biological research. Application of bioscience in the nonproliferation and threat reduction programs is already widespread, helping protect the Nation from bioterrorism and the threat of biological weapons of mass destruction.

STAFFING

A major issue facing the NNSA Laboratories and addressed by the Chiles Commission is attracting and retaining the personnel needed to meet our future missions. Two facts that give us concern are the age distribution of our technical staff, averaging 47 years, and the ages of the weapons designers, averaging 54. Recruiting and retaining outstanding personnel must now be considered one of our most serious and persistent management challenges.

Los Alamos has several programs to strengthen our human resources. With Lawrence Livermore National laboratory, and as part of the University of California contract with NNSA, we are in the process of developing collaborative 5-year staffing plans to address recruiting, retention and training issues supporting the nuclear weapons program. Los Alamos has developed several recruiting incentive programs including hire-on bonuses, employee referral bonuses, pay incentives for "hot skills" like computer science, and an enhanced relocation package. Los Alamos has established recruitment "pipelines" by hiring students to introduce them to the work of the Laboratory.

Our postdoctoral program attracts outstanding scientists and engineers with recent Ph.D. degrees to participate in cutting-edge work with Laboratory researchers. Many of these "post docs" prove themselves to be valuable researchers and we invite them to make their career at the Laboratory. Over our history the Los Alamos mission has been greatly enriched by these wonderfully talented young researchers.

However, the number of LDRD-supported postdoctoral employees at LANL was down 38 percent in fiscal year 2000, because of the LDRD cut as well as the reduction in qualified applicants, discouraged we assume by the flood of negative publicity. The total number of post docs at LANL is still down by 25 percent in fiscal year 2001 but appears to be returning to previous levels. Continued involvement in basic science programs, especially with the flexibility afforded through LDRD, is essential to Los Alamos in recruiting postdocs. Authorization of another, more direct mechanism to support strategic hiring, such as a salary pool funded through an additional 1 percent in Lab overhead, might be considered by NNSA and Congress.

Our proposed Information Technology Laboratory (ITL) in Santa Fe will be an effective recruitment and retention tool. Managed in collaboration with Rice University, the ITL will be a national focus for computer and computational science. Coupled with our world-class ASCI computing facilities and our engagement in the most challenging technical problems in the world, this will attract outstanding faculty and students from the university community who will have a rich opportunity for collaboration with Laboratory staff.

We remain troubled over possible impressions that the NNSA Laboratories have an unfavorable employment atmosphere, particularly as seen by some in the Asian-Pacific Islander community. Although the DOE–IG did not find evidence supporting this concern, we are working to correct this impression and to ensure fair treatment for everyone.

Tight funding overall exacerbates the problem of staff revitalization. The funding levels in the President's fiscal year 2002 budget request will not allow Los Alamos to bring in new scientists and engineers who are needed to take over the responsibilities from senior people as they move on and retire. We look forward to the Hamre Commission findings and advice on maintaining leadership in science and security.

OPERATIONAL EXCELLENCE

The nation expects its national laboratories to execute their missions with a high level of operational excellence. Los Alamos strongly supports that expectation. Our work should be conducted with the utmost care for the safety and fair treatment of our workers and the public, respect for the environment, protection of national security information, and effective use of taxpayer-supported resources.

The January 2001 decision by the DOE to extend the Management and Oversight (M&O) contract for the Laboratory with the University of California (UC) included new provisions designed to enhance operational excellence. Achievements in this area, such as illustrated below, were important in that decision. Continuation of the contract was very welcome news to the Laboratory staff, who worked hard to realize these improvements. Safety

Los Alamos has reduced its Occupational Health and Safety Administration (OSHA) Lost Workday Case Rate (LWC) by a factor of four, from an LWC of 4 per 200,000 work-hours in 1996 to an LWC of 1 today. Even the Cerro Grande fire, which subjected the Laboratory to emergency conditions for over 2 weeks, did not cause our LWC or injury rates to jump. LWC is a standard OSHA metric of days per year lost to on-the-job illness or injury. We are now equal to best-in-class rates among comparable U.S. industries.

We did this by adopting a new approach in 1996, Integrated Safety Management (ISM), a system that fully engages the workforce from top to bottom in taking individual responsibility and initiative for safety.

Although the trend is favorable, we recognize that safety incidents at Los Alamos, especially in our nuclear facilities, can be very visible. Since setting clear and challenging goals is well received at this Laboratory, I have set a goal to cut LWC by

half, to 0.5, in 2 more years. Achieving this goal will make us best in class for R&D organizations worldwide. We will add other metrics to help improve our safety performance.

Nuclear Facility Operation

The UC M&O contract extension requires us to engage outside expertise in nuclear facility operation. Therefore, Los Alamos has already awarded agreements to BWX Technologies and Westinghouse Government Services Company. Both companies have experience operating nuclear facilities for DOE. The companies will help the Laboratory improve its operation of nuclear facilities, including the Plutonium Facility, Chemistry and Metallurgy Research facility, and critical experiment facilities.

Security

As with safety, everyone must pull together for the institution to be successful in security performance. In fiscal year 2000 we launched the Integrated Safeguards and Security Management (ISSM) program, which actively engages the entire workforce to integrate security into all work practices. Security awareness is up and security incidents are down compared with last year.

A key element of the safety and security programs is to ensure that every worker is trained in these responsibilities. To ensure that security training is kept current, the security area badge system will now automatically reject entry for anyone whose required training has lapsed.

Secure work habits are fostered in a secure environment with the right tools for the job. We have strengthened the security environment in X Division by upgrading weapons designer workspace to a security exclusion area, involving additional access controls. Security vault access procedures have also been strengthened. Classified media accountability has been implemented, with over 65,000 items bar-coded. We are piloting an automated accountability system to track and inventory classified media.

Making satisfactory progress in security was an important element in DOE's decision to extend the M&O contract with UC. To provide additional expertise and meet requirements in the contract extension, UC has already engaged the Aegis Research Corporation to help with safeguards and security.

We remain concerned over the balance of effort and resources directed toward physical security versus cyber security. We think that a risk-based approach would direct more resources, around one-quarter of the total security budget, to cyber security. The cyber security funding proposed in the NNSA FYDP would provide the resources necessary for future program success.

Project Management

Laboratory organizational changes have strengthened project management, with visible results. About 40 projects ranging from a few million up to $165 million as the largest, such as the Strategic Computing Complex (SCC) construction, are in a formal project management system that provides detailed management and reporting tools and the training to implement them.

For reporting to upper management, the system provides project performance scores in four general categories. We then direct special attention to projects as necessary based on these scores, including regular reviews by my senior management team and myself. Important projects that this system has helped make successful include DARHT Phase I, the Strategic Computing Complex, Accelerator Production of Tritium, the Atlas pulsed-power machine, the Los Alamos Spallation Neutron Source subproject, and the Beryllium Technology Facility.

Our project management system was put in place following recommendations from an external panel of experts appointed to review Laboratory project management. For continued outside advice and to meet requirements in the UC M&O contract extension, UC has already awarded an agreement to Parsons Infrastructure and Technology Group for project management expertise.

Cerro Grande Fire Funds

Over $1 billion worth of fire and flood vulnerabilities were identified in the community and the Laboratory after the Cerro Grande Fire occurred in Los Alamos County and surrounding area in May 2000. With the help of Congress, the Cerro Grande Rehabilitation Project was developed and funded at $342 million in fiscal year 2000 and 2001 to address the Laboratory's most urgent needs.

The Cerro Grande Rehabilitation efforts are being managed as a formal project, with baselines, reporting, and change control. Work scope includes: procuring Laboratory equipment that was lost during the fire; replacing Fire Department equipment and vehicles; repairing buildings; implementing erosion controls and flood con-

trols; and addressing other vulnerabilities that resulted from the fire. The project is also executing several line item construction projects including: a new Emergency Operations Center (EOC), two small office buildings, replacement of critical portions of the Laboratory Site-Wide Fire Alarm System, installation of a Multi-Channel Communications System, addressing damages that occurred to the DARHT project, and addressing vulnerabilities at LANL's solid and liquid waste operations facilities.

The initial Cerro Grande funding was received at LANL in August 2000. The line item construction projects, which total approximately $100 million, are being baselined. The costs and commitments as of March 31, 2001 are $84.3 million.

The Laboratory is extremely grateful for this support from the administration and Congress.

Land Transfer

Transfer of surplus Los Alamos site DOE lands to local governments, directed by Congress in 1998, will cost approximately $3 million per year over 5 years for environmental and archeological work. Direct funding at that level, rather than $1.9 million as proposed in the President's Budget, will facilitate timely completion without adding to the burden carried by other programs.

OVERALL BUDGET OUTLOOK AT LOS ALAMOS FOR FISCAL YEAR 2002

One of the topics we have been asked to address for this hearing is the budget situation at our specific institution. Let me preface my comments by noting that I limited hiring at the Laboratory during fiscal year 2000 in anticipation of possible changes that might occur as the result of a transition to a new administration. This strategic hiring program allowed us to hire essential people needed for our key mission activities but restrained hiring in other areas. This will soften any employment disruptions that could occur as a result of budget decisions made for fiscal year 2002.

I should also caveat my comments by noting that there are many steps ahead where Congress and the administration can revise the fiscal year 2002 numbers, particularly resulting from policy reviews of the Nation's defense policy and its nuclear weapons posture.

Let me now state the current budget picture as we see it for Los Alamos National Laboratory for fiscal year 2002. In the Stockpile Stewardship Program, the President's Budget should cover the inflation costs of the program at the Laboratory. Within that program, we hope to be able to avoid a reduction in force, but programmatic delays and personnel transfers among programs are likely.

In the Defense Nuclear Nonproliferation programs, the picture is more troubling. The Los Alamos share of the cuts proposed in the nonproliferation R&D and Russian programs could place the jobs of up to approximately 100 employees in jeopardy due to lack of funding. It is our hope that once the policy reviews of the new administration are completed, both the administration and Congress will agree to budget adjustments that would support this program adequately.

The reductions in the Environmental Management Program for fiscal year 2002 could lead to a reduction of approximately $25 million in the Los Alamos program. This could impact Los Alamos employment, contractor activities, and slow the pace in cleaning up old waste sites. This is of considerable concern to the Laboratory, our neighbors in Northern New Mexico and to the State of New Mexico Environment Department. We have worked with all parties to reach an agreeable cleanup schedule. That is now jeopardized by the proposed cuts.

These cuts are also likely to delay the shipments of waste from Los Alamos to the WIPP site in Carlsbad, New Mexico. Our goal was to accelerate from 6 shipments per week to between 12 and 14, but this probably will not be possible under the proposed budget. We would much prefer to move to the accelerated schedule. The wastes are much better cared for by being thousands of feet below ground than on the surface at Los Alamos.

In the science and energy programs the size and impact of reductions to Los Alamos programs are less clear at this time and may change as the fiscal year 2002 budget evolves. The Office of Science receives essentially flat funding (with no inflation adjustment), but some programs within that office receive cuts that we hope will be reconsidered. For example, the Biological and Environnmental Research (BER) programs receive a reduction of $50 million, or 10 percent at the same time that the National Institutes of Health receive very substantial increases. There are national security programs that rely on the capabilities of the BER program. These would be harmed if the reductions are not reversed.

NATIONAL NUCLEAR SECURITY ADMINISTRATION REORGANIZATION

The witnesses today have been asked to comment on the National Nuclear Security Administration's reorganization put forward in March. The Laboratory Directors had the opportunity to discuss organizational issues with General Gordon in sessions prior to the announcement of his plan. I will provide any assistance General Gordon requests as he continues to develop the organizational structure of NNSA. I am very hopeful that the changes announced in March will address some of the fundamental organizational issues of the new administration.

The NNSA leadership has established streamlining of functions as one of its goals. I am confident that the two new associate administrators—one for facilities and operations and another for management and administration—will facilitate communication, assignments of responsibilities, and decision making.

General Gordon's plan also provides additional and strengthened venues for external liaison and communication, including an external review group, weekly telephone conferences, a management council, and a revitalized Nuclear Weapons Council. The Management Council will be able to emphasize the integration and synergy that is needed throughout the NNSA. His belief that the Nuclear Weapons Council must be revitalized as a mechanism to get improved agreement between the Department of Defense and the Department of Energy has our strong support.

CONCLUDING REMARKS

In conclusion, I will repeat that the Stockpile Stewardship and Nonproliferation programs continue to work, but the loss of human resources and failure of infrastructure threaten our continued ability to perform critical tasks. With support from Congress, the NNSA can turn this situation around:

- General Gordon has developed a Future Years Defense Plan (FYDP) to bring national security requirements and resources into alignment. This requires strong congressional support.
- The plan includes re-capitalization of the infrastructure needed to execute the assigned mission. Without this, the programs cannot succeed.
- Attention must also be given to attracting and retaining outstanding people through broad engagement in the world of science and technology, as recognized in NNSA's Mission 6. This means that the laboratories must be able to participate in the science programs outside of the NNSA, particularly those sponsored by DOE's Office of Science.
- Attention should be directed to security and cyber security to ensure that the requirements are appropriate and the resources are commensurate.

Finally, I will say that, past and present difficulties notwithstanding, we are hard at work in the NNSA and are meeting our assigned tasks to the best of our abilities. I believe strongly that there is no more competent and dedicated group of people for these tasks than can be found in the NNSA laboratories and production plants.

Senator ALLARD. Thank you, Dr. Browne. Now, we have Mr. Joe Buggy, President of Westinghouse Savannah River Company, at the Savannah River Site. Welcome.

STATEMENT OF JOSEPH J. BUGGY, PRESIDENT OF WESTINGHOUSE SAVANNAH RIVER COMPANY

Mr. BUGGY. Thank you, Mr. Chairman. It's a pleasure to be here. At Savannah River Site (SRS), our primary defense-related NNSA missions are tritium production, when the projects that General Gordon mentioned are completed, providing tritium-loaded reservoirs for the stockpile, and participating in surveillance testing for stockpile components, primarily tritium reservoirs.

We also supply technical support and design support for the future pit manufacturing capability. At Savannah River, we currently have two major projects, line items underway supporting these programs. That's the Tritium Modernization and Consolidation Project (TMCP) as well as the Tritium Extraction Facility (TEF).

I'd just like to say all of those programs are progressing very well today on-budget, on-schedule and things are going well for those missions at Savannah River.

We also support the nonproliferation program in that Savannah River is the site selected for the three plutonium disposition facilities, pit disassembly and conversion, MOX, and possibly plutonium immobilization. We're working with the Department of Energy on those facilities as well.

Savannah River is somewhat unique. All of the missions I just described are NNSA missions, and yet the services to support them are provided by the Department of Energy's Environmental Management Program (EM). The Environmental Management Program is the landlord at Savannah River Site. As such, the operation's manager at Savannah River reports directly to the Assistant Secretary for Environmental Management.

We have senior NNSA officials, one designated each at the present time from defense programs and one from the nuclear nonproliferation. These individuals report directly into Department of Energy headquarters.

There's a strong need for integration among these programs and consistency in terms of the way our site does business. From my perspective, I know that these program officers recognize that and are working very well together to accomplish that.

The proposed organizational structure that General Gordon mentioned earlier will ultimately provide a single point of contact for NNSA at Savannah River Site and that will work even better as we'll have a single focal point for programmatic, technical and budget direction.

The proposed budget, the Defense Program's budget for Savannah River Site, is $234 million. This funding is sufficient to execute the core stockpile stewardship mission and to maintain progress on those two important line items that I just mentioned.

The budget is, however, approximately $19 million short of the Defense Program requirements. That's attributable primarily to three things. One was an unclaimed pension contribution requirement. One was a loss of approximately $9 million in infrastructure support. One will be a cost increase to the Defense Program of approximately $7 million due to shifts in overheads from the Environmental Management Program to the Defense Program's program.

In fact, the interconnection between DP and EM at SRS is a very important consideration. While NNSA has supplied its required level of support, and NNSA is only a small part of the landscape at Savannah River, there will be a negative impact on the site's overall capability in light of the severe budget problems that we face in the Environmental Management budget.

I won't go into the details with this committee on the Environmental Management budget, but we need to recognize that the NNSA support that we're going to be able to provide is inextricably linked to the Environmental Management support for site infrastructure and site overheads.

I believe that the missions we are performing for NNSA are all going very well. I think that the primary needs for the stockpile stewardship will be met even at the reduced levels of funding that I just mentioned for Savannah River. Like the speakers before me, the major impact to those programs will be in refurbishment of the infrastructure that supports those defense program missions at the site.

With that, I'll close.
[The prepared statement of Mr. Buggy follows:]

PREPARED STATEMENT BY JOSEPH J. BUGGY

Good afternoon.

On behalf of the Westinghouse Savannah River Company, I am pleased to submit the following testimony regarding the Savannah River Site NNSA programs. The Westinghouse Savannah River Company leads an integrated team that operates the Savannah River Site. We have operated SRS since 1989.

Presently, our primary NNSA missions are: (1) tritium production, which will resume upon the completion of future projects; (2) providing tritium-loaded reservoir components to support the Nuclear Weapons Stockpile Maintenance program; and (3) surveillance testing of stockpile evaluation reservoirs and components. We are also providing technical and design support for the Weapons Complex future Pit Manufacturing capability.

Currently, we have two major line-item projects underway to support the tritium mission: Tritium Modernization and Consolidation, and the Tritium Extraction Facility. Both of these projects are key elements of the Stockpile Stewardship program.

At SRS, we also support the Nuclear Nonproliferation program. SRS has been selected as the location for construction and operation of three new facilities to dispose of about 50 metric tons of surplus U.S. plutonium. WSRC is currently designated as the operator of the pit disassembly and conversion facility and the plutonium immobilization facility.

SRS is somewhat unique. All of the missions I just described are NNSA missions, yet the services to support them are provided by DOE's Environmental Management program, which serves as the landlord for SRS. DOE's Operations Office manager at SRS reports to the Assistant Secretary for Environmental Management; senior NNSA officials are designated for both Defense Programs (DP) and Nuclear Nonproliferation (NN), and report to those offices at DOE headquarters.

Certainly, there is a strong need for integration among the three program offices, and for consistency in the way the site does business. From my perspective, I know that the program offices recognize that, and are working well together to achieve that consistency. The proposed organizational structure has a single point of contact for all NNSA activities at the site. That will work well, since it will provide a focal point for both programmatic, technical and budget direction.

The proposed Fiscal Year 2002 Savannah River Defense Programs budget is $233.6 million. This funding is sufficient to execute the core Stockpile Stewardship mission, and to maintain progress on the two line-item projects I mentioned previously.

The fiscal year 2002 budget, however, is $18.7 million short of Defense Programs requirements. An unplanned pension contribution in fiscal year 2002 ($2.4 million) and necessary infrastructure restoration and facilities modification funding ($9.4 million) are the major components of this shortfall.

Infrastructure restoration projects include the replacement of aged electrical switchgear and building ventilation upgrades. Facility modifications funding will support conceptual design for expanding loading capacity, engineering design and facility modifications to increase Reservoir Surveillance testing capacity. These modifications will prevent creation of a Surveillance testing backlog, and will result in outyear savings by allowing closure of a 50 year old facility.

In addition, a preliminary estimate of $6.9 million in overheads shift could impact the DP budget due to severe budget restrictions in Environmental Management programs. In fact, the interconnection between DP and EM at SRS is an important consideration. While the NNSA program is providing its level of support, NNSA is only a small part of the overall SRS landscape. There will be a negative impact to the site's overall capability in light of the severe budget problems within the Environmental Management program.

EM has the landlord responsibility for the site's general infrastructure, which is now approaching 50 years of age. Many of our systems—process and domestic water systems, sanitary sewer systems, roads, laboratories and others—require major upgrades which are beyond the financial capabilities of the site's annual funding allocations, primarily from the EM program.

The Fiscal Year 2002 Savannah River EM budget is currently targeted for a $160 million reduction from fiscal year 2001 levels; that will be $214 million less than what is required. That funding shortfall will have two effects on our NNSA programs. One, it will reduce funding to address the urgent site infrastructure needs, some of which I have just described to you. Two, as I mentioned above, this reduc-

tion will shift overheads to the SR–NNSA budget, resulting in erosion of planned infrastructure upgrades.

At the beginning of this testimony, I noted that the baseline Nuclear Nonproliferation program at SRS supports DOE's plutonium disposition efforts. As of this hearing, the fiscal year 2002 funding for SRS has not yet been determined. I will be happy to provide you additional information on that program for the record at a later time.

We are proud to continue our support for the national security missions that have been located at SRS. SRS and its local stakeholders have a long tradition of support in this area, and we appreciate the confidence that has been shown in us. I thank you for inviting me to meet with you today, and I am pleased to answer any questions you may have.

Senator ALLARD. Thank you very much. Now, we have Mr. John Mitchell, President of BWXT Y–12 at Oak Ridge, Tennessee. Welcome.

STATEMENT OF JOHN MITCHELL, PRESIDENT OF BWXT Y–12

Mr. MITCHELL. Yes, sir. Mr. Chairman, and members of the subcommittee, we appreciate very much the opportunity to be here today. I have to admit, I've managed a lot of facilities in my life in various places and careers, I have never, ever managed one where the only way to achieve less notoriety is to get rid of the word poster child. I assure you that is in fact my intent through the next few years not be able to claim that mantle much longer.

Y–12 is a very interesting and complicated plant to operate. The new management team has been there about 6 months. I'd like to take just a few short moments to describe some of the things that have gone over in those 6 months.

One I would highlight is in our operational areas. The facilities at Oak Ridge are designed to handle enriched uranium, of course, and we manufacture many products that way. Our system is designed to operate in a closed loop, that is where you recycle and recover all of the uranium that we produce, whether it be waste chips for manufacturing, waste mop water, or whatever.

That particular part of the Y–12 complex has not operated in excess of 6 to 7 years at this point. What that means is that everything we do for manufacturing creates waste that we simply store. What that has done is create a backlog of storage that now actually occupies our buildings in many ways there.

I'm very pleased to say that last week for the first time, we received permission from NNSA to operate that particular part of the complex, and we in fact will be processing that waste and producing enriched uranium for the first time in 6 years in the next 10 days. So, we're very proud of that accomplishment.

We place a great deal of emphasis on the safety and security of the operations we do. The types of materials we manage require that. They leave us no choice. Many of the comments have been about infrastructure. People I think should be put in that context, we ask our people to operate under ever-increasing safety standards and at ever-increasing security standards in a complex that was not designed to meet those standards and that we're going to have great difficulty in sustaining over the long term.

The people at Y–12 have done a great service to the Nation over many, many years. One of the things we hope to do is to provide them a complex, the tooling, equipment, the facilities and technology, to honor that commitment they had over time.

A lot of our emphasis, of course, is on modernization of Y–12. We believe there are three component parts that have to be in balance and operate in parallel to modernize Y–12. One of the keys is reducing the infrastructure we have. We have in excess of 500 identifiable facilities at the Y–12 plant, some of which are fully in use, some of which are partially in use, some of which are marginally in use, and some of which are not used at all.

But, we have to support all those buildings. Because of the type of work that has been done at those facilities in the past, we can't walk away from them. They require extensive surveillance and monitoring even in their inactive state. It is extremely important to us to reduce that footprint, get rid of that burden in our cost and reduce our infrastructure down to just what we need for the long-term future to support here.

We have to consolidate. We have buildings where because of the original design, or occupied different parts of the buildings, we now only operate parts of those processes. So, we operate in small parts of buildings. Without the ability to consolidate, we will be forced to maintain and use our planning to fully support the buildings even though they only marginally contribute all the time.

The other part is selective recapitalization. In some parts, we simply must invest new dollars. Right now, the materials we handle are scattered over a very large number of special storage facilities to meet the security requirements. We must consolidate those. We must put in modern, flexible security requirements.

The one thing you know about security is whatever standard you're meeting right now is not the standard that's sustainable for the future. Security standards only increase over time. Right now, we need a significant capital investment to be able to keep the materials we have safe and secure for the long term, not just for the short term.

We also have to maintain specialized processes where we're the only place in the country that does certain types of manufacturing takes place. In many of those cases, we have not manufactured some of those specific products and materials for 12 to 15 years, when some of the weapons in the stockpile were produced new.

We have not achieved volume production of those items in many years. As we approach the upcoming time, when we go back to support the modernization of the life extension programs, we essentially have to redevelop those processes. The people that did them in the past are not necessarily there. The tools, equipment, and process are not all sustainable right now, sometimes from a safety sense, sometimes simply because you can't maintain the equipment anymore. We actually have vacuum-tube equipment at some of these processes, vacuum-tube controllers.

So, we have to go invest in modern facilities, tooling and processes and sometimes selective recapitalization is the right way to achieve that and to revive them in a constrained manner.

The fiscal year 2002 budget as presented allows us to maintain the status quo at Y–12. It does not allow us to make the substantial investments we need along those three lines. To significantly reduce the infrastructure that we have to support, allow us to constrain and consolidate our infrastructure down to the footprint we need, and also to selectively modernize and then put new tech-

nologies, new equipment, and new tools in. We are very much constrained in our ability to do that.

The life extension programs coming up provide us a long-term predictable workload increase from where we are right now. We have to be able to step up our ability to focus our funds and capabilities directly on what's needed for that and it's a step up from what we do right now. We really need support to allow that to happen.

Y–12 is a great place. It has served the country well since the Manhattan Project. It is a vital and unique national asset. It's not clear we've treated it that way. With your support, we look forward to doing just that. That concludes my remarks, sir. Thank you.

[The prepared statement of Mr. Mitchell follows:]

PREPARED STATEMENT BY JOHN MITCHELL

Mr. Chairman and Committee Members: Thank you for the opportunity to update you on the Defense Program activities at the Y–12 National Security Complex in Oak Ridge over the last 6 months and to provide you my views on our ability to meet the requirements of the Stockpile Management Program, both in the near and long term. We have unique capabilities and challenges at Y–12 and have initiated efforts in many areas to address these and successfully meet the expectations and requirements of the National Nuclear Security Administration (NNSA).

BWXT Y–12—THE FIRST 6 MONTHS

BWXT Y–12 completed a highly successful contract transition and set in place organizational structures and operational philosophies that would set the stage for constructive change. Continuing a long-standing Y–12 tradition, all weapons deliveries were met. In addition, safety was engineered into the disassembly process for future weapons components. An emphasis on safety is a top priority, as demonstrated by the Bechtel Safety Leadership training being provided to 856 Y–12 managers and supervisors and by improved Defense Nuclear Facilities Safety Board (DNFSB) relationships. The Executive Steering Group, consisting of senior management and others, focuses on continuous management review and direction. A safety culture based on people, not just paper, is being established.

A new plan for Enriched Uranium Operations (EUO) Restart was set in place by our project team and our corporate-sponsored challenge teams. The Operational Readiness Review for reduction operations was completed on schedule, and NNSA has approved the return to full operational status.

A strong emphasis has been placed on the successful modernization of Y–12. All major capital modernization projects have been reviewed with the intent of increasing our confidence in being able to execute these major projects on time and within budget. In conjunction with the modernization program, we have reflected in our 10-year plan and in our budget request recognition that our infrastructure requires major recapitalization and footprint reduction. Maintenance management requires major investment and improvement. The organizational structure reflects our commitment to manage modernization and infrastructure improvements at Y–12 as major projects as well as management commitments.

Other successes include the renegotiation of the Atomic Trades and Labor Council (ATLC) contract, which was extended for 3 years by mutual agreement. Benefits for both active and retired employees have been reviewed and adjusted in a fair and equitable manner.

Overhead budgets have been reduced, resulting in the absorption of approximately $20 million of new requirements without impacting planned work scope. An executive-level Resource Management Review Board (RMRB) was established to drive a reduction in indirect costs. These initiatives have resulted in a net saving to direct-funded programs.

PROGRAMS

The Directed Stockpile Work (DSW) in fiscal year 2001 and requested fiscal year 2002 funding meets the directive schedule requirements, incorporating efficiencies where possible. The DSW requirements are integrated with and dependent upon Campaigns and Readiness in Technical Base and Facilities (RTBF) provided capa-

bilities. This approach provides confidence in our ability to meet emerging requirements for future Systems Life Extension Programs (SLEPs).

The funding provided for Campaigns, in fiscal year 2001 and requested in fiscal year 2002, provides for several modernization planning and early design and planning activities for major projects such as the Special Materials Complex (SMC) and the Highly Enriched Uranium Materials Facility (HEUMF). Some upgrades to existing systems, processes, and equipment needed to perform DSW are supported. We will implement new technologies and reengineer core manufacturing processes to meet more stringent health, safety, security, and environmental requirements. Our challenge is to simultaneously maintain aging technology, plan for near-term life extension programs, and invest in new technologies and skills required to support future requirements.

Readiness in Technical Base and Facilities (RTBF) maintains and repairs production and process facilities and equipment. The projected funding supports current production requirements and restart of processes, and maintains and operates restarted operations, moving towards recycle versus storage of material.

The funding levels requested in fiscal year 2002 for Campaigns and RTBF maintain the status quo. However, they do not allow us to make much-needed investments in upgrading the infrastructure, decreasing our exposure to equipment and facility failure, or developing and installing modern processes and equipment that will increase reliability, reduce risk, enhance engineered safety, and update our technology. Without additional support in these areas, our long-term ability to meet the Directed Stockpile Weapons program objectives is increasingly at risk.

The completion of the Restart of selected processes is key to our long-term success, as recycle of material versus storage of material is the cost-efficient solution.

MODERNIZATION OF FACILITIES AND INFRASTRUCTURE

The proposed DOE/NNSA's new Facilities and Infrastructure Initiative has given the nuclear weapons complex a head start on needed infrastructure improvements by raising the awareness of the problem and garnering support for infrastructure projects. It has opened the door for the creation of successful strategies for modernization—strategies that will balance a program of capital investment with infrastructure reduction and technology development. But without significant investment in the immediate future, this opportunity will be wasted.

BWXT Y–12's strategy for infrastructure improvement is based upon a similar approach. This strategy begins with intense planning focused on determining the scientific and manufacturing capability needs for the future. Then the basic equipment, facilities, and skills required to support these needs are defined, as well as the equipment, facilities, and skills that will no longer be necessary. In the first years, while maintaining production, the complex will concentrate on deactivating and eliminating unnecessary infrastructure, finding efficiencies within the current ongoing processes, and aligning technology development efforts with the need for reestablished capabilities.

In succeeding years, by eliminating non-essential equipment, processes and systems, the complex will make room physically and economically for beneficial upgrades. Priority will be placed on removal of non-essential buildings and equipment that restrict consolidation activities or occupy prime real estate needed for potential reuse. Savings in surveillance, analysis, maintenance, and security can be reinvested in replacement of vital manufacturing and material science processes. Old, single-use, or near-failing equipment can be replaced with more efficient multipurpose machinery. Thoughtful incorporation of new technologies and process methods can improve efficiency and make inherently hazardous work safer.

The result of Y–12's infrastructure improvement approach will be a consolidated manufacturing footprint, with a central hub of secure operations surrounded by the necessary developmental, technical, and other support functions. Nuclear material storage, as well as the utilities infrastructure, will be consolidated for the entire site. Over time, vacated facilities and utilities systems can be closed down, deactivated, and eliminated; and perimeter areas can be redeveloped for employee use and recreation. The goal is to develop a more flexible core capability base-one adaptable to changes in work scope and technology, cost-efficient, and able to attract and retain new talent.

Achieving and sustaining infrastructure improvement within the current DOE/NNSA funding forecasts will be a significant challenge. The funding structure is organized to support DOE/NNSA programs through a process aimed at both operations and discrete capital projects. However, as operating equipment ages, there becomes an increased demand in both of these areas simultaneously. Maintenance needs go up, which is an increased burden on operating budgets. Additionally, needs

for capital replacement also go up, further exacerbating the burden on operating budgets.

Every year, it becomes more difficult to keep ahead of the curve-to provide maintenance and replace operating equipment before failures occur. The only way to offset increased needs for spending is through efficiencies gained with the same capital improvements and technological advancements that must compete with the operating dollars. This situation forces constant trade-offs between operations, maintenance and capital investment.

But we have come to a point, especially at Y–12, where the trade-offs have favored operations to the detriment of both the maintenance that sustains those operations and the necessary capital improvements. Obviously, it has been extremely difficult to sustain investments in capital in this environment. Likewise, given the years of deterioration at Y–12, it will be extremely difficult, if not impossible, to reestablish operational capability to service all of DOE/NNSA's needs without a sustainable, long-term program of investment.

For Y–12, such an 8- to 10-year program would be aimed at eliminating the maintenance backlog as well as eliminating non-essential process equipment and facilities from the maintenance schedules. This program would also focus on investing in technology efficiencies and building new facilities, such as the Highly Enriched Uranium (HEU) Materials Storage Facility, Special Materials facilities, and a new manufacturing building with technical development capability.

Y–12 will require an investment to eliminate long-range costs of upkeep for equipment and buildings no longer used or needed, an investment for technology and security improvements, and an investment in construction of new buildings.

Without this type of re-capitalization and infrastructure reduction strategy, DOE/NNSA will be able to make only limited progress toward its infrastructure improvement goals. BWXT Y–12 is committed, however, to investing in infrastructure improvement. It is prominent in the newly developed Y–12 strategic plan. It is the basis for sustaining Y–12 as a valued asset and the basis for advancing Y–12's operational excellence into the future. Y–12's approach to improvement and modernization will result in a smaller, cleaner, more cost-effective complex that will be able to serve the national security needs of this nation well into the 21st century.

WORKFORCE

Y–12 has a very high-technology, highly skilled workforce. Our focus is on maintaining and developing the skills for current as well as future technologies that will be introduced as part of modernization. We will continue to develop skills that complement our unique capabilities and utilize new technology methods.

We are concerned, however, about the growing liability in workers' compensation cost. We, like other contractors, continue to pay these current-year costs from existing, current-year funds. If these costs continue to escalate, as the trends suggest, the impacts will be to our modernization plans and technology improvements. We recommend a consideration of a separate, direct funding action to reflect this growing liability.

TEN-YEAR PLAN

The vision of the future state of Y–12, as we have stated, is a consolidated manufacturing footprint, with a central hub of secure operations surrounded by necessary development, technical, and support functions. Nuclear material storage will be consolidated, as well as the utility infrastructure for the site. Over time, vacated facilities and utility systems will be closeddown, deactivated, and eliminated; and perimeter areas can be redeveloped for employee use and recreation. The goal is to develop a more flexible core capability base—one adaptable to changes in work scope and technology, cost-efficient, and able to attract and retain new talent.

There are a number of decisions yet to be made on alternatives for modernizing Y–12. Given years of deterioration, it is relatively easy to identify the physical infrastructure problems that require solutions. Evaluating the production readiness of the processes and technologies, however, is a more difficult task and is not yet completed. With the number of readiness cases to be studied and other uncertainties associated with forecasting future stockpile work, this evaluation will be an intensive effort for BWXT Y–12. Working through alternatives, achieving agreement with NNSA, the design labs and other production sites, making decisions, estimating the resources, and developing justifiable and sustainable schedules that NNSA can rely upon requires time.

MAJOR CAPITAL PROJECTS

We have identified the operational and capital funds required to support the early design and planning activities for major projects such as the Special Materials Complex (SMC) and the Highly Enriched Uranium Materials Facility (HEUMF). For fiscal year 2002, this provides for the design, planning and initial acquisition efforts for these two critical projects.

We have intensely reviewed the plans and estimates for the construction phases of these projects and will continue to look for improved project-structuring opportunities. We have introduced new management and new controls to the execution of all capital projects. We believe we have the management and system expertise to regain credibility in the execution of capital projects.

SUMMARY

Y–12 is at a key decision point in its future. We know what needs to be done. I respectfully request your consideration of, and support for, increased investment in reducing risk in our ability to meet future stockpile and national needs. Reducing unneeded infrastructure, upgrading our facilities and processes, and selected investment in major recapitalization are urgently needed to assure that Y–12, an irreplaceable national security asset, can continue its commitment to and record of successful support of national needs.

Thank you very much for the opportunity to submit this testimony.

Senator ALLARD. Thank you, John. Mr. Douglass, you are President of Government Services at Honeywell Federal Manufacturing and Technologies in Kansas City. Welcome.

STATEMENT OF DAVID DOUGLASS, PRESIDENT OF HONEYWELL FEDERAL MANUFACTURING AND TECHNOLOGIES

Mr. DOUGLASS. Thank you, Mr. Chairman. Honeywell operates the Kansas City plant for the NNSA. The plant is the only nonnuclear production facility the NNSA has, and I'd like to share with you the issues facing the Kansas City plant from the view of a businessman.

Today, the Kansas City plant is thriving. We are busy producing components for every active weapon system in the stockpile. Last year, we procured, built, and shipped over 167,000 parts on time to our customer virtually 100 percent of the time.

For the past couple of years, one of our most pressing issues has been critical skills and managing the anticipated retirement of a large part of our workforce. I am pleased to say we are making progress. This year, we are hiring 150 new engineers and technologists in addition to replacing attrition.

With the support of NNSA, we have adopted a very contemporary competitive benefits package which allows us to enhance our ability to recruit and retain some of the best and brightest. Today, when you walk through our facility, it's exciting to feel the sense of the energy and enthusiasm that these new associates bring to our plant.

The plant itself, though 60 years old, is in reasonably good condition. It remains a very secure and safe facility to work in. We've accomplished this over the years by balancing production requirements with technology needs, with head-count and infrastructure requirements, as well as bringing commercial best practices, such as Sixth-Sigma, into the business to improve our processes, save money, and then redeploy those savings back into high priority needs or fixing things that are broken.

However, all of our efficiency improvements will not make up for the problems created over the past decade by funding shortfalls. In

my prior job as a plant manager, I routinely reinvested about 5 percent of the value of my plant equipment back into the business on an annual basis to assure that I maintained a viable competitive enterprise over the long term.

For high-tech businesses, that level of reinvestment is actually much higher. At the Kansas City plant for the last 6 years, the level of reinvestment in plant and equipment has been 2.4 percent. You need to keep in mind that the Kansas City plant supports a broad variety of processes from basic manufacturing to various advanced technologies, which should place us at the upper end of that 4 to 5 percent reinvestment curve.

This is the one area that concerns me the most as I look into the future for the needs for the business. This lack of investment has created a backlog in infrastructure ranging from the need to replace 40-year-old air handling units to implementing advanced microelectronic technologies we need to keep pace with developments at the National Laboratories.

What I don't want to have happen is for me to appear in front of you a year from now, or 2 years from now, or even 10 years from now, and tell you that we are unable to sustain the production operations at the Kansas City plant because we failed to make the long-term investments today. That long-term investment, and the need to fix the deferred infrastructure, remains the greatest risk to the sustainability of operations at the Kansas City plant and our ability to support the stockpile life extension requirements in the future.

We will continue to ring costs out of the business at Kansas City. That's what Honeywell does. In the past, I have had the ability to take those cost savings and turn those back into the business to meet high priority needs. As we look out into the future, reprogramming rules constrain my ability now to take the cost savings that we will continue to make and put those into high priority needs.

I need the flexibility in the future to take the cost savings that we realize as part of our ongoing business, and the flexibility to put those into high-priority infrastructure needs so that we can manage an efficient and effective facility in the future.

I look forward to working with this subcommittee, and the NNSA to ensure that the Kansas City plant and the nuclear weapons complex remain viable components for our national security mission. Thank you.

[The prepared statement of Mr. Douglass follows:]

PREPARED STATEMENT BY DAVID S. DOUGLASS

Mr. Chairman, my name is Dave Douglass. I am president of Honeywell Federal Manufacturing & Technologies, which manages the National Nuclear Security Administration's manufacturing plant in Kansas City, Missouri, and facilities supporting transportation safeguard activities in Albuquerque, New Mexico. The Kansas City Plant today is an active, safe, secure, and reliable facility. One of the most complex manufacturing sites in the country, we have complete electronic, mechanical and rubber and plastics factories under one roof, and we bring to the nuclear weapons complex expertise in science-based manufacturing, procurement and e-business systems. The nonnuclear components we produce comprise 85 percent of the parts manufactured within the nuclear weapons complex, as well as 85 percent of the components that constitute a nuclear weapon.

With the help and support of this subcommittee and Congress over the past 3 years, we've dealt with a number of key issues facing the Kansas City Plant. Your

support allowed us to satisfy some persistent infrastructure needs and proactively address issues relating to critical skills hiring and the anticipated retirement of a large percentage of our workforce within the next few years. However, because of the seriousness of past budget shortfalls, these improvements have focused on short-term fixes rather than long-term solutions. Today, I would like to discuss some of the long-term issues facing the Kansas City Plant.

Mr. Chairman, the proposed fiscal year 2002 budget for the Kansas City Plant will allow us, on the surface, to meet our directed stockpile work obligations. There will be minimal impact on activities pertaining to stockpile maintenance and evaluation and product support, and our Enhanced Surveillance and Advanced Design and Production Technologies campaign work will remain fully funded. With this funding level, we can also maintain basic facility operations and program readiness, and continue our efforts to address critical skills and overall workforce needs.

However, we have deferred investment in capital equipment and infrastructure, which has significantly increased the risk of sustaining uninterrupted operations and, ultimately, will impact our ability to perform the Kansas City Plant's mission. The proposed fiscal year 2002 levels decrease our funding by one-fourth for the Non-nuclear Readiness Campaign, which focuses on upgrades to technologies and preparations for the Stockpile Life Extension Program. Construction funding under the Readiness in Technical Base and Facilities program is reduced by $5 million. This includes plant footprint reductions and production process consolidations which, if implemented, would allow us to reduce overhead costs. All facilities and infrastructure recapitalization programs will again be deferred, creating an even larger backlog of needed facility improvements and equipment recapitalization. Safeguards and security funding will be decreased slightly, and cybersecurity funding will be reduced by 94 percent, allowing for only very basic support activities.

Cybersecurity and infrastructure recapitalization are two of our major concerns. Without the additional funding, we will not be able to implement any of the new cybersecurity initiatives. We also cannot address our growing backlog of infrastructure needs.

My experience in industry suggests that companies need to invest in themselves in an ongoing manner. Generally, industrial companies set aside approximately 5 percent of plant replacement value in their annual budgets for recapitalization required to sustain on-going competitive operations; high-tech companies may need to invest a larger percentage because of today's rapidly changing technologies. The National Nuclear Security Administration's Albuquerque Operations Office, in its May 1998 Phase II Facilities and Maintenance Study, recognized that the design life of most government facilities is 25 years. This equates to an annual reinvestment of 4 percent of the plant replacement value.

Considering our diverse set of technologies and manufacturing capabilities, the Kansas City Plant's recapitalization efforts for the past 6 years have averaged approximately 2.4 percent annually. This consistent under-funding has created a backlog of infrastructure needs for the Kansas City Plant. The under-funding has occurred even though we have reduced headcount by 50 percent, from 6,000 to 3,000 associates since 1990, as part of our efforts to balance production, staffing and infrastructure requirements with available funding.

In 3 of the past 6 years, our funding to recapitalize and modernize infrastructure (facilities, utilities and equipment), as well as to maintain pace with technology, has totaled less than 2 percent of the plant's replacement value (based on a total estimated replacement value of $1.2 billion). This level of reinvestment in the plant's infrastructure is insufficient when it comes to offsetting depreciation and replacing obsolete or worn equipment.

Because Honeywell has managed the Kansas City Plant since 1949, our associates consider it as much their plant as that of the National Nuclear Security Administration. They take ownership and pride in its wellbeing. Throughout our stewardship of the facility, we have earned a reputation for our ability to introduce industry best practices, such as Six Sigma, which we use to reduce costs and maximize our efficient use of the budget. Since January 2000, these efficiency savings have totaled in more than $8.7 million.

We have focused on the short-term—repairing, maintaining, or replacing the equipment most likely to cause major production failures, often at the expense of needed long-term infrastructure improvements and modernization. In general, our capital equipment management strategy has been successful. We ship 99.9 percent of our products on schedule from a plant infrastructure that is generally safe and sound. We have avoided major production shutdowns, and even been able to allocate a portion of equipment funding for advanced technology. We prioritize and manage capital needs as new requirements arise. However, we also face an increased risk of impacting production schedules because of equipment failure, excessive mainte-

nance costs due to the age of existing equipment, and the inability to maintain and advance technology. This, in turn, affects our ability to integrate with suppliers and the national labs. To sustain our production mission efficiently, we project the Kansas City Plant's capital equipment recapitalization funding to be $12 million a year.

There were no new construction line item starts in fiscal year 2000 and 2001, and the proposed budget eliminates any for 2002. This affects our ability to support new technology needs in our reservoir and microelectronics areas. There will also be an impact on continued facility operations, particularly needed replacements of air-handling units and chillers.

The accelerated rate of technology change has required us to balance our limited funding between investing in manufacturing capability and facility infrastructure needs. We are a leader in science-based manufacturing, which minimizes the expense of prototype production. However, it also involves exchanging designs electronically with the national labs and working closely with them to concurrently engineer product designs and simulate product performance. This partnership requires us to continually upgrade our computer systems and networks.

Mr. Chairman, the Kansas City Plant is a cornerstone of the nuclear weapons complex. We support 42 product families and 120 advanced technologies, shipping more than 60,000 product packages annually. We are busily producing components for every weapons system in the active stockpile. The proposed fiscal year 2002 funding levels brings increased performance risks related to new workload requirements on the Stockpile Life Extension Program, because we cannot prepare in advance for the work. We are concerned about the increased risk of equipment failures and facility infrastructure breakdowns. We are concerned about the safety and health of our workforce as a result of these breakdowns. We are concerned about our ongoing ability to recruit critical skills and maintain a qualified workforce. Increased funding for recapitalization is required to continue our strong performance at levels expected by the National Nuclear Security Administration.

Mr. Chairman, thank you for the opportunity to present these views to you today. Honeywell is committed to our national defense mission and to the future success of the Kansas City Plant and nuclear weapons complex. I look forward to continuing to work with you and the members of this committee to address these challenges.

Senator ALLARD. Thank you, Mr. Douglass. Mr. Ruddy, you are the President and General Manager of BWXT Pantex in Amarillo, Texas. Welcome.

STATEMENT OF DENNIS R. RUDDY, PRESIDENT AND GENERAL MANAGER OF BWXT PANTEX LLC

Mr. RUDDY. Thank you. I have been the plant manager at the Pantex Plant since February the 1st, I'm a bit of a newcomer and I thank you for letting me have this opportunity to speak to you today.

The Pantex facility is unique in its ability to support the Nation's nuclear weapons stockpile. Our production bays themselves are the only capability that the Nation has for nuclear explosive operations.

Like my colleagues, I see the formation of NNSA, and the direction that it is taking, as a very positive step toward better management of the Nation's nuclear stockpile. Although the formation of the NNSA is positive, I see some problems with next year's budget in that the new organizational structure cannot address without your assistance.

Since arriving at Pantex, we have aggressively addressed the immediate needs of the facility, our people, and the NNSA. We have attained a repackaging rate of nuclear pits at the expected and desired level of 200 pits a month, 4 months ahead of schedule using 40 percent less people than had been previously planned.

In the program to protect workers from exposure to beryllium, BWXT Pantex completed a 10-month plan for testing site employees in a mere 6 weeks and an 18-month facility characterization

program also in 6 weeks. Cleanup activities that were planned for completion in September of 2004 will be completed in August of this year.

These actions, which may seem a little bit incredible, are already generating cost savings that are being applied to Pantex's most pressing infrastructure problem. The improved processes for pit repackaging have produced $700,000 that can be redirected to other programs.

Next year, because we have accelerated the beryllium program, we'll have $600,000 available for other applications. In addition, by better utilizing the capability of the people that are already at the plant, we've reduced our hiring plans from 432 people to support next year's needs to about 260 people, thereby freeing up an additional $13 million that can be used in future budgets for infrastructure needs.

While these funds can be used to address infrastructure, they will not reduce the existing $218 million backlog that we have for deferred maintenance. In previous congressional testimony, I provided examples of the maintenance concerns such as leaks so numerous that we have to cover weapons with plastic bags when it rains outside. Fortunately, in Amarillo, it doesn't rain that often, but it does provide a visual for the deterioration of our infrastructure.

But the magnitude of the problems that we have there cannot be covered just by the kinds of cost improvements that we've been able to make. Our readiness in technical base and facilities (RTBF) funding for next year is about $85.5 million. It doesn't even maintain the status quo.

If we don't get additional funding, we will continue to increase the $218 million backlog, and we believe that if we want to start moving ahead to the future and be able to support not only this year's, but future year's, needs for the Stockpile Stewardship Program and maintain the facilities, we will need an additional $82 million in fiscal year 2002.

I believe that the added investment at Pantex is warranted not only because of the national security needs, but also because sound business judgments dictate this need. In a short period of time, we have been able to demonstrate our ability in a commitment to use the DOE's funding productively. I commit to you that additional funds, if given to us, will be used to ensure that Pantex is capable of supporting future needs.

Mr. Chairman, members of the subcommittee, the NNSA is facing difficult issues in maintaining a viable production complex and a productive workforce. We must take immediate steps to solve these key problems caused by habitual underfunding.

We cannot rely on the expectation that we will be successful every year in treating only the symptoms and not the root causes of deteriorating infrastructure and uncertain staffing. I am asking that you arm the operators of your defense plants with the funding required to leverage corporate expertise and the best industry practices, as mentioned by Mr. Douglass, in the management of DOE facilities.

Thank you very much for listening to me today.

[The prepared statement of Mr. Ruddy follows:]

PREPARED STATEMENT BY DENNIS R. RUDDY

Mr. Chairman and Members of the Committee: My name is Dennis Ruddy. I am President and General Manager of BWXT Pantex, which manages the Department of Energy's Pantex Plant near Amarillo, Texas.

I became the General Manager of the Pantex Plant on February 1, 2001 as a result of BWXT Pantex being competitively selected to be the managing and operating contractor. While our company is new to NNSA, I can assure you we are totally committed to achieving excellence in all areas at Pantex and supporting the NNSA mission. At Pantex our mission is to:

- Evaluate, retrofit, and repair weapons in support of both life extension programs and certification of weapon safety and reliability;
- Dismantle weapons that are surplus to the strategic stockpile;
- Demilitarize and sanitize components from dismantled weapons;
- Develop, test, and fabricate chemical and explosive components; and
- Provide interim storage and surveillance of plutonium components.

BWXT Pantex is excited about the NNSA organization and the opportunity to work with General Gordon and his team to improve the operation of the production complex. We see the formation of the NNSA as an important step in focusing proper attention on production problems and ensuring activities involving our National Strategic Stockpile are understood and fully supported by Congress. The NNSA will also allow the Secretary of Energy to focus his attention on our Nation's energy supplies with full assurance that strategic defense issues will not go unresolved.

Pantex reports to the Deputy Administrator for Defense Programs through the Albuquerque Operations Office. This structure is very similar to the previous reporting structure and maintains the existing successful lines of communication. At Pantex we view ourselves as the focal point of production activity and the new NNSA structure allows DOE to continue to focus attention on our efforts to assemble and disassemble nuclear weapons.

Although BWXT Pantex views the formation of NNSA as a very positive event, the fiscal year 2002 budget presents problems that the new organizational structure cannot resolve without your assistance. Therefore, I would like to devote the remainder of my testimony to the funding issues we currently face at Pantex.

Since our assumption of the management of Pantex, we have aggressively addressed the immediate needs of the facility, our people and the NNSA. We have attained a repackaging rate of 200 pits per months 4 months ahead of schedule with 40 percent less people than planned. In the program to protect workers from exposure to beryllium, BWXT Pantex completed a 10-month plan for testing site employees in 6 weeks; an 18 month facility characterization program also in 6 weeks; and cleanup activities planned for completion in September 2004 will be completed in August of this year.

These actions are already generating costs savings that are being applied to Pantex's most pressing problems, which is the disrepair, obsolescence, and deterioration of the infrastructure. Improved processes for pit repackaging will free up $700,000 this fiscal year, which we have already used to fund other DOE directed priorities. Our accelerated beryllium activities will make $600,000 available next year to address unfunded needs, such as roof repairs, computing infrastructure modernization, and capital equipment replacement. In addition, by better utilizing the capabilities of existing employees we have reduced outside hiring from 432 people to approximately 260, thereby freeing $13 million in future budgets to be used for infrastructure improvements. But even when added to existing projections for RTBF spending, these cost savings do not reduce the existing $218 million backlog in maintenance activities nor support the future infrastructure requirements of the Stockpile Stewardship Program.

The maintenance backlog numbers I quote are based on the current state of repair for the facility. Obviously, when existing maintenance requirements go un-funded, the potential for significant system failures and maintenance costs increase. As an example, the replacement of tires on a car might be estimated at $400 million for the entire vehicle; but deferring maintenance could result in a flat tire and damage to a wheel, thereby, causing damage beyond the $400 million in deferred maintenance. We are in a position at Pantex where the size of our estimated maintenance backlog is increasing with time, because of induced system failure.

A negative trend in plant funding since the mid-1990s has created the infrastructure problems we are now experiencing. In previous Congressional testimony I have given examples of our maintenance issues, such as leaks so numerous that nuclear weapons must be covered with bags when it rains. We are fixing these leaks with money made available through improvement initiatives. However, the magnitude of the RTBF problem far exceeds our ability to address funding shortfalls through

business improvements alone. Although all work is currently being performed in a safe manner, we need to act immediately to ensure safe operations are possible in the future.

Our RTBF funding target of $85 million in fiscal year 2002 does not even maintain the status quo. Preventive maintenance, utility upgrades, waste operations, and the computing infrastructure remain under-funded. I am, therefore, asking that $81.7 million be added to the Pantex budget in fiscal year 2002 with corresponding additions for later years. The additional funding in fiscal year 2002 will be used to correct the mentioned under-funded activities and, in addition, re-capitalization needs of the facility, containers for the repackaging of pits, and storage issues associated with high explosives. The increase in later years will be used to complete the activities identified in our Ten Year Comprehensive Site Plan and thereby ensure that the Stockpile Stewardship Program is fully supported.

As you are aware, the Pantex facility is unique in it's ability to support the Nation's nuclear weapon stockpile. Our production bays and cells, along with specialized technical, safety, and security resources, provide the only capability for nuclear explosive operations in the DOE. Although the amount of additional funding I am requesting for fiscal year 2002 and subsequent years is substantial, it pales in comparison to the conservatively estimated $6 billion needed to replace the Pantex facility.

I believe the added investment at Pantex that I propose is warranted not only by National Security needs but also by sound business judgment. BWXT Pantex has demonstrated in a short period of time the ability and commitment to use the DOE's funding productively and I commit to you that any additional funding will be used to ensure Pantex is capable of supporting our Nation's needs for the foreseeable future in the most cost effective manner possible.

Mr. Chairman, NNSA is facing difficult issues in maintaining a viable production complex and workforce and must take immediate steps to solve key problems caused by habitual under-funding. We cannot rely on the expectation that we will be successful every year in treating only the symptoms and not the root causes of deteriorating infrastructure and uncertain staffing. I am asking that you arm the operators of your defense plants with the funding required to leverage corporate expertise and best industry practices in the management of DOE facilities.

Mr. Chairman, thank you very much for the opportunity to present these views. I look forward to continuing to work with you and the members of this committee to ensure the safety and reliability of the stockpile in the future. I will gladly answer any questions the committee may have.

Senator ALLARD. Thank you. I want to thank all of you for your testimony. I have a question here for all of you and I want to refer to the Scott report. The Scott report concluded that all the facilities have been neglected due to a scarcity of facilities and infrastructure funds because of the high priority given to science over bricks and mortar.

Later on, the subcommittee will ask you for your specific infrastructure concerns. At this time, I would be interested in hearing from the panel what type of maintenance plan the NNSA needs to ensure that we do not end up with a maintenance backlog in the future. Dr. Robinson?

Dr. ROBINSON. Sir, Sandia is in relatively better shape than most of the others. We carry out the nonnuclear responsibilities. Thus, over the years, our facilities have had a somewhat lower cost for the brick and mortar than for other facilities.

The nuclear labs with revised standards have had a great difficulty constantly spending to keep up with changing standards rather than to maintain the condition of the facilities.

The MESA Facility, which I highlighted, is probably the best example of the problems we face. The electronics components within nuclear weapons become obsolete before they become old. You cannot buy them anymore. You cannot replace them in any way.

We are constantly trying to stay at the state of the art of the industry, but yet add the other requirement that's unavailable from

commercial sources, and that's radiation-hardened circuits, so it will withstand the hostile environments and the environment within the weapon itself. For this reason, we have to go on major equipment upgrades.

The MESA facility is as much an exercise in bringing the equipment up to modern standards as it is the facility for us, but a very, very key part of our need.

We have also done comparisons with how the spending over the years compares to say Intel. Intel is a corporation we've collaborated with. They have licensed us some of their technology. We have licensed them some of ours. We spend about half of the level annually on new equipment that Intel does.

But yet, this is an area we are constantly striving to have our weapons be second to none in the world. It's not a formula that exactly balances out over the long term.

Senator ALLARD. Dr. Tarter.

Dr. TARTER. Mr. Chairman, we have, as with all the facilities, a maintenance backlog. As with Sandia, I think our problems are not as severe in many cases as those in some of the plants. I think we have done several things and I'd like to make a comment in addition along the same lines as Paul did.

I think we very consciously have gone through, and this happened about 3 years ago, a site-wide prioritization of every facility in terms of its operational status. Is it falling down? Is it in perfect shape? Then, how valuable is it?

Using that as a matrix, if it's extremely valuable and in bad shape, obviously we put the highest priority on it. We've gone through a very conscious prioritization on everything in the site. We were able to take care of those in sort of the A and B categories of greatest need. We cannot approach the next level down of facilities, which are needed for the long term health of the site. But I think at least we have a methodology that has helped us approach that reasonably well over the years.

I think Paul made one very excellent comment. One of the areas, particularly in the current world, which is a piece of the infrastructure that isn't just bricks and mortar, is telecommunication, how you communicate. Somehow, it isn't just the bricks and the mortar. It is making the site, and I think John Mitchell mentioned how it's selective recapitalization of the whole site, not just replacing stuff that is there.

I think that's this conscious process that we all need to go through. So, we have needs. Again, I think we have tried to get a methodology and I think some start on that additional piece would be very welcome.

Senator ALLARD. Dr. Browne.

Dr. BROWNE. Yes, Mr. Chairman, we have some very serious needs for maintenance, a lot of deferred maintenance has occurred over the years. We have a 50-year-old infrastructure frankly dating back to the Cold War days.

About 40 percent of our facilities have been identified as in the poor or fail mode. I think you would find similar things at some of the production plants. They are the same vintage.

I think it was Mr. Douglass from Kansas City who mentioned the 2.4 percent reinvestment rate. Ours has been less than 1 percent

at Los Alamos. So, we have some very, very serious problems that we would like to see corrected.

Senator ALLARD. Mr. Buggy.

Mr. BUGGY. Let me just separate for a moment maintenance from infrastructure upgrades, if I might. From a maintenance planning point of view, and a maintenance management point of view, our tritium facilities at Savannah River Site are in very good shape. We have an excellent maintenance program. Our backlog is, and has been, for 2 or 3 years a manageable backlog from a maintenance point of view.

Our issue remains what's been reinforced here a number of times, and that's reinvestment in aging infrastructure. We are able to keep up with maintenance of old facilities, but it's very expensive to do that. From a lifecycle cost point of view, you're far better off reaching the reinvestment numbers that have been mentioned here more than once to eliminate the severe expense associated with maintaining these aging facilities.

Senator ALLARD. Mr. Mitchell.

Mr. MITCHELL. Mr. Chairman, probably 75 to 80 percent of the funding that I spend on maintenance is spent on what I would call breakdown maintenance. That is reacting when something is already broken. Somebody already found out it didn't work and told me and I had to go fix it.

The remainder is spent on preventative maintenance. What that means is that our ability to plan and sustain any kind of maintenance plan is driven by the fact that we are reacting to production needs. Anytime you're in a breakdown maintenance mode as we're operating a production facility, when things break you fix the things that have to be fixed then to get the production line back up.

So our ability to sustain any kind of planned investment for maintenance is very much restricted by how much we have to do just to keep the production line running.

As we increase our ability to sustain and support the life extension programs, this will be made worse. We are going to be reactivating lines we have not used for some period of time. Pieces of equipment that we have not actively used for production are going to be coming back on line, all of which represent old technologies in many cases and very high maintenance risks.

It is going to be extremely difficult for us to break out of this reactive maintenance mode for a while without a very, very significant direct and sustained investment and being able to get the equipment back up to the former standard. It doesn't drive us, we drive the plant.

Senator ALLARD. Mr. Douglass.

Mr. DOUGLASS. Thank you. We have all been very effective over the years in doing reactive maintenance and it's what's enabled us at Kansas City to continue to support the variety of production applications we have to date.

Unfortunately, things such as replacing air handling units aren't glamorous. However, when an air handling unit breaks down, it shuts down my clean room. When I shut down my clean room, I'm unable to do microcircuit production. That is what will begin to effect us over the long term. We'll continue to use efficiency improve-

ments to address near term needs and those have been effective to date.

However, we need the infusion to address the long term sustainability of business so that we can continue to be ready to support the Stockpile Life Extension Program.

Senator ALLARD. Mr. Ruddy.

Mr. RUDDY. You started off the question by talking about science over maintenance or science over infrastructure. I think that's the position that we're in as long as we have to maintain deterrence without nuclear testing. So, that emphasis is not incorrect.

The position that we have been put in is to not act like businessmen in reinvesting in our business. Let me use a couple of other benchmarks. The facility infrastructure at Pantex has been estimated conservatively at about $6 billion. If you use a 40-year depreciation, we should be reinvesting in that facility at a rate of about $150 million a year. Our funding average over the past 10 years has been less than $20 million.

Another benchmark would be a percentage of revenue reinvestment at the 5-percent level that Mr. Douglass talked about before. For a business like Pantex, which as a commercial business would be about a $2 billion business. Again, that would be about $100 million a year in reinvestment.

The point I'm trying to make here is that, as Mr. Douglass just said, you pay twice for deferred maintenance. You have to pay for it sooner or later, but you also pay for it in your productive capacity being off line. That's a very expensive thing to do in facilities with the high technology that we have across our complex. Thank you.

Senator ALLARD. Senator Reed.

Senator REED. Thank you very much, Mr. Chairman. Mr. Chairman, because of the number of panelists, and also the late hour, could I request permission to submit written questions to both General Gordon and the panelists?

Senator ALLARD. Yes. I think that's appropriate. Everyone will have 3 days for questions to be submitted to the subcommittee. Then, if the panelists would respond promptly back, we'd appreciate that very much.

Senator REED. Thank you, Mr. Chairman. Thank you, gentlemen, for your testimony and let me ask that each of you to respond to the following questions.

Funding for Laboratory Directed Research and Development Program (LDRD) was restored in fiscal year 2001. The DOE Science Advisory Board recommended that it should be increased to as much as 10 percent of lab budgets. Could you indicate from your perspective in each individual lab why LDRD is so important and what is the appropriate funding level and have we reached that level yet? Dr. Robinson.

Dr. ROBINSON. Sir, I've been in this community for more than 30 years. I began at Los Alamos. When I went to Los Alamos, the size of LDRD funding was 20 percent. I've watched it, over that period of time, continue to decrease. It went below the current 6 percent to 4 and is back up to 6 percent now.

The industrial standard, if you look at the research and development components to government contracts, they're typically in the

range of 8 to 12 percent. Higher-tech industries spend 20 percent. The DuPont Corporation has traditionally spent 20 percent on research and development. The software companies of the high-tech generation are in the 25- to 30-percent categories.

So, there is not a single number. Ours is among the lowest. The principle purpose is for new ideas. When new ideas take place between one set of ears, someone has an idea quite often at home at night or waking up in the morning with the idea in their head. They come in and they say, "Gee, I just thought if we put the following elements together, we might be able to achieve the following."

That's the beginning of LDRD. It's exploratory ideas to try something out that's never been done before. I refer to it as the lifeblood of a laboratory. It is what keeps your people at the top of their game. It's what keeps their psychic energy engaged in what they do.

When you constantly have people come in with new ideas of how to make things better, how to bring new strengths to the company and you say gee, I'm sorry, there is no money, it's not a very good feeling to be a manager in such a situation. But, that's what I've watched things change over the years.

I believe somewhere in the 8 to 10 percent range would be far superior to where we are today.

Senator REED. Thank you, Doctor. Dr. Tarter.

Dr. TARTER. Let me pick up. I think you can talk about LDRD in a lot of different contexts, but let me use it in the one which I think General Gordon referred to use it and I think some of the questions to him spoke to it and Paul mentioned it briefly. That is basically recruiting and retaining people.

I think General Gordon indicated you might get some insight as to why people come or join a place and how we bring them into the site. When you hire new, primarily Ph.D. graduates from a university, whether it's physics or chemistry or whatever it is, they probably have not spent their last 5 years doing weapons design and they probably won't spend their next 2 years doing weapons design.

What they do is they come and join an institution where they can do cutting edge research in areas that are relevant to weapons design. They come in, as Paul said, and when that happens they have ideas. Those ideas infuse themselves into the weapons understanding, but they get to do unclassified projects, in many cases, on the days they enter an institution.

Then, as General Gordon said, it's not quite a bait and switch, but they get interested by the more applied problems.

Something like well over half of those people got part of their support, not all of their support, but part of their support on LDRD projects that came in with them and their ideas. So, if you could defend or promote, or whatever you wish on LDRD in many respects, but in my mind it is the people bringing them in and allowing their ideas to infuse the institutions that is the overwhelming necessity for having it.

I think, to pick up on a comment that Dr. Browne made, that at the current level of very structured microstructure funding of the program, then I think LDRD needs to be in Paul's suggested range of the 5 to 10 percent where we can debate those details because

our flexibility in other areas is very much focused on a detailed program thing. So, I think that's the proper range.

Senator REED. Thank you, Doctor. Dr. Browne.

Dr. BROWNE. Yes, I would echo everything Bruce and Paul said. I would just add one more point and that is that sometimes people think that the research that's done in LDRD doesn't result in anything relevant to the program.

In fact, NNSA has put together a lot of reports on the impact that this research has had on the program. One of the most recent examples that we have from Los Alamos is a new type of radiography, which is called proton radiography, which allows you to see inside of an exploding object with higher resolution that we've ever been able to do it before. But, in addition, it allows you to create a motion picture of the dynamics of an imploding object.

That's really powerful. That came out of people funded from LDRD, people who worked in our science programs who were not directly related with the weapons program.

I think Paul's right that the number between 8 and 10 percent would allow us to have the ability to begin to address this critical skills problem. I think Bruce said it well. It's the critical skills part of this that we have to get the people with the highest quality into these labs.

I know, and I think Bruce is in this same category, and perhaps Paul is too, we all came to these labs about 30 years ago and we were recruited through essentially LDRD, all three of us.

Dr. ROBINSON. If I could add one more thing?

Senator REED. Doctor, please.

Dr. ROBINSON. When I arrived at Los Alamos, one of the first things I learned as a young experimental physicist was a statement Enrico Fermi had made at the laboratory during the war. He said it's not worthy of being called an experiment unless it has at least a 50 percent chance of failing.

Because that's how science moves and advances forward. You take a risk. You try something. You see how it works out and make the next step.

In our structured programs, no one will allow you to fund something that might have a 50 percent chance of failing. It's only in the LDRD area that you get to try a new idea with that large a chance of failing. We've gotten away from the scientific method with overstructuring of the programs.

Senator REED. Thank you very much. Let me shift to the other side and ask the plant managers a question, which I would like everyone to respond to, and that is cooperation between the labs and the plants.

I think that we would all suggest that it has had its ups and downs over the years. But, if you could just give us a notion of where you think we are and those things we can do to improve that relationship. Mr. Ruddy, could you start and we'll go down the table?

Mr. RUDDY. In the short time that I have experienced the interaction between the laboratories and the plants, I have been very gratified. Most people don't know it, but I spent 25 years at the Bettis Atomic Power Laboratory. So, I sat on the laboratory side as

well as the plant side. I've been quite pleased with the amount of cooperation between the laboratories and the plants.

However, one of the things that we have to concentrate on is bringing better program management skills to that interface. In a lot of cases in the past, and in a lot of the complaints that have come to me, it's because we haven't communicated very clearly our needs in very succinct terms.

What do you want and when do you need it? That kind of communication will continue I think to keep the level of cooperation between the plants and the laboratories at the highest and most effective level.

Senator REED. Thank you. Mr. Douglass.

Mr. DOUGLASS. We work continually with the laboratories. We have partnerships with all three design laboratories. We take products that they design and move them into production. Those relationships are working very well today.

We also work a lot between the plants to try to realize greater efficiencies in the complex and the sites in the complex. It's also important that each of the sites work very efficiently to improve our own operations, such as how we might deploy new e-business technologies to drive greater efficiencies both internally and throughout the complex using information technologies.

I would characterize the relationships as strong and with the leadership that's now in place in the complex, getting stronger.

Senator REED. Thank you. Mr. Mitchell, please.

Mr. MITCHELL. I have about a 30-year career of witnessing relationships with the laboratories, in different places and different guises. I would characterize it right now as excellent by the way, but I think there are reasons for that. If you go back to the 60s, 70s, and 80s, when we were in the heydays of doing things, people had common goals and common objectives, shared ways of making trade-offs and values and investments. Everybody was producing the same product so you knew how to trade.

I think what happened in the last 8 or 10 years when that was gone, was you saw people not knowing how to make their own value judgments about how to do things. They tended to become institutionalized, particularly competitive in some areas. I think the key to our new modern way of doing things and a successful habit in the future is the reintroduction of the drive the extension programs give us. We again have a common focus. We can identify what the product is, we know we have to work together. Neither one of us can succeed without the other. I think there's been a very noticeable change in the relationship with the laboratories driven principally by the W87, candidly, that we carry into other places.

A shared objective, ways to make shared values. That allows us to work together and use all our skills cooperatively. I think there's a great future that way.

Senator REED. Mr. Buggy, please.

Mr. BUGGY. Just briefly, I'd like to just reinforce what's been said. My experience is that there's very good cooperation among the plants. They work together to try and drive cost savings into their operations. A large number of plant managers meeting go on to share ideas. The relationship between the design agency which is generally the labs and the plant I think is excellent, and at the risk

of sounding like I'm looking for a job, I'd like to compliment General Gioconda for his strong support in driving those kind of partnerships between the plant and the labs, as he's done over the last couple of years. I think it's worked very well.

Senator REED. Dr. Browne, from the labs' perspective now.

Dr. BROWNE. Yes. We can't do our job without the plants and I think John Mitchell said it the best, at the end of the Cold War when we really saw the program budgets really falling through from the ceiling down to the floor, it started not to tear us apart but we didn't have a common focus anymore. I think the restructuring of the program has brought us back together again and I think we're working well together.

Senator REED. Dr. Tarter.

Dr. TARTER. Yes, I—as John Mitchell said, I think the W87 really brought out the—we had a common purpose. I think it worked very well and I think that—as we get onto the SLEP schedule, meeting the Department of Defense requirements, I think you'll find that we continue to build the lattice.

One other comment I'd make is I think an interesting—before Mr. Douglass became head of Kansas City, we had an interesting thing which I think we can make more of in the future, and that is we had a program which is no longer at our laboratory, isotope separation. We needed a project-focused manager, and manager in a managerial, technical and engineering personnel with Q clearances, ability to work nuclear weapons environments. We basically took people from Kansas City on a short-term period, a year or two, to do that work.

I think both in terms of technologies, as well as people, that's something which if we gain in the sense of the NNSA we'll be able to share around the complex.

Senator REED. Dr. Robinson.

Dr. ROBINSON. The enterprise that's put together with all of us working collectively has extraordinary goals compared to any other industry. The only thing even approximating the level of reliability we require is a heart pacemaker. So the product depends on all of us functioning. We do share a common faith but it's the mission that all of us embrace that's much larger than just us being successful with our product. It is the country that's on the line and I think that mission spirit has forced the cooperation levels. It's been a good one throughout my 30 years.

Senator REED. Thank you very much. Mr. Chairman, I think perhaps if we had written questions, we could get some more knowledge and at this point, I will give back my time.

Senator ALLARD. I have one question. I want to emphasize security for just a little bit. Perhaps you might tell us what you see as the biggest security risk. I think the last 2 years I am not just pointing at the labs and the plants here, but in all agencies of the Federal Government I think security somehow has gotten moved too far down on the priority list.

I would like to just ask you what you see as your biggest security risk in both the laboratories and the weapons. Also, what you may see in the future. I mean, what are you doing for cyber security for example. Then, also, do you feel that you have a good point of contact with the NNSA? Do you fall into a plan there or an organiza-

tional chart or do you feel like you have to report and I would like to have you comment to that, if you would, please.

Dr. ROBINSON. The biggest security risk for at least a decade has been in the cyber area. Computers allow so much classified information to be concentrated that the potential for theft is enormous. I told my people in the same way as we talk about a revolution in the information age, there's a revolution in espionage because of the access to computers.

The Wen Ho Lee case I think was a wake up call for everybody. The material that was put onto tapes, which were carried outside the laboratory, represented 80 reams of paper. Now, if someone had tried to carry that out as paper, I dare say it would have attracted a lot of attention.

We have been on an intensive campaign both within the laboratory to change the way our business is done in all three of the laboratories. Sandia had the responsibility to build the classified communications system for all the complex, the plants and the labs. It's an enormous challenge and one that I think is not going to get any easier as we move to the future.

Senator ALLARD. Do you feel like you have somebody in the NNSA to whom you can report?

Dr. ROBINSON. We formed a task force with the best experts from each of our facilities and they have teamed up with the NNSA to have a brief that I believe is as powerful as exists in our government today. We have taken on the role of providing red team analysis for the cyber systems of most of the major agencies of our government outside of NNSA as well.

Senator ALLARD. Now, do you have anything you would like to elaborate more on what he said? Dr. Browne?

Dr. BROWNE. I agree with everything Paul said, that cyber is the biggest threat that we face. We spend on physical security, the guards and gates, etcetera, probably close to $100 million at Los Alamos.

Two years ago, when we funded cyber security out of our laboratory indirect, we put about $10 million of our laboratory indirect into cyber security. This year, it's funded through a direct funding line so we're not allowed to use overhead for cyber security. We will only direct fund it at the level of about $4 million this year.

I think that's way too low. Our minimum requirement is somewhere around $15 million and probably twice that is what really would allow us to address the threats that are coming up. We think we're secure today.

But as Dr. Robinson mentioned, the threats are getting more sophisticated and I think these labs have to stay ahead of the game and we're going to require more resources to do that. The dollars have to make it out into the field. The fiscal year 2002 budget has increased funding for cyber security in the President's budget. I just hope a lot of that money makes it out to the labs where a lot of the issues are.

Senator ALLARD. Yes, Mr. Mitchell.

Mr. MITCHELL. Just to comment, I recognize the intent when the security funding was put in its own separate line, it's own category, and treated separately to allow it to be highlighted. I believe in some areas it may have acted to the detriment of what's intended.

It has severely reduced our flexibility and ability to react to quickly sometimes. Because now we're reduced to operating through a budget cycle, specifically in security matters, as opposed sometimes to reacting quickly within other funds where we have flexibility.

Security issues, when they come up, happen quickly. You must respond very quickly. The timing of our budget cycle doesn't always support that. To your other question, however, I believe it's quite clear we know we do have representatives in NNSA who are responsible and accountable in a security matter.

Senator ALLARD. Dr. Tarter.

Dr. TARTER. Yes, I certainly agree with John and Paul that cyber security has been what's different and I think that's overtaken in thinking through these issues.

I think one of the important things for the committee to be aware of, if you're not, is that near the end of the last administration, a commission was chartered under the direction, under the leadership of former Deputy Secretary of Defense, John Hamre, to basically explore the science/security interface, if you wish.

As General Gordon commented earlier, that's a very, very strongly led and strongly peopled commission, with people from industry, the military, the intelligence community. They are on about an 18 month track. I don't know the exact date. John or Paul may remember but it's about another 6 months and I think we have looked to them as has General Gordon, and I believe Secretary Abraham has probably almost formally rechartered them if not yet. But we are looking forward to them to speak on many of the issues, particularly those involving cyber security and the whole science/security interface. I think the committee would be well-advised perhaps to have Secretary Hamre talk on some of those subjects when their commission is done.

Senator ALLARD. Mr. Douglass.

Mr. DOUGLASS. Just briefly. Information is becoming increasingly important to us as we manage our businesses. The timeliness and the accuracy of that information is increasingly important. Thus, the information technology to support it and the security elements that extend with that become more and more of a challenge. That's not to say that we are not sufficiently protected in the cyber realm today. For example, in Kansas City, Cisco came in and intentionally we let them try to hack into our systems. They were unable to, and they said the systems were some of the safest that they've seen. But cyber security is part of some of this deferred infrastructure. With the rapid advancements in information technology, we have to continue to keep pace with the technology that extends into the whole IT realm.

Senator ALLARD. Very good.

Mr. RUDDY. I would just add to what Mr. Douglass said. The bandaids that we're adding to our IT system make them more vulnerable. If we keep pace with the technology then we can be assured that we will have the best available cyber security but if we continue to put bandaids on our systems, we're going to create a vulnerability that didn't exist at the time that we put them on.

Senator ALLARD. Thank you. I want to thank the panel. We will keep the record open for 3 days for questions and for statements

and for information, I will be submitting some inquiries regarding reorganization, NIF, and ASCI.

So, again, I know sometimes it is difficult to come and let us know what you are doing and it is hard to get away from the job. But, we appreciate you taking the time to be here to let us know what is happening. Thank you very much. The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR WAYNE ALLARD

RESTORING TRITIUM PRODUCTION

1. Senator ALLARD. General Gordon, according to your budget submission under "Project Milestones," the next major milestones for the Tritium Extraction Facility (TEF) in fiscal year 2001 are completion of the final design, completion of site preparation, and initiation of facility construction. After that, the next major milestone is not until fiscal year 2004, which is completion of facility construction. What measures do we have to indicate we are making steady progress between fiscal year 2001 and fiscal year 2004?

General GORDON. The TEF project is being tracked against a detailed baseline schedule that contains thousands of activities. The TEF Project Office at the Savannah River Site tracks currently active project items, sometimes on a daily basis. Monthly, the TEF Project Office submits data reports to the NNSA Headquarters Tritium Project Office. These data reports give the status of all currently active project items, their completion percentage, the rate of spending for each activity, any issues pertaining to the activities, and earned-value analyses of cost and schedule performance. The TEF Project Office also makes weekly verbal and written summary reports to headquarters. The Commercial Light Water Reactor (CLWR) Project, of which the TEF Project is a subset, holds quarterly review meetings where project progress and issues are discussed in detail.

In addition to these formal reports, the TEF Project Office has been subjected to a series of independent external reviews of the facility's design and the project's management and performance. Various aspects of the TEF Project are subject to financial incentives to help ensure successful schedule, cost, and technical performance of the TEF Project Office and its subcontractors.

The Stockpile Stewardship Plan milestones listed for TEF for fiscal year 2001 have all been accomplished. The following is a list of additional significant project milestones for the TEF from fiscal year 2002 until fiscal year 2006:

a. Award fixed-price contract for TEF remainder of plant and begin construction (2Q/fiscal year 2002);

b. Complete civil/structural construction of the Remote Handling Building and the Tritium Processing Building (4Q/fiscal year 2002);

c. Begin training of TEF operating personnel and preparation of operating procedures (4Q/fiscal year 2003);

d. Submit FSAR addendum for approval (2Q/fiscal year 2004);

e. Begin integrated testing of TEF systems (1Q/fiscal year 2005); and,

f. Critical Decision–4, begin operation of the TEF (2Q/fiscal year 2006).

PIT PRODUCTION

2. Senator ALLARD. General Gordon, does the future pit facility include a flexible enough plan and program that whatever pit production requirements may occur in the future, the new facility will be qualified to take on those new requirements?

General GORDON. Yes. A modern pit facility must have the capability to address all future pit fabrication requirements. The size and composition of the future nuclear weapons stockpile must be specified and expected lifetimes of pits must be predicted with more precision so that planning for this facility is sufficient to ensure appropriate capacity and to ensure that the facility will be available when required. We are studying just these factors in our preconceptual design studies initiated with the $2 million provided for that purpose in our fiscal year 2001 appropriation.

WORKFORCE RETENTION AND REPLACEMENT

3. Senator ALLARD. General Gordon, the Chiles Commission Report, in particular, and other reports, discuss a variety of challenges to attracting the best and bright-

est into the ranks of the nuclear weapons complex. What are the biggest obstacles preventing the best and brightest scientists and engineers from joining the nuclear weapons program?

General GORDON. Last year we submitted to Congress a joint report with DOD titled "Nuclear Skills Retention Measures within the Department of Defense and the Department of Energy" pursuant to section 3163 of the National Defense Authorization Act for Fiscal Year 2000. In that report we stated: "From its inception, a key consideration of the SSP has been to provide cutting edge facilities and a challenging programmatic environment to promote the recruitment and retention of world-class scientists and engineers, by providing the instruments for intellectual challenge, as well as the new tools and capabilities needed to assess and certify the stockpile." The most significant obstacle to attracting the best and brightest scientists and engineers to the nuclear weapons program will be if we fail to continue to provide the Stockpile Stewardship Program with a challenging work environment and state of the art facilities.

4. Senator ALLARD. General Gordon, is there a coordinated plan or management perspective addressing the issue of workforce retention and recruitment in response to the Chiles Commission Report?

General GORDON. Our joint report with DOD to Congress presented our management perspective on the problems and challenges to recruitment and retention of critical skills to maintain the nuclear deterrent indefinitely. The report also summarized the situation at each of our weapons production plants, laboratories, and the Nevada Test Site and the actions being taken or planned by our contractors. Each contractor is maintaining a workforce plan focused on critical skills. We review those plans and are using performance metrics reports to keep tabs on progress in this crucial area. While there is no single coordinated plan for the entire complex, we promote joint efforts and the sharing of best practices among the contractors.

5. Senator ALLARD. General Gordon, what efforts are being made to ensure that the unique expertise and experience held by our current scientists and engineers are being recorded and cataloged for future workers?

General GORDON. The Office of the Deputy Administrator for Defense Programs of the National Nuclear Security Administration (NNSA) is developing a Nuclear Weapons Information Management (NWIM) program, which encompasses the planning, identification, acquisition, protection, dissemination, storage, and retrieval of nuclear weapons information, data, and knowledge. Knowledge capture activities are being conducted at some sites, which consists of conducting interviews or video taping of presentations with retiring or retired nuclear weapons experts to provide Stockpile Stewardship Program information that may not be formally documented. In addition, some programmatic activities are designed to document and transfer information to the next generation of scientist and engineers. For example, the Baselining Program is designed to establish and document our current understanding of weapons for refurbishment activities and for future weapon designers. Another example is the "Titans" program at Los Alamos National Laboratory, which consists of a formalized program of transferring weapon expertise from current senior experts to junior designers. Much of the "Titans" program senior designer expertise is contained in documented lecture notes. Similarly, the Sandia Weapon Intern Program includes one-on-one encounters with senior weaponeers and nuclear weapons pioneers. Also individual sites have training programs in which lecture materials include case histories on weapons. Defense Programs' weapon surveillance program is designed to identify and document unusual findings, their analyses, and corrective actions for later reference by future experts.

6. Senator ALLARD. General Gordon, would adding design work on a new weapon help ensure that current designers pass critical skills and experience on to successive generations of weapons scientists?

General GORDON. Without question, the development of a new nuclear weapon design would provide an important challenge to our people and the nuclear weapons complex that goes beyond our current activities. These are capabilities that can degrade if they are not exercised from time-to-time. A new design would allow our older, more experienced designers to mentor the upcoming generation of designers in new and challenging work to test both their abilities and the Nation's confidence in them. The Chiles Commission noted in its final report in 1999 that "5 or more years of experience working with experienced senior designers is required to develop a fully capable, independent designer." We have in place several mentor programs to train our critical next generation, but more can be done. The NNSA is looking to develop an advanced concepts office within the Office of Defense Programs to

stimulate, identify, and execute high-impact seed projects to encourage new thinking, innovative strategies, cross-cutting integrated approaches, address technology gaps, and provide a challenging environment to our current and future weapons designers. The NNSA feels that the current set of activities in stockpile refurbishment along with the advanced experimental tools being developed and the increasing simulation capabilities provides challenges and increased understanding to the next generation of weapons designers. These challenges could be supplemented by new design work, if that work can be made realistic enough to be viewed as "career challenging and enhancing" by young scientists and engineers.

INFRASTRUCTURE: READINESS IN TECHNICAL BASE FUNDING

7. Senator ALLARD. General Gordon, there are several facilities—either whole or in part—within Defense Programs which are not now being used, nor does NNSA anticipate using in the future. The excess facilities space creates opportunities to reduce the landlord costs of the program; however, they are often in such poor condition, that they are not acceptable for transfer to the Environmental Management (EM) program. This seems like a good opportunity to reduce non-mission direct expenses. What can be done to expedite the transfer of these unused facilities and help eliminate some of these apparent inefficiencies within NNSA?

General GORDON. We do have excess facilities at all of our sites. We are reviewing how to proceed with either the transfer of those excess facilities to the Office of Environmental Management or decontamination and decommissioning of the facilities ourselves. Our long-term goal will allow us to create a weapons complex that is properly sized (reducing our foot print), with increased operational readiness of facilities, reduced non-productive facility downtime, reduced unplanned corrective maintenance, arrested deterioration of facilities, and extended useful lifetimes of current facilities.

ABILITY TO RESUME UNDERGROUND TESTING

8. Senator ALLARD. General Gordon, the second Foster Panel Report stated that "DOE report[ed] that it is prepared to conduct underground nuclear testing within 24 to 36 months, if so directed by the President." The Foster Panel offered its opinion that "such lead times are unacceptable and that the NNSA should investigate a range of possible options to reduce lead times to, say, 3 to 4 months from the President's making a decision to proceed." Would it still take NNSA 2 to 3 years to resume underground testing if directed to do so by the President?

General GORDON. Consistent with existing Presidential direction (PDD–15), NNSA is maintaining the ability to conduct an underground nuclear test within 3 years at the Nevada Test Site. A 1999 DOE and the Secretary of Defense's Office of Program Analysis and Evaluation (PA&E) joint review for the Nuclear Weapons Council identified a number of issues that could be addressed to improve test readiness. As part of the National Defense Review, NNSA staff in consultation with the National laboratories have reviewed and largely revalidated the findings of the PA&E study. The identified items to improve test readiness, such as procedures, diagnostics, and field test neutron generators, have been included in proposals for additional test readiness funding. However, improving readiness lead times to substantially shorter periods is a different matter. Even at the peak of the underground test program it typically took 18 to 24 months from a decision to develop a test to the conduct of that test. Much of this is the time required to prepare a device for testing including assembling diagnostics. Stockpile devices require extensive modifications to test underground and it is difficult to shorten this time. In order to shorten the test time down to 1 year, specific test devices would have to be selected and prepared, and diagnostics and test racks would need to be developed. If a test were to be done for demonstration only, with minimal diagnostics, it is believed that the test could presently be prepared in about 1 year. To shorten the time to 3 months, NNSA would have to almost fully prepare a test and be standing by, ready to emplace a device in the Nevada Test Site location. A decision to begin to prepare specific devices for testing would require a Nuclear Weapons Council decision.

9. Senator ALLARD. General Gordon, is the NNSA concerned with this long lead time and are you doing anything to reduce this long lead time?

General GORDON. The NNSA believes that a 2-year test readiness posture may be too long to meet U.S. national security requirements. As part of the Strategic Review, and upcoming Nuclear Posture Review, the NNSA is working with DOD to assess the implications of reducing the test readiness posture to 18 months or less.

NNSA REORGANIZATION

10. Senator ALLARD. General Gordon, I am concerned that right now responsibility is diffused and that no one person, whether they are a Federal employee or a contractor, is held accountable. What actions are you taking to ensure there are both clear lines of authority and accountability?

General GORDON. One of my key objectives in standing up the NNSA is to define clear lines of authority and accountability. One step we have taken toward that goal was to prepare a Report to Congress on the Plan for Organizing the National Nuclear Security Administration, submitted on May 3, 2001. This organizational plan establishes a clear distinction between staff and operational organizations. Staff elements are to provide input and support, but operational managers will be responsible for running their respective organizational units.

In an effort to assure that direction and control of our contractors is only exercised by those authorized to do so, the report defines the missions and functions of each headquarters organization and discusses external and internal relationships among organizations. Writing down these specifics about each organization helps establish operational discipline. We recognize that much remains to be done to achieve this objective and thus we intend to report again on our progress by October 1, 2001.

11. Senator ALLARD. General Gordon, the organizational chart which you have provided the subcommittee appears to offer a much smoother flow in the chain of command than what we have seen in the past. I would appreciate an explanation of how you anticipate the chain of command to operate in this new organizational structure, and how you envision the lab directors and plant managers fitting into the overall organizational scheme.

General GORDON. The NNSA organizational plan, cited above, envisions dividing headquarters functions into program and support activities: Defense Programs and Defense Nuclear Nonproliferation will focus on achieving mission objectives, such as maintaining the stockpile and deterring proliferation. Two new organizations, Management and Administration, and Facilities and Operations, will focus on the enabling functions, such as budget, facilities readiness, and security, required to do our job. As Administrator, I will be responsible for the overall performance of the organization. The Administration has asked Congress to statutorily create a Principal Deputy to provide me assistance in my role of integrating these functions.

By defining clear missions and functions for each headquarters organization, we are seeking to prevent multiple interventions from headquarters in the work of our field organizations and contractors. The responsibilities of the Lab Directors and Plant Managers are defined in contracts and they receive formal direction through contracting officers at our field offices. However, I intend to develop a close working relationship with the laboratory directors a partnership that will provide them with the broad outlines of our expectations. The leaders of our program organizations will have similar if somewhat deeper relationships with the relevant associate lab directors and plant managers that are responsible for accomplishing the mission work of the NNSA. In a similar way, the heads of our support organizations will work closely with the relevant officials in the contractor organizations to assure that enabling functions such as facilities maintenance and security are being performed appropriately. While specific decisions and directions will be formally communicated through the contractual chain, these lines of communication will establish clear expectations between our contractors and the leadership here at headquarters.

12. Senator ALLARD. General Gordon, how do you envision the NNSA organization interacting with the Secretary of Energy and other DOE officials?

General GORDON. I am pleased to say that the relationship between NNSA and the Secretary is working quite well. We consult regularly on issues of mutual interest, and are working to assure that the NNSA Act is implemented consistent with the intent of Congress. We are seeking ways of ensuring that the Secretary receives necessary information about the operations of the NNSA, without DOE staff organizations directing the activities of NNSA programs or contractors. For example, we are seeking to better coordinate or consolidate the Department's oversight activities to avoid duplication and reduce unnecessary visits.

While NNSA has established authority over, and responsibility for, the 18 functions listed in the NNSA Act, organizationally we must still depend on DOE for some services, such as processing personnel and procurement actions. In these cases, NNSA has signed memorandums of understanding (MOUs) with DOE organizations that we will continue to rely upon. These MOUs make it clear that DOE

personnel are providing a service to NNSA and are not directing or controlling NNSA activities.

SECURITY WITHIN THE NNSA

13. Senator ALLARD. General Gordon, how are resources for security allocated between headquarters, the field offices, and the facilities themselves? In your response, please provide a chart or outline of how these funds are applied by category and funding level.

General GORDON. The funding levels for NNSA security headquarters, field offices, and facilities are allocated in accordance with validated Safeguards and Security requests. The categories of Physical Security, Personnel Security, and Cyber Security are used as decisions within the NNSA scope. Allocation of available security resources flow from headquarters to field offices and then to facilities for NNSA O&M and construction work. Attached is a chart showing how security funding is applied by category to facilities, field offices, and headquarters within NNSA. The funding shown for the Personnel Security category includes necessary processing, control, and educational activities but does not include the cost of conducting individual security investigations. Additional funding to reimburse the OPM and FBI for performing individual security investigations is provided from DOE's Office of Security and Emergency Operations (SO–21).

Department of Energy
Defense Programs / National Nuclear Security Administration (NNSA)
Safeguards and Security Budget Request
(dollars in thousands)
CURRENT SITE FUNDING TARGETS

		FY 2002 NNSA Safeguards & Security Decision Units				
Albuquerque	FY 2002 Site Targets	Physical Security	Personnel Security *	Cyber Security	Total Funding	(MA) WFO Funding
Albuquerque Operations Office	3,424	-	3,424	-	3,424	-
Kansas City Plant	11,503	9,985	650	868	11,503	156
Los Alamos National Lab	86,358	80,129	2,234	3,995	86,358	1,880
Pantex Plant	67,766	65,283	378	2,105	67,766	619
Sandia National Lab	55,009	45,207	3,027	6,775	55,009	12,585
Total Albuquerque	224,060	200,604	9,713	13,743	224,060	15,240
Nevada	30,617	28,971	1,138	508	30,617	1,093
Lawrence Livermore National Lab	80,411	62,359	5,435	12,617	80,411	11,646
Oak Ridge, Y-12 Plant	58,981					916
BWXT		13,909	200	176	14,285	-
Wackenhut Inc		43,555	319	822	44,696	-
Savannah River/Tritium facility	9,712	9,425	153	134	9,712	-
Headquarters **	35,500	5,500	-	30,000	35,500	-
Security Investigations a/	N/A	-	-	-	-	-
Total DP/NNSA (FS-20) O&M	439,281	$ 364,323	$ 16,958	$ 58,000	439,281	28,895
LINE ITEM CONSTRUCTION(39FS-20)						
Los Alamos National Lab.						
99-D-132 Nuclear Materials S&S Upgrades Project	9,600	9,600	-	-	9,600	-
Total DP/NNSA Construction	9,600	9,600	-	-	9,600	-
TOTAL DP/NNSA (FS-20) S&S ***	$ 448,881	$ 373,923	$ 16,958	$ 58,000	$ 448,881	$ 28,895

Broken outline indicates external & internal S&S decision unit.

*** Personnel Security funding is site; Clearance Processing , Visitor Control, and Security Education costs.**
a/ NOTE: Actual Security Investigation cost to reimburse OPM and FBI is funded in DOE's Office of Security and Emergency Operations (SO-21)
**** Includes $30M at HQ for Cyber Security. $5.5M for Integrated Safeguards and Security Management (ISSM)**
***** Includes $28,985 of WFO funding target for Departmental Administration(MA) in FY 2002.**

RESTORING TRITIUM PRODUCTION

14. Senator ALLARD. Mr. Buggy, do you have any concerns with a delay in the schedule or the missing of milestones with the construction of the TEF?

Mr. BUGGY. The Project has just completed the major task of detailed design ahead of schedule. That design and virtually every other aspect of the Project have been the subject of many independent reviews. The reviews have verified the strength of the Project team and its plan. Where improvements were recommended, the plan was further strengthened. We feel that the Project is in excellent shape regarding the quality, accuracy, and completeness of design. Physical construction is underway. Notwithstanding our progress to date, as part of effective project management, we have identified several potential risks. Our planning calls for two major lump sum construction subcontracts, the first for the civil/structural portion of the Remote Handling Building (RHB), and the second for the electrical, piping, and mechanical systems installation. The RHB subcontractor is several weeks behind schedule and is currently working extended shifts to recover schedule. His current forecast shows schedule recovery by December of this year. We are working with the subcontractor to support his success and we consider his recovery achievable, but it will be a challenge. The second subcontract is technically more challenging and a more difficult coordination task than the RHB. We expect to award this subcontract in January 2002. We are concerned with market conditions and availability of qualified contractors willing to perform lump sum construction work on a government contract. If there is a lack of qualified contractor interest or the bids come in significantly higher than our budget, the project cost and schedule could be impacted.

15. Senator ALLARD. Mr. Buggy, are there any other issues at the Savannah River Site (SRS) which would create a problem for the TEF to be constructed by 2006?

Mr. BUGGY. Interruptions in adequate and timely funding are always a concern. We are currently forecasting the need to pull approximately $15 million of outyear funding forward to fiscal year 2003. This is not an increase in the TEF's cost, but an adjustment to the required funding profile based on a more mature schedule logic. DOE HQ is aware of the need and supports the change. If this funding profile change is not supported, it will impact the cost and schedule of the project. Additionally, any cuts in overall site funding for EM would have an adverse impact on TEF because the proportionate share of site overhead costs for DP projects such as TEF would be increased.

WEAPONS EXPERTISE

16. Senator ALLARD. Dr. Robinson, Dr. Tarter, Dr. Browne, Mr. Buggy, Mr. Mitchell, Mr. Douglass, and Mr. Ruddy, what efforts are being made at your laboratories or weapons plants to ensure the unique expertise and experience held by our current scientists and engineers is being recorded and cataloged for future workers?

Dr. ROBINSON. We have a number of purposeful, integrated activities focused on people, work activities, and processes to ensure that the unique expertise and experience of current and past employees are available for future generations.

We begin by actively recruiting the best qualified technical graduates from the finest institutions in the Nation to assure that a continued talent base is available to meet future weapon program needs. We engage our existing staff and new hires in mentoring relationships with experienced staff to build their knowledge and understanding of the intricate details associated with weapon systems. We specifically task our most experienced members of technical staff with a special responsibility to mentor and train less experienced personnel.

Sandia conducts a Weapons Internship Program, which involves course-work, field trips, and mentoring by our retirees, to expose selected young staff to the history and background of the weapon program, stockpile systems, and major technical underpinnings. This program helps assure that our young engineers receive the required training to take on the challenges they will face. In addition, we retain key members of our retired workforce on consulting agreements to advise on current and future weapon-related activities.

In addition to our focus on people, we want to expose our staff to the proper mix of work activities. We actively seek out a balance of experienced and new personnel in staffing our development teams that support stockpile activities. Through dual revalidation programs and baselining, we actively engage design teams in assessing the qualification of components and systems, identifying aging concerns, and formu-

lating key input information. These programs will guide future refurbishment of the stockpile or the development of new weapons, should that be required at some point in the future. Future baselining activities will engage our staff in assessing our knowledge base of all stockpiled systems, identifying gaps, and developing plans and priorities to address needs. Our ability to provide continuous, meaningful, and challenging stockpile engineering work to exercise and develop the capabilities required for the future will be crucial to our success.

Our emphasis on processes contributes to preserving our knowledge of how to support the future demands of the nuclear weapon program. Through our Knowledge Management Program, information recorded by weapon design teams and individual engineers on key capabilities and issues is preserved in accessible, searchable formats. Seminars emphasizing lessons learned and relevant experiences provide a means to share information across the program. Our peer review process, involving knowledgeable experts and engaging our retiree population, provides a mechanism for reviewing and assessing design activities. The documentation resulting from these activities is retained permanently, in a form readily accessible to authorized employees, in laboratory archives. Our processes would be incomplete without the documentation represented by our technical business practices, policies, and implementation in our processes. These tools embody the requirements associated with how we conduct our work, and serve to guide our employees in the use of the demonstrated, proven processes required for nuclear weapons program support.

Dr. TARTER. At Lawrence Livermore, we have developed the Nuclear Weapons Information Base, a sophisticated information retrieval library that can be accessed on a need-to-know basis by our weapon scientists and engineers. Livermore has been a leader in the DOE/NNSA community in developing and implementing strict need-to-know protocols to guarantee proper security of this system. The system uses web-based hierarchical search routines to provide rapid access to available information. On-line information ranges from detailed weapon blueprints to classic papers written during the 1950s. This database is supplemented by videotaped interviews with veteran weapon designers and engineers, and new documents reviewing major areas of past weapons work.

Dr. BROWNE. The Laboratory is actively working to ensure that unique expertise is both captured and retained for future nuclear stewards. Our activities designed to accomplish this include the TITANS graduate program in nuclear weapons design, and the JNETF (Joint Nuclear Explosives Training Facility), which is a cooperative program between the Labs, DOD, and other appropriate personnel to provide hands-on engineering training from current and past weapon engineers. We also are pursuing an overt mentoring program to facilitate the training of new scientific and engineering personnel by experienced nuclear weapons experts. Some of the experimental activities that we are conducting include small scale experiments and work on world class facilities at the Los Alamos Neutron Science Center (LANSCE), the dual axis radiographic/radiography hydrotest facility (DARHT), and others around the DOE complex. This serves to train the next generation of scientists. Lastly, we have developed an archiving program to retain our nuclear test data with the expertise for preparing, acquiring, and interpreting this information.

Mr. BUGGY. It is of paramount importance to appropriately document results of projects, R&D, engineering development, troubleshooting, and even day-to-day technological support activities. This alone, however, does not guarantee technology transfer to new generations of scientists and engineers. The most effective documents for technology transfer have the rigor of peer reviewed publications, but our funding mechanisms, travel restrictions, conference, and training restrictions all have a discouraging effect on peer reviewed publications. In any event, technology transfer to the next generations of scientists, engineers, designers, etc., must occur because of sharing the culture of the persons whose expertise we are trying to capture. Reading reports won't suffice, so we must get new people on board now so they can share the tribal knowledge and experience the culture of the current cadre of experts. We have almost lost the opportunity for this culturally enhanced technology, or knowledge, transfer to occur. The Savannah River Site is currently working in collaboration with the National labs and plant sites within the Nuclear Weapons Complex to develop knowledge preservation tools. Efforts are also underway to consolidate technical data and process history so that it can be recorded in knowledge preservation systems, thereby making it readily retrievable and easy to understand. The information being collected includes technical bases documents, test results, and procedures as well as photographs and video tape interviews and discussions with field experts.

Mr. MITCHELL. A number of archival or data storage programs have been put in place to document process or design critical information that is essentially stored in people. The primary thrust, however, is to actively reiterate or identify new per-

sonnel to become the repository of this vital information, and to support active and effective mentoring programs (including hands-on experience) to transfer both the tangible and intangible information to these new people.

Mr. DOUGLASS. Honeywell has taken several proactive measures at the NNSA's Kansas City Plant to ensure the unique expertise held by engineers, technicians, and other workers is recorded and cataloged for the future. These efforts are focused on recruiting, retention, knowledge preservation, and training.

Given that nearly 90 percent of the workforce is eligible to retire in the next 10 years, for the first time in a decade, Honeywell is proactively recruiting new workers who meet critical skills needs as identified through the Chiles Commission study, who replenish our pipeline, and who can fill positions opened because of current worker retirements. As a result of improved recruiting strategies, nearly 90 percent of applicants are accepting offered positions, which is a high statistic for this industry. Aids to recruitment have included a detailed critical skills assessment and skills gap action plan, as well as sign-on bonuses, excellent benefit packages, and a concentration on internet recruiting.

Honeywell has implemented several commercial best practices to ensure new workers learn the business quickly, so they become active contributors. Among these practices are a mentoring program that partners new workers with experienced workers, especially in the engineering ranks, and a leadership development series that provides recruitment and retention training for managers. Because the long waiting period for clearances often discourages new employees who are eager to work, Honeywell has developed and launched a "Career Trek" program that provides new employees with up to 100 hours of strategic training about the business, its mission, functional areas, and programs. Six Sigma training ensures that all new exempt employees learn how to streamline processes and reduce costs by becoming Six Sigma Green Belts.

Retaining qualified workers is another way Honeywell ensures expertise is recorded and cataloged. In addition to serving as mentors to new employees, experienced workers have been active participants in capturing both past manufacturing practices and current work instructions for future workers. Honeywell ensures retention by using lump-sum compensation and reward programs strategically to retain employees with critical skills it believes are at risk of leaving the company. Cutting-edge technologies and facilities that allow state-of-the-art manufacturing and close partnership with the laboratories also have a significant impact on both retention and recruitment efforts. Over the years, Honeywell has carefully balanced the Kansas City Plant's budget to ensure that basic infrastructure needs were met while investing in new technologies that are aligned with national laboratory design needs.

Honeywell also ensures the continuity of expertise and experience through its Knowledge Preservation initiative. To date, this program has captured information for approximately 15 percent of critical Kansas City Plant manufacturing processes. As part of this initiative, current and retired workers are interviewed about past and current manufacturing processes, and the discussions are videotaped, recorded, and cataloged for future use within the nuclear weapons complex. One of the advantages of this approach is the ability to capture subtle nuances that can't be conveyed in written descriptions. The information is subsequently made available to employees through a user-friendly software technology that presents process, test, and definition information in an integrated manner. Honeywell has also been instrumental in sharing this technology within the nuclear weapons complex, including Pantex and Los Alamos National Laboratory.

In addition, Honeywell's on-line Command Media program is recognized as an industry best practice for capturing work instructions, updating them, and ensuring that they are available to all employees. This system ties closely to another best practice, the Kansas City Plant's Manufacturing Execution System. In addition to written work instructions for key processes as provided through Command Media, the Manufacturing Execution System includes videotaped segments that demonstrate how processes should be performed. These work instructions and video demonstrations become a major component of training and day-to-day operations.

Mr. RUDDY. The production plants are planning collaborative efforts in the areas of university recruiting and educational outreach to leverage the number and variety of opportunities across the complex. At Pantex, knowledge retention initiatives such as archiving weapons data through video tape, interactive electronic procedures, photographs, I structured interviews and research of past operations are being incorporated into a knowledge library. This library will be used to train new weapons engineers, scientists and technicians. Weapons operations videos and pictures are cataloged electronically for easy retrieval. The Weapons Operations Start-Up program captures the history of a weapons program prior to start-up through

interviews and research of past operations. In collaboration with Sandia National Laboratory's Knowledge Preservation Program, key personnel and retirees are interviewed and video-taped to capture program knowledge. The same process is used to collect history about high explosives development and fabrication.

CRITICAL SKILLS

17. Senator ALLARD. Dr. Robinson, Dr. Tarter, Dr. Browne, Mr. Buggy, Mr. Mitchell, Mr. Douglass, and Mr. Ruddy, would adding design work on a new weapon help ensure that current designers pass critical skills and experience on to successive generations of weapons scientists?

Dr. ROBINSON. As I discussed in my response to the previous question, we have a number of projects underway aimed at ensuring the transfer of skills and experience to a new generation of weapons scientists and engineers. We also seek every possible opportunity to facilitate this transfer by involving our young staff in the very real and important work that we are doing to steward our Nation's stockpile. However, these programs and this approach have shortcomings.

New design work for Sandia can come in two ways: new weapon designs, or extensive refurbishing of current stockpile designs. In the absence of new design work, our weapons engineers and scientists are largely engaged in the task of monitoring, assessing, modestly refurbishing, and maintaining the existing stockpile. While this work is of great importance, it is inherently limited in scope limited in that it does not engage the full breadth and depth of capabilities and interfaces at our laboratory and within the NNSA's nuclear weapons complex. These activities cannot exercise the full range of skills necessary for nuclear weapon design or engage the complete, creative, engineering process that is called into play by a new set of requirements or a "blank-sheet-of-paper" approach. Nor does this stewardship role afford our next generation of engineers and scientists an unrestricted opportunity to exercise the new skills that they bring. Additionally, weapon designers have fewer opportunities to incorporate new technologies that exist in the laboratory's scientific and technical base and that will be required to fulfill our mission in the future. Without a continuous flow of such opportunities, attracting, engaging, and retaining the very best engineering and scientific talent to perform nuclear weapons work will be difficult.

Execution of a new weapon design effort would address these shortcomings, exercise the full range of capabilities and processes of the NNSA complex, and engage the full engineering creativity of our next generation of weapon designers. A continuous flow of new weapon system design work, coupled with the processes and programs we already have in place, would ensure that critical skills and knowledge are passed on to successive generations of weapon engineers and scientists. The current experience base would be merged with new skills and technologies that the new generation brings to the task.

Dr. TARTER. The improved computational and non-nuclear experimental capabilities being developed for stockpile stewardship are principally being applied to evaluations of current weapons and possible modifications of these weapons. These applications have a high overlap with the skills needed for designing new weapons, but are not a complete substitute for the full experience of new weapon design. New design requires decisions on materials, optimization of many parameters, and careful integration with the delivery system designer, usually a military service and its supporting contractors. During the past 5 years, Livermore has had one project to develop a partially-new design, the SLBM Warhead Protection Program Pit Reuse project. That project has been very useful for training, and has produced a prototype design that may have future utility in the stockpile; however, it is now wrapping up. Design work on a new weapon at this time would indeed be very beneficial for helping to maintain activities that we think are necessary to ensure that critical skills are passed along.

Dr. BROWNE. Authorized new weapon design work, that is programmed and funded beyond our existing stockpile obligations, would be an important step toward passing critical skills and experience on to successive generations. It should be understood that new weapon design work has never been and cannot be a stand-alone computer activity but must include experimentation, testing, and prototype fabrication. The training it will generate involves not only our future designers, but also our engineers, experimentalists, materials scientists, and technicians. The integrated and unique tools developed under stockpile stewardship that can be fully exercised in this process include Accelerated Strategic Computing Initiative (ASCI) codes, experimental tools, prototype production facilities, and engineering testing.

Mr. BUGGY. Yes, if we have new designers working with experienced designers.

Mr. MITCHELL. A new weapons design program would provide the best (and only believable) methodology to transfer appropriate knowledge and experience for a broad range of nuclear weapons activities. This is not limited to the actual design process, but could include production and operational support planning as well.

Mr. DOUGLASS. The Kansas City Plant maintains a strong link to the weapon designers at the national laboratories through its expertise in manufacturability. As the laboratories develop designs, Honeywell works with each new generation of scientists to help them understand how to build manufacturing efficiencies, quality, and lower costs into their designs. However, keeping pace with each generation of scientists and contemporary weapon designs means the Kansas City Plant must keep pace with the most current manufacturing practices and capabilities. To do this, the Kansas City Plant must continually upgrade facilities and equipment. However, over the past 6 years, recapitalization has averaged 2.4 percent, compared to an industry norm of 4 percent.

In keeping with its approach to operate the Kansas City Plant like a commercial business, Honeywell has implemented plans that identify skills, training, and infrastructure needed for the future. For example, an in-depth, long-range Technology Plan is in place that scopes out skill, equipment, facility, and technology needs for a 10-year period. Honeywell's deployment of Six Sigma processes that emphasize defect-free production, process streamlining, and cost reductions is also shared throughout the complex. These are two methods Honeywell uses to ensure that information, particularly affecting manufacturability, is passed on to weapons scientists.

Mr. RUDDY. Yes. A new weapon program would foster the passing of skills from experienced designers to those with less knowledge. Bringing a new weapon program online involves all aspects of the design process and would require all existing skills and expertise available at Pantex. A new program would be an excellent way for less experienced personnel to become involved in a program from start to finish. It would also be a benefit to the most experienced personnel because it has been years since a new program began.

INFRASTRUCTURE SOUNDNESS

18. Senator ALLARD. Mr. Ruddy, during the hearing you mentioned that when using normal business practices, a corporation would provide a minimum of annual maintenance expenditures in proportion to the cost and age of the facility. Please provide a detailed response describing the principles behind this practice and also compare and contrast DOE's and NNSA's maintenance records.

Mr. RUDDY. I have broken the response into two parts—(1) reinvestment in capital assets and (2) maintenance expense.

An analysis of three U.S. companies that are household names—Ford, General Electric, and Boeing—shows their capital additions over the last three years have ranged from a high of about 5 percent of revenue at Ford to a low of 2 percent of revenue at Boeing (see attached summary). This can only be compared to the Pantex Plant in a hypothetical way, because comparable revenues at our facility would include classified components from other sites. But even using a very conservative example, if the value added of Pantex's $350 million budget was 25 percent of the output of the plant, this would result in comparable revenues of about $1.4 billion. Using the 2 percent to 5 percent standard of the three commercial companies would equate to a reinvestment of $28 million to $70 million per year in capital additions at Pantex.

Another way to look at spending on new capital would be to compare capital additions to depreciation expense. The range in these three companies is a ratio of one to two times depreciation. The Pantex Plant has a replacement value estimated at $5 billion (more discussion later). A conservative estimate of 40 years life would equate to about $125 million per year in depreciation. Using the example of these three commercial companies of one to two times depreciation, this would be $125 million to $250 million in capital additions. I recognize that the three commercial companies would be using historical cost for their depreciation calculations, but the facilities in these companies would be much more up to date (and closer to replacement value) than the Pantex Plant. Even if the value of assets at Pantex were assumed to be half (or less) than the replacement value, reinvestment at commercial rates would be substantial.

In contrast to the examples above, in the last 5 years at Pantex capital additions have ranged from $5 million to $18 million per year. This is woefully short of commercial standards or any other standards.

Maintenance costs are a separate requirement over and above new capital additions. While there is no single prescription for how much maintenance is adequate, maintenance cost per estimated replacement property value (RPV) is a useful and commonly used indicator of maintenance cost-effectiveness. High percentages may indicate potential for cost reductions; low percentages may indicate exploitation of assets without consideration of future impacts.

This indicator is also easy to review over time. During the 1998 Phase II study (U.S. Department of Energy Albuquerque Operations Office, *Defense Program Phase II Facilities & Maintenance Study,* May 1998) of maintenance at DOE Defense Programs sites, this indicator was used to compare site maintenance expenditures to industry best practices.

Results are summarized in Figure 1. A range of between 2 and 4 percent of annual maintenance per RPV is recommended by the commercial sector, the GAO, and the Building Research Board of the National Research Council. In addition, the board of directors of the North American Maintenance Excellence Award (Plant Engineering Magazine, *Benchmarking Maintenance,* March 2001) has established a range of 2.2 percent to 2.5 percent as representative of superior maintenance operations.

Site	Maintenance (K$)	RPV (K$)	Maintenance Funding (% RPV)
Livermore	20,710	1,483,160	1.4%
Los Alamos	31,493	2,188,684	1.4%
Sandia	26,359	1,790,000	1.5%
Nevada	14,865	328,703	4.5%
Kansas City	33,515	1,212,523	2.8%
Pantex	20,511	1,585,748	1.3%
Savannah River	2,367	592,700	.4%
Y-12	11,409	1,236,529	.9%
Grand Total	$161,230	$10,418,047	0% 1% 2% 3% 4% 5%

Figure 1. 1998 Maintenance Baseline

As indicated in Figure 1, the average maintenance cost per RPV for DOE Defense Programs sites was 1.5 percent, lower than the minimum recommended level of 2 percent. It should be noted that the Phase II study recognized the current estimated RPV was understated and there was a need to develop a credible RPV for evaluating maintenance performance at Defense Program sites. Taking Pantex as an example using the previously mentioned RPV of $5 billion vs. the study's value of $1.6 billion, the maintenance funding is only 0.4 percent.

Follow-on analyses by the DOE, including an assessment by the Office of Inspector General (IG) (U.S. Department of Energy Office of Inspector General, *Management of the Nuclear Weapons Production Infrastructure,* August 2000 (Draft)) in fiscal year 2000, substantiated the 1998 results and indicated deterioration of the infrastructure has impacted weapons modification, remanufacture, dismantlement, and surveillance testing of nuclear weapons components. It is important to note that at least 66 percent of the facilities at Pantex are 25 years old or older.

Furthermore, failure to provide minimum annual funding has resulted in a 'bow wave' of deferred improvements needed to address aged and deteriorating facility conditions. Figure 2 compares maintenance funding and deferred maintenance at the Pantex Plant from 1998 through 2000 and reflects the 'bow wave' described in the draft IG report and follow-on Facility and Infrastructure Study conducted by the DOE.

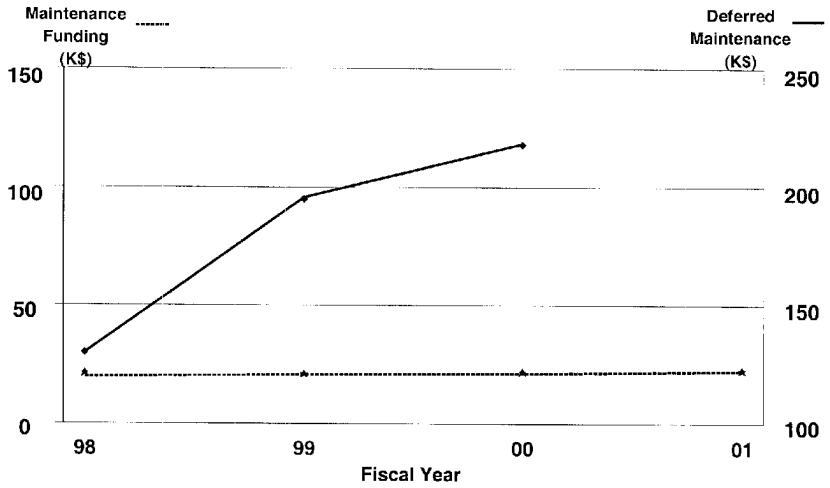


Figure 2. Pantex Plant Deferred Maintenance Trend

Figure 1 does not include additional Plus-Up funding received for maintenance related items (e.g., roof repair, cathodic protection, utilities system upgrade, etc.) in fiscal years 1996, 1998, 2000, and 2001 to address urgent infrastructure needs.

Since 1998, assessment data indicate the condition of plant facilities has continued to deteriorate. For example, Pantex Plant facilities in the 'good' category dropped from 51 percent in 1998 to 29 percent in 2000, while facilities in the 'poor' category increased from 4 percent in 1998 to 20 percent in 2000.

The current estimated RPV for Pantex Plant is $5.1 billion, a significant increase from the understated estimate of $1.6 billion in 1998. This figure reflects the total cost associated with the replacement of all structures, utilities, services, and equipment required for the mission of the Pantex Plant escalated to current year dollars. The minimum suggested annual maintenance cost based on 2 percent of RPV is $102 million, which includes replacement of capital equipment.

Another measure of maintenance financial performance is the ratio of maintenance cost to plant operating dollars. Conversations with maintenance personnel at a nuclear power plant, the only industry that approximates to Pantex Plant, indicated their maintenance budget is approximately 15 percent of their operating budget. This equates to a suggested $45 million annual maintenance budget for Pantex Plant compared to actual budgets of $24,122,000 in fiscal year 2000 and $24,560,000 in fiscal year 2001. The age of the facility, its current condition, and the ability to schedule restoration activities influence the appropriate allocation in any given year.

It is clear that recent funding has not scratched the surface in addressing deferred maintenance, which includes both corrective maintenance and life cycle replacement and upgrade projects that were requested but not funded. To meet the objectives of the Stockpile Stewardship Program and maintain capability consistent with the Plant mission while controlling costs, appropriate funding for infrastructure maintenance is required.

Examples of Reinvestment in Commercial Businesses
Based on Annual Reports for FY2000
Millions of $

	Ford - Automotive Sector			General Electric (w/o GECS)			Boeing		
	2000	1999	1998	2000	1999	1998	2000	1999	1998
Revenue	141,230	135,073	118,017	69,497	60,944	56,026	51,321	57,993	56,154
Depreciation Expenses	3,507	2,592	2,301	1,725	1,735	1,761	2,036	1,645	1,622
Capital Additions	7,393	7,069	7,252	2,536	2,036	2,047	932	1,236	1,665
Gross PP&E	72,368 *	69,088 *	NA	30,189	30,199	NA	20,970	20,199	NA
Net PP&E	37,508	36,528	NA	12,199	12,381	NA	8,814	8,245	NA
Capital Additionas as % of Revenue	5.23%	5.23%	6.14%	3.65%	3.34%	3.65%	1.82%	2.13%	2.97%
Capital Additions to Depreciation Rate	2.1	2.7	3.2	1.5	1.2	1.2	0.5	0.8	1.0
Capital Additions as % of Gross PPE	10.22%	10.23%		8.40%	6.74%		4.44%	6.14%	

* Assumed tooling gross cost at two times net

NATIONAL IGNITION FACILITY

19. Senator ALLARD. Dr. Tarter, is the National Ignition Facility (NIF) still on schedule and within the revised cost estimate?

Dr. TARTER. Yes, the NIF is on schedule and on cost according to its baseline approved by DOE in September 2000, as modified to be consistent with the fiscal year 2001 congressional appropriation. The recent DP Status Review of the NIF Project reviewed all aspects of the NIF Project, including project performance and progress in implementing its new earned value measurement system. The results of this review were reported to NNSA Administrator General John Gordon as part of his certification of the NIF Project to Congress according to the requirements of the fiscal year 2001 Energy and Water Appropriations Act.

20. Senator ALLARD. Dr. Tarter, last year, the NIF went through a re-baselining, adjusting the cost and schedule of the project. Is the current baseline on schedule and budget?

Dr. TARTER. Yes, the NIF Project is currently remaining on schedule and on budget according to the new baseline approved by DOE in September 2000, as modified to be consistent with the fiscal year 2001 congressional appropriation.

21. Senator ALLARD. Dr. Tarter, are you meeting your milestones to assure us you are, in fact, on schedule?

Dr. TARTER. Yes, I can assure that the NIF Project is currently on schedule. As Laboratory Director, I have been monitoring the NIF Project very closely and I receive weekly Project updates from the NIF Project Manager and the NIF Programs Associate Director. The NIF Project has implemented an industry-standard cost and schedule performance measurement system based on earned value of the work performed. Using this standard measurement system the project has the ability to monitor its cost and schedule performance to a very high degree of accuracy.

22. Senator ALLARD. Dr. Tarter, in the NNSA's NIF report, "High-Energy-Density Physics Study Report" (April 6, 2001), you discuss the appropriate number of beams for the final NIF configuration. Varying numbers including 48, 96, 120, and 192 are discussed. The conclusion of the report indicates that we should remain committed to the 192-beam configuration. Why is this configuration so strongly preferred and could we not do nearly as well with some of the other, less expensive configurations?

Dr. TARTER. The High-Energy-Density Physics (HEDP) Study Report concluded that NIF should remain committed to the 192-beam configuration because it is the only configuration that meets the HEDP requirements of the Stockpile Stewardship Program. For example, only the full 192-beam configuration of NIF is capable of providing the necessary symmetric arrangement of laser beams and the necessary energy to create ignition and fusion burn along with the complete ability to fully diagnose and measure the conditions inside a burning fusion capsule. Fusion ignition and burn performs a vital function in our Nation's modern nuclear weapons stockpile.

Equally as important, the full 192 beam NIF is required for fielding highly complex weapons physics experiments that do not require ignition. These experiments will measure detailed weapons-related physical data on nuclear weapons materials

under conditions of extreme temperature and pressure and study weapons phenomena associated with aging and refurbishment in a laboratory setting. In these experiments some of the NIF's 192 beams are used to create the extreme conditions of temperature and pressure that approach those occurring in exploding nuclear weapons. Simultaneously, other laser beams (called back lighters) are used to take pictures of the experiments, which permit us to develop a detailed understanding of the underlying physics.

A recent assessment by our nuclear weapons experts regarding the value of NIF for different configurations of laser beams concludes that nearly two-thirds of the value of NIF is derived from the experiments that are only available with the full 192-beam laser system. In terms of cost efficiency, nearly two-thirds of the cost of the project is required for the basic R&D, design, and infrastructure. The precisely aligned and clean environment that is required for NIF must be in place before the installation of the laser components. Relatively little money is saved by reducing the number of lasers installed. This is particularly true when the cost reductions associated with buying many components is taken into account.

In summary, our nuclear weapons experts have determined that requirements of the Nation's Stockpile Stewardship Program can only be met by the full 192-beam configuration of NIF. From a project execution point of view, the relative cost savings of reducing the number of NIF beams is small compared to the total cost of the facility.

23. Senator ALLARD. Dr. Tarter, in several hearings you have stated that the Stockpile Stewardship Program (SSP) will be sufficient to ensure the safety and reliability of the stockpile in the absence of testing. Obviously, there are several important components of stockpile stewardship, and I'm not trying to get you to say that one part of SSP is more important than another, but do you believe the SSP is sufficient as an alternative to testing even if the 192-beam NIF is not constructed?

Dr. TARTER. I have consistently stated in my testimonies before this committee that a strongly supported, sustained Stockpile Stewardship Program has an excellent chance of ensuring that this nation can maintain the safety, security, and reliability of the stockpile without nuclear testing. However, it is an extremely demanding program from both technical and managerial perspectives with ambitious goals and not without risks. We remain positive about the program's prospects for success.

The Stockpile Stewardship Program is a highly integrated program and all of the key elements NIF, subcritical experiments, advanced hydrodynamic testing, plutonium experiments, and advanced computers are required. Take any one out and there is no Stockpile Stewardship Program. While some other combination of new tools and limited nuclear testing may be able to maintain the stockpile, it would take time and considerable expense to devise the right program time we do not have with our aging stockpile. Without NIF, I doubt that any program could be devised that would maintain the stockpile with adequate confidence without some level of nuclear testing.

ADVANCED SIMULATION COMPUTING PROGRAM

24. Senator ALLARD. Dr. Robinson, Dr. Tarter, and Dr. Browne, has the Advanced Simulation and Computing Program (ASCP), which was initially billed as a critical scientific element to help shift from test-based confidence to simulation-based confidence, has met its expectations?

Dr. ROBINSON. The Accelerated Strategic Computing Initiative (ASCI) continues to make excellent progress in developing modeling and simulation capabilities and the required computational infrastructure to support the engineering and scientific needs of our weapons program. Such capabilities are required to meet our expectations for the program. To date, all major milestones of the program have been completed as planned. In less than 5 years, this program has produced results that make it the most successful high-performance computing program ever. The four fastest computer systems in the world are now at the NNSA laboratories. With these systems, the laboratories have been able to calculate, for the first-time ever, three-dimensional simulations of nuclear weapon explosions and performance of warhead components in hostile environments. These accomplishments were made possible by successes in research areas such as scalable algorithms, programming techniques for thousands of processors, and advanced visualization capabilities. We are using the three-dimensional, full-physics predictive codes developed in the ASCI program to support weapon performance assessments, refurbishment analyses, accident analyses, and qualification studies. We expect continued deployment of these capabilities to meet the needs of the stockpile refurbishment schedule.

Dr. TARTER. Expert judgment about nuclear weapons performance depends on both experiments and computer simulations. Those experiments do not presently include nuclear testing we are relying on the testing of weapon components and experiments that provide us a greater understanding of the underlying physics issues, as well as computer simulations. The much higher fidelity simulations made possible by the ASCI are an absolutely critical element of the Stockpile Stewardship Program. However, the simulations depend on experimentally-gathered data, and they are validated and benchmarked through comparison with experiments that we are able to conduct and data from previous nuclear tests. Although we place heavy reliance on simulations to assess the integrated performance of a nuclear weapon, decisions and actions about the stockpile must be grounded in experimental reality. This necessity drives the Stockpile Stewardship Program's investments in much more capable experimental facilities, such as NIF and the Dual Axis Radiographic Hydrodynamic Test Facility, together with the greatly enhanced numerical simulation tools developed through ASCI.

ASCI continues to be a major success story in the Stockpile Stewardship Program. As I mentioned in my testimony, Livermore's partnership with IBM has been highly successful. We took delivery of ASCI Blue Pacific (3.9 teraops) in fiscal year 1998 and then ASCI White in fiscal year 2000 (12.3 teraops). Both machines exceeded their performance requirements and they are being used to meet important Stockpile Stewardship Program milestones, such is our first ever 3–D simulation of a nuclear weapon primary, completed in December 1999.

However, it will take a string of successive investments to achieve ASCI's goal of full-scale simulation of weapons performance based on first-principles physics models without resorting to simplified models. The threshold for that capability is 100-teraops, and reaching the goal quickly is vital to success of stockpile stewardship. The next step at Livermore requires the construction of the Terascale Simulation Facility (TSF), and funding for TSF is needed in fiscal year 2002 to keep ASCI plans on schedule.

Dr. BROWNE. The ASCI program was designed to provide predictive nuclear weapons simulation capability beginning with validated tools to be produced in 2004, so it is still too early to evaluate ASCI's final success at meeting expectations. However, the program has achieved an extraordinary level of success to date. For example, early delivery of a prototype three dimensional secondary explosion simulation in calendar year 2000 is a measure of program progress. The program has successfully met its planned capability demonstrations on or ahead of schedule.

25. Senator ALLARD. Dr. Robinson, Dr. Tarter, and Dr. Browne, do you feel that the Advanced Simulation and Computing program can provide data through modeling which will be reliable enough to continue to forgo testing?

Dr. ROBINSON. The scientific and engineering capabilities in development by the ASCI are essential for advancing and integrating our scientific knowledge on nuclear weapons. We will rely on modeling and simulation, data from legacy tests, and new data from NNSA experimental facilities to form the basis of our technical assessments. We remain confident that the combination of experimental data and advanced modeling and simulation will provide us with a solid foundation on which to base our assessments of nuclear weapons. There is no question, however, from an engineering point of view, that actual testing of systems to confirm their performance is the desired regimen for any high-technology device, from cars and airplanes to medical equipment and computers. For a nuclear weapon design, testing of the complete system, both when it is first developed and periodically throughout its lifetime to ensure that aging effects do not invalidate its performance, is the preferred methodology. I and others who are, or have been, responsible for the safety and reliability of the U.S. stockpile of nuclear weapons have testified to this obvious conclusion many times in the past. To forego systems validation through testing is, in short, to live with uncertainty.

Dr. TARTER. This was covered in my previous response.

Dr. BROWNE. Please see my answer to the previous question.

QUESTIONS SUBMITTED BY SENATOR THURMOND

IMPORTANCE OF MIXED OXIDE FACILITY

26. Senator THURMOND. General Gordon, I am aware that the NSC is presently reviewing the mixed oxide (MOX) program. I recently wrote the National Security Advisor, Dr. Rice, expressing my support for this significant initiative and highlighting its many important benefits. Are Dr. Rice and the NSC aware that this program

has not only considerable international non-proliferation benefits, but also provides many valuable domestic benefits as well?

General GORDON. Yes. The NNSA's Office of Fissile Materials Disposition has briefed representatives of the NSC as well as other government agencies on three separate occasions regarding the plutonium disposition program. These briefings have covered the domestic and international non-proliferation benefits of the program. The NSC recently completed its review of non-proliferation assistance programs to Russia, but the final decision on DOE's Russian plutonium disposition efforts has not been made. The Department is conducting an independent assessment of the Russian program to explore any technology or program options that might increase the effectiveness of our efforts to reduce costs. This independent assessment will likely be concluded by the end of the year.

SURPLUS MATERIAL AND THE MOX PROGRAM

27. Senator THURMOND. General Gordon, South Carolina has accepted, and showed a willingness to accept in the future, surplus weapons materials with the understanding that these materials would be processed in South Carolina. In other words, there was the assurance that there would be a "path out" for these metals and oxides. I am concerned that if the MOX program does not move forward, these surplus weapons materials will not be processed. If South Carolina believes that there is no "path out" in the form of MOX, I am further concerned that the "path in" will be closed. Is that a message which is being received by the administration, especially those who are reviewing the future of the MOX program?

General GORDON. Yes. Numerous letters, phone calls on the subject, as well as meetings with the South Carolina congressional delegation have made the administration very much aware of the need to provide a "path out" of the Savannah River Site for surplus plutonium brought there from other locations.

ACCELERATOR FOR THE PRODUCTION OF TRITIUM

28. Senator THURMOND. General Gordon, do you share my view that Accelerator for the Production of Tritium is, as specified by law, a defense program?

General GORDON. Achieving confidence in the ability to supply tritium by using an accelerator, as a backup technology to the use of the Tennessee Valley Authority's Watts Bar and Sequoyah reactors, is a defense program. The Office of Defense Programs is pursuing the goal of achieving that confidence by partnering with the Office of Nuclear Energy in a new Advanced Accelerator Applications program. This new program has begun the process of leveraging the substantial investment made in the Accelerator Production of Tritium (APT) program over the past several years to investigate waste transmutation, perform research on advanced fuels, and at the same time preserve the capability to produce tritium in an accelerator, if that ever becomes necessary.

FUTURE CAPABILITIES

29. Senator THURMOND. General Gordon, the nuclear deterrent is a key component of the defense posture of the United States. Despite that, we no longer manufacture tritium or pits, both necessary elements in nuclear weapons. The failure to produce these materials seriously undermines the credibility of our nuclear deterrent. I understand that the Department of Energy is asking for funds for pre-conceptual design. I have no idea what that means, although it sounds like a bureaucratic term for not moving forward as aggressively as needed on this project. The Foster Panel stated in its report that ". . . we believe a faster rate of progress should be sought, because 10 more years without the capability to produce adequate numbers of nuclear components is pushing the limits of acceptable risk." Why have we not already begun conceptual design of a pit manufacturing facility as the Foster Panel urged last year?

General GORDON. The conceptual design of a major systems acquisition in the Department of Energy may not occur until after the approval of mission need. The approval of mission need (Critical Decision 0) for a modern pit facility is scheduled for fiscal year 2002. During fiscal year 2001, the National Nuclear Security Administration is working on the mission need statement, system description, preconceptual studies, National Environmental Policy Act of 1969 and acquisition strategies, and planning schedules required for Critical Decision 0 for a modern pit facility, using the $2 million earmarked in our fiscal year 2001 appropriations for this purpose.

30. Senator THURMOND. General Gordon, when are we going to move forward with the conceptual design of a pit production facility?
General GORDON. See my answer to question 29.

31. Senator THURMOND. General Gordon, what do you require to begin the conceptual design process of a pit production facility?
General GORDON. See my answer to question 29.

SAVANNAH RIVER SITE INFRASTRUCTURE

32. Senator THURMOND. Mr. Buggy, earlier this year, we had the opportunity to hear from former Secretary of Energy James Schlesinger of the Panel to Assess the Reliability, Safety, and Security of the United States Nuclear Stockpile. Secretary Schlesinger's testimony highlighted the deteriorating infrastructure at several of the weapons complex sites. What is the state of the infrastructure at the Savannah River Site?
Mr. BUGGY. Through extraordinary efforts in planning and cost effective work execution, SRS general Site infrastructure continues to maintain support to all enduring Site missions. A significant portion of the Site infrastructure and mission infrastructure is 40 to 50 years old. The frequency of failures and maintenance requirements for infrastructure systems are increasing. Declining vendor support and decreased spare parts availability increase the cost of maintaining a functioning infrastructure. In addition, the Site supports a suite of obsolete and fragile core business systems software with increasing costs to maintain acceptable service levels. During the past 5 years, infrastructure operating and capital expenditures have been restricted due to increased budget pressures and monies being directed to higher priority mission functions. Since 1993, the small projects capital budget for general Site infrastructure has declined 80 percent, from an average of $60 to $12 million, while the infrastructure deferred maintenance backlog has risen to $47 million. The NNSA Defense Programs Facilities at Savannah River Site are in good condition and are maintained in a manner that enables consistent support of the Stockpile Stewardship mission. The success of the Defense Programs facilities and infrastructure program at SRS is based on management attention and support, routine prioritization of identified needs and emerging issues, a long-range plan for upgrading technology and facilities, adequate funding allocations, and re-investment of savings/efficiencies into the program. Due to constant attention to this program, SRS maintenance expenses have been limited to less than 5 percent of the replacement property value for the facility. While the facilities and infrastructure are in good condition, the cost of maintaining this status with both aging facilities and newer, highly specialized technology is increasing. Defense Programs has increased its facilities and infrastructure funding requests to accommodate the rising costs.
While the NNSA program is providing the essential level of support for technical infrastructure needs, NNSA is only a part of the overall SRS landscape and is dependent upon the site's overall infrastructure. SRS is a multi-program site, with the Environmental Management Program having landlord responsibility for site general infrastructure (water, sewage, electrical, steam, roads, laboratories, telecommunications, etc.) that is now approaching 50 years of age. Many of these systems and related facilities have degraded to conditions that require major upgrades which are beyond the financial capabilities of the site's annual funding allocations primarily from the Environmental Management budget. Safe and efficient operation of these aging infrastructure systems is essential for SRS to continue to perform both its NNSA and EM missions.

33. Senator THURMOND. Mr. Buggy, what impact would the fiscal year 2002 DOE budget proposal have on the situation at SRS?
Mr. BUGGY. The DOE budget proposal would acutely impact our ability to fund and execute critical health, safety and environmentally related infrastructure capital projects that support all missions at SRS. In fiscal year 2002, using the current EM Integrated Priority List (IPL) as a basis for Site priorities, the only component of funding available is less than $10 million in the small projects capital budget, closeout funding for existing infrastructure Line Items, and funding to support core business applications replacement. This capital reinvestment in the general Site infrastructure is less than 1 percent (actual 0.375 percent) of the infrastructure capital value of approximately $3.2 billion and continues to be well below the recommended 2 percent to 4 percent normal reinvestment needed to maintain a viable infrastructure. The proposed fiscal year 2002 Savannah River Defense Programs budget is $233.6 million. This funding is sufficient to execute the core Stockpile

Stewardship mission, and to maintain progress on two major line-item projects, the Tritium Facility Modernization and Consolidation project and the Tritium Extraction Facility. However, the budget is $19.5 million short of Defense Programs requirements and $9.2 million of that total is directly associated with facilities and infrastructure restoration and modification. Infrastructure restoration projects that are affected by this shortfall include the replacement of aged electrical switch gear and building ventilation upgrades. Facility modification projects affected are those that support weapons refurbishments.

Since 1993, the EM small projects capital budget for general Site infrastructure has declined 80 percent, from an average of $60 million to $12 million, while the infrastructure deferred maintenance backlog has risen to $47 million. In fiscal year 2002, using the current EM Integrated Priority List (IPL) as a basis for Site priorities, the only component of funding available is less than $10 million in the small projects capital budget, closeout funding for existing infrastructure line items, and funding to support core business applications replacement. This capital reinvestment in the general Site infrastructure is less than 1 percent (actual 0.375 percent) of the infrastructure capital value of approximately $3.2 billion and continues to be well below the recommended 2 percent to 4 percent normal reinvestment needed to maintain a viable infrastructure. Failure to adequately fund the EM infrastructure needs could lead to failures that could compromise the ability of NNSA to execute its missions at Savannah River Site.

34. Senator THURMOND. Mr. Buggy, in your opinion, what is the required level of funding to maintain the site infrastructure for fiscal year 2002?

Mr. BUGGY. Infrastructure recapitalization activities at SRS require an immediate funding increase of approximately $30 million over the proposed SRS infrastructure budget for fiscal year 2002. This will allow commencement of design and procurement activities for the Site's Infrastructure Recapitalization program. This program is intended to reinvest approximately $75 million per year for a sustained period with an ultimate goal of achieving a Site Facility Condition Index (FCI) of 5 percent (investment backlog divided by total asset value). The Site's current FCI is approximately 9.3 percent indicating an immediate need for capital infusion. The current value is based on the Site infrastructure capital value of approximately $3.2 billion, and a backlog of the most critical line items projects ($200 million) and deferred small operating projects ($100 million). Recent independent assessments of the Site's infrastructure recommend an FCI target of 5 percent. This targeted goal should maintain the Site at an appropriate condition given our complexity and mission.

The NNSA facilities and infrastructure recapitalization initiative needs to be fully funded and then allocated across the nuclear weapons complex. The Defense Programs need at Savannah River currently stands at $9.2 million to address all facilities and infrastructure shortfalls. This will ensure timely repairs, modifications, and upgrades are executed to support the National defense missions and preclude creating a large investment backlog.

PLUTONIUM IMMOBILIZATION PLANT

35. Senator THURMOND. Mr. Buggy, the DOE fiscal year 2002 budget suspends funding for the Plutonium Immobilization plant. How will this action effect the Nuclear Materials Stabilization program at the SRS?

Mr. BUGGY. From an SRTC technology development point of view, the suspension means that, if and when we restart the program, we will have a steep learning curve because the investment in our core development team will have been dispersed among other programs. It is unlikely that we will be able to reassemble the team, which has so successfully nurtured this program thus far.

The planned end state for the Nuclear Materials Stabilization program at SRS is to have the entire SRS inventory of plutonium converted to stable plutonium metal or plutonium oxide and packaged to the full requirements of the DOE Plutonium Storage Standard (DOE–STD–3013). Once stabilized and packaged per the Standard, the SRS inventory of plutonium will be safely stored pending transfer to the Plutonium Disposition program (as input to either the PIP or the Mixed Oxide Fuel Fabrication Facility). With the suspension of the PIP, most of the materials destined for SRS will most likely remain at their respective locations until future planning assumptions are developed. Part of the PIP scope required characterization of the plutonium bearing materials around the complex to ensure that they met a common standard for shipment, receipt, and processing in the PIP. If these materials are not transferred to the SRS for storage or other stabilization efforts, then there will be

no impact at the Savannah River Site to the Nuclear Materials Stabilization program. However, if these materials are included as part of the Nuclear Materials Stabilization program or are processed in the F or H Canyons to produce initial feed material for the Mixed Oxide Fuel Fabrication Facility, then a significant impact (cost and schedule) will occur. In addition, SRS will have to continue to characterize any incoming materials to the site and add storage capacity for incoming material and product material awaiting final disposition. Projected annual cost for future safe storage and surveillance of the stabilized SRS plutonium inventory is approximately $25 million (fiscal year 2001 dollars).

36. Senator THURMOND. Mr. Buggy, regarding the Nuclear Materials Stabilization budget proposal for fiscal year 2002, I have been informed that the DOE fiscal year 2002 budget request includes $391 million for this program. Last year, the program was funded at $430 million. How can you manage this program with such a significant decrease?

Mr. BUGGY. The Nuclear Materials Stabilization Budget proposal for fiscal year 2002 based on the President's Budget will focus on F-Area Stabilization activities first by continuing with the DNFSB 94–1/2000–1 implementation plan which would include full operations of F-Canyon and FB-Line stabilization activities. The vault operations in 235–F would continue, but reduced scope for the Packaging & Stabilization project would be accomplished by installing a furnace and welder in the existing FB-Line facilities. The Am/Cm project would be suspended with partial funding for the "direct to waste" disposal option. Limited DNFSB 94–1/2000–1 initiatives would be continued in H-Area stabilization with the focus on completing existing Plutonium solutions to oxide in HB-Line Phase II. H-Canyon and HB-Line Phase I stabilization activities would be suspended. Efforts in fiscal year 2002 will be focused on F-Area stabilization activities first to reduce the mortgage by delaying stabilization activities in H-Area. If adequate funding is provided in fiscal year 2003, the focus will then resume in H-Area.

37. Senator THURMOND. Mr. Buggy, what funding do you believe is necessary to accomplish this mission in fiscal year 2002?

Mr. BUGGY. Full finding would be approximately $420 million and include: Stabilization activities in both F&H Area to support DNFSB 94–1/2000–1 and Am/Cm Direct Disposal to Waste, and Furnace and Welder in the FB-Line option.

QUESTIONS SUBMITTED BY SENATOR BOB SMITH

SECURITY AND SCANDAL AT THE DEPARTMENT OF ENERGY

38. Senator SMITH. General Gordon, the Wen Ho Lee scandal died down some time ago, as did a subsequent scandal at Los Alamos when critical missing disks were later retrieved behind a copy machine. After each scandal, the press moves on to other sensational stories, and we in Congress are inclined to believe action will be taken to fix the problem and to avert future scandals. But with regard to DOE, that does not appear to be happening. Let me make it clear that I am not blaming this on the new Administration, which has yet to get its appointees through confirmation and which got a late start on its transition, but on the former Administration and its allies in the DOE bureaucracy, who appear resistant to change. I have been told that the theft of nuclear secrets remains as possible now as during the Wen Ho Lee flap 2 years ago. What is your response to this accusation?

General GORDON. No matter how many security and counterintelligence measures are put in place, there can be no guarantee that espionage or loss of classified information will not occur. What we can do is make employees more aware of the possible impact of security lapses and the threat of foreign intelligence services that seek DOE classified information. I believe that we have done a good job in both of these areas, as well as enhancing security measures, and therefore do not agree with the assertion that the DOE is as vulnerable to loss of classified information as it was 2 years ago.

The DOE has instituted a number of security changes to reduce the potential for the loss of highly classified information. These changes include additional controls on the handling of sensitive information, enhancements to physical security at key facilities, and additional controls on computers. These measures have addressed identified weaknesses. In addition, there are now counterintelligence programs in place at the DOE and NNSA facilities that enhance protection of our personnel, programs, and information. Thus, the potential for the theft of nuclear weapons secrets has been reduced.

Clearly, good security relies on the employee. For this reason, DOE has enhanced its annual security awareness training, which includes a counterintelligence component. There are also a number of specialized security and counterintelligence training activities now taking place that address specific security and counterintelligence concerns. Specifically, employees are being made increasingly aware of vulnerabilities of computers to outsiders and the protection capabilities that are in place to address these threats. We also have a program in place to alert employees whose travel or contacts put them at greater risk of being approached.

39. Senator SMITH. General Gordon, after years of scandals and promises by Secretary Richardson to fix the security problem, it appears to persist. Do you agree with this assessment?

General GORDON. No. Over the past 2 years, we have made significant progress in upgrading our security posture. We have implemented a number of changes to improve security. These have included immediate actions as well as long term efforts. Security is not a one-time effort. It requires a continuing commitment to ensure protection of information. The DOE has made that commitment and will work to reduce security problems.

40. Senator SMITH. General Gordon, what would it take to inculcate a necessary "culture of security" at DOE labs? Can you comment on a letter to Secretary Abraham from RETA Security Inc. addressing the risk to Special Nuclear Materials in the DOE's Sites & Transportations (this letter subsequently was posted on a whistle-blower web site).

General GORDON. There is a history of protection of information within the nuclear weapons complex, based on a shared understanding among employees, of why information needed to be protected. There was also an understanding that people can make honest mistakes and that only if people work together can information receive true protection. DOE today is seeking to revive and restore this culture. One of our major goals is improving communications within the Department so that people know their concerns about security are heard.

The DOE has begun a number of efforts aimed at this goal. The importance of protection of information is being stressed from the top down. Employees are being included in the information flow to ensure that good ideas as well as concerns are allowed to pass up to senior management. Changing a culture is difficult but not impossible and the DOE is working hard on this issue.

With respect to the second part of your question I refer you to the letter of March 5, 2001, which responds to RETA's concerns (attached).

41. Senator SMITH. General Gordon, has there been a written response to the letter from RETA Security Inc., and if so, please provide me with a copy?

General GORDON. Yes, the Department responded to the RETA on March 5, 2001. A copy of our response is attached.

Department of Energy
Washington, DC 20585

March 5, 2001

Mr. Ronald E. Timm, President
RETA Security, Inc.
Post Office Box 369
Lemont, Illinois 60439

Dear Mr. Timm:

The Secretary has received your letter dated February 9, 2001, and has asked me to reply. We appreciate and take seriously the security concerns expressed by our employees, our contractors, and other interested parties. Consequently, we assure you that the issues raised in your letter, as well as the similar issues raised in your January 2000 letter to General Eugene Habiger, have been thoroughly reviewed.

The Department concurs that one of our most important missions is to protect the national security assets entrusted to our care, including our inventories of special nuclear material. The main thrust of our safeguards and security program is to protect this material; and yes, we do spend a lot of money and considerable effort to ensure that we provide adequate protection to those assets. Your letter asserts that special nuclear material in DOE's custody may be in imminent danger of "detonation" or "abrupt theft" – particularly at three specified locations – with all the undesirable consequences of such an occurrence. You further assert that other departmental actions, or inactions, serve to allow these alleged dangerous conditions to continue. We do not concur with your conclusion that special nuclear material is at undue risk in the Department; our analyses lead us to the opposite conclusion. The bases of our conclusions and the various points you raised in your letter are addressed in the attachment.

The Department is serious about protecting all of our national security assets. Reviews and reports of the Department's independent oversight organization have identified deficiencies in need of correction, but have generally concluded, based on the overall performance of protection systems in place, that special nuclear material is not at immediate risk. Various other reports by DOE and external groups have reached the same conclusion. Further, there are numerous examples of the Department's timely response, immediate compensatory measures, and follow-on corrective actions regarding those deficiencies that have been identified. The Department's protection strategy relies on the identification and analysis of risk and the implementation of programs to eliminate identified risks or to reduce them to acceptable levels. In light of your background and experience, you surely understand that it is impossible to totally eliminate all risk associated with special nuclear material as long as such material exists. That is why the Department expends so much effort and so many resources to characterize and implement reasonable actions to reduce risk. We believe our protection programs are sufficiently robust to ensure that any residual risk is low, posing no significant threat to our assets, employees, facilities, or the public. Although it is troubling that an individual such as yourself should reach conclusions so different from those reached by countless other informed and objective parties,

we must nevertheless conclude that your concerns regarding the vulnerability of special nuclear material and the Department's protection program are overstated. While the Department's protection program may not be perfect, we firmly believe it is effective. Moreover, we constantly strive to improve it and will continue to closely inspect the Department's safeguards and security programs. We have seriously considered your concerns, as the IG has done previously, and we appreciate your interest in this program.

Sincerely,

Glenn S. Podonsky, Director
Office of Independent Oversight
and Performance Assurance

Attachment: Response to Points Made in February 9, 2001,
Letter to Secretary Abraham

cc:
K. McSlarrow, S
G. Friedman, IG-1
T. Gioconda, DP-1
C. Huntoon, EM-1
E. Fygi, GC-1
J. Decker, SC-1
M. Gunn, CH
J. Hamre, CSIS

ATTACHMENT

Response to Points Made In
February 9, 2001, Letter to Secretary Abraham

You indicate that during the Inspector General's investigation that followed your January 2000 letter to General Habiger you provided numerous documents "exposing" presumably unacceptable risks at the Rocky Flats Environmental Technology Site, the Office of Transportation Safeguards (formerly Transportation Safeguards Division) and Los Alamos National Laboratory. You also indicate that the Inspector General did not seriously consider your allegations of risk.

The Inspector General conducted an extensive review into the concerns you expressed in your January 2000 letter, including allegations of lying in the reporting of the status of safeguards and security programs at Departmental sites, allegations of retaliation against persons trying to correct security problems, and allegations that appropriate actions were not taken to address risks you had identified. After reviewing thousands of pages of classified and unclassified documents, including those provided or identified by you (and including the referenced "point papers"), and interviewing more than thirty senior and knowledgeable security officials, the Inspector General concluded that: there was no evidence that Departmental officials lied in reporting the actual status of security; appropriate Departmental officials were aware of your risk concerns and that there was no evidence that they arbitrarily decided to ignore those concerns; and no Departmental officials interviewed indicated that they had suffered retaliation for their part in reviewing Safeguards and Security Site Plans (SSSPs) or for assisting the mentioned special assistant. The Inspector General also found that several actions had been taken in response to your security concerns. The Inspector General also noted that some of your concerns had not been resolved due to disagreements over the underlying bases of your concerns. While the Inspector General thoroughly addressed the January 2000 allegations indicated, he did not attempt to determine whether Special Nuclear Materials were actually at risk; that determination was beyond the scope of his investigation and within the responsibility of the Department's security offices. Experts in those offices have reviewed your concerns in this area and, again, disagree with your conclusions. Surely you are aware that the quality assurance process of which you were a part suffered from low credibility among many security professionals in the Department and that some of the tools and techniques you employed are considered inappropriate or improperly applied to the SSSP quality assurance process.

Concerning your allegations that Special Nuclear Materials are at risk at the Rocky Flats Environmental Technology Site, while in the custody of the Office of Transportation Safeguards, and at Los Alamos National Laboratory, we are convinced that current conditions lead to a different conclusion. The Department, through various line management and independent oversight activities, has identified some deficiencies at Rocky Flats. A Department-level inspection of safeguards and security at Rocky Flats last occurred in March-April 2000, and did not find special nuclear materials to be at risk. While some deficiencies were identified, Rocky Flats developed and implemented plans to address those deficiencies. A subsequent review found that Rocky Flats is successfully working towards its improvement goals. There is

significant decontamination and decommissioning work ongoing at Rocky Flats. Much of the special nuclear material has been removed from the site, and the remaining material has been consolidated into fewer locations, which aids physical protection efforts. Rocky Flats deploys a large protective force contingent in the immediate vicinity of the remaining potential targets. The most recent review of protection at Rocky Flats concluded that the Special Nuclear Material remaining is not at risk.

The Department has similarly inspected the Office of Transportation Safeguards (OTS) on a regular basis. Those inspections have sometimes included major performance tests. The last full Department-level inspection occurred in November 1999, with follow-up activities in early 2000. Those inspection activities sometimes identified protection concerns regarding OTS operations. OTS has usually responded quickly to such concerns and in the recent past has made significant upgrades or changes to weapons, equipment, and tactics. The Department's last independent oversight evaluation of OTS found that they had met the Phase 1 "goalpost" improvements set for them by the Department and that they maintained adequate capabilities to protect their cargos. The Office of Independent Oversight and Performance Assurance is currently in the process of conducting a comprehensive inspection of OTS, that will, in part, assess the progress being made toward completion of the mandated Phase 2 "goalpost" improvements.

Over the past two years in particular, Los Alamos has received considerable oversight by line management and independent oversight organizations. As mentioned in your letter, an October 2000 inspection identified deficiencies in the Los Alamos vulnerability analysis process and also identified protection deficiencies at specific locations. You may not be aware that Los Alamos and the Office of Defense Programs (DP) instituted compensatory measures and developed corrective action plans to address those deficiencies. A Department-level follow-up visit to Los Alamos in December 2000 verified the implementation of the compensatory measures and progress on corrective actions. The Office of Independent Oversight and Performance Assurance is scheduled to conduct a comprehensive inspection at Los Alamos, including major performance tests, during June 2001.

You indicate your belief that, while the Office of Independent Oversight and Performance Assurance (OA) has identified vulnerabilities during its inspections, the executive summaries of its reports are "politically expedient" and "less than candid,"and that OA does not criticize Defense Programs or Environmental Management sites. OA has a long history of identifying existing deficiencies in protection throughout the Department. In fact, OA's efforts in recent years have been concentrated on the Defense Programs and Environmental Management sites, because those are the sites that contain the greatest amounts of the most sensitive materials and information. You also claim that OA is critical of non-weapons program sites, but does not criticize weapons program sites. A careful review of OA inspection reports clearly demonstrates that your claim is erroneous. OA reports discuss the detailed results of inspections in the report body or in separate appendices that concentrate on a specific security discipline. The details of identified deficiencies and what needs to be fixed are found in those portions of OA reports. The Summary Report, or, in shorter reports the Executive Summary, is intended to provide a concise overview for senior managers and an overall sense of the inspection results and the areas that require additional management attention. While the Summary Report/Executive Summary does not typically discuss deficiencies in great detail, it does identify all significant deficiencies,

explains why they are important, and clearly indicates whether corrective actions are needed. Further, it serves to place inspection results in the appropriate context and perspective based on the total results (favorable and unfavorable) of the inspection activity and provides a conclusion regarding the overall effectiveness of the site's protection program.

You imply that information in point papers provided to former Secretary Richardson by a special assistant, and specifically a December 2000 paper regarding "vulnerabilities" at Los Alamos, have not been properly addressed by the Department. We can assure you that the special assistant's point papers to the former Secretary were referred by Mr. Richardson to the appropriate organizations, were reviewed by those organizations, and that warranted actions were taken. The Inspector General also reviewed the point papers that had been submitted at the time of their (previously described) investigation. It should also be noted that the special assistant accompanied OA on a December 2000 follow-up visit to Los Alamos, the purpose of which was to verify that necessary compensatory measures were in fact in place. The OA team determined that required compensatory measures were in place and Los Alamos was conducting performance testing and vulnerability analyses to complete their implementation of a revised protection strategy. The special assistant's subsequent point paper nevertheless reiterated his previous position that the site in question at Los Alamos should be shut down and the nuclear materials moved elsewhere. Based on the assessment of the other trained security specialists, the Department determined that conditions at Los Alamos did not warrant such immediate and drastic action.

You charge that changes in the Department's analytical process used in the development of security strategies is "dumbed down," and imply that the purpose of the change is to avoid identifying risks that managers don't want to have to address. The Department has recognized the need for improvement in this area, as the historical tools and methods employed have not been optimally effective and efficient. We have experienced considerable difficulties in developing comprehensive and effective security plans, due in no small part to the fact that certain analytical tools have proven to be expensive and not always effective in identifying vulnerabilities. We are still using various tools, but have decided to improve the planning and analysis process through the increased use of expert judgment and less blind reliance on flawed analytical techniques. This does not mean that we intend to discontinue the use of analytical techniques; rather, we will use a more judicious blend of analytical methods, expert judgment and performance testing. We expect the new process to be quicker and more easily applied than the more complicated methods that haven't worked well in the past. The Inspector General review concluded that the new procedures have the potential for significantly enhancing the process, but that strong management involvement will be needed to ensure that the new process achieves its potential. We also believe that the process holds great promise; however since it is new, the Department has not yet had the opportunity to fully evaluate the effectiveness of its implementation across the Department.

Finally, you charge that the Department has taken retaliatory action against a Senior Security Analyst who tried to alert the public to security dangers at Los Alamos. As you yourself hold a DOE security clearance, I'm sure you are aware that individuals entrusted with our nation's most sensitive information are held to a high standard of trustworthiness. The individual you refer to had his security clearance suspended due to his admitted release, without prior authorization, of a draft DOE Inspector General report on sensitive DOE security matters. His action was in direct contravention of his signed "Security Responsibility Statement" promulgated by the DOE Office of Security Affairs specifically to prevent such releases. His case is currently being processed under the DOE's administrative review procedures (Title 10 Code of Federal Regulations), which afford the Analyst opportunity to explain his actions while he remains employed by the Department in a position that does not require a security clearance.

FOREIGN VISITOR PROGRAM

42. Senator SMITH. General Gordon, you mentioned that you have made some changes to the foreign visitor program. Can you explain further those changes?

General GORDON. See my answer to the following question.

43. Senator SMITH. General Gordon, is it true that under the previous administration, DOE labs wrested control of the foreign visitors program from the labs and that as a result, there is no record of what foreign visitors were in and out of the labs?

General GORDON. I would not conclude that the DOE laboratories have wrested control of the foreign visitors program, nor that the Department lacks records of foreign visitors to the laboratories. DOE's current policy on access by foreign visitors to DOE facilities was established by Secretary Richardson on July 14, 1999, with the issuance of two directives: DOE Policy and Notice 142.1, Unclassified Foreign Visits and Assignments. These directives established a framework of management accountability which delegates approval authority to the local site manager, requires coordination with counterintelligence, foreign intelligence, export control, and security organizations, and establishes a DOE-wide requirement for a central tracking system for visits and assignments to DOE facilities. This policy places authority and accountability at the local site manager level, the level most knowledgeable about the specific foreign visit. Visitors from countries identified as state sponsors of terrorism must, however, be approved by the Secretary of Energy. To assist in implementing this policy, the Department initiated its current tracking and approval system on July 1, 2000, replacing an earlier system used to record foreign visitors approved for access to the national laboratories and other DOE facilities. The current system, the Foreign Access Centralized Tracking System (FACTS), is a very secure, web-based platform, available to all facilities. It is designed to serve as the Department's central repository for information related to visits and assignments by foreign nationals.

POLYGRAPH POLICY

44. Senator SMITH. General Gordon, what is the proposed DOE policy on polygraphs and are there any legislative clarifications you might be seeking from Congress.

General GORDON. The use of polygraph in the NNSA is a difficult issue. On the one hand, polygraph has both a deterrent and detection potential. On the other hand, the polygraph is perceived by some as intrusive and of questionable validity. The DOE has engaged the National Academy of Sciences to address the issue of validity, but in the meantime has proceeded to implement a program to comply with the current requirements under the law. However, I am concerned that the legislative requirement that everyone in certain high-risk programs, and anyone new coming into the programs, undergo a polygraph examination, may be too broadly drawn. Positions within these high-risk programs vary in degree of sensitivity and I feel that polygraph should be used for only the most sensitive positions.

QUESTIONS SUBMITTED BY SENATOR JACK REED

PIT MANUFACTURING AND CERTIFICATION

45. Senator REED. General Gordon, DOE and Los Alamos have been trying to regain the ability to manufacture a weapon pit for several years. This effort has been plagued by many problems, including substantial schedule delays and significant cost growth. The budget request appears to support the goal of having a certifiable W88 pit by 2003. The budget does not appear to support the goal of having a certified pit by 2008 or 2009. Am I correct in this assumption?

General GORDON. Yes, you are correct in that assumption as so stated in our budget documentation. The current budget request for fiscal year 2002 supports the fabrication of a certifiable pit in fiscal year 2003 but not the certification of a pit by a date certain.

46. Senator REED. General Gordon, does NNSA have a plan that fully identifies the scope, schedule and cost of achieving a certified pit, and if so, what is the cost, what is the schedule, and when will this plan be submitted to Congress?

General GORDON. Yes, the recently completed W88 Pit Manufacturing and Certification Integrated Project Plan, based on some 18,000 activities and 350 individual work packages, identifies the cost, scope, and schedule to manufacture and certify a pit. This plan schedules the fabrication of a certifiable pit in fiscal year 2003 and completion of the certification process in fiscal year 2009 and is estimated to cost $1.7 billion. Congressional staffs have been briefed on the cost, scope, and schedule associated with the W88 Pit Project Plan. The final report on the Plan is undergoing

a final review by DOE/NNSA. An interim report was submitted to Congress in December 2000.

AMENDED BUDGET REQUEST

47. Senator REED. General Gordon, do you anticipate submitting an amended budget request for fiscal year 2002 and if you do, what do you think will be in that request?

General GORDON. The administration submitted its fiscal year 2002 amended budget in June. No additional funds were identified for NNSA.

TEST READINESS

48. Senator REED. General Gordon, the Foster Panel has urged increasing the level of readiness to resume nuclear weapons testing reducing the time it takes the United States to conduct a test from its current 18 to 24 months down to 6 months. Have you had an opportunity to review this recommendation and understand its costs?

General GORDON. Consistent with existing Presidential direction (PDD–15) NNSA is maintaining the ability to conduct an underground test within 2 to 3 years at the Nevada Test Site (not 18 to 24 months as stated in the question.). However, since it has been 9 years since the last U.S. nuclear test was conducted, a 6-month nuclear test readiness capability is not technically feasible, considering the safety, environmental, and Threshold Test Ban Treaty reporting requirements associated with nuclear test resumption. When the nuclear test program was active, a nuclear test typically required between 18 and 24 months to design, field, and execute. Many complex tests took longer. The time was needed not simply because of resource limitations but also to assure adherence to good scientific and engineering practices and compliance with applicable safety and environmental regulations. In the few instances that required a nuclear test to be fielded in a shorter time frame, it was only possible to do so by modifying an already prepared nuclear test. If a test was done for demonstration purposes only, with minimal diagnostics, such a test could be prepared in about one year. All that said, a 2- to 3-year test readiness posture may simply be too long to meet U.S. national security requirements. As part of the Strategic Review and upcoming Nuclear Posture Review, NNSA is working with DOD to assess the implications of reducing the test readiness posture to 18 months or less.

PANTEX

49. Senator REED. General Gordon, the DOE Pantex facility is almost at full capacity now with new life extension programs planned for the future. What improvements are necessary to allow Pantex to meet the DOD life extension requirements for the W76, the W81, and the W80?

General GORDON. Projects and efforts needed at Pantex to support the NNSA W76, B61–7/11, and W80 life extension programs and provide the increased production throughput needed for these programs are:

- *Special Nuclear Material Component Requalification Facility.* Some Life Extension Programs require inspection of the pits. This project provides the capability to recertify and/or requalify pits for use in war Reserve weapons.
- *Building 12 to 44 Production Cells Upgrades.* By 2008, insufficient cells will be available to meet Life Extension Program work requirements. These upgrades will make additional cells available for the full range of operations needing the unique safety features of a cell by adding exhausts, upgrading the heating and air conditioning and fire protection systems, and modifying the waste isolation valves.
- *Component Evaluation Facility.* Currently, weapon component evaluation activities, such as computed tomography, separation testing, and mass property measurements, are located in bays that otherwise would be used for weapon assembly/disassembly. This project will provide a new facility to consolidate component evaluation and increase capability and capacity for existing nondestructive evaluation testing. It will also provide space for the deployment of new technologies required to perform new and additional surveillance and requalification of weapon components and weapons. Consolidation of activities will provide increased efficiencies in the evaluation process by co-locating evaluation bays and will also increase production ca-

pacity by allowing bays currently used for evaluation to be returned to weapon assembly/disassembly.

• *Building 12 to 64 Production Bays Upgrade.* Building 12 to 64 bays are currently used for purposes other than their original weapon assembly/disassembly mission. This project will improve the building's 17 bays for nuclear explosive operations.

• *Fire Alarm System Replacement.* This effort will replace unreliable alarm panels currently installed in facilities throughout the site. The manufacturer of current panels can no longer provide these panels or acceptable replacements, spare parts are no longer available, and the aging panels have an unacceptable failure rate. Failure of a panel in a nuclear explosive facility could preclude nuclear explosive operations for several months.

50. Senator REED. General Gordon, the Foster Panel recommended that the enhanced surveillance program be continued and further recommended that this program be even more rigorous. Are there plans to resume this program and what would it cost?

General GORDON. The Enhanced Surveillance Campaign (ESC) is a key element of the Stockpile Stewardship Program, and it is an active, ongoing program. The ESC focuses on providing component aging and lifetimes analyses to support the annual assessment of the stockpile and to support the stockpile refurbishment decisions and schedules. The ESC goal is to develop and implement predictive techniques that will identify aging defects with sufficient lead time for the complex to take action prior to any impacts on weapon safety or reliability. By making a technical determination of component lifetimes, the ESC also enables the avoidance of unnecessary or premature expenditures on hardware and the associated facilities prior to the true need. The program budget for fiscal year 2001 is $102 million and $83 million in fiscal year 2002.

51. Senator REED. General Gordon, is the workload at Pantex such that you would consider using another facility for the surveillance program, such as the Device Assembly Facility (DAF) at Nevada?

General GORDON. Various elements of the surveillance program occur at many of the NNSA plants and facilities. Pantex conducts the disassembly and inspection of the stockpile samples selected for quality and reliability testing, builds joint test assemblies for flight tests, and builds test beds for laboratory testing at the Pantex Weapons Evaluation Test Laboratory. Many components are already sent to other NNSA sites for detailed surveillance evaluation. For example, Los Alamos does surveillance on pits and detonators, Savannah River Site evaluates gas transfer systems, and Y–12 evaluates canned subassemblies.

There is no plan to totally relocate any of the activities currently conducted at the Pantex facility because of limited capabilities or capacities. There is an ongoing study of expanding the use of the DAF at the Nevada Test Site to include some nuclear warhead special operations currently conducted at Pantex, followed by warhead disassembly and inspection activities. This study will include an assessment of the added costs for having some duplicate operations, including the need for additional trained technicians. Prior to beginning any new nuclear warhead operations at DAF, the necessary nuclear explosive safety studies and other authorization basis would need to be completed.

NONPROLIFERATION PROGRAMS

52. Senator REED. General Gordon, many of us on the committee are very concerned about the significant reductions in the nonproliferation programs. The reductions in the research and development programs and the Materials Protection Control and Accounting (MPC&A) program are particularly troubling as are the reductions in other programs designed to assist Russia with closing some of their nuclear cities. These programs are currently under review by the administration. Do you see an opportunity to restore some of these cuts in the future?

General GORDON. Although the fiscal year 2002 request is $100.2 million (11.5 percent) below the fiscal year 2001 appropriated level, it actually represents a 8.6 percent increase over the fiscal year 2000 level. The fiscal year 2002 request normalizes program growth over 2 years at 4 percent per year. These programs were subject to the administration review of cooperative nonproliferation programs in Russia. That review recently concluded that these programs were effective and should continue with little change.

MORALE

53. Senator REED. General Gordon, over the past several years the morale of the employees at the DOE laboratories has been very low. Do you believe there has been improvement recently and what more can be done to improve morale and thus the ability to recruit and retain these valuable employees?

General GORDON. Morale problems remain but have shown modest improvement over the last several months. Scientists and engineers are motivated principally by the intellectual challenges involved in the application of their technical skills to solving problems of national importance. The improvement in morale can be attributed to the fact that the labs and plants are back at work and some of the security problems that confronted us are now behind us. There are several actions that we can take to improve morale. First, I have asked the National Academy of Sciences to perform a review of the polygraph program and I expect to came back to Congress and request some clarification to the existing polygraph legislation. Second, we must provide stable long-term funding for the Stewardship Program. In the long run, we continue to believe the main attractions to the National laboratories will be the advanced facilities (like high performance computing, NIF, LANSCE, MESA, etc.) and their associated influx of new ideas and creative research programs. Both current and new scientists will be drawn to the laboratories to utilize the facilities if the work is challenging and recognized.

54. Senator REED. General Gordon, what role do the various requirements to polygraph lab employees have on morale?

General GORDON. The polygraph program is clearly objectionable to some of our employees, and a few have been quite vocal in their opposition to it. While I do not think you will find anyone who enjoys being polygraphed, I think it is fair to say that opinions of our employees run the gamut, from some who strongly support the program to some, as noted, who strongly object to it. While our primary focus is on security and complying with the legislation, we are doing all that we can to address employee concerns with respect to the polygraph program, and seek to minimize any negative impact it may have on recruitment and retention. Unlike the National Security Agency and the Central Intelligence Agency, where polygraph testing has long been used as a condition of employment and is seen by employees as something of a "rite of passage", our scientists in many instances are just now being confronted with this prospect after many years of service. We must deal with this cultural shift in a straightforward manner; addressing their concerns while protecting our most sensitive equities.

While polygraphs may now be a factor, the issues of recruitment and retention are complex and pre-date DOE's proposed use of counterintelligence-scope polygraph examinations. This is well documented in the March 1999 Report of the Commission on Maintaining United States Nuclear Weapons Expertise (Chiles Report). The Chiles Report characterized DOE as being in a war for talent with the private sector. The scientific and technical talent that DOE must attract and retain has many options in today's competitive technology marketplace. The Department is committed to achieving the goal of having both good science and good security, and will continue to work hard to address employee concerns that impact on that goal.

55. Senator REED. General Gordon, have you had an opportunity to review these requirements and do you have any recommendations on how these requirements should be modified?

General GORDON. We are working with the DOE Office of Counterintelligence (OCI) to review, and possibly refine, the current polygraph requirements. We have found within the high-risk programs (identified in the legislation) sensitivities of positions can range broadly. For instance, in the Personnel Assurance Program and the Personnel Security Assurance Program there may be significant numbers of persons whose duties and responsibilities do not constitute high-risk from a national security or counterintelligence standpoint. We believe that there may be others whose positions were not captured within the mandated categories who have access to information of such sensitivity that they, too, should be subject to polygraph screening. The OCI is working to develop a consistent rationale and process to identify all such positions of interest and provide recommendations to me and to the Secretary with respect to any perceived need for legislative action in support of the program.

NATIONAL IGNITION FACILITY (NIF)

56. Senator REED. General Gordon, the National Ignition Facility (NIF) ran into a series of construction problems that caused increases in the overall cost of the NIF. These problems were addressed. The program was stretched out so that it would fit within future years budget projections and appears now to be largely back on track. Can you give us a status of the NIF?

General GORDON. The revised NIF schedule and cost baseline was approved by the Secretary of Energy and submitted to the Congress on September 14, 2000. On April 6, 2001, I delivered to Congress the NIF Certification Package required by the Energy and Water Development Appropriations Act for Fiscal Year 2001. I certified that the full 192-beam NIF is required to support the Stockpile Stewardship Program and that the Project is meeting its technical milestones, as defined in the revised baseline, on schedule and within budget. The certification confirmed that first and second quarter project reviews determined the project to be on schedule and cost; delivered a study of requirements for and alternatives to a 192-beam ignition facility for maintaining the safety and reliability of the current nuclear weapons stockpile; verified that an integrated cost-schedule Earned-Value project control system has been implemented; and, included a 5-year Budget Plan for the Stockpile Stewardship Program. On my last visit to the Lawrence Livermore National Laboratory, I saw evidence that NIF is being carefully managed under departmental project manager directives and is receiving appropriate high level manager attention and oversight.

57. Senator REED. General Gordon, last year NNSA received $10 million less than requested for the NIF. Has this reduction had any impact on the NIF and will it need to be restored in the future?

General GORDON. For fiscal year 2001, Congress appropriated $10 million less than requested against the approved cost and schedule baseline funding profile. To adjust for this shortfall, some current year activities have been delayed. Future year acquisition plans have been affected and future scheduled activities and funding for some key industrial partners have been deferred. The funding profile in the NIF Certification I submitted to Congress on April 6, 2001, includes the restoration of this shortfall over the remaining years of construction.

QUESTIONS SUBMITTED BY SENATOR DANIEL AKAKA

FISCAL YEAR 2002 FUNDING AND MODERNIZATION

58. Senator AKAKA. Dr. Robinson, Dr. Tarter, Dr. Browne, Mr. Buggy, Mr. Mitchell, Mr. Douglass, and Mr. Ruddy, in your testimony you emphasized the need to modernize not only the facilities but the equipment used with respect to ensuring the safety and reliability of our nuclear deterrent. What impact does the funding request submitted for fiscal year 2002 have on these issues?

Dr. ROBINSON. There is one critical project I noted in my testimony where the issue identified in this question is immediate: the Weapons Evaluation Test Laboratory. The Weapons Evaluation Test Laboratory will replace a 40-year-old facility at NNSA's Pantex Plant, where assembly and disassembly of nuclear warheads and bombs are conducted. This new construction will provide a state-of-the-art facility for testing weapon component devices and implementing advanced diagnostic techniques developed by the Enhanced Surveillance Campaign. It is our intention to provide resources from operating funds to design and replace the aging test equipment with modern computerized test equipment. This project is important for maintaining confidence in the safety, reliability, and performance of the stockpile without nuclear testing. The fiscal year 2002 budget request of $5.3 billion for NNSA Defense Programs reduced the line item to replace the Weapons Evaluation Test Laboratory and eliminated funding to begin replacement of aging test equipment. Both elements need to be maintained.

In addition, other critical facilities are under development that will contribute significantly to the Stockpile Stewardship Program. They are: the Microsystems and Engineering Sciences Application Project (MESA), the Joint Computational Engineering Laboratory (JCEL), the Distributed Information Systems Laboratory (DISL), and the Z Accelerator Refurbishment (ZR). The Microsystems and Engineering Sciences Application (MESA) complex is needed to upgrade the equipment used to develop future microsystems that will enhance the surety and affordability of stockpile refurbishments. It will support research and development of technologies that will attract the best and the brightest scientists and engineers to Sandia for us to address the challenges of future weapons science and engineering. The MESA initia-

tive will allow Sandia to renew the semiconductor processing equipment so that we can continue to research the science and technology of radiation-hardened microelectronics. This equipment will also support Sandia's ability to serve as the supplier of last resort for very-low-volume production of specialized stockpile microelectronics, should anything happen to the private-sector supply base. The Joint Computational Engineering Laboratory (JCEL) and the Distributed Information Systems Laboratory (DISL) are essential for deploying ASCI technology. JCEL will be a state-of-the-art facility at Sandia's site in New Mexico, and will provide laboratory space for developing, prototyping, and using leading-edge computing, communications, and virtual environments. DISL, at Sandia's laboratory site in California, will provide technologies for seamless, secure, and reliable access to scientific and engineering information from the geographically dispersed elements of the nuclear weapons complex, including laboratories, production facilities, and NNSA offices. DISL will focus on research and development to enhance the integration of design and manufacturing tasks.

The Z Accelerator provides unique high-energy-density physics environments today, and consequently it is in very high demand for weapon studies. However, Z is over 15 years old, and many of its components are approaching the end of their useful lives. The Z Refurbishment (ZR) project will replace aging subsystems with state-of-the-art components, increase capacity to more nearly meet the weapon program's demand for experiments, and increase the output and effectiveness of this unique accelerator for Stockpile Stewardship. The scope of work for NNSA Defense Programs at Sandia National Laboratories is intended to ensure the safety, reliability, and survivability of our nuclear deterrent, which is the core mission of the laboratory. As such, the investment in new facilities and their accompanying capital equipment, the replacement of research and development capital equipment, and the capital refurbishment of facilities and capabilities are all focused on meeting that mission goal. The fiscal year 2002 budget request at $5.3 billion will not satisfy all the construction, operations, and recapitalization objectives of the SSP across the NNSA complex as currently planned.

Dr. TARTER. Stockpile Stewardship will not succeed without the new-facility investments that are being made at the NNSA laboratories. Scheduled programmatic work at the laboratories and the plants has also placed exceedingly high demands on provided funding. The cumulative effect of necessary continuing attention to the highest and most immediate priorities over the course of the Stockpile Stewardship Program has been shortage of funds to recapitalize NNSA's underlying infrastructure. As a result, NNSA has developed a Facilities and Infrastructure Recapitalization Plan, which we are supporting.

Over the years, Livermore has depended on having special facilities and equipment in an accommodating work environment to attract and retain an exceptional staff. Sustaining the quality of our workforce is made more difficult by the continued aging of our facilities without major reinvestment. At Livermore, only 60 percent of our employees currently reside in permanent space, and 70 percent of the temporary office space (trailers and modular buildings) is nearing or beyond end of service life. Overall, 14 percent of Livermore's office and laboratory space is in need of major rehabilitation and nearly 30 percent of the space is in need of minor rehabilitation. Such working conditions are not conducive to retaining and attracting the exceptional workforce that we need to accomplish our mission.

Older facilities typically are more expensive to maintain and usually have higher costs associated with safe and healthy operations. Our overall maintenance backlog is about $330 million if funded with programmatic dollars. In addition, obsolescent equipment needs to be replaced. Accordingly, our input into NNSA/DP's Infrastructure Recapitalization Initiative totals $65.8 million for fiscal year 2002, with $38.2 million for high priority items. Some of the 12 high-priority maintenance, general plant projects, and capital equipment items include replacement of electrical power systems in aging facilities, a number of building renovation projects, and investments in High-Efficiency Particulate Air (HEPA) filters to more effectively ensure that our high environmental standards continue to be met. Two other high priority projects include a decontamination and demolition project and a scoping and design study for rehabilitation of a major building complex at our site.

Dr. BROWNE. To accomplish the work and meet the needs mentioned in the testimony will require a significant addition to the resources for fiscal year 2002 and future years. Without additional resources programmatic accomplishments will face significant delays.

Mr. BUGGY. See responses to earlier questions.

Mr. MITCHELL. Please see my earlier answers.

Mr. DOUGLASS. The proposed fiscal year 2002 budget target for the Kansas City Plant (at the $5.3 billion DOE/NNSA budget level) will support basic facility oper-

ations and will maintain the same minimum level of investment in capital equipment projects as in prior years. Significant facility improvements and equipment projects will continue to be deferred, increasing the risk of unplanned interruptions in operations, creating an even larger backlog. This also precludes investment in new equipment and technologies needed to support emerging Stockpile Life Extension Program needs and the ability to keep pace with development at the National laboratories.

Additionally, at this budget level, Stockpile Management Restructuring Initiative (SMRI) line-item construction funding is reduced by $5 million from the requested level. The SMRI project reduces the Kansas City Plant footprint by consolidating production processes which, when implemented, will allow Honeywell to reduce overhead costs and operate the plant in a more efficient manner. Reduction in SMRI line-item funding delays completion of the line item and, therefore, delays realization of the cost reductions. Funding of facilities and infrastructure recapitalization efforts at less than the commercial industry benchmark of 4 to 5 percent of the value of the assigned capital equipment base continues to be a major concern.

Mr. RUDDY. If Pantex receives the funding requested during testimony, and the funding is sustained, it will ease the underfunded condition Pantex has worked under the past 6 years. This underfunded condition has led to premature degradation of Pantex's physical plant. With this funding, aged and technically obsolete equipment can be replaced, and life cycle replacements can be planned and executed on schedule. Also, maintenance backlog items can be corrected and prevented through the institution of predictive and preventive maintenance programs.

DOE LEADERSHIP AND MANAGEMENT

59. Senator AKAKA. Dr. Robinson, Dr. Tarter, and Dr. Browne, there have been a number of reports which have emphasized the need for improved leadership and management throughout the Department of Energy, to include NNSA and its field facilities. Do you feel you have the authority and resources to address these leadership and management concerns?

Dr. ROBINSON. I believe we have established an appropriate foundation within NNSA thus far. As indicated in my testimony, NNSA is making significant progress under the leadership of General John A. Gordon toward establishing its identity as a semi-autonomous agency. General Gordon solicited input from the laboratory directors as he considered the NNSA management structure that he announced on March 14. The NNSA structure provides the framework for Federal authority. As the NNSA executive management team is put in place, we will work closely with it to establish the roles and responsibilities for field offices and the laboratories with clear lines of authority and accountability to NNSA headquarters. Historically, the GOCO (government-owned, contractor-operated) contracting model has worked extremely well for the laboratories and the Federal Government. Unfortunately, in the last decade that concept has been seriously weakened, as indicated, for example, by the 1995 study of DOE oversight and management by the Secretary of Energy's Task Force on Alternative Futures for the DOE National Laboratories (Galvin Report). It is my hope that the executive team that will implement the new NNSA management structure will permit reforms that will allow us to return to the earlier very effective GOCO model. Under this concept, the NNSA Federal structure provides the National mission assignment (what is to be done) while the laboratories determine how to get that job done. In general, the conduct of operations of the programs and the infrastructure and landlord responsibilities should be the purview of laboratory management, within the constraints established by law and the financial resources provided by Congress. An example of clear delegation and accountability is my responsibility as a laboratory director to provide an annual letter on the status of the nuclear weapons stockpile to the secretaries of Energy and Defense so that they can jointly certify the stockpile to the President. I feel that I have full authority to fulfill that assignment with integrity.

Finally, I should mention that the low-level budget obligation controls that were put in place for the nuclear weapons program in fiscal year 2001 have created difficulties for both NNSA and the laboratories. Thirty-two different funding categories (rigid control levels) were created. Consequently, NNSA budget deployment has been substantially more complex and burdensome. Historically, budgetary control levels were high enough to allow some flexibility to address emerging needs and other evolving program requirements without the need for a significant number of reprogramming requests. I strongly encourage that we return to the fewer number of budget control levels. I am confident that NNSA and the laboratories will still

be able to fully meet the intent of Congress and be significantly more efficient in doing so.

Dr. TARTER. From my perspective, the working relationship between the NNSA administrator, General John Gordon, and the laboratory directors is excellent. But improvements throughout NNSA will take time to implement. Earlier this year, General Gordon made significant organizational changes to NNSA and has filled many of the newly created positions with high-quality people. The new team faces a number of significant challenges to clarify lines of authority, facilitate long-range planning, and improve overall efficiency. We agree with the direction General Gordon is taking NNSA and are working to help him succeed in his goals for the agency.

Dr. BROWNE. As Director of Los Alamos National Laboratory, I have authority and resources to address internal Los Alamos leadership and management issues, within the constraints of regulation, law, and of the UC contract. These constraints include, however, numerous oversight requirements imposed on Los Alamos that severely constrain my ability to manage the Laboratory effectively. Additionally, because of the numerous (31), narrowly-defined, congressional budget appropriation categories, coupled with the DOE discretionary reprogramming cap of $5 million, I am severely limited in my ability to shift resources from the spending plan established when the budget was built and submitted 2 years earlier. This structure constrains my ability to address unforeseen issues that have arisen in the interim, such as surveillance findings concerning our stockpiled weapons, safety and security issues, and refinements in the program plan. While we support accountability for resources and deliverables in the SSP, we recommend returning to broader budget categories for appropriations, or raising DOE's reprogramming authority, or both. Resource and deliverable accountability to Congress can be accomplished through improved planning, project controls, and reporting requirements. I believe the NNSA FYDP will greatly help this situation.

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

NONPROLIFERATION PROGRAMS FUNDING

60. Senator BILL NELSON. General Gordon, I'm deeply disturbed about reports that the administration plans to cut funding for nonproliferation programs by $100 million. I am convinced that these very critical programs are important to our national security. How, in your judgement, would these cuts affect our efforts to prevent proliferation?

General GORDON. Although the fiscal year 2002 request is $100.2 million (11.5 percent below the fiscal year 2001 appropriated level), it actually represents a 8.6 percent increase over the fiscal year 2001 level. The fiscal year 2002 request normalizes program growth over 2 years at 4 percent per year. These programs were subject to the administration review of cooperative nonproliferation programs in Russia. That review recently concluded that these programs were effective and should continue with little change.

NNSA INFRASTRUCTURE MODERNIZATION AND RECAPITALIZATION

61. Senator BILL NELSON. General Gordon, I appreciate the report highlighting infrastructure needs and priorities for all facilities and the development of a long-term plan for facility modernization and recapitalization. Please explain how the President's budget for fiscal year 2002 addresses much-needed improvements to our many World War II-era facilities.

General GORDON. I would simply quote Secretary Abraham, who indicated on April 9, 2001, in his statement concerning the DOE fiscal year 2002 Budget Request to Congress that, "While awaiting the policy shaped by the Strategic Defense Review, we will refocus funding to meet vital national security needs, including investments to maintain our nuclear weapons arsenal, shore up an aging weapons infrastructure, and improve safeguards and security at all DOE facilities."

The President's budget provides the same level of resources for our facilities and infrastructure as has been provided in the last several years. The base maintenance and infrastructure efforts at our sites are primarily funded within the budget for Readiness in Technical Base and Facilities and through site overhead allocations. Our focus is to ensure that facilities necessary for immediate programmatic activities are maintained sufficiently to support the workload.

The outcome of the administration's strategic defense review could result in a fiscal year 2002 budget amendment to address, among other things, funding for the maintenance backlog in the nuclear weapons complex.

MATERIALS PROTECTION, CONTROL, AND ACCOUNTING PROGRAM

62. Senator BILL NELSON. General Gordon, the Materials Protection, Control, and Accounting (MPC&A) program, which improves physical security at Russian nuclear weapons facilities, is cut in the President's budget by $31 million, almost 18 percent, to around $139 million. What has changed to make the funding requirement drop?

General GORDON. The primary change that has occurred with respect to the MPC&A program is reflected in the significant progress made in improving the security of Russian facilities containing nuclear weapons and weapons-usable material. According to a recent General Accounting Office study, the program has provided significant threat reduction for 192 metric tons, some 32 percent of the material at risk. The report also acknowledges MPC&A upgrades underway on an additional 130 metric tons of nuclear material. Improved security for over 320 metric tons of nuclear material represents more than half the material we have identified as requiring such protection, but there remains almost that much material still requiring security upgrades. The budget request for fiscal year 2002 reflects a continued commitment to complete the necessary upgrades at the remaining facilities in Russia considered at-risk.

63. Senator BILL NELSON. General Gordon, has the requirement changed?

General GORDON. No. As noted in our response to the previous question, the program has made significant progress in improving the security of Russian nuclear materials and warheads but much work remains for the program to complete its mission. In addition, within Russia we continue to see conditions that underscore the critical importance of the MPC&A mission, including poorly trained and equipped guards at nuclear sites and Russian physical protection standards often insufficient to protect proliferation attractive material. Given these conditions, the program believes there also remains considerable work to be done in such areas as regulatory development and operator training to ensure that the Russian government is prepared to assume full responsibility for protecting its materials.

64. Senator BILL NELSON. General Gordon, how would you describe the risks associated with this reduction in funding?

General GORDON. While some programmatic activities are scheduled to be either slowed down or adjusted, the requested funding levels of the NNSA's nonproliferation programs are considered sufficient to carry out its mission of reducing the threat posed by the spread of weapons of mass destruction. Additionally, while the fiscal year 2002 budget request is $100.2 million (11.5 percent) below the fiscal year 2001 appropriated level, it actually represents a 8.6 percent increase over the fiscal year 2000 level. The fiscal year 2002 request normalizes program growth over 2 years at 4 percent per year.

NUCLEAR CITIES INITIATIVE

65. Senator BILL NELSON. General Gordon, the Nuclear Cities Initiative (NCI), which prevents a Russian brain drain by helping find or provide civilian jobs to their unemployed weapons scientists, was cut in the President's budget from $27 million in fiscal year 2001 to $6.5 million in fiscal year 2002, a cut of about 76 percent. This will force you to work in one city, rather than three. How would you describe the risks associated with this cut?

General GORDON. The NCI is focused on nuclear weapons complex reduction in Russia, which it achieves by reducing the physical footprint, removing functions and equipment, and creating sustainable, alternative non-weapons work within a functioning city economy. NCI is currently working in three closed cities. At $6.5 million, NCI will focus most of its efforts in Sarov and will provide limited support to projects in Snezhinsk and Zheleznogorsk. This prioritization helps ensure that the requested NCI funds are utilized in a manner that has the highest impact possible in facilitating the reduction of Russia's nuclear weapons complex.

66. Senator BILL NELSON. General Gordon, how will this affect the likelihood of more of these scientists working for Iraq, Libya, or Osama bin Laden?

General GORDON. While it would be difficult, if not impossible, to predict exactly the impact a changing budget within the NCI program would have on the likelihood

of scientists going to work for Iraq, Libya, or Osama bin Laden, I can assure you that we at the NNSA are working very hard to ensure that the NCI funds are spent in a prioritized manner that provides the highest impact possible. At our fiscal year 2002 funding request, the NCI will focus its work primarily on the closed city of Sarov, with minimal work involving projects at the closed cities of Snezhinsk and Zheleznogorsk. This prioritization is based in part on where we believe the greatest impact can be gained with the current funding level, and where we believe the greatest risk is.

STOCKPILE SAFETY AND THE ENVIRONMENTAL MANAGEMENT PROGRAM

67. Senator BILL NELSON. General Gordon, in your opinion, does the President's budget fully protect the safety and stability of our stockpile, particularly in light of cuts to Environmental Management programs?

General GORDON. The fiscal year 2002 President's budget provides for the continued safety and stability of the nuclear weapons stockpile for the near term. The fiscal year 2002 request provides a 4.6 percent increase for the Weapons Activities appropriation that maintains ongoing stockpile stewardship activities at roughly the fiscal year 2001 level. Funding to meet DOE annual weapons alterations, modifications, and surveillance requirements is included in Directed Stockpile Work, Stockpile Maintenance, and Stockpile Evaluation, and the request is sufficient to support the fiscal year 2002 workload requirements in the current Production and Planning Directive. The budget request fully funds stockpile life extension and refurbishment of the W87 and B61 in fiscal year 2002, and supports initial limited engineering development for the W76 and W80. We expect to receive further guidance on pace and scope for these systems from the administration's strategic reviews. The reductions to the Environmental Management programs do not impact the safety and stability of our stockpile.

68. Senator BILL NELSON. General Gordon, what impact might these cuts have on the morale of DOE employees?

General GORDON. Final fiscal year 2002 appropriations for the Environmental Management programs will determine whether or not there are employee impacts in those programs. Although the decisions on indirect allocations will not be made until the fiscal year 2002 budgets are appropriated and executed beginning in October 2001, we believe there will be no impact to employees associated with the Weapons Activities programs.

69. Senator BILL NELSON. General Gordon, does the amount provided in the President's budget assume a unilateral reduction in our stockpile?

General GORDON. No. No change in the size of the stockpile is assumed in the fiscal year 2002 budget request.

MAINTENANCE AND THE WEAPONS COMPLEX

70. Senator BILL NELSON. Dr. Robinson, Dr. Tarter, or Dr. Browne, recently, former Secretary of Energy James Schlesinger and Mr. Steven Guidice testified before this subcommittee on the results of their study assessing the safety and reliability of the stockpile. In their report, they found that $300 to $500 million per year is needed for, "a 10-year program to eliminate critical maintenance backlogs and gaps in stockpile repair and replacement capabilities." Would you agree with such an assessment, and on that amount of money?

Dr. ROBINSON. The assessment by Secretary Schlesinger and Steven Guidice affirms the conclusions of a number of reviews conducted in the last 15 years, the most recent resulting in the Facilities and Infrastructure Revitalization Initiative at NNSA. In my opinion, the general assessment and the funding range indicated by Secretary Schlesinger and Mr. Guidice are reasonable. As I mentioned in my testimony, a review at Sandia National Laboratories identified approximately $300 million in projects that can benefit from the Facilities and Infrastructure Revitalization Initiative funding during the course of the next few years.

Dr. TARTER. A major increase in investments is needed to deal with aging NNSA facilities throughout the nuclear weapons complex affecting workplace quality and, in cases, severely limiting productivity. The $300 to $500 million per year for 10 years is a figure that has been arrived at by a number of people that examined problems complex-wide.

Data about Livermore helps to substantiate that overall estimate. As I stated in my written testimony, 14 percent of Livermore's office and laboratory space is in

need of major rehabilitation and nearly 30 percent of the space is in need of minor rehabilitation. Our overall maintenance backlog is about $330 million if funded with programmatic dollars, and reduction of the maintenance backlog is not the only issue we face. Obsolescent equipment needs to be replaced. Legacy facilities from long-discontinued programs, as well as outdated and unusable or unsafe laboratory space, must be decommissioned, decontaminated (where necessary), and demolished. In addition, some buildings require upgrades to meet present-day seismic-safety codes. An additional $25 to $50 million per year for a decade would greatly help us to recapitalize our infrastructure. Livermore needs help of that magnitude, and there are NNSA sites with greater problems than we have.

71. Senator BILL NELSON. Dr. Robinson, Dr. Tarter, or Dr. Browne, please explain how the President's budget addresses much-needed improvements to our many World War II-era facilities and what your most pressing facility needs are.

Dr. ROBINSON. Sandia National Laboratories has only one area of World War II-era facilities remaining, and it is scheduled for decontamination and demolition. In my testimony concerning infrastructure to the Senate Committee on Appropriations, Subcommittee on Energy and Water Development, on March 13, 2001, I stated that approximately 45 percent of our buildings are at least 30 years old. I also pointed out that many of the utilities serving them are beyond their useful life. The planned construction at Sandia National Laboratories is intended not just to provide advanced capabilities, but also to provide essential and effective working space for staff. Our most pressing facility needs are addressed by the Microsystems and Engineering Sciences Application Complex (MESA), the Distributed Information Systems Laboratory (DISL), the Joint Computational Engineering Laboratory (JCEL), the Test Capabilities Revitalization (TCR), the Weapons Evaluation Test Laboratory (WETL), and the Z Accelerator Refurbishment (ZR) projects. Timely completion of these projects is essential to meeting our requirements. The fiscal year 2002 budget request at $5.3 billion will not satisfy all the construction, operations, and recapitalization objectives of the Stockpile Stewardship Program across the NNSA complex as currently planned.

Dr. TARTER. Other than funding for line-item construction of major new facilities, since the mid 1990s our infrastructure reinvestments have been in the range of $25 to $50 million per year in programmatic dollars. Over the same time period, we developed and put in place a very effective methodology for prioritizing recapitalization investments, and we have demonstrated cost-effective approaches for dealing with aging facilities. The Laboratory has been able to make infrastructure reinvestments wisely and efficiently. However, with the level of funding the Laboratory has received, we have been barely treading water taking care of high-priority deficiencies at nearly the same rate that new ones arise as facilities and equipment continue to age. To make significant headway on reducing our maintenance backlog and dealing with other infrastructure issues, we need more funding than the President's budget provides.

Our input to NNSA/DP's infrastructure recapitalization initiative totals $65.8 million for fiscal year 2002, with $38.2 million for high-priority items. Some of the 12 high-priority items are: maintenance projects; general plant projects; capital equipment items including replacement of electrical power systems in aging facilities; a number of building renovation projects; and investments in High-Efficiency Particulate Air (HEPA) filters to more effectively ensure that our high environmental standards continue to be met. Two other high priority projects include a decontamination and demolition project and a scoping and design study for rehabilitation of a major building complex at our site.

[Whereupon, at 4:42 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2002

TUESDAY, JUNE 26, 2001

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

DEPARTMENT OF ENERGY'S BUDGET REQUEST FOR THE OFFICE OF ENVIRONMENTAL MANAGEMENT

The subcommittee met, pursuant to notice, at 10:05 a.m. in room SR–222, Russell Senate Office Building, Senator Jack Reed (chairman of the subcommittee) presiding.

Committee members present: Senators Reed, Bill Nelson, and Allard.

Majority staff members present: Madelyn R. Creedon, counsel.

Minority staff members present: George W. Lauffer, professional staff member; Ann M. Mittermeyer, minority counsel; and Scott W. Stucky, minority counsel.

Staff assistants present: Kristi M. Freddo and Thomas C. Moore.

Committee members' assistants present: Elizabeth King, assistant to Senator Reed; Peter A. Contostavlos, assistant to Senator Bill Nelson; Eric Pierce, assistant to Senator Ben Nelson; John A. Bonsell, assistant to Senator Inhofe; and Douglas Flanders, assistant to Senator Allard.

OPENING STATEMENT OF SENATOR JACK REED, CHAIRMAN

Senator REED. We are joined by the ranking member, Senator Allard. The Strategic Subcommittee meets this morning to discuss the Department of Energy (DOE) Environmental Management (EM) program. Our witness today is Dr. Carolyn Huntoon, who was formerly the Assistant Secretary of Energy/Environmental Management and who is currently serving in that role in an acting capacity. Welcome, doctor. Thank you so much for joining us this morning.

In the past, the Strategic Subcommittee has had the opportunity to hear from the major prime contractors responsible for implementing the DOE cleanup programs. While we were not able to do that this year, I did want to extend to these contractors the opportunity to provide testimony to be included in the subcommittee's record of this hearing. At the moment, I know of one contractor, Fluor Federal Services, that has stated they may submit testimony

for the record. Any testimony from any major prime contractors will be included in the record provided such testimony is submitted prior to 6 p.m. tomorrow.

I would like to add that submitting testimony is completely voluntary and optional. We are not making a request of any contractor to submit testimony. Senator Allard and I would have preferred the opportunity to hear from the contractors directly, but the committee's schedule this year does not permit such a hearing.

At $5.9 billion, the Environmental Management program is the single biggest program at the Department of Energy. Of that amount, $5.7 billion falls within the jurisdiction of the Armed Services Committee. This program is governed by a series of enforceable agreements that are important to the health and well-being of the communities around the many DOE sites and of the employees who work there.

These agreements have been a driving force to remedy the well-documented history of environmental contamination by the DOE and its predecessor agencies. Today, many are concerned that the President's budget request for fiscal year 2002 will not allow the DOE to meet the requirements contained in these agreements. Dr. Huntoon, the DOE's continuing ability to comply with the enforceable agreements is one of the subjects I would like to you address this morning.

Over the past few years, the DOE has made substantial progress in cleaning up these sites, but much remains to be done. At many of these sites, new or improved technologies will be needed to sustain the program's recent progress. Dr. Huntoon, I note in your prepared testimony that the DOE last year used more than 200 new technologies across the complex to improve the rate and reduce the cost of cleanup and waste treatment activities.

While it is appropriate that the bulk of the science and technology funding should be focused on near-term problems, I am concerned that the budget request may not support new basic or longer-term research efforts. Many of the DOE sites are faced with cleanup challenges that will continue far into the future and for which there are either no or minimal methods of cleanup or treatment. I hope the DOE will continue with its program to develop and field the technologies necessary to reduce the cost and time of cleanup.

The Environmental Management program is a complex and challenging program that will remain a challenge for many years to come. I'd like to thank you, doctor, for your service to this program and your distinguished service to the United States Government. We look forward to hearing from you this morning. Now at this time I would like to turn to the ranking member, Senator Allard, for his opening statement.

Senator.

STATEMENT OF SENATOR WAYNE ALLARD

Senator ALLARD. Thank you, Mr. Chairman. Good morning.

Senator REED. Good morning.

Senator ALLARD. I want to thank the witnesses for appearing before the subcommittee today. Dr. Huntoon, as you near the end of your term as the Assistant Secretary for Environmental Manage-

ment, I want to say that you have performed well while serving in this capacity and I thank you for your service. I have enjoyed working with you during the past couple of years, including our joint appearances at several EM meetings.

You can also offer some useful guidelines, I think, for future holders of this important office, and I will miss working with you, but I do think that your successor, Jessie Hill Roberson, has a proven track record and I look forward to working with her as she moves into her new responsibilities after confirmation here in the Senate. You have enormous challenges, you notice how positive I am about that.

Senator REED. Just a question of timing, Senator.

Senator ALLARD. Enormous challenges are present across the Environmental Management program, both in terms of scale and complexity. The legacy of a five-decade nuclear weapons program has been essential in providing strong national security. It has also forced us to take on another very important mission, and that is cleanup of our former defense nuclear facilities.

One of the innovative approaches to completing cleanup of these defense nuclear facilities is the defense facilities closure projects program. Although this program was started before you took over as the Assistant Secretary of Environmental Management, it certainly has been advanced during your tenure. The goal of successfully cleaning up and closing several of the EM sites is important for a variety of reasons.

First and foremost, it provides safety to the communities in and near DOE facilities. Whether it is the Fernald or Mound sites in Ohio, or the Rocky Flats site in Colorado, the communities surrounding these facilities want to see the sites cleaned up. In fact, in last Thursday's *Dayton Daily News*, dated June 21, 2001, it was reported that the Miamisburg Mound Community Improvement Corporation, which has concerns whether the community's site will be completed by 2006, has rolled out a plan to make sure the 2006 closure date remains on track. Now, whether this plan or other innovations help the DOE achieve the goal of a 2006 closure, cleaning up and closing these sites would be the fastest way to ensure safety for the workers and surrounding communities.

While closure requires strong integration and cooperation across the entire EM complex, it will also provide a financial windfall to the remaining EM sites by freeing up $1 billion per year upon closure of Fernald, Mound, and Rocky Flats. That is a significant number there, Mr. Chairman.

Dragging out the cleanup schedule at any site continues the dedication of a large percentage of the EM funding toward landlord and mortgage costs. Rocky Flats spends almost $1 million per day to maintain the systems that safeguard the material and keep the buildings safe for the workers to work in them. With a variety of problems that have plagued the Department of Energy during the past decade, the DOE needs to prove they can successfully clean up and close a major former defense facility. If we delay closure of these facilities beyond 2006, such a move may create enough political pressure to delay closure indefinitely.

Long delays only increase the costs, avoid the safety of closure, avoid the cleanup of our environment, and deny the other major

EM sites additional funding which will be borne out of closure, and prove to the naysayers that the DOE is back to business as usual. They can't get the job done on time or within their budget.

I think we can do better than that. Frankly, I don't think we can afford to go down that path, nor do I believe we need to. It is a big challenge to close Fernald, Mound, and Rocky Flats by 2006, but the alternatives are certainly unacceptable. We owe it to the local community, to the other sites that will benefit from newly available resources, and to the American people who want to see their environment cleaned up and their sources handled responsibly.

The Department of Energy should seize this moment. Therefore, I look forward to hearing from you today about the EM program and to discuss how we can make sure we are successful in getting the cleanup done. With that, Mr. Chairman, I look forward to working with you on this very important issue, and I yield back.

Senator REED. Thank you very much, Senator Allard. Let me also join you in commending Dr. Huntoon for her extraordinary service to the Nation and the Department of Energy and she has confirmed her innate wisdom by planning to retire in Rhode Island. I can't think of anything that is more wise in such an approach.

Senator ALLARD. Mr. Chairman, you have a beautiful State. I can only think of one State that might be more beautiful.

Senator REED. That's right. That is, I think I know what it is, Senator. We are pleased, doctor, that you are here today. Your opening statement is already in the record, so you may proceed with your testimony.

STATEMENT OF DR. CAROLYN L. HUNTOON, ACTING ASSISTANT SECRETARY OF ENERGY FOR ENVIRONMENTAL MANAGEMENT, DEPARTMENT OF ENERGY, WASHINGTON, DC

Dr. HUNTOON. Thank you, Mr. Chairman, and thank you, Senator Allard. It is a pleasure to be here today to talk about the DOE Environmental Management fiscal year 2002 budget and ask for your support. As you both have just been listing for us, we know that 50 years of nuclear weapon production enabled us to win the Cold War, but left behind this profound legacy of waste and environmental contamination.

I'm talking about, to remind you, trillions of gallons of contaminated groundwater, millions of cubic meters of contaminated soil, millions of gallons of highly radioactive liquid waste, and thousands of contaminated buildings across our country. Although the progress in addressing these problems was initially slow, I believe we have turned the corner, and we are beginning to see some real tangible evidence of success.

For example, we have completed cleanup of 71 of the 113 geographic sites, or 66 percent of the geographic sites have been cleaned up, and three more will be done by the end of this fiscal year. We have completed cleanup at over 4,900 of the nearly 10,000 release sites. That is 49 percent of the release sites. We stabilized 57 percent of our nuclear material residue and 12 percent of the plutonium metals and oxides.

At the Hanford site in Washington State, we are moving spent nuclear fuel away from the Columbia River into a safer dry storage

area. This project took time. It is very technical. A very difficult project, but we are making progress.

At the Savannah River site in South Carolina, we have produced over 1,100 canisters of vitrified high-level waste. At Oak Ridge in Tennessee, we completed the cleanup of the gunite tanks 10 years ahead of schedule by using a suite of innovative technologies. At Paducah in Kentucky, we have completed removal of the infamous Drum Mountain. We have received over 270 shipments of transuranic waste and disposed of over 1,800 cubic meters of transuranic waste at the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico, and this is helping us meet our commitments at the sites around the country to remove waste.

We are also doing so well at Rocky Flats that closure by 2006 is moving from a vision into a realistic goal. In short, we have accomplished a lot. We have accomplished it safely. But we still have much more to do.

In fiscal year 2002, we are asking $5.91 billion for the program. This may not sound like a lot or enough to some people. It is not as much as some people would like, but the good news is $5.91 billion is still a lot of money. I believe we can continue to make progress with this funding. The budget continues to place the highest priority on protecting the health and safety of the workers and the public at all of the DOE sites and continuing work to mitigate our highest risk.

We will ensure that the nuclear materials are properly managed and safeguarded. Maintaining compliance is a priority but given the demands on this budget, it will be a challenge at some of our sites. We have given priority to several key projects that will help reduce high risk, provide significant mortgage reduction, and are key to completing activities at other sites. These projects include keeping Rocky Flats and Fernald on track to meet their accelerated closure dates.

We will continue progress in designing and constructing a vitrification plant to immobilize the high risk, highly radioactive waste at the Hanford site, and in vitrifying the highly radioactive waste at the Savannah River site and selecting a technology for the pretreatment of a portion of that waste. We are almost doubling the shipments of transuranic waste to WIPP to support the closure or compliance requirements in other states. This includes shipments from the Idaho National Engineering and Environmental Laboratory, Rocky Flats, Savannah River, and Argonne National Laboratory-East in Chicago.

Stabilizing spent nuclear fuel or moving it from wet storage to a dry, safer place is a high priority, as is continuing progress on disposing of waste and cleaning up the sites, completing active cleanup of Weldon Springs in Missouri and developing a long-term stewardship program to monitor and maintain remedies after cleanup is completed.

The budget continues to fund development and deployment of new technologies that can reduce cleanup costs and schedules. The fiscal year 2002 request also funds high-priority new responsibilities that were added to our program this year. This includes the turnover of the uranium enrichment plants in Portsmouth, Ohio, and activities required to keep it safe and operable; design and con-

struction of the depleted uranium hexafluoride conversion plant at Portsmouth and Paducah, Kentucky; and acceptance of some excess facilities from the National Nuclear Security Administration and the Office of Science for eventual decontamination and decommissioning.

The Secretary has challenged every program in the Department of Energy to become 5 to 10 percent more efficient. In addition, he has challenged us to reduce the schedules and cost of completing cleanup. This EM budget reflects this challenge. The Secretary has asked me to initiate a top-to-bottom assessment of the program, which will be completed by my successor.

The goals of this top-to-bottom assessment are to strengthen our project management, to reduce our contractor overheads, to employ effective contracting strategies to ensure we are performing work as efficiently as possible and in the proper sequence, and to ensure that our decisions are based on sound science.

In implementing this approach, we will continue open dialogue with Federal and state regulators. The Secretary has invited the governors of the states which host our major states and EPA Administrator Whitman to work with him to find more efficient ways to do business and improve the compliance framework that governs much of the Department's work at these sites. To date, we have received affirmative responses from seven governors and Administrator Whitman.

While working together with our Federal partners and with our contractors and with your support for this budget, we can develop solutions to achieve our shared environmental goals more efficiently. Thank you for your continued support of this program. I'll be happy to answer any questions.

[The prepared statement of Dr. Huntoon follows:]

PREPARED STATEMENT BY DR. CAROLYN L. HUNTOON

Mr. Chairman, and Members of the Subcommittee, I appreciate this opportunity to appear before you to discuss the Department of Energy's Environmental Management (EM) program and its fiscal year 2002 budget request.

The Department of Energy's fiscal year 2002 request of $19.2 billion fulfills President Bush's commitment to responsible discretionary spending while meeting critical requirements and priorities in the National security, energy, science, and environmental quality programs the Department administers. We faced some tough choices for all of the Department's programs, but the end result is a balance among the critical national priorities in the programs administered by DOE.

The Environmental Management program constitutes nearly a third of the Department's budget, second only to our national security activities, illustrating the scope and complexity, as well as the challenge, of the cleanup we face. Our budget request of $5.913 billion for fiscal year 2002 for the EM program will enable the DOE to continue the cleanup of the contamination and wastes that resulted primarily from nuclear weapons research and production over the past 50 years. We are requesting $4,128.7 million in Defense Environmental Restoration and Waste Management (excluding $420 million for the Federal contribution to the Uranium Enrichment Decontamination and Decommissioning Fund); $1,050.5 million in the Defense Facilities Closure Projects; and $141.5 million in Defense Environmental Management Privatization. This totals $5,179.2 million in traditional budget authority and $141.5 million for privatization funding in the Defense accounts. Detailed information on site activities covered under this account are attached to this testimony.

The level of funding in our request reflects the Department's priorities for the EM program. These priorities are, first and foremost, to ensure the safety of the workers and the public at all our sites. The request supports critical safety programs for the protection of workers who carry out cleanup activities across the DOE complex. Our request supports activities needed to address high risk wastes and nuclear materials

to ensure they are safe and secure and that progress continues to reduce risks. It keeps us on track to meet accelerated closure schedules at Rocky Flats in Colorado and the Fernald site in Ohio. It supports many key projects, including the development of a waste treatment plant at Hanford to immobilize high-level waste, increased waste shipments to the Waste Isolation Pilot Plant, and stabilization of spent nuclear fuel and plutonium materials at the Savannah River Site in South Carolina. Our budget request continues efforts to develop and deploy innovative technologies that can reduce the cost and schedule of cleanup. While the budget addresses the major cleanup problems covered by compliance agreements and other essential requirements across the complex, Energy Secretary Abraham also has directed a top-to-bottom management review of the EM program with the goal of identifying efficiencies and speeding up our cleanup efforts.

The Secretary has challenged every program in the Department to become 5 to 10 percent more efficient, and the EM review will focus on meeting this challenge. Under this management review, the program will work to identify steps to strengthen project management, implement contracting strategies that help reduce costs and schedules, make greater use of new technologies, and sequence work more effectively. We must be sure that we are spending our cleanup dollars on the right problems and that we are addressing cleanup problems as effectively as possible.

Critical to the success of these efforts is the involvement and support of our state and Federal partners. The Department is firmly committed to conducting the cleanup safely and in compliance with applicable laws and regulations. It is critical, however, that we are conducting the cleanup in the best and most practical way possible. Accordingly, the Secretary has invited the governors of the States that host our sites and EPA Administrator Christine Todd Whitman to work with us to improve the compliance framework that governs much of the cleanup work at our sites. We need to review our cleanup work to ensure it promotes on-the-ground results, makes use of technologies that are efficient, and reflects the lessons and technical understanding developed over the past decade. I am confident that, working cooperatively, we can find ways to achieve our shared environmental goals more efficiently.

INTRODUCTION

Before discussing the specifics of our fiscal year 2002 budget request, I would like to provide an overview of our program, as well as highlight some of our accomplishments in the past year and our planned achievements for the current fiscal year.

A. Meeting the Challenge of the Environmental Legacy

The Environmental Management program is responsible for managing and cleaning up the environmental legacy of the Nation's nuclear weapons program and government-sponsored nuclear energy research. A common theme among the very diverse facilities across the country where the EM program is conducting cleanup is the challenge presented by the magnitude and complexity of the task we face in managing large volumes of nuclear wastes, safeguarding materials that could be used in nuclear weapons, and remediating extensive surface and groundwater contamination.

In total, we are responsible for addressing an estimated 1.7 trillion gallons of contaminated groundwater and 40 million cubic meters of contaminated soil and debris. EM is responsible for safely storing and guarding more than 18 metric tons of weapons-usable plutonium, enough for hundreds of nuclear weapons. Our inventory includes over 2,000 tons of intensely radioactive spent nuclear fuel, some of which is corroding. EM is also responsible for storage, treatment, and disposal of radioactive and hazardous waste, including over 340,000 cubic meters of high-level waste stored at the Hanford, Idaho, New York, and Savannah River sites; and for deactivation and decommissioning of about 4,000 facilities that will no longer be needed to support the Department's mission. The EM program also is responsible for critical nuclear non-proliferation programs to accept and safely manage spent nuclear fuel from foreign research reactors that contain weapons-usable highly enriched uranium.

Completing the cleanup of the legacy from nuclear weapons production will meet our obligations to those communities and states that supported our national defense effort and helped win both the Second World War and the Cold War. Completing this cleanup will allow us to turn lands and facilities to other public uses and allow the Department to focus on its science, security, and energy missions.

B. Accomplishments and Progress in Fiscal Year 2001

I am pleased to report that EM is making significant progress around the country. Our accomplishments reflect the program's continued commitment to performance-

based management, establishing goals and performance measures that demonstrate our progress in on-the-ground environmental cleanup and meeting our goals. For example:

- In fiscal year 2000, EM completed its cleanup work at two more sites: the Battelle Columbus-King Avenue site in Ohio and the Monticello site in Utah. We plan to complete cleanup of the Grand Junction site in Colorado, General Atomics in California, and Argonne-West in Idaho by the end of fiscal year 2001. This will bring the number of completed sites to 74, with 40 sites (including the Moab site in Utah) remaining that require active cleanup.
- The rate of shipments of transuranic waste for disposal at the Waste Isolation Pilot Plant (WIPP), the world's first deep geologic waste repository, continues to increase. WIPP received 58 shipments in fiscal year 2000 and plans to receive an additional 381 shipments by the end of fiscal year 2001, which will bring the total number of shipments to 471 containing over 3,000 cubic meters of waste since WIPP began operations in March 1999. We are receiving waste from Rocky Flats, Los Alamos National Laboratory in New Mexico, Hanford, and the Idaho National Engineering and Environmental Laboratory (INEEL), and made the first shipment from the Savannah River Site last week.
- We continue progress toward the ambitious goal of closing Rocky Flats by 2006. In February 2000, we put in place a new "closure" contract that provides incentives to the contractor to meet the December 2006 target date for site closure. We completed the demolition of Building 779 in January 2000, 8 months ahead of schedule. This is the first plutonium facility of its size and complexity in the Nation to be decommissioned and demolished. Shipments of waste continue, including 249 cubic meters of transuranic waste to WIPP in fiscal year 2000 with another 1,000 cubic meters scheduled for fiscal year 2001. We are removing nuclear materials from the site, we completed shipments of plutonium scrub alloy to the Savannah River Site in fiscal year 2000, and will complete shipments of classified metals to Los Alamos and the Savannah River Site in fiscal year 2001.
- In December 2000, we awarded a "closure" contract for the Fernald site in Ohio, which includes incentives to the contractor to accelerate closure ahead of the 2010 closure date in the site's current baseline. We continue to stay on track for closure by deactivating and decommissioning facilities, disposing of contaminated soils and waste, and shipping nuclear materials off-site.
- We produced a total of 231 canisters of vitrified high-level waste in fiscal year 2000 at the Savannah River Site in South Carolina and expect to produce 220 more canisters in fiscal year 2001.
- At INEEL, we recently finished moving Three Mile Island spent nuclear fuel debris to a newly constructed dry storage facility, almost 2 months ahead of the milestone in the Idaho Settlement Agreement. Construction of the Advanced Mixed Waste Treatment Project started in fiscal year 2000 under a privatization contract. This facility will treat up to 65,000 cubic meters of stored waste. Transuranic waste shipments to WIPP continue in support of the Settlement Agreement with the State.
- At the Oak Ridge Reservation in Tennessee, we completed the cleanup of all eight "Gunite" tanks containing highly radioactive sludge in fiscal year 2000, 8 months ahead of schedule and 10 years ahead of the original baseline. We began shipments of low-level waste to the Nevada Test Site for disposal, which allowed the resumption of off-site shipments of waste to the Toxic Substances Control Act (TSCA) Incinerator under an agreement with the State. In fiscal year 2001, we will begin construction of a new on-site disposal facility for remediation wastes, as well as the construction of a transuranic/alpha waste treatment facility, which will prepare Oak Ridge waste for shipment to WIPP.
- At the Hanford site in Washington State, we continue to make significant progress in reducing the urgent risks associated with the 177 underground high-level waste tanks, some of which have leaked to the surrounding soils threatening groundwater and the nearby Columbia River. We are successfully resolving tank safety issues in fiscal year 2001; we will resolve an issue related to flammable gas safety, the last of high priority safety issues, and remove all remaining tanks from the "Watch List." We continue interim stabilization of single-shell tanks, transferring free liquids in the tanks to more secure double-shelled tanks. We began pumping free liquids from four single-shelled tanks in fiscal year 2000 and will begin pumping

another six tanks in fiscal year 2001, meeting all milestones in the Consent Decree with the State of Washington. In December 2000, a new performance-based contract was awarded ahead of schedule for construction of the treatment facility that will immobilize a significant portion of the high-level tank waste.

• Also at Hanford, in December 2000, we began moving spent nuclear fuel from the K-West basins to safer, dry storage away from the Columbia River. We plan to remove, dry, and transport 116 metric tons of heavy metal spent nuclear fuel in fiscal year 2001. We are also continuing the stabilization of plutonium-bearing liquids and materials in the Plutonium Finishing Plant, completing about 50 percent of solutions and 9 percent of the containers by the end of fiscal year 2001. In fiscal year 2001, we will dispose of more than 490,000 tons of contaminated soil and debris in the onsite disposal facility.

• In fiscal year 2001, we will complete construction of the Decontamination Waste Treatment Facility at the Lawrence Livermore National Laboratory in California. This facility will provide new, state-of-the-art technology for treatment of Livermore waste.

• At the Los Alamos National Laboratory, we began full operation of our sealed source program in fiscal year 2001 to recover radioactive sources that exceed the U.S. Nuclear Regulatory Commission's upper limit for commercial disposal and therefore currently have no approved disposal pathway. This program removes unwanted radioactive sources from the private and public sector and places them in safe storage at Los Alamos. We have brought 1,100 private sector sealed sources to Los Alamos for storage and expect to recover over 2,000 sources by the end of fiscal year 2001.

• In support of non-proliferation goals, we have completed a total of 19 shipments to date of spent nuclear fuel from foreign research reactors in 25 countries since the start of the acceptance program, including three shipments in fiscal year 2001 from Argentina, Chile, Germany, Italy, and Japan. All told, these 19 shipments effectively removed from commerce an amount of uranium equivalent to over 20 crude nuclear weapons. This program is crucial in supporting U.S. policy to reduce and eventually eliminate the use of highly enriched (nuclear weapons-useable) uranium in civil commerce world-wide.

• All EM sites achieved full implementation of Integrated Safety Management (ISM) by the end of fiscal year 2000. ISM is a "common sense" approach to safety management that defines the necessary safety structure for any work activity that could affect the safety of the public, the workers, or the environment.

• Our on-the-ground use of new innovative technologies continues to increase, many of which contributed to or resulted in the accomplishments described above. During fiscal year 2000, DOE sites used EM-sponsored innovative technologies 210 times in cleanup activities. For example, a breakthrough technology (LASAGNATM) that uses buried electrodes to produce a flow of groundwater and dissolved contaminants toward "in situ" treatment zones was deployed at the Paducah Gaseous Diffusion Plant to treat trichloroethylene and technetium contamination in the ground. During the next 2 years, this technology is expected to reduce the level of contamination in the soil to a level that presents no threat to groundwater.

• Also in fiscal year 2000, 30 innovative technologies were made available for use for the first time. One such technology is the Vadose Zone Characterization System which measures contaminants that have leaked from high-level waste tanks into the groundwater. We also initiated 37 full-scale demonstrations of innovative technologies, including the Fiber Optic Tritium Detector and Quantifier, which enables tritium measurements to be made safer, faster (real time), better, and cheaper than traditional liquid scintillation-based techniques.

• During fiscal year 2001, the sites expect to deploy new technology at least 60 times in cleanup activities. For example, we plan to deploy a new technology recommended by the fiscal year 2001 "blue ribbon panel" on alternatives to incineration at Hanford to treat organic hazardous and radioactive mixed waste.

THE FISCAL YEAR 2002 BUDGET REQUEST

The fiscal year 2002 budget request of $5.913 billion will enable EM to continue making progress in cleaning up its sites. The request supports the Department's key priorities needed to meet the environmental management mission. Our request:

- protects the health and safety of the workers and the public at all our sites as our first priority;
- ensures the safety and security of high risk wastes and nuclear materials and continues the progress in addressing our high-risk cleanup problems and addresses critical needs across the DOE complex;
- keeps the major sites on track for meeting accelerated closure goals;
- continues investments in science and technology to find safer, less expensive and more efficient solutions for cleanup problems;
- provides for long-term stewardship responsibilities after cleanup is done.

In addition, the budget request for fiscal year 2002 reflects an increased scope of responsibility from previous requests, funded primarily in non-defense accounts. These include:

Turnover of the Portsmouth Plant: In June 2000, the U.S. Enrichment Corporation (USEC) announced its intention to cease uranium enrichment operations at the Portsmouth Gaseous Diffusion Plant in Ohio. The Department must take steps to keep the facilities in a safe and operable standby condition to ensure, if necessary, that U.S. energy security and nuclear fuel commitments can be met; mitigate the impact of the cessation of enrichment activities on workers; and transition the facility from USEC operation to DOE stewardship.

Uranium Programs: The Energy and Water Development Appropriation for fiscal year 2001 consolidated funding for Uranium Programs and cleanup activities and authorized the transfer of Federal personnel from the Office of Nuclear Energy, Science, and Technology to EM to carry out the associated responsibilities. With this transfer, EM is now the landlord at the gaseous diffusion plant sites, responsible for the management and disposition of 680,000 metric tons of depleted uranium hexafluoride, among other activities associated with the gaseous diffusion plants now leased to USEC.

Remediation of the Moab Site: The National Defense Authorization Act for Fiscal Year 2001 directed the Department to undertake the remediation of the uranium mill tailings site in Moab, Utah, a site previously owned and operated by a now-bankrupt private company.

Transfer of Excess Facilities: Beginning in fiscal year 2002, EM will resume for the first time since 1996 accepting excess contaminated facilities, on a limited basis, from other DOE program offices for eventual deactivation and decommissioning.

I would like to highlight some of the critical activities supported in the fiscal year 2002 request and our plans for the Environmental Management program.

A. Safety First

The safety of our workers is paramount in all we do. We expect outstanding safety performance as a matter of course, demand this from ourselves and our contractors, and accept nothing less. Full and continued implementation of Integrated Safety Management is our way of achieving and sustaining a safe and healthful cleanup. The fundamental principle of Integrated Safety Management is that all accidents are preventable and that safety requirements must be consistent and defined at all steps of planning and conducting work. We recognize that safety culture flows down from actions by the senior management of an organization. These actions enforce the belief at every level that constant attention to safety has an incremental beneficial effect. The Office of Safety, Health, and Security was created to track safety and to assist our managers, programs, and sites in meeting their safety responsibilities.

We influence workers' approach to doing a job by instilling a safety culture; ensuring that workers have the proper knowledge, qualifications, training, and equipment; identifying areas for improvement and verifying that safety deficiencies are corrected; and measuring progress and disseminating lessons learned.

We also have a new initiative to more formally assure that new technologies are developed with the safety of the worker using them as a primary consideration. New technologies, however cost effective, will not be developed and deployed unless they can be used safely. Our goal is develop technologies that are safer to use, and make cleanup safer.

Our enhanced focus on safety has begun to pay off. Currently, the total recordable case rate (a measure of occupational injuries and illnesses, more serious than those requiring first aid) for EM contractors and Federal employees was 1.7 compared to the overall DOE rate of 2.0 and the private industry average of 6.7, despite the fact that the construction type work employed in EM activities is considered to be among the most hazardous. We have, in fact, reduced the EM total recordable case rate by 25 percent since 1999. There has also been considerable progress in closing out corrective actions in response to independently-observed safety deficiencies. There is every indication that workers are committed to the principles of Integrated Safety Management and are taking an active role in making it a part of workplace culture. We are driving safety performance to new levels of excellence, and are developing new ways to safely manage the risks associated with cleanup. Our fiscal year 2002 request fully funds the safety systems and processes that ensure our workers are protected.

B. Giving Priority to the Highest Risk Materials and Wastes

Moving spent nuclear fuel to safe storage at Hanford—In December 2000, we began removing spent nuclear fuel from K-West Basins at the Hanford Site in Washington as part of our ongoing effort to protect the Columbia River. This project is a first-of-a-kind technical solution to move 2,100 metric tons of corroding spent nuclear fuel from at-risk wet storage conditions in the K-East and K-West basins into safe, dry storage in a new facility away from the river. Our fiscal year 2002 request of $163 million for the Spent Nuclear Fuel Project at Hanford allows this critical project to continue on schedule, supporting the transport of 662 metric tons of spent nuclear fuel from K-West Basin and the completion of modifications to K-East Basins.

Stabilize Plutonium at Hanford and the Savannah River Site—We are reducing risks by stabilizing plutonium-bearing materials at Hanford and the Savannah River Site, consistent with our commitments to the Defense Nuclear Facilities Safety Board. At Hanford, our request provides $73.8 million to continue stabilization activities at the Plutonium Finishing Plant, where we will complete stabilization of the remaining 4,300 liters of plutonium-bearing solutions and polycubes and continue stabilization and packaging of plutonium oxides and residues. These stabilization activities are a critical step in the deactivation of Plutonium Finishing Plant, which will significantly reduce "mortgage" costs at Hanford.

At the Savannah River Site, our request of $357.6 million will continue operations in the two chemical processing canyons to stabilize nuclear materials, including plutonium residues and plutonium metals and oxides, as well as plutonium alloys from Rocky Flats. Stabilization of these "at risk" materials is critical in resolving health and safety concerns surrounding these liquid or unstable radioactive materials; in supporting closure goals at Rocky Flats; and in responding to Defense Nuclear Facilities Safety Board recommendations. By the end of fiscal year 2002, with stabilization of sand, slag, and crucible plutonium residues, we will complete processing of all nuclear materials currently planned to be stabilized using the PUREX process in F-Canyon.

Safely Manage and Treat High-Level Waste in Underground Storage Tanks at Hanford—The River Protection Project at Hanford includes the safe storage, retrieval, and treatment of 53 million gallons of high-level waste now stored in 177 underground tanks near the Columbia River. In fiscal year 2002, we will continue interim stabilization of the tanks, i.e., pumping liquid waste from single-shelled tanks, which are at or beyond their design life or do not conform to current design codes, into more reliable double-shelled tanks. We will initiate pumping of four additional single shell tanks, staying on track to meet our commitment to complete interim stabilization of all single-shell tanks in 2004.

Fiscal year 2002 is a critical year in developing the waste treatment plant to vitrify the high-level tank waste, one of the most critical, complex, and costly projects in the DOE complex. The fiscal year 2002 request provides $500 million to develop treatment facilities to vitrify at least 10 percent by volume and 25 percent of the radioactivity of the 53 million gallons of high-level tank waste. Initially being developed under a privatization approach, the privatized contract was terminated in May 2000 because of price and management concerns, and a new contract using a cost-reimbursement approach was awarded in December 2000. The new contract contains incentives tied to performance, encouraging the contractor to meet or exceed cost and schedule goals. The request provides funds to initiate construction of high-level waste pre-treatment and low-activity vitrification facilities and continues the design and installation of waste retrieval systems that will provide waste feed to the treatment facilities.

Treat High-Level Waste and Begin Construction of Salt Processing Pilot Plant at Savannah River Site: The fiscal year 2002 request includes $110.6 million to support continued vitrification of high-level waste at the Defense Waste Processing Facility that has produced more than 1,080 canisters of vitrified waste. By the end of fiscal year 2002, we will complete about 22 percent of the expected lifetime total of 6,025 canisters. The request also supports development of a technology to separate the high-activity and low-activity fractions of the salt waste, in order to minimize the amount of waste that must be vitrified and disposed of in a deep geologic repository. The Department is scheduled to identify a preferred alternative technology or technologies in June 2001 to replace the In-Tank Precipitation technology, which was terminated in 1998 because of excessive benzene generation. Two of three technology options currently being considered are a result of the EM science program; without this work, Savannah River Site would have had to begin development of new alternatives, creating a further delay of at least 6 years. In fiscal year 2002, we will begin construction of a pilot plant that will provide design and operational information for a full-scale salt processing plant.

Complete Construction of the Advanced Mixed Waste Treatment Project at INEEL—The request includes $40 million in budget authority for the Advanced Mixed Waste Treatment Project (AMWTP) at INEEL, a privatization project that will greatly increase the INEEL's capability to prepare 65,000 cubic meters of waste for disposal at WIPP. In fiscal year 2002, we will complete construction of the facility, and we will be on track to begin operations in 2003 in accordance with the agreement with the State.

In response to a lawsuit and community concerns, the Department put the incineration component of the AMWTP on hold pending an expert review of alternative technologies to incineration that can meet legal standards. The "blue ribbon panel" of experts, in a December 2000 report, identified several promising technologies. The request provides $5 million to explore several of these technologies, which may eliminate the need for the incinerator that had been planned for AMWTP.

Increase Shipments to WIPP: The request of $164.6 million plus $2.6 million for safeguards and security for the Waste Isolation Pilot Plant will allow us to increase shipments of contact-handled transuranic waste to WIPP in fiscal year 2002. We will continue critical shipments from Rocky Flats to support the closure schedule and from INEEL to meet its agreement with the State, as well as limited shipments from other sites. The WIPP facility remains critical to meeting our closure and completion goals at other sites.

Begin Construction of a Pilot for "Melt and Dilute" Technology: The Savannah River Site has been developing a cost-effective path forward for spent nuclear fuel that does not require stabilization for health and safety reasons. This research and development effort is helping us identify technologies to manage spent nuclear fuel and other nuclear materials without chemical separation. Our efforts to develop the "melt-and-dilute" process have been so successful that we selected it as the preferred technology to prepare aluminum-based spent nuclear fuel for geologic disposal. Construction of a pilot plant that will test real spent fuel to demonstrate the viability of the melt and dilute process will be completed this fiscal year, and the $4 million requested in fiscal year 2002 will support operations of the pilot plant. This will provide a firm basis for the design and construction of the full-scale facility to prepare and store this spent nuclear fuel prior to final disposition in a geologic repository.

C. Supporting the Closure of Major Sites

Staying On Track to Close Rocky Flats: The fiscal year 2002 budget request of $628.6 million plus $35.4 for safeguards and security, or a total of $664 million, supports the closure of Rocky Flats by December 15, 2006, the closure date targeted in the contract. The Rocky Flats site is the largest site challenged to accelerate site cleanup and achieve closure in 2006. To date, significant progress has been made toward making this goal a reality. A key ingredient for closing Rocky Flats is being able to ship nuclear materials and waste off-site, which requires that other sites, often DOE sites, are available and prepared to accept the materials. Our request also provides the necessary funds to other sites, such as Savannah River Site, Oak Ridge, Nevada Test Site, and WIPP, to support their part of the Rocky Flats closure effort. The coordination and support of these planned shipping campaigns to the receiver sites demonstrates the Department-wide commitment to the goal of achieving accelerated closure of Rocky Flats.

Accelerating the Closure of the Fernald Site: Our request of $285.3 plus $4.7 million for safeguards and security also funds efforts to complete cleanup and close the Fernald site in Ohio. The site is currently scheduled to close in 2010, but the new closure contract for Fernald awarded last November includes incentives to the

contractor to accelerate the completion date to 2006. Fiscal year 2002 efforts build on past cleanup progress, including stabilization of liquid uranium solutions, off-site shipment of low level radioactive wastes, disposition of excess nuclear materials, and decontamination and demolition of several large industrial buildings at Fernald. We will continue these activities in fiscal year 2002, including completing shipments of uranium materials to the Portsmouth site in Ohio for disposition, and beginning the full-scale remediation project for Silos 1 and 2 that contain radium-bearing residues generated from the processing of high-grade uranium ore.

D. Meeting New Responsibilities

The budget request for fiscal year 2002 reflects an increased scope of responsibilities assigned to EM as a consequence of congressional action in last year's legislation on internal initiatives. We have incorporated these new requirements into our request and prioritized the necessary activities in consideration of existing requirements of the Environmental Management program.

Turnover of the Portsmouth Plant: In June 2000, the United States Enrichment Corporation (USEC) announced its intention to cease uranium enrichment operations at the Portsmouth Gaseous Diffusion Plant in Ohio and to return the plant to DOE. The EM program is responsible for placing and maintaining the plant in cold standby condition and for other critical transition-related activities, as well as eventual decontamination and decommissioning of the plant.

A total of $125 million requested in fiscal year 2002 in the Uranium Facilities Maintenance and Remediation account supports activities to winterize the facilities, place the facilities in cold standby, and mitigate the impacts on the workforce. Some of these funds will be used to replace some of the funding sources for a fiscal year 2001 reprogramming for transition activities now pending before Congress. In fiscal year 2002, this will allow us to complete the winterization of the plant, an activity we must begin this year. It will fund actions needed to place those portions of the plant needed for production of enriched uranium in a condition that would allow for restart of the operations within 18 to 24 months, should that become necessary in the future. It allows us to selectively begin deactivating other parts of the plant and structures at the site that are no longer needed in order to reduce the surveillance and maintenance costs.

Uranium Programs: The Energy and Water Development Appropriation for Fiscal Year 2001 consolidated funding for Uranium Programs and cleanup activities, and authorized the transfer of Federal personnel from the Office of Nuclear Energy, Science and Technology (NE) to the Environmental Management program. With this transfer, EM became responsible for a number of additional activities, including safely managing 680,000 metric tons of depleted uranium hexafloride (DUF6) now stored at three gaseous diffusion plant sites and the design, construction, and operation of DUF6 conversion facilities at Portsmouth and Paducah. We also are responsible for maintenance and cleanup of facilities not leased to USEC, management of DOE Material Storage Areas in and around USEC buildings, and for pre-existing liabilities arising from law or agreement after the transfer of the uranium enrichment operations to USEC.

The fiscal year 2002 request in the Uranium Facilities Maintenance and Remediation account places priority on actions needed to ensure safety, including maintenance of the DUF6 cylinders. We also will continue to work with the Commonwealth of Kentucky regulators to undertake actions needed to resolve the notice of violation issued by Kentucky concerning hazardous waste identified in the DOE Material Storage Areas at Paducah. The request also keeps the development of the DUF6 conversion facilities on track to begin construction in January 2004, consistent with the schedule provided in Public Law 105–204.

Transfer of Excess Facilities: The Department has a number of aging facilities that are no longer needed to support mission work. The costs to maintain these facilities so that they do not become a safety or contamination hazard can be significant, costs which can increase as facilities degrade over time. EM currently manages the majority of the Department's excess contaminated facilities. Since 1996, due to concerns about funding and increasing the scope of EM responsibilities, facilities that became excess to the needs of other programs have been managed by those programs. However, consistent with a new DOE order, beginning in fiscal year 2002, EM will, on a limited basis, begin accepting excess contaminated facilities from other DOE program offices for eventual deactivation and decommissioning.

In fiscal year 2002, ten facilities or facility complexes, located at Brookhaven, Oak Ridge, Pantex Plant in Texas, and the Savannah River Site, will transfer to EM from the National Nuclear Security Administration, the Office of Science, and the Office of Nuclear Energy. We are requesting funds for surveillance and maintenance to enable EM to manage these newly transferred facilities safely, based on a budget

transfer from the DOE program that currently "owns" the facility. Since these excess facilities constitute new work scope for the EM program, we are requesting the funding in a separate program account to enable DOE and Congress to track the cost and progress associated with the excess facilities transferring in fiscal year 2002. We also plan to include facility transfers in future years in this account.

E. Continuing the Investment in Science and Technology

Developing and using more effective technologies in our cleanup continues to be a critical element of our strategy to reduce the cost and the pace of cleanup. Since its inception, EM's Science and Technology program has made approximately 280 innovative technologies available for use. Yet we have seen an increase in the needs for technological solutions reported by the sites. This is due to a large degree to better problem definition and a better understanding of project requirements, uncertainties, and costs. More than two-thirds of the EM life-cycle cost estimate occur after 2006, so the need for Science and Technology investments continues.

The fiscal year 2002 request of $196 million for the Science and Technology program activities will support the Department's near-term needs for technical solutions while allowing us to work toward solutions for the more intractable environmental problems.

Over the past several years, Environmental Management's Science and Technology program has concentrated not only on technical achievements, but also on ensuring its activities are directly linked to solving specific problems identified by project managers in the field and enhancing the program's management practices. I am pleased to report today that both technical advances and management processes for the Science and Technology program are solidly on track:

On-the-ground Successes: In fiscal year 2000 alone, there were more than 200 innovative technologies used for the first time in a project or site across the complex, demonstrating that EM's Science and Technology program is successfully meeting real cleanup needs. For example, an innovative phytoremediation process was activated at the Mixed Waste Management Facility at the Savannah River Site. Tritium-contaminated water is pumped above ground and sprayed onto the roots of selected trees where it is evapo-transpired into the atmosphere at safe concentrations. This process, which is already making improvements in downstream water quality, will prevent contaminants from flowing into Fourmile Creek and the Savannah River.

At Hanford, the In Situ Redox Manipulation process, a 1998 R&D Magazine R&D 100 Award recipient, is being used on the highest-concentrated portion of a chromium VI groundwater plume. This process replaces expensive pump-and-treat with a permeable treatment zone that immobilizes chromium traveling through it.

Over 30 technologies were used as an integrated system to remediate the Oak Ridge Gunite and Associated Tanks, some of DOE's oldest tanks. Retrieval operations were completed in fiscal year 2000, 10 years ahead of schedule and at a savings of $350 million.

Technical and Deployment Assistance: While furnishing innovative technologies is the cornerstone of our activities, the program also provides scientific and technical support to EM cleanup decisionmaking. In response to public concern about incinerator emissions, last year a Secretarial "blue ribbon panel" studied emerging alternatives to incineration, which resulted in recommendations on emerging technologies that hold greatest promise for further development. EM's Science and Technology program led the effort to provide technical data for this effort.

The Science and Technology program is also supporting the development of an alternative technology to in-tank processing for cesium removal from high level waste. The Tanks Focus Area, one of the five teams that address DOE's major environmental problem areas, is performing much of the testing and will continue to work with the site to develop and pilot the selected technology. It will also continue development of an alternative until the primary technology has successfully completed pilot-scale tests on actual waste.

Deployment assistance teams were sent to the Paducah Gaseous Diffusion Plant and the Pantex Plant last year to perform technical reviews of their groundwater, soils, and surface water contamination. Based on the teams' recommendations, innovative technologies are being deployed at both sites.

Also, a first-ever textbook of reference material related to contamination of the vadose zone, a major problem for DOE sites, was compiled and published. This is an exhaustive compendium of information from multiple agencies and the private sector.

Basic Research: Research sponsored by the Environmental Management Science Program (EMSP) is yielding beneficial results. To date, this work has been documented in 576 publications and has resulted in 28 patent disclosures and applica-

tions. Promising EMSP work is using tobacco and rice plants by a University of Georgia team to detoxify ionic mercury. This method could be applicable to mercury-contaminated soils at shallow depths, such as at Oak Ridge. Also a new technology being pursued at Sandia National Laboratory in New Mexico acts as a molecular "sponge" by capturing and storing radioactive strontium from liquid hazardous waste. Heat turns the sponge into a stable material that shows promise of being suitable for disposal.

With the requested $32 million, EMSP will complete research begun in fiscal year 1999 on scientific problems associated with the vadose zone, subsurface contamination, and groundwater issues to support initiatives at sites such as Hanford. Also, the first full year of research will be completed on projects awarded in fiscal year 2001 to improve the effectiveness of tank cleanup and decontamination and decommissioning processes.

F. Meeting Long-Term Stewardship Responsibilities

As the Department completes stabilization, cleanup, and disposal of waste, we must consider the next and final stage in the cleanup process: meeting our enduring environmental protection obligations through long-term stewardship at sites that are unable to be cleaned up sufficiently to allow for unrestricted use. DOE's cleanup efforts have resulted in substantial risk and maintenance cost reductions across the complex. However, at most sites, cleanup will make the land available for other industrial uses, but not necessarily unrestricted use. Like private sites or other Federal facilities, cleanup to levels allowing for unrestricted use often cannot be achieved for economic or technical reasons, including the presence of residual contaminants or deliberate entombment of waste or facilities.

The Department has a legal and moral responsibility to ensure the protection of human health and the environment after cleanup is complete. The goal of long-term stewardship is the sustainable protection of human health and the environment after cleanup, disposal, or stabilization is complete. The long-term stewardship program allows the Department to provide safe and effective long-term stewardship while optimizing future land and resource use. Good project management, applying the best science and technology to manage residual hazards, and increasing public confidence through effective involvement of state and local governments, Tribal Nations, and stakeholders are essential to a successful long-term stewardship program. A reliable long-term stewardship program can also provide confidence to regulators and the public that non-removal remedies are acceptable because the Department can be trusted to care for the sites after the waste is contained in place. These needs are not unique to the Department of Energy. While EM's Office of Long-term Stewardship may be the first office addressing these issues in the Federal Government, I would suggest to you that it will not be the last.

In January 2001, DOE reported to Congress on the Department's long-term stewardship responsibilities, in response to the fiscal year 2000 National Defense Authorization Act (NDAA). The report provides the best available information on the cost, scope, and schedule of DOE's current and future long-term stewardship. It concludes that DOE currently carries out such activities at about 30 sites and may eventually be responsible for stewardship at 129 sites.

Recently, we designated the Idaho Operations Office as the lead field office for our long-term stewardship program. The Grand Junction Office, which is currently conducting stewardship at sites that have completed cleanup, has been transferred from the Albuquerque Operations Office to the Idaho Operations Office to provide for continuity of critical operations and to coordinate policy and guidance development.

The fiscal year 2002 request maintains funding for long-term stewardship activities at $8 million. In addition, $5.4 million in funding for Grand Junction also supports its stewardship activities. The number of sites moving from active cleanup to stewardship is expected to grow from 30 sites in fiscal year 2001 to 35 sites in fiscal year 2002, with an additional 33 sites transitioning into long-term stewardship in the next 5 years.

The request also supports INEEL and Headquarters activities to address complex-wide long-term stewardship challenges. Our emphasis in fiscal year 2002 will be on resolving issues that interfere with, or potentially delay, the transition of sites through closure and into long-term stewardship. We also continue investments in science and technology to help ensure that the protections provided by our remedies can be maintained as cost-effectively as possible for the necessary duration.

ENSURING WE USE RESOURCES EFFECTIVELY

The cleanup facing DOE is perhaps the most complex and challenging environmental challenge in the world. It is one of the most costly, currently estimated to

cost about $200 billion to complete. It is critical that we manage the program well and employ strategies that will help us continue progress and meet our commitments more efficiently and at a lower cost. The comprehensive, top-to-bottom assessment of the Environmental Management mission that the Secretary has directed be conducted will help identify opportunities to optimize the use of cleanup funds. Strategies to achieve this include:

- implementing sound project management practices;
- achieving efficiencies through innovative performance-based contracting approaches that provide financial incentives for performance;
- working closely with state and Federal regulators, tribal nations, and other stakeholders at our sites; and
- linking sites through integration.

A. Improving Project Management

Sound project management is fundamental to cost effective and timely completion of EM's massive clean-up effort. EM has accomplished significant improvements in the past several years in planning and execution of project baselines, but certainly more work remains. In particular, we need to improve our up-front planning and our project risk management practices. The latter is particularly important given the high degree of uncertainty associated with many of our first-of-a-kind projects.

EM's Office of Project Management, created in August 1999, is charged with bringing state-of-the-art project management tools and training into the EM program to enable us to better manage our projects. We work closely with the Office of Engineering and Construction Management (OECM) in the Office of the Chief Financial Officer, the unifying organization for project management for DOE. We learn from and compare our performance with the standards and practices of external organizations such as the Construction Industry Institute, the Project Management Institute, and the National Aeronautics and Space Administration.

Over the past year, EM has significantly improved project management practices by taking an aggressive approach to implementing the new DOE project management order, Program and Project Management for the Acquisition of Capital Assets, which mandates that industry standard processes and reporting be incorporated into DOE project management. We have recently identified over 70 discrete, well-defined projects (referred to as Capital Asset Projects) that will be subject to the comprehensive project management requirements laid out in the new DOE order.

A sample of the other changes made to promote better project planning and reduce overall program costs include:

- We are increasingly using a comprehensive project planning tool similar to that used by the Construction Industry Institute across the complex. We expect its use to result in near-term project cost and schedule improvements.
- We have instituted quarterly performance reviews for key projects and formalized a "critical decision" approval process using the expertise of DOE's Energy Systems Acquisition Advisory Board (ESAAB). These internal and external independent project reviews are the independent "eyes and ears" and assist us in making sound decisions.
- We have begun to make use of "state-of-the-art" cost estimating models for environmental remediation and decontamination and decommissioning projects. We plan to extend these models to all types of EM projects.
- We are putting together Integrated Project Teams to provide more effective intra-site communication. These teams are charged with expanding technology transfer and reducing project risk associated with cross site waste transfers.
- We are developing the project management career ladder to ensure that future project managers have the right training and experience to manage the large complex environmental management projects to come.

EM is taking project management "off the drawing board" and putting it into practice. Both headquarters and field offices are making changes needed to promote effective project management. While we will certainly face challenges ahead, we also anticipate substantial project management improvement, and more success stories in the coming years.

B. Improving Contract Management

The EM program accomplishes its work largely through facility management contracts that provide for management and operations at each site. EM site managers have oversight responsibility for 11 facility management contracts. Managing performance under these contracts is key to successfully carrying out the EM mission and to reducing costs.

To ensure we get what we pay for and that we get what we need, we have moved away from traditional cost-plus-award-fee contracts and are applying performance-based contracting and management principles to all our facility management contracts, as well as to our support service contracts. This contracting approach uses objective performance metrics to define and measure contract performance, tying the contractor's fee to achievement of these specific performance measures. Innovative performance metrics developed and used by EM sites include multiyear performance incentives, "gateway" provisions requiring the contractor to complete previous performance requirements before earning fee in a performance area, and "stretch" and "super-stretch" goals in which the contractor uses cost savings to fund unfunded work.

In the past few years, we awarded new cost-plus-incentive-fee "closure" contracts for the Rocky Flats and Fernald sites tied to completing the closure of the site. The contracts identify a target closure and include incentives for accelerated completions and reductions in fee for any delay beyond this targeted date. The contracts also include cost and schedule incentives focused on ensuring the cleanup is conducted safely and compliantly. We also negotiated new or extended contracts for operation of the Waste Isolation Pilot Plant, the Richland Operations Office and the Office of River Protection at Hanford, and the Savannah River Site that tie fees to performance.

To further enhance contract reform objectives, EM is taking an increasingly active role in defining performance expectations, ensuring that these expectations are consistent with the Department's strategic plan, reviewing results, and holding both site managers and contractors accountable for producing results. In fact, site managers now have very specific elements in their annual performance plans concerning contract management.

C. Working with Our Regulators and Other Stakeholders

We have found that performing good technical work is not enough. Getting the job done requires coordination with regulators and others outside of DOE that have a stake in our actions. By working cooperatively with regulators, stakeholders, local communities, and the Tribal Nations, we have improved the efficiency of the EM program and have made progress in meeting our regulatory commitments in a more efficient and cost-effective way.

Critical to the success of our efforts to improve the efficiency of this program and the cleanup results is the involvement and support of our state and Federal partners. We believe this is an opportune time to examine the compliance framework that guides cleanup at all our major sites to ensure it reflects the experience gained over the past decade when many agreements were put in place. Accordingly, the Secretary has invited the governors of the States that host our sites and EPA Administrator Christine Todd Whitman to work with us to review our cleanup work to make sure it promotes on-the-ground results, and reflects the lessons and technical understanding that have developed. I am confident that, working cooperatively, we can find ways to achieve our shared environmental goals more efficiently.

Our request supports public participation through continued relationships with states, site-specific and national advisory boards, and Indian tribes potentially affected by our activities. We will encourage an open and frank dialogue with our regulators to ensure that we are pursuing the most efficient and most cost-effective solutions to cleanup and compliance needs, as well as the most appropriate sequencing of work.

D. Linking Sites Through Integration

While each DOE site has its own objectives and milestones for cleanup and closure, no site can complete its mission without help from other parts of the EM program. Making use of the unique capabilities for managing and treating nuclear wastes and materials at our sites and sharing information and expertise is critical to our success. Through integration, we seek to use available capacity rather than construct new facilities; apply innovative technologies at multiple sites; and apply lessons learned and site successes complex-wide. We work to address common problems and challenges across the DOE complex through a corporate approach.

The contribution of other sites to the closure of Rocky Flats continues to illustrate the importance of integration. Our ability to close Rocky Flats depends on the acceptance of waste and materials by other DOE sites, including the Savannah River Site, Los Alamos, Pantex Plant, Lawrence Livermore National Laboratory, and the Nevada Test Site. Rocky Flats is in the process of formulating an Integrated Closure Project Baseline that integrates the Department's contractual commitments to provide items and services with activities to be carried out by the site contractor. The Integrated Closure Project Baseline highlights that the closure of Rocky Flats is

truly a complex-wide project, requiring the support and careful coordination of a number of Departmental sites and programs. It has improved our ability to integrate complex-wide activities, schedules, and resources.

We are working to develop disposition pathways for surplus nuclear materials throughout the DOE complex, including orphan materials (i.e., those with unclear programmatic ownership), and wastes that cannot be disposed of in their current forms. This requires that the Department has a full understanding of the surplus materials inventories and corresponding disposition plans prior to termination of facility capabilities. For example, EM recently completed the "Savannah River Site Canyons Nuclear Material Identification Study" (February 2001) to determine which materials would potentially require the use of the Savannah River canyons. Such disposition studies often identify the need to transfer materials and wastes between DOE sites in preparation for ultimate disposition. To support one particular transfer, EM recently revised DOE's 3013 Storage Standard for surplus plutonium, accelerating Rocky Flats closure by allowing metals and oxides stored there to be packaged for shipment off-site. We are also working to develop a cost-effective disposal approach for the classified waste currently stored at Rocky Flats.

Finally, the transport of radioactive waste and material between sites is critical to the success of our integration priorities. Our national transportation program, which has successfully moved spent nuclear fuel containing U.S. enriched uranium from research reactors around the world to the U.S. for safe storage, is applying its success to other DOE shipments. For example, EM is working with other DOE program offices and with the sites to develop a national packaging strategy that will improve the availability of certified casks for unique types of DOE shipments, is working with NNSA to ensure the availability of Transportation Safeguards System for shipping special nuclear materials from Rocky Flats, and is developing the option of shipping waste to WIPP via rail. Our efforts will enable us to identify future packaging and transportation needs, to support aggressive shipping schedules, and to utilize our transportation assets more efficiently.

PROVIDING EFFECTIVE FEDERAL OVERSIGHT

Critical to successfully managing the cleanup program and to identifying and implementing more efficient ways of doing business is having the Federal workforce in place to provide effective oversight of the contractors that compete for and carry out the actual cleanup work. Federal employees establish the program and project goals; they provide the direction to the contractors; and they monitor contractor performance to ensure we are getting the results we need, at the quality and cost promised, and that work is done in a safe and compliant manner. Our initiatives to reduce the costs and schedules of the cleanup depends on having an effective Federal workforce to keep the pressure on the contractor to find more innovative and efficient ways of doing business.

The Federal workforce performs essential tasks that it would be inappropriate to have contractors perform. These include formulating the annual budget and outyear projections; managing contractors, including contract negotiations, oversight, and accountability; representing the Department in its dealing with regulators; analyzing and formulating program policy and planning; and integrating activities and information across sites.

Our request for Program Direction, which funds Federal salaries as well as travel and administrative and technical support services, is $355 million. However, our request reduces support services and travel funds by almost half, while essentially maintaining the funds for Federal salaries. The request supports 2,708 Full-time Equivalents (FTEs) about 84 percent of which are in the 12 DOE field and operations offices and includes increases in the Carlsbad Field Office and the Office of River Protection to reflect increased requirements. Overall, the Program Direction account has been significantly reduced from earlier years. The number of Headquarters FTEs, for example, is 45 percent less than when at its highest point in 1995. The request for Program Direction in fiscal year 2002 is about 15 percent less than in fiscal year 1997, the year these activities were consolidated into a single account.

The Department continues to place a high priority on workforce management to provide a stable workforce with the right skill mix and technical capabilities to accomplish our mission, now and into the future.

CONCLUSION

In conclusion, the Department is making progress in cleaning up the legacy of contamination left from the nuclear weapons production process. We are giving priority to reducing our most serious risks, accelerating cleanup at our major sites

across the country, safely storing and safeguarding weapons-usable nuclear materials, and reducing the long-term costs of the program. We will continue to use science and technology to reduce costs and schedules, improve our project management, make the most effective use of our unique resources across the DOE complex, and maintain our focus on worker safety. We pledge to continue to work closely and cooperatively with Congress to ensure that this progress continues and that we can meet the challenges ahead in the most effective way.

SUMMARY OF THE FISCAL YEAR 2002 BUDGET

The total fiscal year 2002 budget request for the Department of Energy's Environmental Management Program is $5.913 billion. This includes $4,128.7 million in Defense Environmental Restoration and Waste Management (excluding $420 million for the Federal contribution to the Uranium Enrichment Decontamination and Decommissioning Fund); $1,050.5 million in the Defense Facilities Closure Projects; and $141.5 million in Defense Environmental Management Privatization. This totals $5,179.2 million in traditional budget authority and $141.5 million for privatization funding in the Defense accounts. The fiscal year 2002 appropriation will fund cleanup at sites across the Nation. Five sites receive almost three-fourths of Environmental Management funding the Hanford site in Washington (including Richland Operations Office and Office of River Protection), the Savannah River Site in South Carolina, the Rocky Flats site in Colorado, the Idaho National Engineering and Environmental Laboratory in Idaho, and the Oak Ridge Reservation in Tennessee.

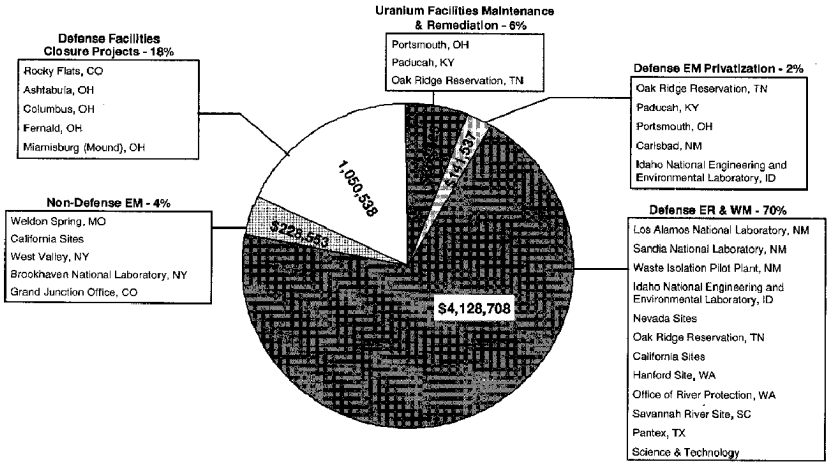
Our fiscal year 2002 budget proposal provides details on each project, including performance measures, which we use to hold managers accountable, and expect to be held accountable by Congress. Summaries of budget accounts and the fiscal year 2002 request by State and Operations Office are attached. In addition, information on each of the following sites can be found immediately after the budget summaries.

1. Hanford Site, Washington
   Office of River Protection
   Richland Operations Office
2. Savannah River Site, South Carolina
3. Rocky Flats Environmental Technology Site, Colorado
4. Idaho National Engineering and Environmental Laboratory, Idaho
5. Oak Ridge Reservation, Tennessee
6. Fernald Environmental Management Project, Ohio
7. Waste Isolation Pilot Plant, New Mexico
8. Nevada Test Site and Operations Office, Nevada
9. Los Alamos National Laboratory, New Mexico
10. Miamisburg Environmental Management Project (Mound), Ohio
11. Lawrence Livermore National Laboratory, California

EM's Five Appropriation Accounts

Distribution of the FY 2002 Request*

(Dollars in Thousands)



Total FY 2002 Request: $5,912,761

* Listing of sites is not complete; funding amounts are net of all adjustments

FY 2002 EM Budget Request by State

Dollars in Thousands

State	FY 2001 Comparable Appropriation	FY 2002 Request					
		Defense Facilities Closure	Defense ER&WM	Non-Defense EM	Uranium Fac. Maintenance & Remediation	Privatization	Total
Alaska	$9,108	$0	$1,868	$0	$0	$0	$1,868
California	91,903	0	46,166	27,329	0	0	73,495
Colorado	718,860	664,000	26,884	14,250	0	0	705,134
Florida	7,317	0	8,000	0	0	0	8,000
Idaho	637,462	0	452,634	5,380	0	89,332	547,346
Illinois	25,623	0	15,801	6,513	0	0	22,314
Iowa	533	0	250	0	0	0	250
Kentucky	89,840	0	3,008	0	72,982	13,329	89,319
Mississippi	1,210	0	865	0	0	0	865
Missouri	56,388	0	1,500	43,000	0	0	44,500
Montana	6,764	0	0	0	0	0	0
Nevada	84,468	0	85,600	0	0	0	85,600
New Mexico	367,740	0	305,253	3,898	0	0	309,151
New York	144,251	0	4,975	122,013	0	0	126,988
Ohio	540,226	386,538	30,686	0	201,096	2,000	620,320
South Carolina	1,297,917	0	1,142,572	0	0	0	1,142,572
Tennessee	474,926	0	285,513	141	88,347	36,876	410,877
Texas	13,369	0	8,100	0	0	0	8,100
Utah	9,067	0	0	1,000	0	0	1,000
Washington	1,604,348	0	1,563,812	1,485	0	0	1,565,297
West Virginia	57,388	0	46,086	0	0	0	46,086
Various Locations	246,940	0	141,296	3,544	1,000	0	145,840
D&D Fund Deposit	419,076	0	420,000	0	0	0	420,000
Subtotal, EM	**$6,904,724**	**$1,050,538**	**$4,590,869**	**$228,553**	**$363,425**	**$141,537**	**$6,374,922**
UE D&D Fund Offset	(419,076)	0	0	0	0	0	(420,000)
Reimbursable Work	0	0	0	0	0	0	(5,391)
Dupont Pension Offset	(50,000)	0	0	0	0	0	0
Prior Year Balances	(168,741)	0	0	0	0	0	(36,770)
Total, EM	**$6,266,907**	**$1,050,538**	**$4,590,869**	**$228,553**	**$363,425**	**$141,537**	**$5,912,761**

NOTE: All dollars include safeguards and security, program direction, excess facilities, privatization, and science and technology funding.

FY 2002 EM Budget Request by Operations Office
Dollars in Thousands

Operations Office	FY 2001 Comparable Appropriation	FY 2002 Request					
		Defense Facilities Closure	Defense ER&WM	Non-Defense EM	Uranium Fac. Maintenance & Remediation	Privatization	Total
Albuquerque	$186,849	$0	$139,085	$3,898	$0	$0	$142,983
Carlsbad	200,960	0	175,630	0	0	0	175,630
Chicago	62,945	0	17,221	33,711	0	0	50,932
Idaho	671,878	0	459,062	20,330	0	89,332	568,724
Natl Energy Tech Lab	64,152	0	46,086				46,086
Nevada	96,338	0	90,928	0	0	0	90,928
Oakland	94,993	0	47,166	27,329	0	0	74,495
Oak Ridge	711,850	0	295,370	43,141	362,425	52,205	753,141
Ohio	553,096	386,538	26,442	95,115	0	0	508,095
Richland	829,254	0	725,958	1,485	0	0	727,443
Richland/ORP	775,094	0	837,854	0	0	0	837,854
Rocky Flats	693,382	664,000	26,199	0	0	0	690,199
Savannah River	1,297,917	0	1,142,572	0	0	0	1,142,572
Multi-Site	175,098	0	141,296	3,544	0	0	144,840
U/TH Reimbursement	71,842	0	0	0	1,000	0	1,000
D&D Fund Deposit	419,076	0	420,000	0	0	0	420,000
Subtotal, EM	**$6,904,724**	**$1,050,538**	**$4,590,869**	**$228,553**	**$363,425**	**$141,537**	**$6,374,922**
UE D&D Fund Offset	(419,076)	0	0	0	0	0	(420,000)
Reimbursable	(5,244)	0	0	0	0	0	(5,391)
Pension Offset	(50,000)	0	0	0	0	0	0
Prior Year Balances	(163,497)	0	0	0	0	0	(36,770)
Total, EM	**$6,266,907**	**$1,050,538**	**$4,590,869**	**$228,553**	**$363,425**	**$141,537**	**$5,912,761**

NOTE: All operations office dollars include safeguards and security, program direction, excess facilities, privatization, and science and technology funding.

1. Hanford Site, Washington

Fiscal Year 2002 Request

Office of River Protection:

	[In thousands of dollars]
Defense ER&WM, Post 2006-ORP	812,468
Defense ER&WM, Site/Project Completion	2,000
Defense ER&WM, Program Direction	23,386
Total	837,854

Richland Operations Office:

Defense ER&WM, Site/Project Completion	419,586
Defense ER&WM, Post 2006 Completion	164,642
Defense ER&WM, Program Direction	53,342
Non-defense EM, Site/Project Completion	1,485
Total	639,055
Defense ER&WM, Science & Technology	36,844
Defense ER&WM, Safeguards & Security	51,544
Total (Hanford Site)	1,565,297

The Hanford Site in Washington State remains the Department's greatest cleanup challenge. The 560-square mile site was carved out of a broad curve of the Columbia River during World War II. It is now the Nation's largest former nuclear weapons production site, and the cleanup of the Hanford Site is the largest, most technically complex, environmental cleanup project yet undertaken. The site contains large amounts of spent nuclear fuel, unstable weapons grade plutonium, 177 underground

tanks containing 53 million gallons of high-level radioactive waste, and more than 100 square miles of contaminated ground water. The Hanford Site remediation activities are regulated by the Tri-Party Agreement which was signed by the U.S. Department of Energy, the U.S. Environmental Protection Agency, and the Washington State Department of Ecology. In addition to cleanup of the site, the EM program provides critical infrastructure activities and service at the site, referred to as "landlord" activities.

The Hanford site mission is carried out by two independent organizations, the Richland Operations Office and the Office of River Protection (ORP). ORP was established in December 1998 following Congressional direction in the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 and is responsible for all aspects of the River Protection Project (formerly the Tank Waste Remediation System), which includes safe storage, retrieval, treatment, and disposal of the high-level radioactive tank waste. Richland Operations Office responsibilities include all aspects of treatment, storage, and disposal of legacy radioactive and hazardous wastes; safe and secure storage of nuclear materials and spent nuclear fuel; and the decontamination and decommissioning of facilities associated with the production of nuclear materials during the Cold War. The Richland and ORP managers report directly to the Assistant Secretary for Environmental Management, and their budgets (with the exception of integrated safeguards and securities and science and technology budgets) are separate. The ORP Manager has been delegated authority for contracting; financial management; safety; and general program management equivalent to other DOE Operations Offices.

Office of River Protection

ORP works closely with the Richland Operations Office to protect the health and safety of the public, workers, and the environment and to control hazardous materials to protect the Columbia River. ORP manages the River Protection Project located on the central plateau (200 Area) of the Hanford Site. The River Protection Project uses two major contracts for the storage, retrieval, treatment, and disposal of the high-level tank waste. A 10-year contract to design, construct, and commission a new Waste Treatment and Immobilization Plant (WTP) was awarded to Bechtel National, Inc. on December 11, 2000. The goal is to treat and immobilize approximately 10 percent of the waste by mass and 25 percent by radioactivity by 2018. The award of this contract follows a privatization effort to design, build, and operate a WTP that resulted in an unacceptable proposal submitted by the privatization contractor and termination of the privatization contract. However, as a result of the privatization effort, DOE acquired a robust technical design for the WTP that has been independently verified. In addition, the contract for maintenance and operations of the tank farms, which will provide waste feed to the WTP, is with CH2M Hill and was recently extended through 2006.

Management of the underground high-level waste tanks remains one of the biggest challenges at Hanford. In fiscal year 2001, we made significant progress in reducing the urgent risks associated with these tanks. The issue of the rising level of tank SY–101 was resolved by dissolving the crust on the surface of the waste through a series of waste transfers and back dilutions. Elimination of the crust reduced the retention of flammable concentrations of gas in SY–101 and permitted us to resolve the flammable gas safety issue for this tank and to remove the tank from the "Watch List" established by the National Defense Authorization Act for Fiscal Year 1991. During fiscal year 2001, we expect to resolve the flammable gas safety issue for the remaining 24 tanks that are affected and to remove those from the Watch List. Once this action is complete, there will be no tanks remaining on the Watch List. The Department signed a Consent Decree with the State of Washington that established a schedule for interim stabilization of the single-shell tanks. To date, we have met all Consent Decree milestones, which includes declaring seven of 29 single shell tanks to be interim stable. The two unstabilized single shell tanks that are suspected of having leaked in the past will be pumped during fiscal year 2001.

For fiscal year 2002, we will continue improving tank safety by transferring free liquids from single shell tanks to double shell tanks in accordance with the Consent Decree schedule. In addition, design and construction will continue on tank farm retrieval systems and other infrastructure improvements necessary to support future waste feed delivery to the treatment facility and eventual removal of all waste from the single shell tanks. Several of these upgrades are adapted from technologies developed under the EM Science and Technology Program. For example, we have procured a variant of the Houdini robotic platform for confined slucing of sludge waste and are planning to test an adaption of the fluidic sampler technology in solid waste retrieval.

In fiscal year 2001, we completed termination activities associated with the privatization contractor, including purchase of the pilot-scale melter, and acquisition of the appropriate intellectual property rights associated with the pilot-scale melter and with the WTP design completed under privatization. In addition, we will continue the design and engineering of the WTP, and begin site preparation activities to support WTP construction, including site clearing and grading, installation of site utilities, and construction of equipment laydown areas. In fiscal year 2002, the requested $500 million in funding will be used to maintain momentum on WTP design, proceed with long lead project procurement, begin facility construction, and manage the project.

1. Richland Operations Office

Over the past year, Richland has formulated an outcome-oriented version of the Hanford Site's future that embraces priorities of regulators, stakeholders, and area Tribal Nations, while recognizing the absolute need to make visible progress in the near-term. The three elements of that vision are: (1) to restore the Columbia River corridor; (2) complete the transition of the Central Plateau to long-term waste management; and (3) prepare the remainder of the site to contribute to the future welfare and well-being of its neighboring communities. This focus on outcomes has resulted in a new contract strategy and a revised project baseline. In December 2000, DOE negotiated an extension to the current site operations contract through 2006 for transitional work in the Central Plateau and the Spent Nuclear Fuel Project. We are currently exploring awarding a closure-type contract for the River Corridor.

In December 2000, we began moving spent nuclear fuel from K Basins, which are leak-prone underground wet storage pools located 400 yards from the Columbia River that hold roughly 2,100 metric tons of fuel, some of which is corroding. This first-of-a-kind, technically complex project entails loading the fuel elements while still underwater into a multi-canister overpack using robotic arms, drying it in the nearby Cold Vacuum Drying Facility, and transporting the fuel for dry storage to the newly-built Canister Storage Building, 12 miles from the river. Moving the fuel to safer storage safeguards the health of workers and the surrounding communities, and reduces the risks to the health and vitality of the Columbia River. By the end of fiscal year 2001, we expect to remove 116 metric tons of spent fuel from the K-West Basin. We will also begin design work for the K-Basin sludge and debris removal system and the sludge pre-treatment system. Our fiscal year 2002 request supports continued transport of spent nuclear fuel in K-West Basin to dry storage.

The Department is continuing to remediate waste sites and dispose of the contaminated soil and debris in the Environmental Restoration Disposal Facility (ERDF). In fiscal year 2000, ERDF received approximately 639,000 tons of contaminated soil and debris from cleanup sites along the Columbia River Corridor, and completed construction of cells 3 and 4. In fiscal year 2001 ERDF will receive over 490,000 tons of contaminated soil and debris. We plan to complete remediation of nine waste sites in the Hanford 100 and 300 Areas, and send up to 461,000 tons of contaminated soil and debris to ERDF in fiscal year 2002.

In fiscal year 2000, we began operating three additional furnaces at the Plutonium Finishing Plant (PFP) for thermally stabilizing plutonium-bearing materials. We completed stabilization of 574 containers of plutonium metals and oxides, and began stabilizing plutonium solutions via magnesium hydroxide precipitation. We also began packaging stabilized plutonium materials using the Bagless Transfer System and the Pipe-n-Go system for packaging residues. In fiscal year 2001, we plan to stabilize 2,190 liters of plutonium bearing solutions and 527 containers of plutonium metals and oxides at the PFP. We have initiated startup of the outer container packaging system at PFP and will also complete brushing and packaging of plutonium metals. Stabilization activities will eliminate the risk posed by the plutonium-bearing materials and is a critical step in the deactivation of PFP, which will significantly reduce mortgage costs at Hanford. In addition, we will continue stabilization of plutonium oxides and residues, and complete stabilization of plutonium-bearing solutions and polycubes at PFP in fiscal year 2002.

We continue to decommission the reactor facilities in the 100 Area through the Interim Safe Storage Project. In fiscal year 2000 and 2001, decommissioning activities continue at the DR and F reactors as well as at the 233-S Plutonium Concentration Facility.

In fiscal year 2000, we made our first shipment of Hanford transuranic waste to the Waste Isolation Pilot Plant (WIPP) for final disposal, completing three shipments totaling 18 cubic meters, and we plan to complete at least five shipments of 42 cubic meters of transuranic waste to WIPP in fiscal year 2001. In fiscal year 2002, we will treat more than 500 cubic meters of mixed low-level waste in accordance with Tri-Party Agreement milestones, dispose of more than 6,700 cubic meters of low-level waste, process over 200 million gallons of radioactive and hazardous

effluents, and complete treatment of 265 cubic meters of mixed low-level waste at a contract facility.

In fiscal year 2002, the Hanford Site Groundwater/Vadose Zone Integration Project will implement the highest priority science and technology activities identified in fiscal year 2000.

2. Savannah River Site, South Carolina

Fiscal Year 2002 Request

	[In thousands of dollars]
Defense ER&WM, Site/Project Completion	391,401
Defense ER&WM, Post 2006 Completion	585,989
Defense ER&WM ,Science & Technology	17,526
Defense ER&WM, Excess Facilities	700
Defense ER&WM, Safeguards and Security	94,225
Defense ER&WM, Program Direction	52,731
Total	1,142,572

The Savannah River Site is a 310 square mile site near Aiken, South Carolina with an on-going defense mission. In addition to cleanup of the site, the EM program provides critical infrastructure activities and services at the site, referred to as "landlord" activities.

One of the critical EM responsibilities at the site is the stabilization of nuclear materials resulting from its mission to produce strategic isotopes for national security purposes during the Cold War. In fiscal year 2001 and fiscal year 2002, we will continue to operate the two canyons as well as FB-Line, and HB-Line, to stabilize "at risk" plutonium-bearing materials and spent nuclear fuel covered by Defense Nuclear Facilities Safety Board Recommendations 94–1 and 2000–1. The Savannah River Site also continues it critical role in supporting the accelerated closure of Rocky Flats, receiving and stabilizing surplus plutonium-bearing materials from Rocky Flats. By the end of fiscal year 2002, more than 25 percent of plutonium residues at Savannah River will have been stabilized. In addition, surplus plutonium metal and oxides from Rocky Flats packaged in DOE-STD–3013 containers will be received and stored in the K-Area Material Storage area until they can be permanently dispositioned. The fiscal year 2002 budget request also supports continued construction of a process to vitrify americium/curium solutions, which have very intense radiation fields and require heavy shielding to protect workers and the public.

The fiscal year 2002 budget request continues support for receipt and storage at the Savannah River Site of spent nuclear fuel from domestic and foreign research reactors in support of national and international non-proliferation goals. In fiscal year 2002, we expect to receive 22 casks of spent nuclear fuel from foreign sources and another 31 casks from domestic sources which will be safely stored at the Savannah River Site's basins. By the end of fiscal year 2001, we expect to have received almost one-third of the spent fuel assemblies that we know other countries plan to return.

The Savannah River Site has been developing a cost-effective technology for preparing spent nuclear fuel that does not require stabilization for health and safety reasons for disposal. This work is helping us identify an approach to stabilize spent nuclear fuel and other nuclear materials without chemical separations. Last August, we selected the "melt-and-dilute" process as the preferred technology to prepare aluminum-based spent nuclear fuel for geologic disposal. The fiscal year 2002 budget provides $4 million for operation of the L-Area Experimental Facility to demonstrate the viability of the melt-and-dilute process. This will provide a firm basis for the design and construction of the full-scale facility to prepare and store this spent nuclear fuel prior to final disposition in a geologic repository.

Much of the EM work at the Savannah River Site that will be completed after fiscal year 2006 involves management of approximately 38 million gallons of high-level waste in 49 tanks, including vitrifying waste for final disposal and removing waste from storage tanks so the tanks can be closed. Two tanks have already been closed and, in fiscal year 2000, we produced 231 canisters of vitrified waste in the Defense Waste Processing Facility (DWPF). As of the end of May 2001, we had vitrified a total of 1,118 canisters of high level waste. We expect the DWPF to produce at least 150 canisters in fiscal year 2002, which will bring the total DWPF canister production level to about 22 percent of its expected lifetime total of 6,025 canisters.

Due to the long-term nature of this project, there are significant potential payoffs if we are able to develop and apply innovative technologies. We are currently mov-

ing forward with technologies that will make it easier to retrieve waste, to improve the way we decontaminate our canisters once they are filled, to reduce worker exposure through use of high efficiency filters that can be regenerated and reused, and to increase the amount of waste in each canister. These advances will allow DWPF to operate more efficiently and ensure that our goals for increasing canister production and reducing life cycle costs are realized.

In-Tank Precipitation operations were terminated in January 1998 because we were unable to successfully pre-treat the waste and limit the levels of benzene generation in the tanks to safe and manageable levels while maintaining production levels for DWPF. Pre-treatment of the waste is necessary to separate the high-activity and low-activity wastes, in order to minimize the amount of waste that must be vitrified and disposed in a deep geologic repository. We undertook a systems engineering analysis, which was reviewed by a panel of independent experts, to evaluate all possible alternatives and have narrowed them down to three. We will select a preferred alternative technology for treatment of the salt component of the high level waste this June, and the fiscal year 2002 budget request supports continued construction of a pilot plant for that technology. The design and operational data gathered from this pilot project will support the design and engineering of the full scale Salt Processing Project facility by providing a research and development test bed.

The first shipment of Savannah River Site transuranic waste to the Waste Isolation Pilot Plant occurred in May 2001, followed by three more shipments in fiscal year 2001, with shipping rates increasing to about one a month during fiscal year 2002. Storage, treatment, and disposal operations of low-level, mixed low-level, and hazardous wastes will continue, including on- and off-site recycling activities.

We will also continue to aggressively pursue the use of new technologies to characterize and clean up contaminated release sites and groundwater plumes. We are using the Vadose Zone Monitoring System to determine how fast and in what concentration contaminants are traveling to the groundwater. This approach provides sensitive early warning of aquifer contamination from the E-Area shallow disposal trenches. At the mixed waste management facility, we have begun using a phytoremediation system to remove tritium from groundwater by the process of "evapotranspiration" using trees and other indigenous vegetation. In fiscal year 2002, we expect to complete key closures at the K Area Burning Rubble Pits and in the L and P Area Bingham Pump Outage Pits. We will complete remediation of five release sites, bringing the total count of sites remediated to 300, nearly 60 percent of the 515 release sites needing remediation. We will also operate 8 groundwater treatment systems in 6 of 11 groundwater plumes at the site to remove and control contamination.

3. Rocky Flats Environmental Technology Site, Colorado

Fiscal Year 2002 Request

	[In thousands of dollars]
Defense Closure, Site Closure	628,577
Defense Closure, Safeguards & Security	35,423
Defense ER&WM, Science & Technology	3,000
Defense ER&WM, Program Direction	23,199
Total	690,199

The accelerated closure of the Rocky Flats Environmental Technology Site is one of the Department's key initiatives. As the first major weapons-related facility to be cleaned up and closed, this project will offer a wealth of lessons-learned that will be applied to other sites in the complex. Similarly, the closure of Rocky Flats requires the implementation of innovative approaches and resolution of new project and policy issues.

One of the innovative approaches we have applied is the use of a cost-plus-incentive-fee closure contract. In January 2000 we awarded Kaiser-Hill, L.L.C. a closure contract valued at approximately $4 billion (excluding incentive fee payments) to complete the closure of the site. The contract identifies a target closure date of December 15, 2006, and includes incentives for accelerated completions and reductions in fee for any delay beyond this targeted date. In addition, the contract includes cost and schedule incentives focused on ensuring the cleanup is conducted safely and compliantly.

We are continuously working to ensure that safety is not compromised in our efforts to complete the cleanup scope as quickly and cost effectively as possible. The

Department's Integrated Safety Management System (ISMS), an integral part of the closure contract, was implemented at Rocky Flats in January 2000. Since January 2001, both the Rocky Flats Field Office and Kaiser-Hill have been working to strengthen the site's safety posture. The site manager requested assistance reviews by the Office of Environment, Safety and Health, which were recently completed. The contractor has also recently completed a site-wide, ISMS-based safety improvement plan.

The contract also formalized DOE's commitment to site closure in that it identified specific activities contractually required by the Department to support closure. These activities are referred to as government-furnished services and items and largely include activities necessary to ship special nuclear materials and wastes offsite. For this reason, we are approaching the execution and management of this contract as a complex-wide project, and this has required us to develop some new management tools. During this first year of the contract execution, we have been working to "projectize" the activities required by the Department through the formulation of the Integrated Closure Project Baseline. This integrated baseline will provide the formality and structure necessary to ensure the Department meets its contractual commitments, as well as improve our means of managing the contract. The Integrated Closure Project Baseline highlights that the closure of Rocky Flats is truly a complex-wide project, requiring the support and coordination of a number of Departmental sites and programs. The effort has been fully supported by the contractor and the other programs and sites, and has received significant attention from external stakeholders, including the General Accounting Office (GAO).

In February 2001, GAO published their follow-on report assessing DOE's ability to complete the closure of Rocky Flats in 2006. Overall, the report provides a thorough assessment of the challenges facing us, and also demonstrates the progress we have made toward closure. Whereas the initial assessment indicated a 1 percent chance of achieving site closure in 2010 (1999 report), this follow-on report concluded there is a 15 percent chance of reaching site closure in 2006 and a 98 percent chance of closure in 2008. As such, the GAO assessment is a powerful validation of the progress realized to date. The report also recognizes the value of the Integrated Closure Project Baseline, and provides useful recommendations for formalizing the responsibilities and authorities necessary to resolve any inter-organizational resource issues.

A key ingredient for closing Rocky Flats is being able to ship nuclear materials and waste off-site. This requires not only the preparation of the materials and waste for shipment, but ensuring the receiver sites and the necessary transportation services are available. We have made some very significant progress to date. We recently completed the shipment of classified plutonium metals to the Savannah River Site and Los Alamos National Laboratory. We also completed the Operational Readiness Review of the Plutonium Stabilization and Packaging System, which will package plutonium metals and oxides into approximately 2,000 containers, and expect to begin packaging operations later this month. These containers will be shipped to the Savannah River Site for storage beginning in August 2001. The disposition paths for the remaining nuclear material streams are being finalized through the integrated baseline development. We plan to ship certain weapons components to the Lawrence Livermore National Laboratory and highly enriched uranium, either contaminated or associated with plutonium to the Savannah River Site. With the proper coordination of receiver site preparation and transportation services (provided by Defense Programs), we hope to complete all nuclear material shipments by the end of calendar year 2002.

We have also made significant progress in the disposition of waste. In March 2001, we made our 100th transuranic waste shipment to WIPP. Rocky Flats to date has disposed of over 650 cubic meters of transuranic waste, more than any other site in the DOE complex. Currently, the site is completing an average of four shipments per week, and by year end will be nearing an average of nine shipments per week. In total, nearly 15,000 cubic meters of transuranic waste and about 100,000 kilograms of plutonium residues will be packaged and sent to WIPP. In fiscal year 2000, we also nearly doubled our planned shipments of low-level waste for disposal.

The site's progress toward the reconfiguration of the site's Protected Area marks another significant accomplishment because it provides considerable productivity improvements. All special nuclear material on-site has been consolidated within Building 371, enabling us to close material access areas in the other major plutonium facilities. This has reduced the security requirements in those facilities, improving access for the workers performing the decontamination and decommissioning (D&D) in those buildings. We will fully implement the reconfiguration once all issues associated with the new alarm and detection systems are resolved. The recon-

figuration of the Protected Area reduces safeguards and security requirements, increasing the total funding available to support actual cleanup activities.

DOE has also clearly made enormous progress in reducing risks at the site. About 80 metric tons of plutonium residues have been stabilized and/or repackaged to date. This represents 79 percent of the total. We have also completed the draining of 32 and removal of 30 liquid piping systems.

We continue to make progress in deactivating and decommissioning buildings. Early in fiscal year 2000 we completed the demolition of Building 779, one of the five major plutonium facilities. Given that this facility once contained 133 contaminated gloveboxes, this achievement marked a significant milestone for the complex. We continue to apply the lessons learned from that demolition to the ongoing activities in the four remaining plutonium facilities. We have deployed an innovative technology called plasma-arc cutting for glovebox size reduction. This technology provides a significant reduction in worker risk and improved efficiency.

In the area of environmental remediation, we are using another innovative technology, a horizontal drilling technology, to characterize the contamination located under the buildings. This characterization information helps us coordinate remediation plans with the facility cleanup schedules to support the 2006 closure date. We continue to work closely with the regulators and stakeholders to refine the details of site cleanup. We expect the regulators will reach a decision on the final soil action levels late this calendar year. Through our integrated stakeholder focus group, we are working to address all the cleanup issues in an integrated fashion to ensure the aggregate impact to the project schedule and costs is considered.

The fiscal year 2002 budget request supports the closure contract and the closure activities we have identified as necessary for accelerated closure, including many of the complex-wide activities required to provide the government-furnished services and items. It is important to note that activities included in other sites' and programs' budgets are also needed to support Rocky Flats closure including the nuclear materials transportation services provided by Defense Programs, the storage operations at the Savannah River Site, waste treatment operations at the incinerator at Oak Ridge, waste disposal operations at the Nevada Test Site, and the availability of transuranic waste containers and trailers from WIPP.

Our fiscal year 2002 request for Rocky Flats enables us to:

- Complete the stabilization and packaging of the plutonium residues;
- Continue the packaging and shipment of plutonium metals and oxides to Savannah River Site (620 containers);
- Ship over 25,000 cubic meters of radioactive waste for off-site disposal; and
- Complete the decontamination and decommissioning of 18 work sets.

4. Idaho National Engineering and Environmental Laboratory, Idaho

Fiscal Year 2002 Request

	[In thousands of dollars]
Defense ER&WM, Site/Project Completion	52,105
Defense ER&WM, Post 2006 Completion	276,551
Defense ER&WM, Science & Technology	18,407
Defense ER&WM, Safeguards & Security	34,346
Non-Defense EM, Site/Project Completion	5,080
Defense, Privatization	89,332
Subtotal	475,821
Use of Prior Year Balances (Defense)	(36,770)
Total	439,051

The Idaho National Engineering and Environmental Laboratory (INEEL), a multiprogram national laboratory with a significant cleanup mission, occupies 890 square miles of the eastern Snake River Plain in southeastern Idaho. INEEL combines a significant environmental and nuclear operations component with basic and applied research and development supporting the Department's four mission areas: Environmental Management, Energy Resources, National Security, and Science. INEEL operates under the sponsorship of EM, and has been designated a lead laboratory as well as a lead field site on long-term stewardship. The EM program provides critical infrastructure efforts at the site, referred to as "landlord" activities. In addition, the INEEL continues to serve important national security functions by receiving spent

nuclear fuel from the Navy, and spent fuel from foreign research reactors that may contain weapons grade nuclear materials.

In total, most EM activities at the INEEL are regulated by enforceable agreements like the Idaho Settlement Agreement, the Federal Facility Agreement and Consent Order, the Site Treatment Plan, and a 1999 Voluntary Consent Order. The Idaho Settlement Agreement guaranteed the government access to the INEEL for national security missions such as spent nuclear fuel examination and storage, in return for meeting specific waste treatment and disposal milestones. To date, the INEEL has met every milestone in the Idaho Settlement Agreement.

INEEL has approximately 65,000 cubic meters of waste contaminated with transuranic radionuclides that must be removed from the State of Idaho under the terms of the 1995 Settlement Agreement. This waste originated from weapons production at the former Rocky Flats Plant in Colorado. We continue to make progress in characterizing, certifying, and shipping the transuranic waste to the WIPP for disposal. A significant effort is underway to meet the Settlement Agreement milestone to ship the initial 3,100 cubic meters of transuranic waste out of the State of Idaho by the end of 2002. In fiscal year 2000, we shipped 103 cubic meters of transuranic waste to the WIPP, exceeding our goal, and plan to ship 1,160 cubic meters in fiscal year 2001 and 1,483 cubic meters in fiscal year 2002. Progress also continues on the Advanced Mixed Waste Treatment Project, a privatization project that will greatly increase the INEEL's processing capability for this waste. Construction began in fiscal year 2000 and will continue in fiscal year 2001 and fiscal year 2002. The facility is expected to begin operations in fiscal year 2003. We are requesting $40 million in the fiscal year 2002 privatization budget for this project.

INEEL plays a key role in meeting non-proliferation goals by providing safe storage and management of spent nuclear fuel from foreign research reactor and domestic sources, and currently manages more than 50 percent by volume of the spent nuclear fuel in the entire DOE complex, constituting about 250 specific fuel types. We are actively improving storage conditions at the site, transferring fuel from wet to dry storage, or from aging facilities to modern, state-of-the-art facilities. For example, we have transferred all spent nuclear fuel in wet storage in the CPP–603 South Basin to improved storage facilities well in advance of the Idaho Settlement Agreement milestone date of December 31, 2000. We completed movement of Three Mile Island spent nuclear fuel and core debris from wet storage at Test Area North to dry storage at the Idaho Nuclear Technology and Engineering Center (INTEC) six weeks ahead of the June 1, 2001, Settlement Agreement milestone. DOE also awarded a privatization contract last year for the design, licensing, construction, and operation of a facility for the packaging and safe dry storage of other spent nuclear fuel at the INEEL. The contractor is now proceeding with the facility design and is scheduled to submit its license application to the Nuclear Regulatory Commission in fiscal year 2002.

The fiscal year 2002 budget request supports the management of high-level waste at INEEL including about 1.2 million gallons of liquid sodium-bearing waste stored in 11 underground tanks, and about 4,300 cubic meters of calcined mixed high-level waste in separate robust temporary storage bin sets. As of June 2001, the volume of liquid sodium-bearing waste will be reduced by 250,000 gallons through evaporation and consolidation of tank contents. A draft environmental impact statement (EIS) for high-level waste treatment alternatives has been issued, and a final EIS and Record of Decision are planned for the end of 2001. We have deployed the Light Duty Utility Arm in two high-level waste tanks, one of a suite of innovative technologies that can inspect, sample, and retrieve waste remotely through openings in the tank dome. In this case, we visually inspected the tank interior and obtained samples of the tank waste. We are moving forward in fiscal year 2002 to inspect and obtain samples from two additional tanks. In addition, we continue to treat and dispose of low level and mixed low level wastes in compliance with regulatory commitments with the State of Idaho. One of the most complex challenges at INEEL is the remediation of buried wastes, contaminated release sites, contaminated soils, and ground water, which is governed by the Federal Facilities Agreement/Consent Order. A key goal is to eliminate the threat these contaminants pose to the Snake River Plain Aquifer, a sole-source aquifer underlying the site that provides drinking water to a quarter of a million people and serves as a critical source of irrigation water for Idaho's agricultural industry. Our environmental restoration program continues to make progress in assessing and remediating these areas of contamination. The INEEL made progress on the Pit 9 buried waste project, with the insertion of 43 probes into the pit. These and other probes will provide data for the comprehensive study that will support selection of a final cleanup remedy for all the buried waste in the Subsurface Disposal Area.

We are applying bioremediation techniques at Test Area North to clean up the ground water plume at the injection well and continuing pump-and-treat operations for the extended plume. At the Test Reactor Area, we will complete remediation of all identified release sites in fiscal year 2001, 2 years ahead of schedule. At INTEC, with the signing of the Record of Decision in fiscal year 1999, we are undertaking the complex process of remediating soil and groundwater release sites while continuing to operate INTEC for spent fuel storage and waste management missions. In addition, we will continue design and construction of the Idaho CERCLA Disposal Facilities for the storage/treatment and disposal of contaminated soils generated in the cleanup of INTEC and other contaminated sites at the INEEL.

The INEEL will continue to perform world-class scientific research and development, technology demonstration and deployment, and systems analysis and integration in fiscal year 2002. The goal of this effort is to ensure a sound scientific basis for decision-making and full integration of science and technology into INEEL and EM operations. To date, INEEL has deployed nearly 100 technologies in its cleanup operations, leading to reduced cost, improved worker safety, schedule acceleration, and lower risks. In fiscal year 2002, deployments are planned to support each major cleanup program at INEEL.

5. Oak Ridge Reservation, Tennessee

Fiscal Year 2002 Request

	[In thousands of dollars]
Defense EM, Privatization	36,876
Defense ER&WM, Post 2006 Completion	244,102
Defense ER&WM, Science & Technology	10,695
Defense ER&WM, Safeguards & Security	11,476
Defense ER&WM, Excess Facilities	500
Defense ER&WM, Program Direction	18,740
Non-Defense EM, Excess Facilities	141
Uranium Facil Maint & Rem, Other Uranium Activ	12,809
Uranium Facil Maint & Rem, UE D&D Fund	65,538
Uranium Facil Maint & Rem, UE D&D-DUF6	10,000
Total	410,877

The Oak Ridge Reservation (ORR) is comprised of three facilities—the Y–12 Plant, the East Tennessee Technology Park (ETTP) (formerly the Oak Ridge K–25 uranium enrichment facility), and the Oak Ridge National Laboratory (ORNL). Funding for EM activities at Y–12 and ORNL is primarily funded in Defense accounts. Funding for the cleanup of ETTP comes from both the Defense and the Uranium Facilities Maintenance and Remediation accounts.

At ORNL, we continue the decommissioning of the Molten Salt Reactor Experiment, an experimental nuclear reactor designed to use a fuel of highly-reactive uranium-233 blended with a molten salt coolant. After 4½ years of operation, the reactor was shut down in December 1969. We have made substantial progress, with input from the National Academy of Sciences, in stabilizing and deactivating this reactor. For example, we have installed and continue to operate a system to remove reactive gases from the reactor tanks and keep the reactor systems below atmospheric pressure until the fuel salt can be removed. In fiscal year 2001, we completed fabrication and testing of uranium conversion equipment; completed the planning, major equipment design and documentation for fuel salt removal, and removed about 14 inches of Uranium-233 bearing material from the charcoal filter bed. In fiscal year 2002, we will continue conversion of uranium captured in the sodium fluoride traps to a stable oxide for repackaging and storage, and will begin flushing and fuel salt removal.

In fiscal year 2001, we completed transferring waste from eight highly radioactive waste storage tanks, called the "Gunite Tanks," at ORNL. The tanks were built in 1943 and were used for waste from chemical separations operations until the late 1970s. The tanks vary in size, with most having a capacity of 170,000 gallons (approximately the size of a 4-bedroom house). The cost of the project was $80 million, less than half the original estimate of $200 million. A key factor in the accelerated schedule has been the development of a variety of remote remediation technologies, such as the "Houdini" vehicle and a robotic arm that provides access to the tank interior. This remotely operated equipment eliminated the need for workers to be placed at risk while performing cleanup, while allowing the work to proceed more efficiently. The robotic equipment will be reused to enhance the cleanup of similar

tanks at other sites. In fiscal year 2002, we plan to continue stabilization of the Gunite tank shells.

The request supports continued operation of the incinerator at Oak Ridge, which is permitted by the State to treat mixed radioactive and hazardous wastes regulated by the Resource Conservation and Recovery Act and by the EPA to treat PCB-contaminated wastes regulated under Toxic Substances Control Act (TSCA). This facility offers unique existing treatment capability for the DOE complex and is a vital DOE treatment asset. In addition to treating wastes generated by Oak Ridge facilities, it has also been used to treat wastes from other DOE sites. It provides a cost-effective and integrated approach to reducing the risk and managing these wastes. The fiscal year 2002 request supports two privatization projects at Oak Ridge. Construction of a facility to prepare transuranic waste for disposal at WIPP and for low-level waste at the Nevada Test Site began in fiscal year 2001 and is scheduled to be completed in November 2002, allowing operations to begin in fiscal year 2003. The Environmental Management Waste Management Facility is an on-site disposal cell with a capacity up to 2 million cubic yards of contaminated soils and debris resulting from cleanup and D&D actions at the site. Construction is currently scheduled to be completed late in 2001.

In fiscal year 2002, the Department will continue its effort to reindustrialize facilities in Oak Ridge, particularly at ETTP. The goal is to clean up ETTP as quickly and as safely as possible so that the site can be reused as an industrial park. As of December 2000, about 6,300,000 square feet of space have been leased to 35 private companies in a total of 71 separate leases. In some cases, the Department has conducted cleanup of the building and, in other cases, the private company is undertaking the cleanup. Overall, we estimate that this strategy will save $182 million in life-cycle costs.

We are making good progress on the Department's largest ever decommissioning project at ETTP. Cleanup of K–33, the first DOE uranium enrichment facility to be decommissioned, is already 60 percent complete as of March 2001. This first building will be finished in fiscal year 2002 and will then be readied for private sector reuse. The K–33 building and two other buildings are being decommissioned under a fixed price contract with BNFL, Inc. The project has turned the corner, and is currently making up for previous schedule delays. The largest supercompactor in the United States is now operating and is helping to minimize waste disposal volumes.

The Department's moratorium on releasing into commerce recycled metals from radiological areas remains in effect, continuing to impact the BNFL project cost. These restrictions are expected to remain pending decisions made after completion of an Environmental Impact Statement. DOE has minimized impacts by purchasing metals destined for recycling and storing them for possible future release.

Our fiscal year 2002 request for Uranium Programs at ETTP supports surveillance and maintenance of the inventory of 4,700 cylinders of depleted uranium hexafluoride (DUF6) and 2,500 other surplus uranium cylinders at ETTP. We are managing the cylinders at ETTP and the other gaseous diffusion plants in Ohio and Tennessee consistent with the consent agreements with the affected states and with Defense Nuclear Facilities Safety Board's Recommendation 95–1, which was closed in December 1999 when the Board determined the Department had met all of the relevant commitments.

The fiscal year 2002 request includes $10 million in the Oak Ridge Account to proceed with the project to chemically convert the Department's inventory of DUF6 into a more stable form that would make it acceptable for reuse, if applications for the material are found, or for disposal. Early in fiscal year 2001, the Department issued the final Request for Proposals to design, construct and, for the first 5 years, operate conversion facilities at Paducah and Portsmouth. Initially scheduled to be awarded at the end of fiscal year 2001, we now expect to award the contract early in fiscal year 2002 due to the number of proposals received and the complexity of the technical and business evaluations. In fiscal year 2002, DOE is requesting $10 million for the conversion project and plans to allocate an additional $12 million to this amount from funds obtained under Memoranda of Agreement (MOA) with USEC. The Department is committed to keeping this project on track to begin construction by January 2004, consistent with the schedule provided in Public Law 105–204.

6. Fernald Environmental Management Project, Ohio

Fiscal Year 2002 Request

	[In thousands of dollars]
Defense Closure, Site Closure	285,299

Fiscal Year 2002 Request—Continued

	[In thousands of dollars]
Defense Closure, Safeguards & Security	4,701
Defense ER&WM, Science & Technology	255
Total	290,255

The Fernald site, encompassing approximately 1,050 acres near Cincinnati, produced uranium for nuclear weapons from 1951 to the end of the Cold War in 1989. Nearly 40 years of uranium production at Fernald resulted in soil and groundwater contamination, a large backlog of wastes, including some unstable liquids, as well as stored nuclear materials such as depleted and enriched uranium. Several years of cleanup progress have included stabilization of liquid uranium solutions, off-site shipment of low level radioactive wastes, on-site disposal of contaminated soils and debris, and deactivation, decontamination, and demolition of several large industrial buildings at Fernald.

Achieving the closure of its two major sites, the Fernald and Rocky Flats sites, is a high priority for the Department. At Fernald, the Department entered into a closure contract with Fluor Fernald on November 20, 2000, whereby the contractor is given incentives to complete site cleanup before the contractual completion date of December 31, 2010. The contractor can earn maximum incentive fees by achieving closure by December 2006. Long-term stewardship, including continued groundwater remediation and long-term institutional controls, will be necessary after active cleanup is completed.

Our record at Fernald demonstrates that we will not compromise safety in our efforts to complete the cleanup quickly and cost effectively. In January 2001, DOE's Office of Environment, Safety and Health awarded the Fernald Environmental Management Project STAR recognition status in the Voluntary Protection Program. This DOE program promotes safety and health excellence through cooperative efforts among labor, management, and government at DOE sites. Contractors that meet the requirements for outstanding performance receive STAR recognition. STAR status is the highest safety performance and program honor that can be achieved.

New technology deployments at Fernald are resulting in significant project cost and schedule savings. For example, a variety of technologies are being used to provide real-time identification of radioactive contaminants in the soil. This rapid characterization reduces the amount of soil excavated and improves worker productivity. These technologies are estimated to reduce remediation costs by over $30 million. A groundwater re-injection demonstration project has accelerated cleanup of the Great Miami Aquifer. Current analysis indicates that the re-injection technology will reduce treatment time from 27 to 10 years, resulting in a cost savings of an estimated $14 million.

The On-site Disposal Facility allows for accelerated disposal of contaminated soil and debris resulting from cleanup and building demolition at a significant cost savings. In fiscal year 2000, we disposed of more than 255,000 cubic meters of waste, contaminated soil, and debris in the facility, including the completion of waste placement in Cell 1 and start of waste placement in Cell 3. In fiscal year 2001, the placement of a permanent cap on Cell 1 will be completed, and approximately 45,000 cubic meters will be placed in Cells 2 and 3. In fiscal year 2002, the disposal facility will continue to be monitored and maintained.

The Silo 3 pre-operations/treatment activities continued in fiscal year 2000, and the design and construction of the Tank Transfer Area/Waste Retrieval System, and Radon Control Systems was initiated. In fiscal year 2001, pre-operational activities for Silo 3 remediation are continuing, construction of the Radon Control System continues, and plans for the Silo 4 mock-up testing of the Waste Retrieval System are being developed. In fiscal year 2002, Silo 3 operations will begin, construction of the Silos 1 and 2 Tank Transfer Area/Waste Retrieval System and Radon Control System will proceed, and the Silos 1 and 2 full-scale remediation project will continue.

Removal of wastes and materials from the site is critical to closure. We are shipping uranium to the Portsmouth Gaseous Diffusion Plant in Ohio, with over 100 metric tons of uranium transferred to date. We are currently on schedule to complete the disposition of all nuclear product material by June 2002. We are also shipping waste off-site for disposal. As of May 2001, thirty-eight unit trains of rail cars loaded with treated waste have left the Fernald site for disposition at a permitted commercial disposal facility.

We continue to make great progress in the demolition of deactivated and decontaminated industrial buildings. Approximately 90 of the over 250 structures that re-

quire decontamination and demolition have been completed. We will complete cleanup of the Plant 6 Complex in fiscal year 2002, and begin work on the Multi-complex and Lab/Pilot Plant Complex. In addition, the facility shutdown of the non-nuclear facilities onsite will continue in fiscal year 2001 and fiscal year 2002. Facility shutdown includes disconnecting utilities on process equipment and structures; and removing and dispositioning of residues, process material, and equipment as required.

As remediation proceeds at Fernald, we are carrying out natural resource restoration projects and demonstrations using plantings similar to what historically and naturally occurs in the area, and incorporating a diverse variety of vegetation to promote wildlife colonization. Through fiscal year 2000, 31 acres were restored, and an additional 40 acres are planned for fiscal year 2001. In fiscal year 2002, the Area 1 Phase III Northern Woodlot/Wetland Mitigation project will be completed, restoring 103 acres, the largest land restoration project to be completed to date.

7. Waste Isolation Pilot Plant, New Mexico

Fiscal Year 2002 Request

	[In thousands of dollars]
Defense ER&WM, Post 2006 Completion	164,570
Defense ER&WM, Safeguards & Security	2,550
Defense ER&WM, Program Direction	8,510
Total	175,630

Operating WIPP is a key element of the Department's strategy to provide for the permanent disposal of the Department's inventory of radioactive waste. WIPP is critical to achieving site closure at the Rocky Flats Environmental Technology Site by December 2006 and to the closure or cleanup of 26 other sites in the DOE complex that store or generate transuranic waste. The total volume of transuranic waste currently managed by DOE (stored and projected) is estimated to be 171,439 cubic meters, of which 167,412 cubic meters is contact-handled (CH–TRU) transuranic waste and 4,027 cubic meters is remote-handled (RH–TRU) transuranic waste. By shipping this waste to WIPP for disposal, the Department will be able to reduce the number of sites where this type of waste is stored, reduce the management costs of this waste, and reduce the long-term risks to the public and the environment.

On March 26, 1999, WIPP began operations, receiving its first shipment of transuranic waste from Los Alamos National Laboratory, subsequently followed by shipments from the Idaho National Engineering and Environmental Laboratory (INEEL) and Rocky Flats. The State of New Mexico issued the final Hazardous Waste Facility Permit, with an effective date of November 26, 1999, enabling WIPP to receive mixed hazardous and transuranic waste, and all five of the major shipping sites (Rocky Flats, INEEL, Hanford, Savannah River Sites, and Los Alamos) are certified under the permit to ship transuranic waste to WIPP. The Hanford Site began shipments in fiscal year 2000, and the Savannah River Site began shipments in fiscal year 2001. As of the end of May 2001, there have been 235 shipments to WIPP totaling about 1628 cubic meters of waste.

The Department currently transports CH–TRU waste in Nuclear Regulatory Commission certified packages called TRUPACT–IIs. To support increased shipping requirements, DOE is procuring additional TRUPACT–IIs. The Department ordered the fabrication of a newly developed container called the HalfPACT to transport heavier-than-average drums of CH–TRU waste under the current TRUPACT–II fabrication contracts. RH–TRU waste requires a shielded cask for safe transportation. The Department will transport the RH–TRU waste in a certified cask called the RH–72B. Contracts were awarded in August 2000 to two vendors to fabricate a total of 12 RH–72B casks. The Department will use fiscal year 1999 privatization funds to procure the casks. The fiscal year 2002 budget request includes no funds for this project.

In fiscal year 2001, the Department awarded a new performance-based Site Management and Operating Contract for WIPP. The Carlsbad Field Office's management and operating contractor assists the Department in managing the activities of the WIPP facility and the National Transuranic Waste Management Program; therefore, the selection of a qualified management and operating contractor for WIPP is not only crucial to WIPP but also to DOE's mission and goals.

In fiscal year 2001, DOE revised the Record of Decision on treatment and storage of transuranic waste. The Department has decided to establish a centralized characterization capability at WIPP to prepare CH–TRU waste for disposal (up to 1,250 of the 7,000 cubic meters planned to be received for disposal annually). The New

Mexico Environment Department must approve a modification of WIPP's Hazardous Waste Facility Permit before the Department could perform disposal characterization at WIPP. By conducting centralized characterization the Department will avoid the necessity of constructing characterization facilities at the small quantity sites.

During fiscal year 2002, WIPP expects to receive CH–TRU waste shipments from Rocky Flats, INEEL, the Los Alamos National Laboratory, the Savannah River Site, Argonne National Laboratory-East, and limited shipments from other sites. We plan to increase shipments from the Savannah River Site to WIPP by using mobile facilities to prepare the waste for shipment. This will allow receipt of Mound transuranic waste at the Savannah River Site, as agreed with the State of South Carolina, to support early closure of the Mound Site.

WIPP will continue activities in fiscal year 2002 to support the first receipt of RH–TRU waste. The Department must receive New Mexico Environment Department and the U.S. Environmental Protection Agency approvals before RH–TRU waste can be disposed of.

The funding request for fiscal year 2002 includes $21.5 million to provide economic assistance to the State of New Mexico, as authorized by the WIPP Land Withdrawal Act. The WIPP program also funds a variety of institutional programs that provide for operational oversight and other assistance for affected governments and stakeholder groups.

The Carlsbad Field Office, working with the Office of Science and Technology, will continue to apply innovative science and technology solutions that facilitate receipt of transuranic waste and promote cost savings in the National Transuranic Waste Management Program.

8. Nevada Test Site, Nevada

Fiscal Year 2002 Request

	[In thousands of dollars]
Defense ER&WM, Post 2006 Completion	74,843
Defense ER&WM, Science & Technology	2,429
Defense ER&WM, Program Direction	5,656
Total	82,928

The Nevada Test Site (NTS) is located 65 miles North of Las Vegas and encompasses 1,375 square miles (an area roughly the size of Rhode Island). The EM program undertakes waste management activities and environmental restoration actions resulting from past DOE nuclear testing activities at NTS.

NTS plays a crucial role for other DOE sites as one of the major low-level radioactive waste disposal facilities in the DOE complex. In fiscal year 2000, the NTS disposed of 18,267 cubic meters of low-level waste and 29 cubic meters of mixed low-level waste. This year's projections are 28,500 cubic meters of low-level waste. NTS disposal operations are critical to closing other DOE sites. For example, Rocky Flats and Fernald will dispose of more than 38,000 cubic meters of low-level waste at NTS to support their closure.

We are working with the State of Nevada to acquire the required permits and to increase capacity for mixed low-level waste disposal at NTS as a result of the February 2000 Record of Decision designating NTS as a regional disposal facility for DOE low-level and mixed wastes. Work is also proceeding on the characterization of transuranic waste drums, in preparation for shipment to the Waste Isolation Pilot Plant, to begin in fiscal year 2002.

Progress continues in the Underground Test Area to address groundwater contamination through installation of groundwater wells, monitoring activities, and modeling efforts. We installed and sampled three deep wells in fiscal year 2000. The corrective action strategy for NTS groundwater contamination was also renegotiated in fiscal year 2000 with the State of Nevada, and have implemented actions to address regulator and stakeholder concerns.

The cleanup of NTS Industrial Sites area that supported the historic nuclear testing continues on schedule. To date, corrective actions have been completed at over half of the 1,068 release sites. Negotiations are continuing with the State of Nevada on corrective action levels for cleanup of soils, which were contaminated primarily by above-ground testing. The start of corrective actions for soils cleanup has been deferred, pending negotiations.

Project baselines have been reviewed with the regulators and stakeholders and fully identify the planned implementation of corrective measures for the various Nevada projects. These baselines include long-term stewardship obligations and em-

phasize the use of innovative technologies, such as the deployment of laser cutting for oversized TRU boxes, and an alternative arid landfill cover and monitoring system.

9. Los Alamos National Laboratory, New Mexico

Fiscal Year 2002 Request

	[In thousands of dollars]
Defense ER&WM, Post 2006 Completion	73,182
Defense ER&WM, Science & Technology	2,538
Non-Defense EM, Post 2006 Completion	2,500
Total	78,220

The Los Alamos National Laboratory (LANL) is a 43 square mile research and development site located 60 miles northeast of Albuquerque, New Mexico. Through fiscal year 2001, the Department expects to complete remediation of 1,302 of 1,942 "release sites," or specific areas where releases of contaminants had occurred, and decommission 36 out of 101 surplus facilities. We plan to complete cleanup of one additional release site in fiscal year 2002.

Approximately half of the fiscal year 2002 funding request for Los Alamos is devoted to environmental restoration work, such as drilling new regional ground water wells to characterize the hydrogeology and cleanup work in multiple watersheds. Although no EM funds in fiscal year 2002 directly support the project to transfer land to the community, a joint project with the Office of Defense Programs, other Los Alamos cleanup work, such as the source removal actions at high risk sites at the TA–21 parcel and some of the characterization work in the canyons, will support the transfer of parcels in future years. At this point, cleanup work has been completed at four of the 10 parcels proposed to be transferred.

The EM program provides for the treatment, storage, and disposal of all legacy waste that is presently stored at the Los Alamos National Laboratory. The legacy waste consists of mixed low-level waste, transuranic waste, and mixed transuranic waste generated at 33 Technical Areas and is treated, stored. Los Alamos has accelerated the treatment and disposal of legacy mixed low-level waste and retrieval of legacy transuranic waste (both transuranic and mixed transuranic) stored on asphalt pads under earthen cover, and now expects to complete these activities a year earlier than previously planned. Treatment and disposal of legacy mixed low-level waste with an identified path for disposal is now planned to be completed in fiscal year 2003. Retrieval of legacy transuranic and mixed transuranic waste stored on Asphalt Pads 1 and 4 has been completed. Retrieval of waste drums on Pad 2 began in fiscal year 2000 with completion scheduled for fiscal year 2002.

In March 1999, Los Alamos National Laboratory became the first DOE site to ship transuranic waste to WIPP. Los Alamos plans to make 19 shipments to WIPP in fiscal year 2001, bringing the total number of shipments or quantities of waste shipped to 41 which includes transuranic waste from the Office of Environmental Management and DOE's Office of Defense Programs.

The Department designated Los Alamos as the lead laboratory for research and development efforts to support DOE's nuclear materials management. In this capacity, Los Alamos provides solutions to complex-wide technical and operational issues associated with stabilization and storage of plutonium and other nuclear materials. LANL also manages the Off-Site Source Recovery Program for the recovery and storage of more than 5,500 commercial sealed radioactive sources, as well as Department of Defense sources and radioisotopoic thermoelectric generators. The program began full operations in fiscal year 2001 and to date has recovered more than 1,100 private sector sealed sources and brought them to LANL for storage. We expect to recover over 2,000 sources by the end of fiscal year 2001, and an additional 1,000 sources in fiscal year 2002.

10. Miamisburg Environmental Management Project (Mound), Ohio

Fiscal Year 2002 Request

	[In thousands of dollars]
Defense Closure, Site Closure	70,939

Fiscal Year 2002 Request—Continued

	[In thousands of dollars]
Defense Closure, Safeguards & Security	5,778
Total	76,717

The Miamisburg Environmental Management Project, a 306-acre facility near Dayton, Ohio used for tritium and plutonium operations, consists of 152 buildings and approximately 230 potentially contaminated soil areas. By the end of fiscal year 2001, over one-half of the 107 buildings scheduled for removal will have been demolished or auctioned for off-site use, a quarter of the 42 buildings scheduled to be transferred to the Miamisburg Mound Community Improvement Corporation will have been decommissioned and decontaminated, and two-thirds of the soil release sites will have been remediated. We still have a goal of completing cleanup of the site by 2006; however, changing conditions and increased scope are making a closure date of several years later more likely. Expanded project scope, especially in the excavation of greater quantities of contaminated soils, has significantly impacted cost and schedule. Worker health and safety issues at various times have seriously curtailed work in the "critical path" areas while additional personal radiation protection equipment to address these concerns has contributed to increased project cost.

We continue to make progress toward closure. In fiscal year 2000, Mound completed the disposition of its excess nuclear materials, most of which were sealed sources used to calibrate and test equipment. The site also completed the decontamination or demolition of four buildings and the remediation of five contaminated soil areas in fiscal year 2000, and will complete three buildings and the assessments of six contaminated soil areas in fiscal year 2001. We are shipping low-level radioactive waste off-site for disposal, approximately 18,000 and 13,000 cubic meters in fiscal year 2000 and 2001 respectively. In fiscal year 2001, Mound will begin off-site disposition of its transuranic waste to the Savannah River Site for interim storage and eventual repackaging and shipment to WIPP.

In fiscal year 2002, Mound will complete shipments of its transuranic waste as well as disposition of all remediation-generated waste. Groundwater remediation will continue, and up to nine contaminated soil areas will be assessed for remedial action. In addition, cleanup will continue on the site's most contaminated buildings, including the tritium operations facilities that comprises three highly contaminated and complex buildings.

In 1998, the Department signed an agreement to transfer ownership of the site to the Miamisburg Mound Community Improvement Corporation as remediation of discrete parcels are completed. To date, the Department has transferred two buildings and 122 acres, and another five acres and two buildings will be deeded over in the next few months, bringing the total acreage transferred to 40 percent of the site. Currently, 31 private businesses employing 342 workers are co-located at Mound in leased or transferred property. The Department's radioisotope heat source program, managed by the Office of Nuclear Energy, Science and Technology, will remain at Mound after the rest of the site is transferred. The program will retain use of three of the site's buildings.

11. Lawrence Livermore National Laboratory, California

Fiscal Year 2002 Request

	[In thousands of dollars]
Defense ER&WM, Post 2006 Completion	32,317
Defense ER&WM, Science & Technology	910
Defense ER&WM, Site/Project Completion	762
Total	33,989

The Lawrence Livermore National Laboratory consists of the Livermore Main Site, an operating weapons research and development laboratory; and Site 300, located about 15 miles east of the Livermore Main Site, which is used to test high explosives and other technologies for defense programs. The EM program is responsible for management of both legacy waste and waste generated from on-going operations. It also is responsible for site remediation, which includes cleanup of hazardous contaminant releases to the soil and ground water contamination at the Liver-

more Site, and releases of hazardous and radioactive materials to soil and ground water from landfills, drum storage areas, and dry wells at Site 300. Both sites are listed on the Superfund National Priorities List and have cleanup agreements with U.S. Environmental Protection Agency and the State of California.

At the Livermore Main Site, we have used an aggressive cleanup strategy to contain and extract groundwater contaminants that uses enhancements to pump-and-treat technology, supplements the existing permanent treatment system network with portable treatment units, and emphasizes specific source area removal. In fiscal year 2000 we continued to install portable treatment units to treat specific areas of the site. In fiscal year 2001, we applied an electro-osmosis technology to our treatment system strategy to attempt to remove groundwater contaminants from fine grained sediments more effectively. In fiscal year 2002, groundwater treatment systems will continue to operate to maintain control of off-site migration of the Western boundary plume.

In fiscal year 2000, we completed testing of the Molten Salt Oxidation unit for treating mixed low-level and hazardous waste and have awarded a contract to a commercial vendor who will own and operate the treatment unit to treat waste. In fiscal year 2001, we will complete construction of the Decontamination and Waste Treatment Facility, a treatment system for mixed low-level waste, and begin operational testing. In fiscal year 2002, we will continue to operate waste treatment, storage and disposal facilities and prepare documentation for closure of old waste storage facilities.

At Site 300, the Department has focused on removal actions such as capping the Pit 6 Landfill to control release, getting groundwater treatment systems in place to contain off-site plume migration, and characterizing the contamination at the site. In fiscal year 2000, we finalized plans and schedules for site-wide cleanup of the site and will begin design work in fiscal year 2001. We will also begin operation of an innovative groundwater treatment system in a canyon in the southeast part of the site using the Iron Filing/Geosyphon technology to remediate high concentrations of contaminants in groundwater. In fiscal year 2002, we will continue operation and maintenance of existing treatment facilities and soil vapor extraction units and will complete remedial design for several of the operable units.

Senator REED. Thank you very much, Madam Secretary. There have recently been press reports questioning the ability of the DOE to comply with the various compliance agreements under the budget as requested. If the Environmental Management program received the funding that has been requested, would the DOE be able to comply with all of its agreements, other than the agreement with the State of Washington for the tanks at Hanford?

Dr. HUNTOON. Senator, compliance, as I mentioned and as you have said, is our commitment with the regulators that regulate our sites—both the state regulators and the EPA to get work done on schedule. To put it in context, let me tell you that today, EM currently oversees 77 cleanup and compliance agreements at 25 sites, and we have committed to about 1,100 enforceable milestones within these agreements through 2070, so you see it is quite a drawn-out process. There are 187 enforceable milestones that occur in 2002.

Now, I put this all in context because we are potentially at risk of missing some of the milestones in these agreements. But without the budget being firm and without the work to identify efficiencies coming in from the sites, our contractors and DOE employees, I don't have a good idea if we are going to have a problem with the compliance agreements. I think it is a little bit premature right now.

The assessment that the Secretary has put in place will have work with our regulators at the sites to make sure that we are doing things as efficiently as possible. I think that after that assessment gets done and we get our final budget numbers, we will

be in a better position to determine if we are going to miss any compliance.

Senator REED. But even the request that you have made, Madam Secretary, with that request, assuming you get it fully funded, which probably is at least not a certainty, could you fulfill all the milestones?

Dr. HUNTOON. It is going to be a challenge. I think it is premature right now to say we are going to miss any particular milestone. I know we are not going to miss any major ones. But as I mentioned, we have 187 enforceable milestones that occur this year, so there is a potential in some areas, but until we get the final budget numbers, and until we have these discussions with our regulators, I just can't say.

Senator REED. If you are not able to make some of these milestones, would that force you to renegotiate these agreements with the EPA and the states?

Dr. HUNTOON. If we were not able to, we would have to sit down and discuss it with them. So far, as I said, I have not been told that we are going to miss any milestones, except the one this summer that you mentioned already. We have known for some time we weren't going to begin construction this summer on the tanks at Hanford, but except for that one, I know of no others that are out there looming. But there are many agreements, as I mentioned, that we are going to have to look at, and we may have to sit down and talk with our regulators on it.

Senator REED. You have also indicated in your testimony some of the new contracting initiatives, and over the course of the past year, the DOE has renegotiated or entered into new contracts at almost all EM sites. These contracts were designed to provide incentives to the contractors to do more work with less money, but were all predicated on a predetermined funding profile. Is the fiscal year 2002 budget request adequate to meet this funding profile at all sites?

Dr. HUNTOON. You mentioned renegotiating the contracts, and we have awarded or renegotiated new contracts at most of our sites. Back to the Rocky Flats model, after we got that new contract in place, incentivizing the contractor for—we called it a closure contract—what the total job is and how can we work to give the contractor incentives to reduce that schedule and complete work. The contracts also give the contractor a little bit more room to sequence their work more effectively and efficiently, and so far—I should knock on wood—it is working. We are moving ahead. We are making a lot of progress at Rocky Flats.

So we have gone into our other sites and even when we could not, when it was not appropriate to rebid contracts, we have restructured the contracts as we have extended them, and we put these incentives in place for specific projects at some of our larger sites to get them done. The 2002 budget as it now exists is going to be a challenge in some of those areas, but the way the contracts are, we can go in and renegotiate specific sections or items in the contract without renegotiating the whole contract if the budget does not allow the projects to continue.

Senator REED. We are at risk in this budget to lose this incentive approach to more rapid, in effect, cheaper cleanup.

Dr. HUNTOON. We would hope we would still keep incentivizing the contractor to accomplish the jobs.

Senator REED. But there is a risk that that would not be able to be sustained?

Dr. HUNTOON. That could be a risk.

Senator REED. We also understand you have begun a review of the Environmental Management program. Have there been any interim or final reports coming out of this review, and if there are, could you please provide us with both the information and the reports, but let me just say, are there any interim reports?

Dr. HUNTOON. We have not have an interim report yet. We have had some verbal discussions. We had asked the group that represents the contractors around the EM complex to look at the ideas of their membership and some of the issues. They may have ideas they can give us to gain efficiencies in the way we do business. We have had a verbal discussion, interim verbal discussion, no report. They are due to give us a report, I believe, soon, and we will provide you with that when we get it.

Senator REED. Thank you very much, Madam Secretary.

Senator Allard.

Senator ALLARD. Mr. Chairman, thank you. I ask unanimous consent that a statement by Senator Strom Thurmond be made part of the record.

Senator REED. Without objection.

[The prepared statement of Senator Thurmond follows:]

PREPARED STATEMENT BY SENATOR STROM THURMOND

Thank you, Mr. Chairman, I want to thank you for scheduling this important hearing on the Department of Energy's fiscal year 2002 budget request for the Office of Environmental Management. Although I have an interest in maintaining the Savannah River Site as a production facility, my greater concern is that we mitigate the waste products of 50-plus years of nuclear production to permit future development at the site, and to protect the health of the thousands of workers and the surrounding communities.

Dr. Huntoon, I join the members of the subcommittee in welcoming you to today's hearing. I specifically want to thank you for your service to the Nation in President Clinton's administration and now as a hold-over pending the confirmation of Ms. Roberson. Last year, when you testified before this subcommittee, you reported that the fiscal year 2001 budget request represented a significant increase over the fiscal year 2000 appropriation. Unfortunately, the fiscal year 2002 budget request represents a significant reduction to last year's, and is more reminiscent of the fiscal year 2000 budget.

As for the Savannah River Site, the fiscal year 2002 request is more than $150 million below last year and $30 million less than fiscal year 2000. Naturally, I find this unacceptable. The current budget request will seriously reduce the Savannah River Site's ability to stabilize legacy nuclear material and transfer these materials for final disposal. I hope you will focus on these issues during your testimony and provide the subcommittee the rationale and consequences of this level of funding.

Mr. Chairman, I intend to work with you to restore the necessary level of funding for the environmental program at the Savannah River Site. It is important not only to my constituents, but also to the country that we maintain credibility in our environmental restoration program.

Thank you, Mr. Chairman.

Senator ALLARD. Again, thank you, Dr. Huntoon. Can the Environmental Management program effectively meet its proposed cleanup and closure goals without a viable Environmental Management technology development program?

Dr. HUNTOON. I don't think it can. My personal opinion is it cannot, and the reason I would say that, Senator Allard, is we still

have some challenges doing some things with some of the materials across the complex. Not a lot, but some significant challenges. There is also the technical risk that comes with a lot of the disposition paths we have already chosen, and we have been resolving those concerns this past year.

The technology to deal with the salt portion of high level waste down at Savannah River—if we had not been funding under our R&D or Science and Technology program, some studies to find better technology for dealing with that, we would not be in the position we are this summer to choose a preferred technology. So we have to, in my mind, keep funding these basic studies to do the R&D, as well as some of technology demonstrations to show that the technology works. We saved money through the use of new technologies this past couple of years, we have saved money using R&D, and I think that will happen in the future.

But we have also learned how to do things to make the DOE complex safer for our workers as they are doing this work through some of our R&D programs and some of our robotic programs also. I believe it is essential.

Senator ALLARD. Regarding the Environmental Management technology development program, have you made progress in getting the best new technologies into the field across the EM complex? My understanding is that because it may mean less labor and efficiencies that sometimes the contractor may not be too willing to bring in those new technologies because it is sending negative incentives it has on the contract. Hopefully, you might give us two answers to that. The contractor aspect of it, and also how successful you think we are in getting these technologies into the field.

Dr. HUNTOON. I think we are increasing our success rate at getting the new technologies out into practice around the complex, and we have achieved that, I think, several ways. Just to name a couple: We have these focus areas where our technical people and our scientific folks look at specific issues that we need to apply technology solutions to. That has helped guide where we spend the technology money that we do spend, but it also gets our people out in the field across the complex to identify the areas where they need help or new ways of doing business. That has brought the user together with the person supplying the technology, working on a schedule that is good for both of them. That has been very effective, I believe.

The other thing that I have taken advantage of a couple of times this year is to deploy some special teams to sites where we had unique problems that needed some outside technical expertise quickly. One of these teams we sent down to Pantex, when we had some groundwater issues down there that we didn't know we had. This team met and reviewed all the data and came forward with a good plan to address the groundwater problem.

We deployed another team at Paducah when we had some issues there. They went and met with site people, reviewed all the data and came up with the new technologies. These are useful ways to get technology deployed quickly and helpfully to the workers and the project managers out in the complex.

I heard when I came into this job that we did have trouble getting technology deployed because it was not invented here or it

would take too much time to transfer the technology in, and we are doing it all by hand any way, or whatever the excuses were. I have not seen that to be the case when I have gone out around the complex or when I have talked to people. I think having a more integrated DOE EM complex-wide look at a lot of our technologies has helped a great deal.

One of the offices that I put into the organization when I organized Environmental Management a couple of years ago was the Office of Integration because we were doing too many "stove-pipe" sorts of cleanup programs around the complex. I think this has helped a great deal.

Senator ALLARD. So you think just more oversight on your aspect, visiting with the contractor has been adequate without us trying to provide some special incentives for them to adopt these new technologies?

Dr. HUNTOON. I think that they are trying to adopt them, and I think the need is what's causing them to do it. I think the need to reduce those schedules, and the need to reduce the cost, and then in some cases, there was just no known way to deal with the issue until something did happen in the technology area. So I think that is working.

Senator ALLARD. I view the multi-site integration plan as a major undertaking with the potential for enormous returns if it runs well. How would you gauge the current status of the multi-site integration plan and is it running as well as you had hoped and intended?

Dr. HUNTOON. I think integration among sites is better, I think we have more work to do. But one of the big issues I believe has to do with not just the movement of materials and the handling of materials at different sites, but, of course, the scheduling of the transportation and the various commitments we have made at some of our sites to meet certain schedules. When you add all those things together, it is pretty complex. It is working: having WIPP open and increasing its shipments almost on a weekly schedule, we are shipping more and more TRUPACTs to WIPP. This has given us some relief in states that we need to ship into, and so that is helping, but to get the entire plan down, to get the whole complex put into an integrated plan is still a challenge. It is a work in progress.

Senator ALLARD. Is there anything that you could recommend to your successor that would make the entire EM complex run more smoothly and improve the chances that the three major Environmental Management sites, that is Fernald, Mound, and Rocky Flats, will close on time in 2006?

Dr. HUNTOON. I think the one thing we were just talking about, of course, is the integrated schedule. While the schedule itself is important, the work itself is what's important. To keep making progress on the work I think is a number one issue. Handling all of the materials that we do in a fashion that is not only safe for the environment, but for our workers and people that live around our sites to me is the number one issue. I said from the day I took this job that we had to do it safely, not only to get our work done, but also to prevent stopping the work, which happens when we have mishaps of some sort. I think keeping an emphasis on our

safety management that we have been doing to keep the work going is very important.

On the work side, maintaining good schedules, monitoring the contractor, making sure that they are meeting the schedule and the milestones that they have committed to in their contracts, and keeping them incentivized to do so, I believe, is very important. On the other hand, Environmental Management has to live up to its commitments to provide the avenue for the movement of these materials for safe storage, so I think my successor is going to have to keep her eye on all three of those situations.

Senator ALLARD. What do you think are the biggest obstacles in keeping all the sites working together as provided by the integration plan?

Dr. HUNTOON. Obstacles? Of course, funding is one of them. I think that is an issue. The other, I think, would be making sure that we keep a communication line open. We have been, I think, very good about having our site managers, our major contractors discussing not just what's going on at their site, but listening to what's going on across the complex, as well as listening to each other. I think that is an essential component.

Senator ALLARD. Mr. Chairman, I do have a few more areas I wanted to cover here. Is there going to be another round?

Senator REED. There is going to be another round, Senator.

Senator ALLARD. OK. I'll hold those for the second round.

Senator REED. Senator Nelson, welcome.

STATEMENT OF SENATOR BILL NELSON

Senator BILL NELSON. Thank you, Mr. Chairman. Mr. Chairman, with this subcommittee's interest in space assets, our witness could well speak to that because she is a former head of the Johnson Space Center, so she is multitalented, and it is a pleasure. Dr. Huntoon, would you share with me if the politics prevent the storage site from being utilized in eastern Nevada, what is the way that we approach a lot of this waste and would you reflect upon, are there changing technologies and developments through R&D that might have a bearing on how we can store this waste and where?

Dr. HUNTOON. Senator Nelson, I don't think my experience in the space program got me ready for handling storage of high-level waste, but I do have some thoughts about it. Fortunately the Environmental Management program doesn't create a lot of high-level waste and is certainly concerned about storing it, but the issues of long-term storage is something that I think is a very complex issue, as you and I have discussed. I think it is a technically challenging issue and I think a lot of scientific work is ongoing to make sure we know how to do that safely.

I believe the work that we did, that we have done and are now doing down in New Mexico at the Carlsbad facility, which is referred to as WIPP, but we have stored transuranic waste in there beginning about a year and a half ago. It took almost 20 years to get the place open to do the proper studies, to do the proper permitting and all, but we got it open and we started shipping. It also took time because we had to work out with the State of New Mexico all of the rules and regulations and all, but we have done that,

and it is successful, and we are really progressing and shipping transuranic waste safely. We have made every shipment safely to Carlsbad, New Mexico, and is being stored in the underground salt caves there.

So we had some experience with handling transuranic waste. The high-level waste you are referring to we are now processing at Savannah River. We are successfully processing high-level waste out of the tanks down there, and we are getting ready to get a contractor to construct the facility to vitrify the waste that is out at Hanford in those underground tanks there. So we are in the business of processing high-level waste and preparing it for storage. In the meantime, it will be put in temporary storage at our facilities where it will be maintained until the Federal Government has a facility to disposition it for long term.

Senator BILL NELSON. There is no magic bullet that you see in R&D that is going to solve this problem?

Dr. HUNTOON. I know of none. I know there is a lot of talk about transmutation. I think as a scientist, I have my skepticism about transmutation. As an individual, as an optimist, I would hope it works out, because that would be a wonderful thing if it does. I know there are researchers that have put some emphasis on transmutation, and I think that would just be super to have that possibility, but that is a stretch right now. I'll be, like you, interested in seeing what happens.

Senator BILL NELSON. I went down to Oak Ridge to the Y–12 plant, and I was struck with the fact that they are operating in many World War II vintage buildings. Is that a concern for the Department, and what would you suggest that we do about it?

Dr. HUNTOON. Senator, the infrastructure or facilities around our complex both in the NNSA and Science and Environmental Management are all aging, maybe like all of us are aging, but they are all aging at a pretty fast clip because we have not put money back into infrastructure. I know that the NNSA has an initiative where they are looking to do some work to improve the infrastructure. We are trying very hard in Environmental Management to only do infrastructure work on those facilities that are absolutely essential to maintain our sites, because we are in the business of decommissioning facilities not in building new ones or fixing up facilities. But we have to maintain the ones we are working in safe for our workers.

So that has been a challenge, because when funds are tight, the facilities are the last things that usually get fixed. You visited Y–12, you should visit some of the other sites around the complex, because they, like Y–12, are in need of some facility work.

Senator BILL NELSON. Thank you. Thank you, Mr. Chairman.

Senator REED. Thank you, Senator Nelson. Madam Secretary, I just tried to do a little back of the envelope profile of funding over the years, and in 1993, EM is about $3 billion, but in fiscal year 2000, $5.7 billion last year appropriated in 2001, $6 billion. This year the request is $5.7 billion. We are moving backwards.

The goal calculated based upon the demands and the course as we know them was to get within 3 to 5 years from now to about $7 billion on an annual steady state basis. It seems that we are going the wrong way in terms of funding, and that the plans that

we have been considering now for several years invariably will suffer. Is that a fair conclusion from the budget profile?

Dr. HUNTOON. Senator, I would hope that our plans will not suffer, and I think the choices this year with the budget were a challenge for us. We did not necessarily have all of the capability that we needed to analyze what this budget would mean for us, and, as I answered a while ago, we are trying to work that out. But the efficiencies that Secretary Abraham has asked us to go look for, we are going to do that. The top-to-bottom assessment will certainly, hopefully, find ways to do things more efficiently and at less cost. I think there is a challenge that we have been given. I think we have given all of our managers the charge to find better ways to do things.

When Secretary Abraham was first briefed on the size of the EM program, and he said that 2070 and over $200 billion are just too much, and I don't disagree with him. That is the current lifecycle cost of the complex, and so any way we can find to reduce those costs and to reduce that time would certainly be beneficial. It is going to be a challenge.

Senator REED. Let me raise an issue in the context of this budget that Senator Nelson touched upon. That is, we all recognize that basic research is important to lower the costs and increase the effectiveness of cleanup. Looking at this budget, there does not appear to be any new basic research efforts that will be initiated. Is that accurate?

Dr. HUNTOON. With the challenges that we had with this budget, and choices that we had to make, we put most of our emphasis on our high-risk areas, as I mentioned, and tried to keep closure on schedule for our major closure sites. Science and technology, therefore, did not receive funding for any new starts this year.

Senator REED. Now, that would presume or at least one could conclude that there are some unfunded research requirements. I presume that is correct, and if that is, could you give us either now or later a list of those unfunded requirements that you consider worthy, but are not going to be funded?

Dr. HUNTOON. Yes. I can give them to you.

[The information referred to follows:]

UNFUNDED RESEARCH REQUIREMENTS

Areas requiring long-term research have been identified through recent major reviews, such as the National Academy of Sciences (NAS) review of the Department's Environmental Quality Research and Development Portfolio (a compendium of DOE's research activities); NAS/National Research Council's (NRC) review of Research Needs for High-Level Waste Stored in Tanks and Bins at U.S. Department of Energy Sites; NAS/NRC review of Research Opportunities for Deactivating and Decommissioning Department of Energy Facilities; NAS/NRC review of Research Needs in Subsurface Science; and a Complex-Wide Vadose Zone Roadmap and Vadose Zone Roadmap at Richland. Some of the yet-to-be-addressed needs that have been identified are:

- Devices for ultra-sensitive, remote-mapping, and real-time characterization of contaminated materials;
- Biotechnological decontamination of equipment and facilities and understanding of the chemical and physical interaction of contaminants with the primary materials;
- Remote intelligent systems to enhance worker safety with special emphasis on actuators, universal operational software, and "virtual" presence;
- Remote sensing instruments for real-time, in situ characterization of high-level waste and process streams;

• Improved solids-liquids separations methods for high-efficiency, high-throughput separations methods that could reduce waste volumes and program costs;
• Highly innovative and effective retrieval methods for removal of high-level waste materials from connecting pipelines;
• Alternative immobilization media to overcome limitations of borosilicate glasses;
• Methods for designing monitoring systems to detect both current conditions and changes in system behaviors;
• Methods to monitor fluid and gaseous fluxes through the unsaturated zone in soil, and differentiate seasonal changes; and
• Subsurface research at the basic and applied level to develop the scientific basis for a subsurface geosciences facility.

Senator REED. Thank you very much. As I understand it, the administration is requesting $180 million in the supplemental. Could you let us know what that $180 million is going to be used for, the pending supplemental that is before the Senate Appropriations Committee today?

Dr. HUNTOON. This is the supplemental for 2001?

Senator REED. Yes.

Dr. HUNTOON. Yes. What we did with the 2001 budget was—as you would imagine when we got into 2001, there were several areas that we were not going to be able to complete and do the work we needed to. So when we had the opportunity to request a supplemental, we put in for those areas.

I think the biggest issue that we had was—again apply priority to our high risk areas—we put some additional funds in Savannah River, for some high-level waste evaporator work that presented problems this past year causing trouble in managing our water down there because we have to use these evaporators that seem to not work as much as they should because they are complex apparatus.

We installed some furnaces, did some other necessary maintenance, for safety work at Savannah River, and we got more involved in some of our pumping of our tanks down there to manage that high-level waste. We have had some leaky tanks, and we were having to move fluid from tank to tank down there to manage the safety aspects of it. These were all new occurrences for 2001.

Out at Richland, we put in some money to recover some of the delays that we had in moving spent nuclear fuel out of the K Basins. As I mentioned in my opening remarks, we're very pleased that we're moving that material out of there now, but it's very complex and it's been a very costly situation. So to recover some of that we had to—it needed more funding. The Plutonium Finishing Plant out at Richland needed more money for some of the cost growth they had experienced in transferring and stabilizing some of the plutonium oxides that they were doing.

Moving on, I think we also put extra money into the Office of River Protection for tank waste management out there. In addition, one of our big issues was not having enough TRUPACTs. These are the shipping containers that go to WIPP in Carlsbad. We've been trying to find ways to help Carlsbad find some resources, and so this was a way to get the TRUPACTs—it takes 3 months after you order them before they're delivered, and based on our schedule, it looks looks like we're going to need them very soon, the extra TRUPACTs.

In Idaho, we went back and added some money for conceptual design for the construction of a high-level vitrification facility. While not a top priority at Idaho, it has been a priority, and so we're trying to get that done.

At Pantex in Texas we funded the development of some groundwater technologies. I mentioned earlier that this past year we had some groundwater issues at Pantex that had not been addressed, and we added money for that. So the supplemental funds are scattered around the complex, but they will all find high priority needs that have come up this past year.

Senator REED. Thank you very much, Madam Secretary. This is, I think, an obvious follow-up comment that at $6 billion roughly last year, you still encountered a shortfall of roughly $180 million which couldn't be avoided. Now with a $5.7 billion base, one has to ask the question, do you begin with even barely adequate resources?

The other question is that there is presumption, obviously, that you can save a lot of money by efficiencies. That presumes that you haven't been conscious of efficiency and conscious of the programmatic demands, and I don't think that's the case. I think you and your colleagues for years have been trying to be more efficient, more productive.

Can you outline any of the areas you think that will free up on the order of $150, $180, $300 million?

Dr. HUNTOON. Senator, at this time, I can't. We will come in for the record if that's all right, and list those efficiencies. We're working on it. I would just mention to you a few ideas that we have had, in talking with our contractors and all, on trying to get some efficiencies. Some of those have to do with examining our own DOE orders, identifying areas that our contractors and our site managers across our complex believe are costing us resources as they try to meet all of these orders at all of our sites.

It's a "one size fits all" and yet our sites aren't all alike. We have some closure sites and we have some sites that are still in operations. We have some sites that have very high-level radioactive materials and we have some sites that do not. So one of the ideas is for us to look at those and not do anything that's unsafe or not do anything that's really dumb, but to try to get some efficiencies. I will provide to you for the record some of the other efficiencies we're looking at.

[The information referred to follows:]

ENVIRONMENTAL MANAGEMENT PROGRAM EFFICIENCIES

EM has been successful in achieving efficiencies in the past and we believe additional efficiencies are possible. For example, in the past, EM has reduced annual support costs by $400 million per year and reduced the uncosted balances by more than $1 billion. More recently, EM has negotiated contracts that provide incentives to accelerate work and achieve savings. These contracts have the potential for significant new savings.

Other initiatives that are expected to produce significant efficiencies include:

- Increased focus on project management principles that hold Federal and contractor line management accountable for program and project performance.
- Use and deployment of innovative technologies to achieve cleanup more efficiently. EM has developed about 280 innovative technologies that reduce risk, cleanup costs and schedules, or perform tasks that were not previously possible. For example, robotic techniques for sludge removal of the Gunite

Tanks at Oak Ridge allowed the project to be completed more than 10 years ahead of schedule and at a savings of $120 million.

• Establishing a partnership with the Department's regulators to work toward better and more efficient ways to achieve compliance. The accelerated closure of Rocky Flats, governed by the compliance agreement with the State and the U.S. Environmental Protection Agency, reflects a goal for closing the site by 2006—from an earlier schedule of 2065—and a savings of $30 billion, and serves as a model for other sites.

• Examining alternative approaches to identify the most cost effective ways to achieve cleanup and building on successes such as the one at Fernald which used on-site, rather than off-site, disposal of waste, resulting in a $100 million savings.

• Continuation of efforts to reduce support costs.

We believe the top-to-bottom review will identify better ways of doing business and related cost savings.

Senator REED. Thank you very much.

Senator Allard.

Senator ALLARD. Mr. Chairman, thank you. The closing of the Fernald and Mound sites in Ohio and the Rocky Flats site in Colorado are still an important key to addressing complexwide challenges to the EM program.

Dr. Huntoon, you've been a strong supporter of the closure effort. What is your current prognosis for reaching closure of any of these site by 2006? I look back on your testimony, I note that you stated on Rocky Flats that you're continuing toward that progress, toward the goal. You think it's ambitious, and in your more informal statement, you said that it's a vision that's becoming closer to reality.

I noticed in your statement here with the Fernald site, that your request of $285.3 million plus $4.7 million for safeguards and security also funds efforts to complete cleanup and close the Fernald site in Ohio. This site is currently scheduled to close in 2010 but the new closure contract for Fernald awarded last November includes incentives to the contractor to accelerate the completion program of 2006. I commend you on getting that contract completed last fall.

On the other site, the Miamisburg Environmental Management Project, you stated the goal was still to complete closure and cleanup of the site by 2006, however changing conditions and increased scopes make a closure of several years later more likely. I worry about having to renegotiate contracts, because if it's anything from what I've experienced in the past, any time you open up a contract things get out of control. You give the contractor all sorts of excuses to start upping the price of cleanup. So I just would like to know how you're moving along with your closure of 2006?

Dr. HUNTOON. Senator, as I mentioned, the Rocky Flats vision is now a more realistic goal, I believe, for 2006. I think we're a little bit behind schedule right now, but our contractor and our site manager have both assured me they think they can make that up. They had a little bit of trouble getting the plutonium processing up and going, but it is operating now, and we are turning out cans of the plutonium, getting it ready to ship, so we hope that that is going to get back on schedule. They anticipate it will, so I anticipate that we are going to stay on schedule for 2006.

Now, having said that, you and I both know that every time we start some new process out at Rocky, or at any of the other sites, we go in and we find or need something we did not know we were

going to find or need a special way to handle something, and it gives us problems. So I am not going to say that it is going to be a done deal and that we can all relax now. I think it is going to take constant vigilance by our DOE team and our contractor to keep that schedule on track and to try to keep those costs contained. It is going to be a challenge, but it is a realistic challenge right now.

Senator ALLARD. That is a realistic comment from what I know, and I appreciate your efforts in that regard.

Dr. HUNTOON. At the Fernald site, we renegotiated a contract to close the site at 2008 with incentives to pull closure back to 2006. So we have incentivized the contractor. We are trying to do that. We have a terrific site manager there who is keeping the trains rolling, if you will, and I think things were working well. We have had some challenges at Fernald also.

Senator ALLARD. I assume that is pretty much along the same model as we have on Rocky Flats?

Dr. HUNTOON. That's right. It is the same model. It is specific issues being incentivized to get done by specific times, giving the contractors some flexibility on schedule, letting them decide the sequencing of the work, working well with the regulators to do this. Everyone has their eye on the ball and hopefully we can pull the date back on the Fernald contract. We are trying hard to do that. That will be a challenge.

Mound is a different story. We have run into technical issues at Mound, particularly with Special Tritium Compound that we have never dealt with before, and neither had anyone else. We are working through that and I think we have some fixes. But it is a challenge. So closure of Mound, it will slip out some. I don't know exactly until when. We still have to get an assessment of that.

Senator ALLARD. I mentioned in my opening statement many of the benefits to the EM program by closing Fernald, Mound, and Rocky Flats, safety to workers in the community, a safer environment, cost savings which can be used at the other sites, a needed success story for the Department of Energy, just to mention a few key ones.

However, I understand this is a very difficult mission to accomplish. Again, are there any major obstacles that you see the DOE or Congress needs to address to make sure we are successful in closing down the designated sites by 2006?

Dr. HUNTOON. I think there are a lot of challenges, as I mentioned, out there to do this. I think in the past you and I have discussed some of them. Just to be specific about Rocky: making sure we get the shipments of materials out of Rocky, making sure that the sites that are receiving the materials are ready for them, and we have met all the obligations, not just with construction and facilities, but also with the regulators for this shipment of the materials, so I think those are going to be challenges. Some of the materials at Rocky depend on being received at Savannah River to be processed, and I think we have to make sure that that is on track.

I think the movement of waste out of Rocky, particularly the mixed low-level waste, is going to be a challenge. We are going to have to make sure we can stay on schedule. So there are some issues.

Senator ALLARD. Do they require some legislative solutions?

Dr. HUNTOON. I don't think, right now I don't know of any legislative solutions that are needed. I think most of them are going to be technical and managerial solutions coming out of Environmental Management, DOE, as well as the contractors.

Senator ALLARD. Mr. Chairman, I have just one more question.

Senator REED. Take whatever time you need, Senator.

Senator ALLARD. The Rocky Flats site has been successful in making big strides toward cleanup while making sure their safety and security requirements are met. They really had a culture change in the way they did business. In fact, before making a plan of cleanup to close Rocky Flats by 2006, the earlier estimate in 1995–1996 predicted closure in 2065 at a cost of $30 billion, and the 2006 closure will cost about $7 billion during the same period of time. Do you believe Rocky Flats is unique in finding these efficiencies or can this type of turnaround be introduced at other EM sites?

Dr. HUNTOON. I think you hit the point of why Secretary Abraham has directed us to do this assessment around the complex. If we were able to do this at Rocky Flats, then he wants us to look for these efficiencies of doing business at other sites. I want to say a couple of things, as I did to him.

Rocky Flats, I think, did have a turnaround or has had a turnaround. One notion is that Rocky Flats is a closure site, and everyone out there has known that and knows it and is focused toward closing and getting the job done. The contractor has contracted with us to close that site. I think that will give us not only a direction for work, but it gives the mindset to all the workers, as well as certainly the contractor and Department of Energy workers there.

Not all of our sites are closure sites. A lot of our sites have ongoing activities that will take them into 2035 or 2040 to meet some of their commitments. So it is not going to be a one size fits all, but I think a lot of the efficiencies that we gained at Rocky, we can gain at other sites, and we have already initiated some of that work with some these contracts we have put in place this past year.

Senator ALLARD. Mr. Chairman, I have a couple questions on waste disposal. I thought I would let you ask a few questions and I'll wrap it up with those.

Senator REED. That is fine, Senator. If you want to continue, it is quite all right, too.

Senator ALLARD. I'll let you ask a couple.

Senator REED. Just let me ask two questions, Madam Secretary. It seems that the efficiencies you are talking about that are in place now are at predetermined funding levels which allow the contractors to really know how much money they will receive over several years, and they are able to manage their work to be more efficient and more timely. Is that a fair description of the structure?

Dr. HUNTOON. That, but also, Senator, it has to do with pricing out specific tasks within the contract. What's it going to take to do this particular job, regardless of how many years or the funding over the years. By doing that, particularly on larger sites where some of our bigger contracts are, we have been able to sequence the

work as our budget will allow it to be done. That is also what we will have to be doing in the future as we get the budgets that we get in the Federal Government. We will have to sequence the work with a contractor that we can afford at the time.

Senator REED. But as you sit at this point, you have already priced out certain tasks. You have already incentivized a contract by providing what is a defined profile of funds. My sense is that this budget that has been requested does not meet those costs that you know of right now, so as a result, you will have to delay certain tasks, sequence certain tasks, is that correct?

Dr. HUNTOON. Because of the budget that has been proposed, we will have the opportunity to renegotiate certain tasks within some of the contracts. I suspect that will happen.

Senator REED. But that means delay in the performance of those tasks or with less money, how do you get more work?

Dr. HUNTOON. We will have to delay some of them or as I said, resequence the work in them.

Senator REED. Another final question, if I may. There are some unavoidable costs in all of this, and one particularly important one is worker safety, and so as you look at these efficiencies, I assume and I know that you will be very sensitive to maintaining the very high standards of worker safety. I presume that, and can you confirm that?

Dr. HUNTOON. Yes. I will confirm it. I think that if I leave any legacy with Environmental Management, it will be that we talk about safety first. I think that has to be in everyone's mind. I know all of our site managers understand that. They have really emphasized safety and our safety record has really improved in the last couple of years, just by keeping a constant vigilance on safety issues, and not asking do we need to do it. We must do it for the environment and the people working and living in the environment. But also, if you have safety problems, that shuts everything down and then the schedule falls apart, so for both of those reasons, safety has to be a top priority. I suspect it will continue to be.

Senator REED. Thank you.

Senator Allard, your final questions.

Senator ALLARD. Yes. On the low-level waste disposal issue, if I refer to the General Accounting Office report on nuclear cleanup, you understand which report I would be referring to?

Dr. HUNTOON. I think so.

Senator ALLARD. It was titled "Nuclear Closure, DOE Should Reevaluate Waste Disposal Options Before Building New Facilities."

Dr. HUNTOON. Yes.

Senator ALLARD. My question is directed toward that GAO report. In light of what that report says, it raised the issue of whether low-level waste should be disposed at our onsite facilities or offsite commercial facilities, and what criteria do you believe the Department of Energy should use in deciding this issue?

Dr. HUNTOON. The biggest criteria that we try to use has to do with being cost effective, what is the most cost effective way to deal with this. I think the policy that we have been following is to use the DOE facilities for disposal of low-level waste that could be done

there, and then evaluate, as I said, the other available facilities when we could not use them on DOE facilities.

Senator ALLARD. Your costs short term on those could show as a savings, but long term, could be more expensive. Is that right?

Dr. HUNTOON. Yes, sir.

Senator ALLARD. Did you try to evaluate that?

Dr. HUNTOON. That's true. This is what we try to evaluate. I'll give you an example. There is a waste criteria that has to be considered because not all the waste is the same, and it can't all go to the same place. Transportation is a big issue. It is costly, and we have to negotiate the transportation routes and what we are shipping where. So that has to be taken into account.

Of course, the level of contamination in the waste is an issue. We can ship some waste to commercial facilities, but they cannot accept waste at certain levels. So it is, I think it is a complex issue involving many that have to be examined, and we have been trying to do that in the complex. It is cheaper transportation-wise, as you might imagine, to put them in local facilities or in cells that we build at the sites where the disposal is occurring, but those tradeoffs have to be done.

Senator ALLARD. Do you plan on changing the way you have been doing business as a result of that GAO report, and if so, what kind of adjustments in your low-level waste disposal contracting practices might that lead to?

Dr. HUNTOON. We are going to, I think, assess each time and do the calculations and do the studies necessary to determine what is most cost effective, the way that we can do it in the safest way. I think establishing criteria and trying to meet them is the best thing that we can do. The issue of transportation, I think, should not be left out of the equation, and sometimes is, and the variance in the waste should not be left out of the equation, and sometimes that is left out. So talking about it in general terms is one thing. Being specific for the specific waste stream and doing the calculations is another one.

Senator ALLARD. I just want to recognize, the staff helps me in doing this, that you were a big help in resolving the container delays and I appreciate that. Also, Madelyn Creedon, while she was at the Defense Programs, assisted the Rocky Flats office at the DOE headquarters, has been very helpful as well, and I want to pay my thank yous to them.

I'd like to get back to the budget questions Mr. Chairman was asking. Now, you have $180 million in the supplemental. Some of the programs that you listed like the leaking tanks, when did those start leaking?

Dr. HUNTOON. Senator, I'll have to get you the dates on that specifically. I am going to say in the last few months.

[The information referred to follows:]

LEAKING TANKS AT THE SAVANNAH RIVER SITE

On January 12, 2001, a leak was identified in Tank 6. Later, on June 15, 2001, a small leak was detected in Tank 5. Waste was safely transferred from these tanks to reduce the level of waste below the lowest leak sites. There have been no reports of leakage into the soil or groundwater and none is anticipated. The Department will continue its surveillance and maintenance activities to minimize risks to the environment and ensure worker safety.

Senator ALLARD. That is not anything that you had anticipated, for example, when you were putting together this budget?

Dr. HUNTOON. No. The 2001 budget.

Senator ALLARD. In the early budget of where you had the $6 billion, that was the last budget, we had the $6 billion total appropriation.

Dr. HUNTOON. It was not anticipated. We do watch these tanks very carefully because they are old.

Senator ALLARD. Yes.

Dr. HUNTOON. These tanks had not leaked before, and we thought we were pretty safe with them, and then we ended up having leaks in two different tanks, which caused us some management of fluid problems.

Senator ALLARD. Now, the shipping of containers, are there things that you knew there might be a need for and did not include in this budget, or is this kind of a last-minute emergency thing?

Dr. HUNTOON. The site was telling us they were hoping, they were scheduled to need this many. I guess in our judgment in forming the budget, we did not think they were going to get there with the number of TRUPACTs they are needing.

Senator ALLARD. So there might have been something that was built into the previous budget, but when you made this request here, you didn't think that there was a real need there at the point, but then that is changed in the process, is that correct?

Dr. HUNTOON. That's right. Like the WIPP containers is a perfect example. Because of some of the delays around the complex at the various sites and getting the permits to ship and all, we have not shipped at the rate that had been projected or anticipated for the last year. Now all of a sudden, these permits have come through and we are shipping and hopefully in another month, maybe another week—I don't remember the date exactly—we will be shipping up to 17 shipments a week into WIPP. Just a few months ago, we were shipping three and four shipments a week. So they had finally reached this projected rate, and now we see that in order to keep up with this rate, we would need to get these orders in for these TRUPACs.

Senator ALLARD. I think maybe the Chairman and I are thinking along the same lines here. We add the $5.7 billion plus the request on the $180 billion, that leaves $150 million—I am sorry, $180 million, it leaves $150 million shortfall as to what was budgeted in the last budget. So the point of my question is that how many items did we have that was built in in the $6 billion budget that in effect we legitimately make up a difference with $185 million to bring us up there, and then you have the $150 million shortfall as a total, as it was when you had your $6 billion budget.

So what I was trying to get out of my question was how many of these truly happened within the last 9 months or so, and which one of those is makeup figures that bring up closer to the $6 billion, because I think that helps us in understanding what kind of funding needs you may have.

Dr. HUNTOON. The 2001 supplemental is for issues that have come up since we submitted our 2001 and received our 2001 budget. We put in the supplemental to handle 2001 issues.

Senator ALLARD. None of those was a duplicate of a request that was on the $6 billion budget?

Dr. HUNTOON. No. That's right.

Senator ALLARD. Thank you, Mr. Chairman.

Senator REED. Thank you, Senator Allard. I guess I can't resist but if you had an extra $200 million in the last 2001 budget, might you apply it to some of these costs, or was it totally unexpected?

Dr. HUNTOON. Some of them might have—I can't say that some of them would not have been, Senator. But some of them have been unexpected. Perhaps we should have expected them, but they have been issues—and they will keep coming up because as I mentioned, this material we are dealing with, the complexity and the age of some of the equipment and all, we keep having these problems.

Senator REED. Thank you very much, Madam Secretary. Again, thank you for your testimony in response to our questions and for your service to the Nation. I would make note that the record will remain open until Wednesday, June 27th at 6 p.m. to receive any questions for the Secretary from members and also to receive any additional testimony from DOE main, major prime contractors. With that, I will adjourn the hearing.

Dr. HUNTOON. Thank you.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JACK REED

WORKFORCE REQUIREMENTS

1. Senator REED. As DOE gets closer to the point in time when it will actually close sites, how would you propose to keep the workforce needed to close on schedule?

Dr. HUNTOON. The Department is doing a variety of things to ensure essential Federal and contractor employees are in place to close designated Environmental Management sites as scheduled. The Secretary of Energy has received authority under Section 3136 of the Fiscal Year 2001 National Defense Authorization Act (NDAA) to provide transition incentives to eligible Federal employees at designated closure facilities. The incentives include accumulation of up to 720 hours of annual leave, retention allowances of up to 30 percent of basic pay, and continuation of health insurance coverage for up to 18 months after termination of employment. This authority will be used to encourage needed employees to stay in their positions until completion of work. The Department also intends to develop procedures for priority selection of employees from closure sites for vacancies in environmental management positions at other sites.

DOE contracts at the closure sites contain incentives to meet scheduled completions of the projects. The contractors, in turn, must retain employees with appropriate skills to meet the contract schedules. Contractors have wide latitude to develop retention incentives for their workforces. At Rocky Flats, for instance, the Department has supported the contractor in having its workers develop personal closure plans, providing reimbursement for tuition for classes that would lead to future employment in other fields, providing pay enhancement incentives to retain employees in select positions, and allowing early retirement. Such incentives can be expected to be used with greater frequency as the sites near their scheduled completion dates. In addition, the Department has developed workforce restructuring plans for the closing sites pursuant to Section 3161 of the NDAA for Fiscal Year 1993. These plans may provide enhanced benefits for voluntary separation of employees, allowing retention of those needed for ongoing work. The DOE Office of Worker and Community Transition manages this program.

WORKFORCE INCENTIVES

2. Senator REED. Do you believe some type of incentive system is appropriate and if so do you have any proposals for such incentives?

Dr. HUNTOON. The Department believes that a system of incentives is appropriate. It has established a Federal Employees Incentives Board to oversee implementation of the Fiscal Year 2001 National Defense Authorization Act (NDAA) Section 3136 incentives. Each of the Environmental Management (EM) closure sites will be developing an annual plan within the next few months which identifies which positions will be surplus and which are required over the closure project's schedule. Appropriate incentives will be provided accordingly, and reviewed on an annual basis. The EM closure sites will also continue to update their contractor workforce restructuring plans and use available appropriations to avoid losing employees needed to successfully meet closure schedules. The Department will support contractor efforts to provide retention incentives, as appropriate.

As the closure work proceeds, the Department will assess the adequacy of current legislative authorities to help retain the necessary workforce and request changes should the current provisions prove insufficient.

REVIEW OF ENVIRONMENTAL MANAGEMENT PROGRAM

3. Senator REED. Have there been any interim and final reports coming out of this review? If there are, could you please provide a copy? What is the purpose of this review and when will it be completed?

Dr. HUNTOON. Secretary Abraham requested that a top-to-bottom review of the Environmental Management program be conducted, in response to his concerns about the projected cost and time (over $200 billion and 70 years) to complete the Department of Energy's cleanup mission. By looking at management strategies, opportunities for complex-wide integration, unnecessary internal DOE requirements, and other aspects of our program, the goal of the review is to identify efficiencies and opportunities to get the Department's cleanup work done more quickly and more cost-effectively.

I initiated this review as Acting Assistant Secretary of Environmental Management, and it will be managed by Ms. Jessie Hill Roberson, the new Assistant Secretary of Environmental Management, once she is confirmed.

INTERNATIONAL TECHNOLOGY DEVELOPMENT COOPERATION

4. Senator REED. In the past the Environmental Management Program carried out some environmental research in Russia. This effort has apparently lapsed. Have you looked at the possibility of reviving that program and partnering with Russia and other research institutes of the Former Soviet Union to look at areas of mutual need?

Dr. HUNTOON. We have a long and continuing history of interaction with the Former Soviet Union that has produced first-rate science on research activities that are mutually beneficial. The fiscal year 2002 request continues support for these activities. For the past 11 years, the Office of Environmental Management has conducted a cooperative research and development program with the Ministry of Atomic Energy (MINATOM) of the Russian Federation to address common environmental management issues. This program, administered by the Joint Coordinating Committee for Environmental Restoration and Waste Management (JCCEM), addresses problems of mutual interest and importance, such as environmental stewardship of the former nuclear weapons complex in each country. The joint work focuses on five areas of cooperation (high-level waste tanks, transuranic stabilization, deactivation and decommissioning, efficient separations, and contaminant transport modeling) and has resulted in demonstrations and deployments of Russian-developed environmental management technologies at both DOE and MINATOM sites. The 11th JCCEM Meeting will be conducted in September 2001 in St. Petersburg, Russia. Approximately $1 million annually is directed to fund Russian scientists.

In addition to the joint work carried out with the Ministry of Atomic Energy, we are also involved in a joint program with the Russian Academy of Sciences. Two implementing arrangements, "Geologic Analogues, Migration and Accumulation of Radionuclides in Geologic Media" and "Risk Assessment and Advanced Modeling Regarding Geologic Disposal," were recently signed at the first meeting of the newly created Joint Coordinating Committee on Science and Technology Cooperation (JCC). JCC serves as the managing body for a Memorandum of Understanding on Cooperation in Science and Technology between DOE and the Russian Academy of Sciences. Scientific collaborations under this program include the study of the conditions of uranium migration and accumulation in rock similar to those found in the U.S. at possible repository sites; the study of the chemical and thermochemical properties of radionuclides and the characteristic migration processes important to re-

pository performance; the behavior and transport properties of radioactive waste at contaminated sites in Russia; and the preparation of a plan for the development of a geologic repository in Russia. The fiscal year 2002 request includes $333,000 for this program.

INTERNATIONAL TECHNOLOGY DEVELOPMENT COOPERATION

5. Senator REED. The European Union has started to fund environmental research in Russia at some of the nuclear facilities. Do you know if there are any opportunities to collaborate in this research?

Dr. HUNTOON. It is possible that opportunities for mutually beneficial collaboration do exist, and we plan to research this during the 11th Joint Coordinating Committee for Environmental Management (JCCEM) in September 2001 in St. Petersburg, Russia.

ENVIRONMENTAL MANAGEMENT SCIENCE PROGRAM

6. Senator REED. In reviewing your testimony and the fiscal year 2002 budget request it does not appear that there is any money in the science and technology account to start any new basic research efforts. Is this accurate? Why is there no money for this?

Dr. HUNTOON. Our request for the Environmental Management Science Program (EMSP) places priority on addressing high priority requirements identified by the sites, continuation of research initiated in prior years, and on moving promising EMSP research results through the next development phase. The fiscal year 2002 request also includes funding for approximately 15 new awards in fiscal year 2002 related to subsurface contamination, including subsurface contamination as it relates to long-term stewardship.

7. Senator REED. In reviewing your testimony and the fiscal year 2002 budget request it does not appear that there is any money in the science and technology account to start any new basic research efforts. Are there unfunded research requirements?

Dr. HUNTOON. The budget request includes funds to continue research initiated in prior years. The fiscal year 2002 budget request also includes funds to address high-priority research in the area of subsurface contamination, including subsurface contamination associated with long-term stewardship that was recommended by the National Academy of Sciences. We will continue to assess long-term research needs for Environmental Management as the cleanup progresses and needs evolve.

8. Senator REED. In reviewing your testimony and the fiscal year 2002 budget request it does not appear that there is any money in the science and technology account to start any new basic research efforts. Could you please provide a list of these requirements?

Dr. HUNTOON. Areas requiring long-term research have been identified through recent major reviews, such as: the National Academy of Sciences (NAS) review of the Department's Environmental Quality Research and Development Portfolio (a compendium of DOE's research activities); NAS/National Research Council's (NRC) review of Research Needs for High-Level Waste Stored in Tanks and Bins at U.S. Department of Energy Sites; NAS/NRC review of Research Opportunities for Deactivating and Decommissioning Department of Energy Facilities; NAS/NRC review of Research Needs in Subsurface Science; and a Complex-Wide Vadose Zone Roadmap and Vadose Zone Roadmap at Richland. Some of the yet-to-be-addressed needs that have been identified are:

- Devices for ultra-sensitive, remote-mapping, and real-time characterization of contaminated materials;
- Biotechnological decontamination of equipment and facilities and understanding of the chemical and physical interaction of contaminants with the primary materials;
- Remote intelligent systems to enhance worker safety with special emphasis on actuators, universal operational software, and virtual presence;
- Understanding the fate and behavior of treated and untreated contaminated material by determining the fundamental chemical species;
- Remote sensing instruments for real-time, "in situ" characterization of high level waste and process streams;

• Improved solids-liquids separations methods for high-efficiency, high-throughput separations methods that could reduce waste volumes and program costs;
• Highly innovative and effective retrieval methods for removal of high level waste materials from connecting pipelines;
• Alternative immobilization media to overcome limitations of borosilicate glasses;
• Methods for designing monitoring systems to detect both current conditions and changes in system behaviors;
• Methods to monitor fluid and gaseous fluxes through the unsaturated zone of soil, and differentiate seasonal changes from longer-term changes in order to better predict the migration of contaminants;
• Planning and research activities related to tank waste retrieval, storage and disposal for the Office of River Protection; and
• Subsurface research at the basic and applied level to develop the scientific basis for a subsurface geosciences facility.

9. Senator REED. In reviewing your testimony and the fiscal year 2002 budget request it does not appear that there is any money in the science and technology account to start any new basic research efforts. Where are the greatest remaining research challenges to improve the rate and reduce the cost of cleanup and waste treatment activities?

Dr. HUNTOON. We recently commissioned several reviews by the National Academy of Sciences (NAS) to help identify the Department's long term research needs in the areas of subsurface soil and groundwater contamination, high-level waste and deactivation and decommissioning. NAS also reviewed for gaps in research in our Environmental Quality (EQ) Research and Development (R&D) Portfolio, a Department-wide compendium of current R&D activities. A concurrent adequacy analysis was also performed on the EQ R&D Portfolio by a team of experts that included representatives from other Federal agencies and the national laboratories. The results of these reviews help form the basis for developing long-range science plans in these areas.

The common theme emerging from these reviews is that the most significant technical challenges in the EM program are associated with the high-level waste stored in tanks and bins at DOE sites, as well as characterization of areas surrounding the tanks. At an estimated life-cycle cost of over $50 billion, this also represents the most expensive problem facing the Department.

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

PRIORITIZATION OF EM CLEANUP

10. Senator THURMOND. I believe that it is safe to say that there is broad bipartisan concern about the administration's proposed budget for fiscal year 2002. Members of Congress, governors, state legislators, interest groups, and private citizens have all been quite vocal in their dissatisfaction. I have personally addressed this matter with the Secretary on a number of occasions. Recently, the Governor of my State hinted that he would close the highways to future shipments of materials from closure sites if funding was not restored. Given the fact that the House Appropriations Committee recently added an additional $699 million for fiscal year 2002 and that the Senate will likely exceed this total, how would you prioritize and spend additional funds for EM cleanup?

Dr. HUNTOON. The administration is concerned about the increase in funding appropriated by Congress for the Environmental Management (EM) program. DOE has initiated a performance review of this program, and we believe it is prudent to review the findings of this study before restoring funding that the budget proposed to reduce.

However, with additional funds provided in fiscal year 2002, we will fund work that would help meet environmental commitments or complete work at specific sites. For example, additional funds will provide added insurance that we will be able to meet upcoming environmental commitments, such as starting hot operation of the waste treatment plant at the Hanford site; improving the storage, treatment and disposal of mixed waste at Savannah River Site, INEEL, and the Hanford Site; and remediating environmental contamination at Savannah River Site, Oak Ridge Reservation, INEEL and several smaller sites. We will fund work that would support accelerated closure of sites, or portions of sites, such as the Hanford Site Co-

lumbia River Corridor Cleanup program, and the closure sites in Ohio. We will also fund additional research and development priorities.

MEETING COMMITMENTS

11. Senator THURMOND. I fully support the Secretary's review and hope that it quickly identifies a quicker, better, cheaper way of addressing the Nation's nuclear weapons legacy. Unfortunately, as it stands today, the best scientists and contractors in the world say it will cost substantially more money to accomplish the EM mission than this budget has allocated. At the Savannah River Site alone the contractor states that in order to meet existing regulatory and critical mission commitments, he must have over $200 million in additional funding. How do you propose to meet the Department's legally enforceable regulatory commitments if you do not fund at a level that science states will allow you to accomplish projects on schedule?

Dr. HUNTOON. Maintaining compliance at the Savannah River Site and other sites across the DOE complex is a priority for the Department. We recognize that we face challenges in meeting some lower-risk commitments in fiscal year 2002.

As you point out, the Secretary is concerned about the cost and schedules for cleanup and has directed a top-to-bottom assessment of the EM program that will focus on ways to more efficiently and cost effectively complete cleanup. The Secretary has also asked the governors of each state in which a major DOE site is located to work with us in this assessment. Given the pressing needs of the Nation in many other areas that affect citizens' well-being, health, and safety, it is DOE's responsibility to ensure that funds are spent wisely and results are maximized.

LEAKING TANKS AT SRS

12. Senator THURMOND. We recently learned of leaking tanks at the high level liquid waste tank farm at SRS. Specifically, tanks 5 and 6 recently experienced leaks which resulted in transferring large quantities of waste from those tanks to others in the tank farm. While such a policy appears to be a safe short-term solution it further constrains additional tank space and could soon interfere with the operation of the Defense Waste Processing Facility (DWPF). I am aware that there is an initiative to improve space management flexibility at the high level waste tank farm by modifying certain tanks. It is my understanding that this initiative would require an additional $10 million in the Waste Removal Line Item. Are you aware of this proposal? Do you agree that this is a high priority initiative? Do you intend to support this initiative?

Dr. HUNTOON. Yes, I am aware of and fully support these high priority efforts. The tank modifications are necessary to resolve recently identified problems associated with the 3H evaporator system by providing additional tank capacity to receive concentrate waste; and to provide additional storage capacity for high-level waste by modifying a tank, which has full secondary containment, that currently stores low-activity waste to allow it to receive high-level waste. Some activities in support of these modifications are already underway.

These modifications are being made to respond to problems that arose during fiscal year 2001, and were therefore not initially addressed in the fiscal year 2001 appropriation. Because of their importance, we have re-prioritized waste removal activities in fiscal year 2001 to support these tank modifications. The fiscal year 2002 request also includes funding for these activities.

SALT WASTE PROCESSING FACILITY

13. Senator THURMOND. As you are well aware, the Salt Processing Facility has been a particularly troublesome project. SRS has approximately 60 percent of the DOE's inventory of high level waste and much of the tank farm is located near the underground water table. Furthermore, the Salt Waste Facility is the lynch pin of several processes; including future operation of DWPF and the immobilization process. According to DOE experts, full funding for this project in fiscal year 2002 requires $59.5 million. The President's budget calls for only $31.13 million in fiscal year 2002. Would you agree that this is a high priority project? If the Department receives additional EM dollars would you support full funding for the Salt Processing Facility?

Dr. HUNTOON. Yes, the Salt Processing Facility is a high priority project. The fiscal year 2002 budget request for $31.12 million supports design and construction of a salt processing pilot facility, continued research and development on a primary and backup technology, and start of conceptual design for a full scale facility. Addi-

tional funding for the salt processing project would enable the pace for conceptual design and related project activities to be increased.

[Whereupon, at 11:15 a.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2002

WEDNESDAY, JULY 11, 2001

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

NATIONAL SECURITY SPACE PROGRAMS, POLICIES, OPERATIONS, AND STRATEGIC SYSTEMS

The subcommittee met, pursuant to notice, at 2:03 p.m. in room SR–222, Russell Senate Office Building, Senator Jack Reed (chairman of the subcommittee) presiding.

Committee members present: Senators Reed, Akaka, E. Benjamin Nelson, Allard, Smith, and Sessions.

Majority staff member present: Madelyn R. Creedon, counsel.

Minority staff members present: L. David Cherington, minority counsel; Brian R. Green and Thomas L. MacKenzie, professional staff members.

Staff assistants present: Thomas C. Moore and Jennifer L. Naccari.

Committee members' assistants present: Menda S. Fife, assistant to Senator Kennedy; Elizabeth King, assistant to Senator Reed; Davelyn Noelani Kalipi, assistant to Senator Akaka; Eric Pierce, assistant to Senator Ben Nelson; Margaret Hemenway, assistant to Senator Smith; J. Mark Powers and John A. Bonsell, assistants to Senator Inhofe; Douglas Flanders, assistant to Senator Allard; and Arch Galloway II, assistant to Senator Sessions.

OPENING STATEMENT OF SENATOR JACK REED, CHAIRMAN

Senator REED. Let me call the hearing to order. My colleague and ranking member, Senator Allard, is on his way, but he suggested that we go ahead. Good afternoon. I would like to welcome our witnesses this afternoon: General Eberhart, Admiral Mies, Major General Blaisdell, and Rear Admiral Dwyer.

Today, the subcommittee will discuss space and strategic programs, operations, and policy. General Eberhart will be the witness on the first panel. Admiral Mies, accompanied by Major General Blaisdell and Rear Admiral Dwyer, will be the second panel. We look forward to hearing from each of you. Indeed, we have a lot of material to cover today.

The subcommittee has the privilege of having both the commanders in chief whose activities fall within the jurisdiction of the Strategic Subcommittee. We would like to discuss with each of you your primary concerns about current programs, as well as your views on the future of your respective areas.

The budget for the strategic programs remains relatively flat in fiscal year 2002. Appropriately, so as there are no new programs or strategic systems in fiscal year 2002. Rather, the focus is to maintain the current force structure or to begin to draw down. The Minuteman III modernization program remains funded in the President's budget. At $155 million there is a concern that certain communications upgrades for the B–2 bomber may not be fully funded. The Trident D5 missile program remains on track to buy 12 missiles, but many Department of Energy (DOE) programs to extend the life of the warheads for these systems are not meeting schedules.

There are substantial concerns about future strategic modernization and retirement programs. Additional D5s needed to support the extended life of the Trident submarines are not included in the out years, nor is there money to retire the Peacekeeper. The Peacekeeper budget for fiscal year 2002 contains $5 million to begin to purchase equipment needed to retire the Peacekeeper.

Similarly, it is not clear that there is sufficient funding in the out years to modernize strategic communications on the E–6 aircraft.

The space program's budget is growing, but many concerns remain about satellite systems that appear to be behind schedule and over budget, such as the Advanced Extremely High Frequency (AEHF) satellites. Tracking space programs is difficult, a fact recognized by the Space Commission when it recommended that space become a major force program.

General Eberhart, in addition to the programmatic issues, I would like you to discuss the recommendations of the Space Commission and how those recommendations can be implemented by the Department in a way that brings increased coordination to space planning and acquisition, but at the same time ensures that each of the services' individual interests are addressed.

One of the key elements of the Space Commission's recommendations was creation of an Under Secretary of Defense for Space. General Eberhart, I would like your views on the role this position would play, not only in space programs and policy, but also in the related areas of information and intelligence.

We have a lot of material to cover this afternoon. When Senator Allard arrives, at the conclusion of General Eberhart's statement, I will ask for his opening statement. But at this point let me call upon General Eberhart. You have submitted a prepared statement. That statement will be made a part of the record, so you may summarize as you wish, General. Again, we are eager to hear your testimony. Thank you.

STATEMENT OF GEN. RALPH E. EBERHART, USAF, COMMANDER IN CHIEF, UNITED STATES SPACE COMMAND

General EBERHART. Thank you, Mr. Chairman. It is indeed an honor to be back in front of this subcommittee discussing issues of concern and of interest. It is an honor to represent three com-

mands, commands that are populated by simply wonderful people: NORAD, North American Aerospace Defense Command, a bilateral command with Canada, a bilateral joint command with men and women of all services of the Canadian Armed Forces and our armed forces and dedicated civilians; United States Space Command, a unified, obviously joint command; and then finally Air Force Space Command, which is an Air Force major command.

We are going to talk in detail this afternoon about systems, about needs and requirements. But, I think first and foremost, I know you share my concern and my interest and realize that what really makes these commands so special, what makes our armed forces special, are the men and women who serve. They are soldiers, sailors, airmen, marines, Coast Guardsmen, they are civilians. It is a total force, guardsmen and reservists.

I do not care what we do in terms of equipment, in terms of facilities. If we do not recruit and retain the right people, it will all be for naught. I know this subcommittee has worked hard to ensure that we take good care of our people and their families.

As you suggested, I will submit my statement for the record. I will summarize here and then address the two specific questions that you asked me to talk about, Mr. Chairman.

Let us talk about some of the missions we have. Most all of those you referred to in your opening remarks. With the Air Force Space Command hat on, we do in fact organize, train, equip, and provide Admiral Mies with the ICBM force to make sure he has the right equipment, that we have the right numbers on alert, that we have highly trained men and women to operate those missiles, to sustain them, to maintain them, etc.

I think that Minuteman III is on track, on track with upgrades replacement programs for guidance and propulsion, a safety enhanced reentry vehicle and new batteries. The list goes on and on, but all very important upgrades that we have on track and we must keep on track to make sure that these missiles are reliable, that they are safe, that they are secure, that they will serve this Nation in terms of strategic deterrence until 2020.

Once the decision is made to take down the Peacekeeper force, then obviously we will all be concerned about doing this in a smart, safe, secure manner.

The next mission area I would like to talk about is space launch. We do our space launches from Cape Canaveral and from Vandenberg Air Force Base. I think the challenge as we move ahead in terms of space launch is to safely fly out the legacy systems, the Titan systems, the older Atlas systems, the older Delta systems, make a smooth transition to the expendable launch vehicles, and make sure that those systems stay on track.

Then finally, I am convinced that we need to invest more and we need to push it up in terms of reusable launch vehicles. I believe that through reusable launch vehicles one day we will get the cost of launch down to something closer to what we would like to see. We will also be much more responsive in terms of our launches, which will be important from the military perspective.

Also, as we think about space launch we must make sure that we keep the recapitalization program of our launch ranges on track, continue to invest in these ranges—we do not want them to

return to the conditions they were 5 and 10 years ago—and make smart investments like Global Positioning System tracking, for which there is money proposed in the 2002 budget to do just that.

The next mission area I would like to turn to is force enhancement. This has really been the focus of our efforts, and I think rightfully so, since Operation Desert Storm. There was a lot of criticism after Operation Desert Storm. I will not debate whether that was warranted or not. I would say that it was not completely warranted because we were trying to take systems that we had designed for strategic and national purposes and use them for the warfighter in the field. They were not really designed for that and we did not have the processes or the organizations set to do that.

We have worked hard the last decade to make sure that, in terms of force enhancement—and I am talking about missile warning, navigation timing, communications, weather, intelligence, surveillance, reconnaissance, those types of things—we have come a long way in a decade. We have invested a lot of intellectual capital and a lot of dollars to make sure that we do that more correctly, if you will.

As a result, you did not hear much criticism after Kosovo, because we worked that issue hard. This is a good news story, but there is a little defense twist on that story. That is it has become so integral to everything we do, these force enhancement mechanisms, capabilities from space, that I would offer to you, Mr. Chairman, they have become targets. People realize exactly how we leverage those capabilities and there are people out there today thinking about how they might deny us use of those capabilities in terms of our situational awareness.

So we have to in the future ensure that we can protect the capabilities we have in space so that our men and women who are engaged, whether it is a humanitarian operation or full-fledged combat, can count on those space assets to provide them the information and the situational awareness they need.

These same people who are out there right now deciding on how they might deny us use of space are trying to figure out how they can better use space. So under the space control mission that we have in U.S. Space Command, we have to be able to protect our assets in space, our use of space, and if necessary to save the lives of our men and women who are engaged, we have to deny the enemy the use of space.

The other mission area that I think is very important, that is a fairly new mission area, and not just important to the Department of Defense—I would offer to you it is important across this great Nation—is what we call computer network operations. That is a combination of computer network defense and computer network attack.

We have had the computer network defense mission a year longer than we have had the computer network attack mission. In my view it is by far job one in this area because we in fact once again rely on our network, our information out there. So if an enemy denies us use of those networks, denies us that information, or, worse yet, tries to portray information that is not valid, I think it will cost us time and in turn casualties in the battle space of the

future. So we are working very hard on computer network defense with the help of the committee.

Computer network attack, also a very important mission, but I view this still as a force multiplier. It is another option for the joint force commander and the National Command Authorities, another arrow in the quiver, if you will. So we are concentrating on computer network defense and we are trying to develop viable computer network attack options.

You asked me to talk about implementation of the Space Commission. I view this from really two different levels. At more of a macro level, a strategic level, as the Space Commission talked about, the cooperation between the DCI and the Department of Defense, I think that is very important. I think you have seen that the National Security Council with the committee established and also with regular meetings between the DCI and the Secretary of Defense, are working this issue at the strategic level.

The second area that you alluded to is more of an operational level, if you will, and that is in the Department of the Air Force. It is much broader than that as you assign the executive agency role to the Under Secretary of the Air Force and also dual-hat that individual as the Director of the NRO. I think this is very healthy. This is a step in the right direction, a giant step in the right direction, in terms of integrating black and white space, integrating what the NRO does and what Air Force Space Command does and what U.S. Space Command does.

But in terms of being good stewards of that role of being executive agent, I personally believe the Air Force will step up and do exactly that. But of course, the proof will be in the pudding, if you will, over time. We will be much smarter about this in a couple years as we look back and talk to the other services and hear from them that their interests have been represented properly.

The other question you asked about was an Under Secretary of Defense for Space Intelligence and Information. That is what the Space Commission recommended. The Secretary of Defense has decided at this point he does not believe that is necessary. He believes that he can get the right focus on space, given the personalities he has involved and with the reorganization inside of the Command, Control, Communications and Intelligence (C^3I) secretariat in the Department of Defense.

I personally believe that, with Mr. Aldridge there and depending on who becomes the Assistant Secretary of Defense for C^3I and with the executive agency in the Air Force, I think we can get the right focus. So I do not think it is about an organizational chart here. It is more a focus on process and effects which will tell the tale in terms of the effectiveness of that organization.

So again, in closing, it is an honor to be with you. We will talk at length, I am sure, during the question and answer period about some of the systems. But I would remind you and of course the other distinguished members of the subcommittee who have just joined us that what this is all about really is people, recruiting and retaining the right people, making sure they have the right training, the right education, and the right tools to do the job that this Nation expects them to do.

Thank you, sir.

[The prepared statement of General Eberhart follows:]

PREPARED STATEMENT BY GEN. RALPH E. EBERHART, USAF

Mr. Chairman and members of the subcommittee: It is an honor to appear before you again representing the outstanding men and women of North American Aerospace Defense Command (NORAD) and United States Space Command (USSPACECOM). Over the last year, I have observed first hand the pride, dedication and excellence of the professionals who work in our commands. Their efforts have contributed to the freedom and security North America enjoys today, and the United States continues to lead the world in space. We are proud to be part of the National security team.

For 43 years NORAD has met the changing threat—transitioning from an initial "air defense" orientation to a broader aerospace dimension—one that provides surveillance and warning of ballistic missile attacks and space events and ensures our air sovereignty against an expanding range of potential threats. NORAD missions remain as vital as ever and constitute a critical component of the defense of North America.

USSPACECOM, established in 1985, is charged with the missions of space support, force enhancement, space control, planning for force application and, most recently, computer network defense (CND) and computer network attack (CNA). Ten years after the Gulf War, we see the huge advantage space brings to our warfighting capabilities. Our efforts to "operationalize" space have enabled us to move time-critical information to front-line commanders and to troops in the field. These efforts were crucial to our success during U.S. and allied air operations over Serbia. Space-based capabilities have become an integral part of our American military operations.

As our reliance on space increases, we believe more attention should be devoted to protecting our access to, and use of, space. In a similar way, we must protect our critical information infrastructure to assure information superiority and develop appropriate strategies to exploit the vulnerabilities of our adversaries' space and computer network capabilities. To meet the unique challenges of our evolving national security environment, we must remain the world leader in space and computer network operations.

For fiscal year 2002, the President's budget includes funding to cover our most pressing priorities. However, the programs discussed in this statement and their associated funding levels and schedules may change as a result of the Secretary of Defense's strategy review, which will guide future decisions on military spending.

OUR PEOPLE ARE FUNDAMENTAL TO OUR SUCCESS

Execution of our National Military Strategy hinges on our ability to attract and retain high quality, motivated servicemen and women and civilian employees. Our tremendous warfighting capability depends on our people. If we take care of them, they will take care of our mission. Without them, even our most effective weapon systems are of little value. Congress' initiatives to improve military and civilian pay, health care and housing for our professionals in uniform are a step in the right direction. We are very grateful for your continued support in these areas. However, we still have work to do.

Our biggest challenges continue to be retention and recruiting. Both NORAD and USSPACECOM are struggling to keep the quality people we need to perform our critical missions. Our commands are feeling the pressure that stems from the combination of a strong economy and industry's demand for the unique technical skill and work ethic found in our people. High-paying civilian jobs that offer stability and exceptional benefits continue to lure our people away from the military.

Last fall, Congress made significant progress in helping us turn the tide by authorizing targeted pay raises for our mid-career enlisted members and extending the Thrift Savings Plan to members of the Armed Services. We are most grateful for this support. As noted in the reports of the Commission to Assess United States National Security Space Management and Organization, the Nation as a whole must place a high priority on the development of a cadre of highly competent and motivated military and civilian space professionals. Specifically, we must cultivate the talents of our people, pique their interest, develop their core space expertise and expand their knowledge base through Joint and Service-specific professional development programs.

For USSPACECOM, recruiting is also important as we seek a balanced mix of military and civilian talent to meet our space mission requirements and new obligations with CND and CNA. Finding this talent continues to be a difficult job as we

compete with industry for people with high-demand space and information technology skills.

Finally, last year, we asked Congress to repeal the fiscal year 2000 congressionally-mandated 15 percent reduction in staff personnel at our unified headquarters. In USSPACECOM, we remain concerned about the possibility of losing 79 billets after we have just assumed our new CND and CNA missions. The Fiscal Year 2001 National Defense Authorization Act offered some relief to this mandate by reducing the personnel cuts to 7.5 percent. Given our current plans, as we establish the infrastructure to support our new assignments, any manpower reduction will adversely affect our ability to fulfill our unified command duties.

READINESS

It is encouraging to see how our Nation's warfighting capabilities have improved over the last decade. As mentioned earlier, space systems are now integrated into virtually every aspect of our military operations and are essential to our success, whether in peace, crisis, or armed conflict. Our increasing dependence on space dictates the need to continue modernizing our space systems, which, in turn, will have a direct effect on our overall military readiness. In addition, we must leverage the benefits associated with partnerships—both within the government and with industry. Finally, we must improve the way military space is organized and managed in order to realize the full potential of our Nation's space power.

Missile Warning. For NORAD and USSPACECOM, missile warning continues to be "Job 1." With the development and proliferation of theater ballistic missiles, it is clear we need the improved detection capabilities of the Space-Based Infrared System (SBIRS) soonest. This system-of-systems will enhance our early warning and space surveillance capabilities, support future ballistic missile defense systems and provide commanders with better battlefield situational awareness.

SBIRS will serve as a combat multiplier for our Nation's military and our allies. The SBIRS High satellites will improve theater missile launch point and impact point predictions and will provide data that assists in performing missions such as real-time battle damage assessment. As for SBIRS Low, we believe the system should be designed to support missile defense. However, we also believe we need to implement "smart upgrades"—supported by cost-benefit analysis—that will maximize both the SBIRS High and SBIRS Low inherent capabilities to support technical intelligence, battlespace characterization and space surveillance.

Because our theater forces are already at risk and because we expect proliferation of more accurate theater ballistic missiles, we strongly advocate SBIRS as our top priority new system. We appreciate the congressional support we have received for this very important program. We remain committed to a launch of the first SBIRS High geosynchronous orbiting satellite in fiscal year 2005, followed by the first SBIRS Low launch in 2006.

Fusion. SBIRS is the foundation of our future missile warning capabilities. However, we must not overlook the value of fusion technology. The Theater Airborne Warning System and the Enhanced Early Warning System will work in conjunction with the space-based Defense Support Program and SBIRS to provide our theater warfighters enhanced protection from theater ballistic missile attacks. These systems will fuse information from space, airborne and ground-based assets to improve warning times dramatically and increase launch and impact point accuracy. We appreciate your continued support for these important programs.

Air Sovereignty. The traditional NORAD mission of aerospace control, or more specifically airspace sovereignty, remains a fundamental priority. The United States must maintain the radar systems, aircraft and command and control capabilities, which serve as pillars for homeland defense. In addition, we must continue to pursue improved space-based surveillance, intelligence and communications capabilities as essential contributions for NORAD mission success.

Force Enhancement. Our force enhancement efforts over the last decade have helped us "operationalize" space. Global Positioning System (GPS) navigation satellites and our Satellite Communications (SATCOM) systems are fully integrated into the warfighting capabilities of all our Services and Unified Commands. The readiness of our military forces depends on the modernization of these systems.

GPS has become a way of life for both our military and commercial industry around the world. From precision farming to financial transactions to surveying remote parts of the earth's surface, every sector of our society relies on the timing and navigation services provided by this system. As a result, we have initiated a modernization program that will provide a more robust anti-jam capability for our warfighters and additional civil signals for aviation, safety-of-life services and other

commercial enterprises. We appreciate Congress' continued support in sustaining and modernizing this national resource.

Reliable and secure SATCOM systems are also key to our military's readiness. We continue to exploit our current SATCOM fleet while developing new, technologically advanced systems. Over the past year, we worked with the other Commanders in Chief to revalidate SATCOM requirements. We reaffirmed the need to modernize our capabilities with a blend of military, civil and commercial systems. As we update our satellites, we cannot forget the user terminals. All aspects of SATCOM must be synchronized for maximum utility. We need your continued support to make this critical modernization effort a reality.

Over the past decade, a significant amount of radio frequency spectrum has been reallocated from the DOD to the Federal Communications Commission for auction to the private sector. Our space and air systems depend upon the spectrum to perform our missions. In order to maintain our state of readiness, we need to carefully consider the national security implications of spectrum reallocations. The Fiscal Year 1999 Defense Authorization Act restored some of the spectrum previously reallocated. We appreciate Congress' help; however, we face continued requests for expanded non-Federal civil and commercial use of this limited spectrum. For instance, there is a proposal being considered to accelerate the reallocation of the Space Ground Link Subsystem frequency, which supports our on-orbit satellite systems. If this proposal is implemented without adequate alternative spectrum for critical military functions, it will limit our ability to effectively command and control our space assets.

Space Support. Our space support missions focus on launching satellites and then operating and maintaining them once on orbit. The Evolved Expendable Launch Vehicle (EELV) is our next generation launch vehicle that will provide assured access to space with quicker response and greater flexibility at a significantly reduced cost. We are pleased to report this program is on track with the first launch scheduled for 2002.

In addition to modernizing our launch vehicles, we are upgrading the ranges that support our Nation's military, civil and commercial space launches. Our Range Standardization and Automation program will standardize launch interfaces, replace obsolescent technology and help reduce operations and maintenance costs while increasing operational flexibility.

Force Protection. Members of our commands serve in virtually every location where U.S. forces operate; therefore, force protection is critical. To the best of our ability, we must proactively safeguard our people and facilities by continuing to conduct regular anti-terrorism training, assessing and correcting our own vulnerabilities, and finally, educating our people to be constantly on guard. We do not view force protection as a mission unto itself but inherent in all that we do.

Partnerships. With the ever-increasing demand for space support, we recognize the need to expand relationships with our "space partners" to leverage existing systems and national level expertise. USSPACECOM and the National Reconnaissance Office continue to explore the possibility of common space systems and seek new avenues to better support both the warfighter and national decision makers. In addition, we are working with the National Imagery and Mapping Agency to develop imagery requirements and with the National Aeronautics and Space Administration to better predict the location of space objects and improve human spaceflight safety. Finally, through our partnerships with other agencies, we are investigating ways to collectively support our CND and CNA missions.

Similarly, we recognize the need to partner with industry. To sustain our readiness, we need to balance the advantages of commercial partnerships with the inherent risks associated with expanding our use of commercial systems. We do this by continually assessing our vulnerabilities and ensuring protected military systems are available for our most critical military missions.

Space Commission. The Commission to Assess United States National Security Space Management and Organization submitted its report in January 2001. We are pleased with the findings and believe the Commission made solid recommendations to improve the way military space is organized and managed. We are working on an implementation plan for these recommendations.

OUR ACCOMPLISHMENTS IN 2000

Our people remain focused and continue to accomplish the mission despite our high operations tempo. In calendar year 2000, our space wings successfully executed 27 launches and deployed all payloads to their respective orbits for a 100 percent success rate. In addition, we recently activated two new squadrons with space control missions. We have made significant strides in establishing the framework for

our CND and CNA missions and have conducted several space and information operations-based exercises to demonstrate our adversaries' capabilities and to identify our own vulnerabilities. Finally, our NORAD forces have been actively involved in homeland defense. The following provides a more detailed description of our activities during the past year:

Space Control. Our people need to train as they fight. To ensure our forces are fully prepared to defend against attacks on our space-based infrastructure, we have recently activated two new squadrons—the 527th Space Aggressor Squadron and the 76th Space Control Squadron. The 527th Space Aggressor Squadron's mission is to replicate the known capabilities of potential adversaries and play the role of the "red team" in exercises like Schriever 2001. The 76th Space Control Squadron's charter is to explore future space control technologies by testing models and prototypes of counterspace systems with the goal of rapidly achieving space superiority.

Computer Network Defense and Computer Network Attack. The threat to DOD computer networks and systems continues to grow. If used properly, a cyber attack offers less militarily capable nations an asymmetric means to degrade the effectiveness of our military forces. As a result, protecting the DOD's critical information infrastructure continues to be USSPACECOM's main focus in the cyber arena.

We are working hard to normalize our CND mission. We established a command and control structure, initiated efforts to improve the dissemination of critical CND information and established reporting and tracking procedures for protecting and defending critical national security information systems. Our challenge is to stay ahead of evolving threats to our computer networks, keep abreast of rapidly changing technology and continue coordinating closely with other government agencies.

On 1 October 2000, the Unified Command Plan designated USSPACECOM the "military lead" for DOD's CNA activities. Our initial focus has been on the development of a CNA concept of operations that addresses the process needed to integrate CNA capabilities into existing operation and contingency plans. Our challenge is two-fold. First, we must understand the CNA needs of the other CINCs and determine the best way to address them. Second, we need to continue developing CNA strategies through simulations and wargaming to improve our understanding of the potential collateral effects associated with such actions.

On 2 April 2001, we transitioned our CND and CNA missions to an organizational construct we call the Joint Task Force for Computer Network Operations (JTF–CNO). Combining our newest missions under a single operational commander enables unity of command and effort. In addition, the JTF–CNO makes more efficient use of available resources, eases coordination with the intelligence community and other partners and establishes a clear cross-agency coordination process. We see the JTF–CNO as a "pathfinder" organization that will adapt to changing threats and mission parameters.

Space and Information Operations Exercises. Over the past year, we have continued to focus on integrating space and information-based capabilities into Service and Chairman of the Joint Chiefs of Staff-sponsored exercises and experiments. Last year's Joint Warrior Interoperability Demonstration showed how space has become an integral part of all we do. Space-based capabilities are not a luxury anymore; they are now fundamental to military operations.

In January 2001, the Air Force sponsored its first-ever Air Force wargame dedicated to space. The Schriever 2001 Wargame explored space warfare issues and investigated the military utility of our future space systems. The preliminary analysis of the results reinforced several key points we have known for some time: a robust "blue" space capability serves as an effective deterrent; the "blue" team is very dependent on space and, as a result, is potentially vulnerable to "red" counterspace actions; and finally, commercial space serves as a powerful force multiplier.

NORAD Deployments. In 2000, we once again demonstrated we are prepared to protect our airspace sovereignty. Our aircraft and personnel deployed to forward operating locations, and, in one instance, our forces stood alert at bases in Alaska and Northern Canada for several weeks to ensure an appropriate response.

OUR WAY AHEAD

As we prepare for an uncertain future, we must focus our attention on protecting and advancing our interests in space and information-based operations or run the very real risk of a "Space Pearl Harbor" or another "Sputnik" that catches us off-guard and unprepared. In addition, we must remain vigilant in protecting and defending our homeland.

Space Control. Since the activation of U.S. Space Command in 1985, we have focussed on integrating space with warfighting: bringing space to the warfighter. Set-

ting our "integration throttle" high has served us well. Today, nearly every endeavor across the spectrum of military operations utilizes space to succeed.

However, our reliance upon space has become a vulnerability. Potential adversaries are watching and responding. They see space as an asymmetric method for leveling the playing field. Not only are threats emerging on a daily basis, but cheap access to advanced commercial space services continues to chip away at our information superiority edge.

Therefore it is time to push up the "space superiority throttle." We have left this throttle at a low power setting for too long. We must ensure our continued access to space, to deny space to others when directed and to carefully address our reliance on the Nation's $60 billion commercial investment in space.

Space is important enough to warrant a significant investment—it is not just a higher hill. This is a medium crucial to our American military operations and one we'll have to fight for in the future.

Space-Based Laser. The Space Based Laser (SBL) could provide worldwide, continuous, boost-phase intercept across a wide range of ballistic missile defense scenarios. Warfighting CINCs recognize SBL's inherent capability to support other DOD missions such as air defense, global surveillance, space control and target detection. We must continue to pursue the technologies associated with systems like the SBL. The mere fact that the United States is developing means to employ force in space may serve as a significant deterrent.

Space-Based Radar. Space-Based Radar (SBR) is a force enhancement system we must explore. The requirement for SBR capability remains high. Our national and military strategies are based on global engagement. As such, our military operations require the day, night, and all weather broad-area surveillance capabilities this system could offer. We were moving forward with an SBR demonstration system, Discoverer II, until it was terminated last fall. In response to the Fiscal Year 2001 DOD Authorization Conference Report, the National Security Space Architect is leading a multi-service, multi-agency effort to develop an SBR Roadmap, which brings together requirements for both the DOD and national users. As part of the Roadmap development, we are heavily involved in an analysis of alternatives that will allow the DOD leadership to make SBR decisions considering other intelligence, surveillance and reconnaissance needs.

Computer Network Defense and Computer Network Attack. We will continue to facilitate and lead the DOD-wide effort for CND and CNA. We intend to fully integrate these options into all military plans and operations, focusing on positive command and control, integrated planning and deconfliction, fully coordinated intelligence support and execution of assigned missions.

Ballistic Missile Defense. With the proliferation of missile technology, one of our primary concerns is the threat of strategic ballistic missiles. A defensive capability is required to protect North America. As part of our unified command responsibilities for ballistic missile defense, we continue our work to establish clear system requirements and develop the necessary procedures and command and control options for an operational capability.

Cruise Missile Defense. In addition to ballistic missile defense, we must also be prepared to defend North America against cruise missile attack. NORAD advocates a three-pronged approach to counter this evolving threat. First, we must develop effective wide-area surveillance around the perimeter of North America. Second, we support an Advanced Concept Technology Demonstration to look at alternative surveillance technologies. Finally, we should leverage others research and development efforts to help counter the cruise missile threat—whenever and wherever we experience it.

CONCLUSION

I assure you, NORAD and USSPACECOM are prepared to provide aerospace defense to the people of North America and space support to U.S. and allied armed forces. We continue to find new ways to improve our warfighting capabilities by integrating space capabilities into all aspects of our military missions; we are working to do the same for computer network operations. As we develop our next generation systems, we must invest the necessary resources and intellectual capital to protect our vital interests and sustain our lead in space. We appreciate Congress' continued support to maintain our high state of readiness. With your help, we will ensure space forces play a key role in our Nation's future defense.

Again, I am honored to appear before you and look forward to your questions.

Senator REED. Thank you very much, General Eberhart, for your testimony.

Senator Allard, would you like to make an opening statement now prior to the General's questions?

STATEMENT OF SENATOR WAYNE ALLARD

Senator ALLARD. I would just briefly thank you for going ahead and holding this hearing.

I look forward to hearing what General Eberhart has to say during our question and response period, and then also look forward to your second panel. I think that it is a very timely hearing and I think it is very important.

Mr. Chairman, I do have an opening statement. I would just like to ask permission to make it a part of the record.

Senator REED. Without objection.

[The prepared statement of Senator Allard follows:]

PREPARED STATEMENT BY SENATOR WAYNE ALLARD

Thank you, Senator Reed. I want to add my welcome to the witnesses today. General Eberhart, welcome. It's always good to see you.

I also want to thank Senator Reed for holding this hearing today. In many respects, this is a challenging year for Congress as a whole and for our committee in particular. The fact that the Defense Department has sent us its budget and legislative proposals so late in the year makes our schedule a very difficult one and puts extraordinary demands on our time. Senator Reed, in holding this hearing, upholds a long tradition of interest in and oversight of these critical defense efforts.

These are also challenging times for our soldiers, sailors, and airmen involved wilth our space and strategic forces. Space is more important than ever to our military effectiveness and that importance will continue to grow. In that light, I think we all read with particular interest the criticisms and recommendations of the Commission to Assess United States National Security Space Management and Organization—the Rumsfeld Space Commission. This commission concluded that the Defense Department and the Air Force have not been well organized with respect to space and consequently have not done an effective job of managing space programs and activities. It made a number of recommendations to correct these deficiencies—and in some cases, Secretary Rumsfeld has opted not to take the advice of Commission Chairman Rumsfeld. Space Command will be profoundly affected by the implementation of these recommendations and our committee will need to have a clear understanding of SPACECOM's view of how this is evolving. I will also be interested to hear General Eberhart's views on the adequacy of the budget proposal to meet his operational requirements now and in the future, and whether space is getting the attention it deserves.

In some ways, matters are equally unsettled with respect to our strategic forces. There is an ongoing nuclear posture review, still in its early stages, that will provide a top to bottom look at our strategic requirements in the future. The results of this review won't be available for several months. The President has also announced his intention to create a new strategic framework to deal with evolving strategic threats and our relationship with Russia. One element of this framework will be unilateral reductions to U.S. strategic nuclear forces to the lowest level consistent with U.S. national security. The President has made clear that this new framework will strengthen deterrence, not replace it. But who we deter, how we deter, how we think about our strategic offensive forces, and appropriate strategic force levels will all be under serious scrutiny.

I look forward to hearing from Admiral Meis on our second panel today to get his views on the requirements of deterrence in the 21st century, and from Rear Admiral Dwyer and Major General Blaisdell on the adequacy of this year's budget proposals to support the programmatic requirements of our deterrent forces.

Thanks again to Senator Reed and to our witnesses for appearing today, and I look forward to their testimony.

Senator REED. Thank you very much, Senator Allard.

Senator Akaka, would you like to make an opening statement?

STATEMENT OF SENATOR DANIEL K. AKAKA

Senator AKAKA. Thank you very much, Mr. Chairman, for holding this hearing. I would like to welcome our distinguished witnesses, particularly General Eberhart. I believe this is an exciting time for our space programs and policies and look forward to working with you to address our national security interests in space, and I look forward to the questioning period.

Senator REED. Thank you very much.

Senator Smith, would you like to make some opening remarks?

Senator SMITH. No, thank you, Mr. Chairman. I will wait until the questions.

Senator REED. Thank you very much.

What I would propose to do is two rounds of questioning. We will limit ourselves to 7 minutes per round. Let me begin.

General Eberhart, the ability to maintain undiminished secure communications, which was put in jeopardy with the loss of the Milstar 3 satellite, appears to continue to be in jeopardy with the delays and cost overruns in the Advanced Extremely High Frequency (AEHF) Satellite program. Is there a plan to get this program back on track and will additional funding be required in fiscal year 2002?

General EBERHART. Sir, as you stated, the unfortunate loss of the Milstar certainly changed the complexion in terms of satellite communications. We were all and still remain excited by the national team proposal and the AEHF as we understand it.

This is not an easy task. The fact of the matter is it is probably the only option available right now to provide in a timely manner the communications we need. In terms of program delays and cost overruns, I do not have the specifics right now. I believe that as we push technology here, as we work to secure what we need in terms of communications, for the information of the subcommittee, we are talking about 12 times the type of capacity, the type of capability, that the Milstar was going to give us. So we are talking about a significant increase in capability.

I would like to tell you that there will not be any delays and there will not be any cost overruns. My intuition tells me otherwise. However, I do believe that we will in fact be successful in this endeavor. We have our best and brightest in terms of industry, in terms of the Department of Defense, working this issue. Although I am not directly involved, as we work through the acquisition process I watch it very closely, as I am sure you know.

So I remain optimistic about the future of the AEHF, but I believe that there will in fact be increased costs and some delays. But I hope that we stay very close to that December 2005 launch, because we need that capability. I believe this increased capability is worth taking some risks to make sure that we achieve that type of capability increase.

Senator REED. Thank you, General.

Let me ask a series of questions about the Space-Based Infrared System (SBIRS). From the budget documents that we have received so far, it appears that SBIRS Low has been transferred to BMDO, but the Air Force has retained SBIRS High. Does this separation of the two pieces of the system give you any concern?

General EBERHART. Sir, at this time it does not. SBIRS High will replace the Defense Support Program, the DSP. So what is really important to me in the near term is to keep SBIRS High on track. We need that for missile warning. You may know from my written statement for the record, day in and day out job one for us is missile warning, and therefore SBIRS is key to job one. So we have to keep that on track.

Now, as you put SBIRS Low with SBIRS High to work the ballistic missile defense mission, then I think it is very important, not that it necessarily be in the same area as we start working through the acquisition process, but there sure has to be a lot of cross-talk, because as you work the intercept geometry with SBIRS Low it is going to be critical that those two fit together, missile warning, handoff, cueing, as we work toward the intercept.

Senator REED. That is being done now through—who is the agency that is charged with that lashup, that linkage?

General EBERHART. Sir, there is a group that is represented by the Secretary of the Air Force, the acquisition community, the Ballistic Missile Defense Office, and the OSD C^{3}I. All of those stakeholders meet on a regular basis to make sure that we have the SBIRS and the BMDO elements all synchronized, to include representatives from the U.S. Space Command.

Senator REED. The budget request for SBIRS High research and development in the fiscal year 2002 budget is about $405 million. In the fiscal year 2001 budget the request projects for 2002 was about $389 million. What is the cause of this $15 million increase in funding for SBIRS High research?

General EBERHART. Sir, I will have to provide that for the record.

Senator REED. That is fine.

General EBERHART. I would only be guessing. I would rather provide it for the record.

Senator REED. General, if it is much more accurate and convenient to reply in writing in the record, that is fine.

[The information referred to follows:]

The request was increased by $15.3 million to reduce software design risk and incorporate lessons learned from SBIRS Increment 1 development and testing. Software risks will be minimized through two efforts. The first effort will reduce the impact of concurrent development and training. The second effort will increase software reliability by providing additional resources to test and evaluate Increment 2.

Senator REED. The current launch schedule for SBIRS High is delivery of the High Earth Orbit (HEO) payload in the second quarter of fiscal year 2002 and the full SBIRS High will be operational around December 2006. The last DSP launch is slated for 2003. The question is what is the life of the DSP constellation, I guess the fallback really?

General EBERHART. Sir, there is risk associated here that we have been concerned with for several years. Right now we think it is an acceptable risk. We look at fallbacks in terms of, depending on what we are going to use as a launch vehicle. It will be a question of which mission area that you are as green in as you would like to be green in.

In terms of the strategic mission, I think that we have acceptable risk here. If we get any kind of slip, delay, any type of failure in

terms of the theater or tactical mission area, there will be increased risk.

Senator REED. Now, there will be presumptively a concurrency between SBIRS High and Defense Support Program (DSP) satellites. There will be a time when you have both operating; that is correct?

General EBERHART. Yes, sir, and that is one of the things we are working in operational test and evaluation, right now. As we make this marriage between legacy satellites and new ground equipment, between new satellites and old ground equipment, to make sure it all works together and all talks together, those are the types of things we bring out through test and evaluation.

But it will be a mixed constellation, you are exactly right.

Senator REED. Just one final question. The time of SBIRS, how is it connected to at least discussions or plans about national missile defense? I mean in terms of its timing, whether it is a precondition or just peripheral to the other decisions?

General EBERHART. Sir, there is a debate out there right now in terms of how essential SBIRS Low is to ballistic missile defense, ballistic missile defense of what I call North America, what we before called national missile defense. There is a recent report, I think an IDA report, that said that maybe it is not quite as necessary as we once thought.

I think it is just a question of how sophisticated that incoming vehicle is in terms of decoys, what you really need in terms of cueing to effect this intercept. I personally remain convinced that SBIRS Low is a very important aspect of ballistic missile defense. I also believe that it will be an important vehicle to do other missions from when we do the cost-benefit analysis.

Senator REED. My time has expired. I would like to recognize that Senator Nelson of Nebraska has arrived. Senator, do you have an opening statement before I turn it over to Senator Allard?

Senator BEN NELSON. I think I need to learn something before I say anything. Thank you.

Senator REED. Senator Allard, please.

Senator ALLARD. Thank you, Mr. Chairman.

I am going to pursue this military use of commercial space assets and talk about some of the space launch ranges, General Eberhart. So I will get right to the question. Do you believe the Air Force has done a good job of managing and modernizing and operating the space launch ranges and is there a business case to be made for privatizing some of these functions?

General EBERHART. Sir, maybe I am parochial here, but I truly believe that the Air Force has done a good job. You can debate in terms of the amount of investment and the timeliness of the investment to recapitalize the range. I would remind you, who does not need to be reminded, of course, of how tight money has been and the tough tradeoffs involved in making that investment.

But we have come a long way in terms of our range modernization programs. That is not to say that we do not have a long way to go, and we need to do that together.

I believe that in many cases, as you well know, we have privatized, contracted out, many of those areas that once were done by blue suiters, that are done by government contractors. So I

think that record is in fact fairly good. As you look out at our remote tracking sites, if you look out at the radars, you go to Antigua, for example, you will see one or two military members there and everyone else is a contractor.

So I believe that we will continue to look for those opportunities where, one, they make sense financially, and, two, we still have the flexibility in terms of our national defense to do that and have the service have the capability we need.

So there is no doubt that we could have done it smarter, quicker, but at the same time it is not easy. Very recently Congressman Weldon from Florida was in Cheyenne Mountain and we showed him the concurrency involved in the Range Standardization and Automation program. That makes most acquisition folks' heads really hurt when you look at what we are trying to do as quickly as we are trying to do it.

Senator ALLARD. Are the commercial users of these ranges and what-not, do you think they are doing their fair share of range modernization operational costs?

General EBERHART. Sir, part of the onus is on us in the United States Air Force to clearly understand the costs associated with a space launch, also to have built-in procedures and other things that make this more businesslike, if you will.

At the same time, we cannot have artificial costs that drive up the cost of launch, because in my view, as we look at space launch, we want to remain a space-faring nation. We do not want to drive any more space launch offshore. If we do not have a good accounting system, if we do not have a reasonable cost of launch, that is exactly what we are going to do. Then that becomes a Catch–22 or a death spiral, if you will, because if you have fewer commercial launches, launches are more expensive for the Federal Government.

So I believe that we need to work together. We are working together. We just recently had another commercial space industry day in Colorado Springs to discuss these very issues—costing, billing, etc.—with the CEOs of the major industries.

Senator ALLARD. What is your view of the value of commercial imagery?

General EBERHART. I believe commercial imagery holds great promise. Obviously, it has to be timely, it has to be of the accuracy and the quality that we need. The fact of the matter is right now our appetite is a little bit bigger than what can be provided by commercial industry. The National Imagery and Mapping Agency (NIMA) is working this very hard. They have a commercial imagery plan that we have endorsed at U.S. Space Command.

But there is no doubt in my mind in the years to come we will use more and more commercial imagery. The challenge, of course, is to in some ways curb the appetite so in many cases you do not need X-foot resolution to work this problem. You need the very definitive resolution to work PGMs, precision guided munitions, and target attack. You do not need it for other things.

So part of the problem is to decide exactly what will satisfy your requirement and can the commercial industry provide that.

Senator ALLARD. The commercial imagery business—let me understand your comment. You say you have so much commercial im-

agery that they cannot handle your volume, or are you saying that you have so much volume that you have to use the commercial imagery? I was not entirely clear how you posed that.

General EBERHART. It is the latter, but there is a little bit of a twist on the latter in terms of the timeliness, the quality. In many cases commercial industry is not able to satisfy that requirement in the near term. I think over a longer term these are the kinds of things that NIMA is working very hard with our industrial partners to do.

Senator ALLARD. I notice today in an article where NIMA has contracted with an Israeli imaging company, and the question that comes to mind is why are they not using one of the three image companies that we have here in the United States? Do you have any insight on that?

General EBERHART. No, sir, I do not.

Senator ALLARD. We will have to pose that to NIMA. But I thought since we had you here I would ask you about that.

General EBERHART. I would not have gotten that right on multiple choice. I did not know about that. My belief would be maybe it is some other sort of a quid, but I do not know.

Senator ALLARD. That is what we want to find out.

How is my time? Is there room for another question or two?

Senator REED. You have perfect timing.

Senator ALLARD. I did not mean to give up quite that easily.

Senator REED. Senator Akaka.

Senator AKAKA. Thank you very much, Mr. Chairman.

General Eberhart, you have identified recruiting and retention as your biggest challenge. You state that both NORAD and U.S. SPACECOM are struggling to keep quality people you need to perform your critical mission. My question to you, which is basic, is does the fiscal year 2002 budget request address this challenge?

General EBERHART. Sir, what I worry about is retaining the right people, because obviously that complicates the recruiting problem and equation. Once you train them, you want to keep them. The trends are in the right direction.

I really attribute that to the types of things Congress and the administration have done, the last 2 years in particular, and what the expectations are of our force that you will do this year and into the future. So if the question is—and I know I am taking this to an extreme—will the 2002 budget fix all our retention problems, it will not. But I think it will send another strong signal that will reinforce how important our men and women are who serve and in turn how important their families are.

So I think if we take the actions proposed in the 2002 budget, once again we are continuing down a path that will help us solve this retention problem.

It is many different things. You have been around military installations for years and years and you know it is not just pay and allowances. It is health care, it is housing, it is schools. It goes on and on. It is spare parts. It is how we treat people. So I think that in the 2002 budget, again, people are certainly emphasized. Our people are hoping, I would say expecting, that those things are enacted which will certainly make their lives a lot easier.

They are never going to get rich serving this Nation in the military. But in many cases they have suffered, and they ought not suffer.

Senator AKAKA. Under the new organization, the Navy will no longer have final authority over some of the space acquisition programs, including activities which are considered to be unique to the Navy. It is my understanding that the Under Secretary of the Air Force will be the deciding authority on whether a project can move forward. My question is how will this oversight be managed? Will it be a formal process, with other services required to submit a proposal? What factors are going to be considered to determine situations where the Army or Navy research laboratory director's authority and discretion will be turned over to the Air Force Under Secretary?

General EBERHART. Sir, at the risk of sounding like an alibi, I will not be directly involved in that. I will have a vote, but I will not be directly involved in that. That will be in the Pentagon. I live in Colorado Springs, and they will be working that with our civilian leadership.

But I believe that in fact this will not be one person making this decision. He or she may have the final say, but this will be more of a council type arrangement, like a committee, where you sit around, you look at the pros and cons, you look at the value added, you make sure that it is interoperable, that it is not redundant, that it is the best leverage of the money available, and then you make a smart decision.

So I do not see this as a stovepipe, where the Navy will not have a chance to make their case. I would also offer to you there is always a court of higher appeal, and that court of higher appeal will be the Deputy Secretary of Defense and the Secretary of Defense. So I truly believe that this is going to work, but the Air Force must be good stewards here. They must be objective, they must be fair across the board. If they are not, people will cry foul, will go to the Secretary of Defense, and then in fact the system will not work.

But I am optimistic. I think that good people will make this system work.

Senator AKAKA. I was particularly interested in this because from what I know it is bringing about a new trend in the military in the space-based programs in making decisions, and probably—it might be something or a model that can be used in the military in other things.

How am I on time? May I ask another question?

Senator REED. Go ahead, Senator, please.

Senator AKAKA. The Space Commission Report states, General, that hostile action against space systems can be confused with natural phenomena. Much research is being done to understand solar and geomagnetic activity, the signatures, and how they affect spacecraft. This research not only advances our knowledge and ability to use space, but also trains many space scientists.

The other service laboratories execute space research and development for both military and basic applications. Secretary Rumsfeld's comments regarding the Army and Navy research laboratories mention research and development for dedicated military missions only.

My question is will basic research programs which do not have immediate military applications be scaled back in response to this new policy and direction?

General EBERHART. Sir, I must admit I am not familiar with the statement from the Secretary. So I will have to provide that for the record. But I will go on the record now and say that, regardless of when I was in the Air Force as a programmer or a warfighter in the Air Force or today as Commander in Chief of U.S. Space Command, when you look at your first example, space weather, space weather is so very important to us in terms of our mission, all of the missions, from missile warning to communications to the effect it is going to have eventually on the atmosphere and PGMs and on and on.

So we are a strong proponent for investment in science and technology and research in terms of space weather and anything else that might have a spinoff that would in fact affect military operations. But in terms of what the Secretary said, I will have to go back and research that, sir, and provide it for the record.

[The information referred to follows:]

To the best of our knowledge and understanding, no basic research intended to meet the needs of our space missions will be diminished. We believe the space research base will continue to be maintained and expanded as needed to meet USSPACECOM requirements.

Senator AKAKA. Thank you very much, General Eberhart.

General EBERHART. One other comment I would like to make. You started with an anecdote about people thinking that something that was wrong with the satellite was in fact caused by someone taking action against that satellite when it was actually weather or some other phenomenon. What we find in many exercises is just the opposite—that we will go out and do something and take a space capability away from them and we will do that sometimes in just a simulated way, but they will assume it was the weather or they will assume it was a failure of the satellite, and really we took the satellite out virtually speaking.

So we have to work that both ways.

Senator AKAKA. Thank you, General.

Thank you.

Senator REED. Thank you, Senator. Senator Smith.

Senator SMITH. Thank you, Mr. Chairman.

Good afternoon, General. General, just to pick up on Senator Reed's question regarding SBIRS Low, do you know the history or the reason why the Air Force recommended SBIRS Low be transferred out of Air Force and into BMDO?

General EBERHART. Sir, I believe one of the reasons—and the frustration that I know that they experienced when I was still on the Air Staff years ago was the fact that BMDO was driving the requirements for SBIRS Low, and if they are driving the requirement but not paying the bill oftentimes people's requirements become a little bit greater.

So I think that the Air Force believed that if in fact BMDO had responsibility for the program in terms of funding, that they might be a little more reasonable and pragmatic in terms of requirements.

I think that is a couple years old, Senator.

Senator SMITH. It was in the authorization, the DOD authorization that we passed here. It was based on the recommendation of the Air Force, and I just wondered if you had any more history on that.

On the funding of space programs, the administration has been pretty forward on stating that space is critical to the future national security needs of our country. A year or so ago, I think you were up here and I asked you a question about whether or not space programs were underfunded and I think you responded: "Well, most all military programs are underfunded," or words to that effect.

How do you feel about that now? Given the stated priorities of space in this administration, do you feel, without getting into the underfunded issue because that is pretty subjective—but how about in relation to everything else? Is space keeping pace with other areas of the military budget on a priority level as articulated by the administration?

General EBERHART. I believe that if we look over the last decade, space has not received the priority that it should have received. Now, maybe I have become more parochial here but, I think that we probably should have diverted more funds to space over the last decade.

As you and I have talked, I am very optimistic, as a result of the Space Commission, as a result of what I have heard from the President and the Secretary of Defense, what I know of the ongoing strategic review and the QDR, that in fact space and information will compete very well, and we will see a boost in funding in those areas as we roll out the 2003 and subsequent budgets.

Senator SMITH. So I think it is coming, but at a pretty—well, let us say, a methodical or a slower rate. In other words, as the fiscal budgets come forth in the next 3 or 4 years you are going to see a greater emphasis coming on space?

General EBERHART. I believe that you will see more money and it will not be money for studies. It will be money for things we know need to be done.

Senator SMITH. A short time ago NASA cancelled the X–33 space plane program. Is there any talk in Air Force circles or Pentagon circles that we might want to take a look at that for its potential military utility, as opposed to going through another program, another prototype, on the so-called space plane? Is there any way we could take over the X–33? Would that work militarily?

General EBERHART. Sir, I am on record in a letter to Dan Goldin asking him to work with the Air Force to keep the team together as we take a look at the technologies and the value added of continuing this program. This is complicated by a decision in 1994 that took the reusable launch vehicle program and gave that to NASA and the expendable launch vehicle program and made that a Department of Defense, and for all practical purposes, Air Force program.

I believe that it is time now to revisit that decision because I truly believe in the future, as I alluded to earlier in my opening remarks, that if we are ever going to get to where we need to be in terms of affordability of space launch, or if we are ever going to

get to where we need to be in terms of responsiveness of space launch, it has to be through reusables.

Senator SMITH. One final question. There were reports in the media that General Ryan and other Air Force leadership were "livid" at Secretary Rumsfeld's focus on space as opposed to fixed wing, and the accusations were in the media that General Ryan and others cancelled or postponed the Schriever space war games out at Colorado Springs. I would like your insight on that as to whether or not that is accurate or whether that is misrepresented.

It is a pretty dramatic comment and I know he is your superior officer, so I do not mean to get you into the middle of that. But if that is the attitude among Air Force leadership, it is a statement that kind of goes strongly against the grain of what you have been saying here today and what other Air Force leaders have said about the importance of space.

I do not want to get you into having to comment on what General Ryan said or didn't say. But in terms of the whole attitude out at Colorado Springs and elsewhere, does this attitude still prevail, persist, that it is fixed wing versus space? Or can we reasonably expect that we could have fixed wing and space? I will give you an easy way out.

General EBERHART. First of all, he is my superior officer with my Air Force Space Command hat on, but with my CINC hat on he is not. So I will answer as the CINC.

But the answer would be the same anyway. The Chief was misrepresented in that article. In fact, there has been a retraction or a modification and a public release that says this is what the Chief really said or how the Chief really feels. The fact of the matter is, we are seeing the light at the end of the tunnel. It is not perceived as space versus fixed wing.

I think that fixed wing operators, day in and day out, are understanding the importance of space in what they do and that, in fact, space is the future. So I see an embracing of the space mission and space investment much different than I did a year, 2 years, 5 years ago. The Chief clearly understands that.

He didn't cancel Schriever 2002. There was again miscommunication. We were going to do it every 2 years. We did it in the first part of 2001. We are going to do it again in 2003. There was not going to be a Schriever 2002. So it takes 2 years to reset the deck to do it again.

So there was a lot of inaccuracies in that article.

Senator SMITH. I know my time has expired. Just one brief follow-up?

Senator REED. Go ahead.

Senator SMITH. It is just the way the sources—they did not identify sources; they never do—leaks from Colorado Springs from the Air Force seem to be the main source of those things. It would just seem to me that apparently there are a few people in the command out there, if there is any validity to it at all, that felt that way or were not really focused on space. There might have been a little internal jealousy. I will take your word for it that General Ryan did not say it, but it is unfortunate that that kind of information comes out of the command.

General EBERHART. Sir, if I could have one rebuttal there, I guess what I would bet personally is that it was not people in the command, but possibly a contractor who wanted there to be a Schriever 2002 so that they would get that business.

Senator REED. Thank you, Senator.

General, you made reference, in response to Senator Smith, to a letter that you sent to NASA. Could you provide us a copy of that letter?

General EBERHART. Yes, sir.

Senator REED. Thank you very much.

[The information referred to follows:]

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE SPACE COMMAND

09 APR 2001

The Honorable Daniel Goldin
NASA Administrator
300 E Street SW
Washington DC 20546

General Ralph E. Eberhart
Commander, Air Force Space Command
150 Vandenberg Street, Suite 1105
Peterson AFB CO 80914-4020

Dear Dan

The Air Force has a continuing requirement for more affordable and responsive access to space. This interest includes leveraging NASA-developed reusable launch vehicle (RLV) technologies, including those scheduled to be demonstrated by the X-33, for potential military application. We believe it is in the national interest to fully evaluate future courses of action that would reap the benefits of the X-33 development effort.

We need time to evaluate options to continue the X-33 demonstrator program, to include incorporating the outcome of the Defense Strategic Review and assessing the full range of opportunities for funding in the FY02 and FY03 budget.

We look forward to working with you to identify contractual arrangements and funding sources to continue this program and keep the Lockheed team in place until we can chart the way ahead on this issue.

Sincerely

RALPH E. EBERHART
General, USAF
Commander

cc: CSAF

Senator REED. Senator Nelson.

STATEMENT OF SENATOR E. BENJAMIN NELSON

Senator BEN NELSON. Thank you, Mr. Chairman.

Thank you, General. I appreciate very much your willingness to be here and what you are doing to organize to meet the challenges of growth in space as important to our national interests would require, and so I thank you.

As part of a missile defense program, President Bush and Secretary Rumsfeld have said that they favor a multi-layered system including a space-based laser, which some believe could enable us to hit an incoming missile in the boost phase. I have really two questions here. One, what efforts have been made to assist in this development? Two, can you tell us how much money will be dedicated to that in fiscal year 2002?

General EBERHART. Sir, I have it at my fingertips here and——

Senator BEN NELSON. Well, just generally. It does not have to be specific.

General EBERHART. In terms of space-based laser, I truly believe that a ballistic missile defense system should be a system of systems and over time, depending on what the threat is, the sophistication of the threat, the origins of the threat, and obviously our capability to counter the threat, we need to tie any and all capabilities to defeating that threat.

For example, what I would love to do is bomb the missile on the launch pad, before they even launch it. When I say bomb it, I am talking about using a cruise missile or something conventional where I do not have to send someone in harm's way.

Then I would like to get the missile in the ascent phase, because if I get it in the ascent phase, it is an easier problem. The missile has not yet deployed decoys. If it is a weapon of mass destruction, there are not several different targets. If there is any fallout, it is back on the enemy, the launch site, as opposed to anywhere else. So I would like to get the missile in the ascent phase.

I believe that space-based laser, airborne laser, and Aegis off an enemy's coast could get a missile in the boost phase. All of those are things that we need to pursue, and we need to look at this as a system of systems. Obviously, this has to take into consideration any treaties or anything else that the Nation decides to adhere to.

But I believe that we need to continue with concept development of a space-borne, space-based laser. We need to look for this integrated flight experiment, this IFX, and see what this thing really will do. I am hopeful.

Senator BEN NELSON. Before you answer on the money side, I asked Secretary Rumsfeld what percentage of success, what ratio of success, would you expect the research and development to give you before you would feel comfortable in deploying the actual system or systems? I mean, if we are talking about munitions, of course, there are duds and certainly not everything is going to work according to the best-laid plans that might be put out there. But how effective does it have to be before you say it is worthy of spending billions, maybe hundreds of billions of dollars?

General EBERHART. As we look at the operational requirements documents and we look at what we want to achieve, what we are looking for is either a 95 percent chance of a 99 percent kill or vice versa.

The question is whether or not you achieve that before you go with some initial capability or not. That is what the Secretary and in turn, of course, the President and Congress will struggle with. Obviously, those are pretty demanding requirements.

Senator BEN NELSON. They are pretty big numbers to spend.

General EBERHART. Exactly. Those are pretty demanding requirements. At the same time, you do not want any leakers. So that is one of the things we have to struggle with.

I will provide you the exact numbers.

Senator BEN NELSON. If you would, thank you.

[The information referred to follows:]

Funding requested in the fiscal year 2002 President's budget for the space-based laser (SBL) is $165 million. When deployed, an operational SBL would serve as a component of a broader Ballistic Missile Defense (BMD) architecture. The goal of the BMD system is a layered defense that will provide multiple engagement opportunities along the entire flight path of a ballistic missile. Individual elements of this Ballistic Missile Defense system would be allocated a portion of the overall required performance, which is yet to be determined.

The development and deployment of an operational SBL require upfront risk reduction efforts. The key risk reduction effort is the SBL Integrated Flight Experiment. It will demonstrate a mega-watt class laser against boost phase targets and is projected for the 2012 timeframe.

Senator REED. Thank you, Senator Nelson.

Senator Sessions.

STATEMENT OF SENATOR JEFF SESSIONS

Senator SESSIONS. Thank you very much.

General Eberhart, there was reference I believe in the Space Commission report that we could be heading toward a space Pearl Harbor. Let me just ask a real simple question. Are our capabilities in space that we need to assist us in military operations safe from attack today, and are we able to neutralize any enemy surveillance or space technologies that could advance their military objectives?

General EBERHART. I would not say that our capabilities in space are safe. But I would tell you that it is a little more difficult to deny us those capabilities than some would lead you to believe, because of redundant systems. The number of GPSs that we have up may not give us the exact coverage we would like. But, to take out our entire GPS of some 24 satellites. We have 28 up there. We cannot quite as easy as some would lead you to believe.

At the same time, am I comfortable that we have things protected like we should? No. That is why you will see us propose programs to move ahead in space control. I talked about this in my opening statement. We have focused on force enhancement, but those things have become so important to us that now we have to think much harder about detecting those capabilities that you asked about.

In terms of our capability to deny the enemy use of space, there are many different ways to do that, many of which are classified and we cannot discuss here. But I believe that we are headed in the right direction. I would certainly like to have more capabilities to deny the enemy use of space.

Senator SESSIONS. As a practical matter, if we had a Gulf War circumstance and a Saddam Hussein had something like the sur-

veillance capabilities that we have, that would complicate our ability to be effective and cost American lives, would it not?

General EBERHART. One of the speeches that I give very often talks about the great victories of the latter half of the last century. If you move from D-Day to Inchon to Schwartzkopf's left hook, none of those would be possible today.

Senator SESSIONS. They could be identified from space.

General EBERHART. Yes, sir.

Senator SESSIONS. Secretary Rumsfeld I know in his testimony there was some question about the tragic tragedy of having to take war to space, and he did not hesitate when asked about that. He said: We have had war on land, we have had it on water, we have had it in the air, and we are going to have it in space; we need to be able the prevail in space.

I hope that you will be a strong voice for that capability. I think most American citizens believe that we are dominant in space, that we can maintain our capabilities and defeat enemy capabilities, and if we are not there yet I think, Mr. Chairman, we need to be sure.

These are not technologically unachievable goals, are they? Is it a question of money or time or technology or what?

General EBERHART. Philosophically speaking as a world citizen, an American citizen and an optimist, I would like to hope that we are not going to have to resort to a war in space—we are not going to have weapons in space. However, my intuition tells me that this probably will not be the case for the reasons the Secretary outlined.

One of my views is that if we plan properly and are not surprised with a space Pearl Harbor or maybe a Sputnik situation again, that will go a long way towards precluding or at least delaying that as long as possible.

I am charged under the unified command plan by the National command authorities for planning for space control and planning for force application. That is exactly what we are doing, hoping in the latter case that we will not have to resort to force application.

Senator SESSIONS. Are there any policies within the Defense Department that inhibit in any way your ability to be prepared to defend our assets in space and to neutralize enemy assets in space?

General EBERHART. Right now there are no policies in terms of space control that cause me a problem conducting the mission. There are some issues in terms of computer network defense, but they are more law enforcement issues that the Department of Defense will work with the Department of Justice and others to propose some legislation in terms of how we track back to find the origin. But there are some issues in terms of computer network operations that the staffs are working.

Senator SESSIONS. With regard to the ballistic missile defense, space-based laser, the Aegis system that could neutralize or destroy a missile at or near launch, we need more research done to be able to do that. We are not capable of doing that readily at this time; is that correct?

General EBERHART. Sir, back to the end of your previous question in another mission area, it is a question of technology. It is a question of dollars, and it is a question of test and development.

Senator SESSIONS. As presently in existence, if it is in existence, the ABM Treaty would complicate, if not prohibit, the kind of testing necessary for some of these programs?

General EBERHART. Again, I think as long as you are testing, in most cases you are OK. It would certainly preclude deployment, but I would have to let the lawyers look at that.

Senator SESSIONS. You think you could do some testing, but not deploy?

General EBERHART. I think so.

Senator SESSIONS. There have been some suggestions to the contrary.

General EBERHART. Let me provide that for the record.

[The information referred to follows:]

As a warfighting command, our primary focus is on the deployment and employment of weapons systems that have been fielded by the services. The services rely upon the OSD-level ABM Treaty Compliance Review Group (CRG) to analyze and provide guidance on each step in the development, testing and fielding of a particular weapon. For instance, the CRG annually reviews the Space-Based Laser Integrated Flight Experiment (IFX), which is the program's key risk reduction effort. The most recent review took place in January 2001. To date, the CRG has determined that the IFX is not mature enough to raise issues warranting a detailed treaty compliance review. We anticipate the detailed review will take place during the IFX preliminary design review currently scheduled in 2005.

Senator SESSIONS. But in your view a serious missile defense system would include the capability of something like the space-based laser or the forward deployed ships to have an opportunity to destroy a missile at launch?

General EBERHART. I say that based on a sophisticated larger threat than we see right now. But I see that in the future we would want to develop a system of systems and we would want to continue the technology to fully understand how you put that together and how you command and control and how that is all interoperable.

Senator SESSIONS. So that would be less critical against a rogue state type attack than a more mature attack?

General EBERHART. The rogue state that we see today, in my view will continue to develop over time and we have to have the ability to counter them over time. That is why you see the different increments in the program today and that is why you see people talking about having systems that would be interoperable.

Senator SESSIONS. Thank you.

Senator REED. Thank you, Senator Sessions.

It was my original intention to have a second round, but given the time, I would just ask if any member has a desire to ask one or two very pertinent questions, with the understanding of course that the General will respond in writing to questions. Senator Allard?

Senator ALLARD. Yes, Mr. Chairman, I do have a number of questions I would like to ask. I do not know about other members on this side.

Senator REED. Go ahead.

Senator ALLARD. We appreciate that.

I am going to bring up this issue of education and training for network operations. What training and education shortfalls have you encountered due to the highly technical nature of the U.S.

SPACECOM mission and in your view what would help or assist U.S. SPACECOM to develop the expertise needed for growing space and computer network operations missions?

General EBERHART. I believe right now that we do a good job of training the individuals once they come on board. Unlike when I left college or left high school, they are computer literate. They have some understanding of computers and computer systems. So the problem is not so much the training in the technical areas, but it is more retaining them, because there is just such a pull out there in society for these types of people in industry, dot-coms, on and on.

But we also have this need to think a little more sophisticated in this arena: advanced degrees, areas where we can pursue more of the strategic aspects of computer network operations, defense, information assurance, etc. So, centers of excellence established by industry and by academia would not only be valuable for the military, but would also be very valuable for the Nation at large.

Senator ALLARD. Let me see. In Colorado Springs you have space Reserves component. Are they helpful?

General EBERHART. Sir, I do not think "helpful" does them justice. We cannot do without them. It is not unique to Air Force Space Command—it is across the board. Whether Guard or Reserve, civilian or contractor partners, we just cannot do what we do day in and day out without them. You cannot say too much about them.

Senator ALLARD. It does help you with the high technology? It helps you with the retention at least?

General EBERHART. Yes, sir, and I am convinced it will increase in the future. We are seeing it at our space launch bases, too. At our space launch facilities we are using more and more Guard and Reserve to help and augment.

Senator ALLARD. Mr. Chairman, I do have a couple of other questions.

Senator REED. Please.

Senator ALLARD. What would be the impact of separate management of the NRO and your Air Force launches?

General EBERHART. We truly believe that if we do that in fact it is not going to save money, it is not going to drive down costs, but it will do just the opposite. As you are probably aware, Senator Allard, the Air Force and the NRO just established a Memorandum of Understanding in June of this year, just about a month ago, which hopefully will address some of those issues that the Intelligence Committees and others have been concerned about—concerns that maybe the Air Force has been charging the NRO too much and it is back to the costing question that you referred to earlier.

But I think we are beyond that. I think that we need to stay joined at the hip as we work these launch issues and work them together.

Senator ALLARD. I would like to follow up on Senator Nelson's questioning about space-based radar. Have the Air Force and OSD decided to deploy the space-based radar?

General EBERHART. Sir, I think there is a problem with the budget in terms of where some of the money is. I think it was in the

engineering, manufacturing, and development (EMD) line as opposed to the research and development line. So my belief, my understanding and what I advocate is that we have not made a decision to deploy. What we have done is made a decision to truly realize what the value added is of such a system. Once we understand the cost and what the advantages are then we will make a decision whether or not we are going to propose a deployment of that system.

But I think there is a little confusion with some of the budget exhibits right now.

Senator ALLARD. We can clear that up, you think, in this budget cycle?

General EBERHART. I think that the staffs are working to clear that up now, sir.

Senator ALLARD. Thank you, Mr. Chairman.

Senator REED. Thank you.

I do not want to discourage further questioning, but Admiral Mies awaits his turn.

Senator SESSIONS. One question.

Senator REED. Senator Sessions.

Senator SESSIONS. I know that the Space and Missile Defense Command has been consolidated and everybody is good soldiers on that. But we really are proud of the work that they do. I guess my question is do you expect them to continue to play a major role in space activities and are there any plans to alter its role?

General EBERHART. No, sir. In fact, I think that relationship must grow stronger every day. Part of that is engendered by the fact that Lt. Gen. Ed Anderson was the Commander of Army Space and Missile Command and is now the Deputy Commander in Chief out in Colorado Springs. So the personalities are right. With the new space complex out there, the part of Army Space Command that is in Colorado Springs will move on the base. No one is coming from Alabama, but people will be relocating from downtown Colorado Springs. I think that will be good for the relationship.

As we move down the road in terms of ballistic missile defense, that relationship will grow stronger—I think all the signs are the right signs, and I do not anticipate any change other than the relationship getting stronger in the future.

Senator SESSIONS. Thank you.

Senator REED. Thank you very much, Senator Sessions.

Thank you, General Eberhart, for your testimony. I am sure our members will have additional questions, which we will forward to you in writing. Thank you very much, not only for your testimony, but also for your service to the Nation. Thank you, sir.

I will now ask the second panel to join us, Admiral Mies and his colleagues. They should be here momentarily. [Pause.]

Let me once again call the committee to order and welcome Admiral Mies, General Blaisdell, and Admiral Dwyer. Thank you for joining us this afternoon and thank you for your service to the country. We look forward to hearing from you. As you know, we have just listened to your colleague, General Eberhart.

We also understand that nuclear deterrence is a critical aspect of our national security policy and it is an issue that will remain very critical to us. We also have to ensure that you have the sup-

port in terms of budget and authority to maintain adequate deterrence.

Recently there has been a great deal of discussion on the number of strategic platforms and warheads that will be needed over time. While these discussions will be ongoing until completion of the nuclear posture review in December, Admiral Mies, we would very much like your views on the subject from your perspective as Commander in Chief of the Strategic Command. You are the individual responsible for targeting and planning and wartime command of these forces, so your views are absolutely critical to us.

Admiral, I know you have submitted a prepared statement. That statement will be made part of the record. So if you would go ahead in either summary form or we would be honored to have your testimony.

STATEMENT OF ADM. RICHARD W. MIES, USN, COMMANDER IN CHIEF, U.S. STRATEGIC COMMAND; ACCOMPANIED BY MAJ. GEN. FRANKLIN J. BLAISDELL, USAF, DIRECTOR, NUCLEAR AND COUNTERPROLIFERATION, OFFICE OF THE DEPUTY CHIEF OF STAFF FOR AIR AND SPACE OPERATIONS, U.S. AIR FORCE; AND REAR ADM. DENNIS M. DWYER, USN, DIRECTOR, STRATEGIC SYSTEMS PROGRAM OFFICE, U.S. NAVY

Admiral MIES. Thank you, Senator. Mr. Chairman, Senator Allard, distinguished Senators: I appreciate the opportunity to appear before your subcommittee to testify on strategic nuclear force policy, force structure, and force posture.

Before I begin, I would like to thank you and your subcommittee for your sustained support of our strategic deterrent forces and your commitment to a safe, reliable, and secure nuclear weapons stockpile.

As you are well aware, President Bush reaffirmed the importance of our strategic deterrent forces in his recent remarks at the National Defense University. The proliferation of weapons of mass destruction and their means of delivery pose the greatest challenge to global stability and security and the greatest challenge to our strategic deterrent forces.

With regard to that proliferation, in essence the issue may not be whether the weapons of mass destruction will be used against the West by a rogue nation or a transnational actor, but where and when. The post-Cold War world is a much more chaotic place. Strategic deterrence, which has worked well in the bipolar framework of the Cold War, may not work as well in a multi-polar world of unpredictable asymmetric threats, and in some cases it may fail.

In recognition of this reality and as part of a comprehensive strategy to adapt our policies and forces to these emerging threats, the President and the Secretary of Defense have articulated a need to move beyond classical, bipolar Cold War deterrence to a more comprehensive framework that integrates other complementary elements of military strategy—elements including dissuasion, denial, and defense.

We need an updated approach to deterrence that includes both offenses and defenses. Missile defense would not be a replacement for our assured response with our offensive forces, but rather an added dimension to complement our existing deterrent capabilities

and an insurance policy against small scale ballistic missile attacks.

I think you are aware that with the end of the Cold War we have dramatically transformed our strategic force posture. Our strategic forces no longer target other countries during peacetime operations. Our strategic bombers and their supporting tankers are no longer on alert. Our strategic submarine force, while positioned at sea for survivability, patrols under comparatively relaxed conditions of alert. Our strategic command and control aircraft no longer maintain continuous 24 hour a day airborne operations.

We must be cautious, however, as we consider further changes in our force posture. Reducing the alert status of our forces, in isolation, can diminish their credibility and survivability. Many "dealerting" proposals jeopardize the existing stability we have against a preemptive first strike because they increase our vulnerability and create a premium for attacking first.

I would also like to challenge the perception that our forces are on "hair trigger" alert—a characterization that is routinely used to justify de-alerting proposals. Multiple, stringent procedural and technical safeguards have been in place, and will remain in place, to guard against accidental or inadvertent launch. Rigorous safeguards exist to ensure the highest levels of nuclear weapons safety, security, reliability, and command and control.

Additionally, the policy of the United States is not to rely on "launch on warning." Our trigger is built so we can always wait—the "hair trigger" characterization is inaccurate.

We are presently maintaining our strategic force at the following START I levels: 50 Peacekeeper and 500 Minuteman III ICBMs; 18 Trident strategic submarines; and 76 B–52 and 21 B–2 bombers. Today we have no new strategic forces under development. Therefore, as our Nation comes to rely on smaller strategic forces the imperative for modernizing and sustaining that force, becomes even more critical to ensure a continued viable deterrent.

Our strategic forces today are in a period of dramatic transition. We have just commenced a decade-long effort to extend the Minuteman ICBM service life for another 20 years and strong congressional support of both the guidance and propulsion replacement programs is essential to maintain an effective and reliable ICBM force for the next two decades. Minuteman sustainment is especially important given the potential drawdown of the Peacekeeper ICBM force. As Secretary Rumsfeld recently indicated, we are in the process of preparing to seek congressional approval to begin Peacekeeper deactivation.

Similarly, with congressional approval, we have commenced conversion of our strategic submarine force from an 18-boat force with two different missiles to a 14-boat force with a common Trident II missile. Again, Congress' support for the Trident II missile backfit program remains essential.

Sustainment and modernization of the strategic bomber force is also critical to provide a force which can support our strategic deterrent requirements. The B–52 bomber force is scheduled to remain in service until 2044. As such, modernization and sustainment of our aging bomber force is critical. Upgrades to avi-

onics, situational awareness, electronic countermeasure capabilities, and survivable, secure two-way communications are essential.

We are also facing very similar sustainment challenges with our near-40-year-old KC–135 tanker force which supports our bombers, similar to those we face with the B–52 bomber force.

Since the fall of the Berlin Wall, we have made great progress in reducing our nuclear arsenal and our associated infrastructure. We have reduced our strategic nuclear systems by over 50 percent and our non-strategic or tactical nuclear warheads by over 80 percent. We have reduced the number of people involved in our strategic forces by over one-half and the number of military bases supporting them by approximately 60 percent.

While overall defense spending in the last decade has declined roughly 20 percent since the end of the Cold War, strategic force spending has declined approximately 70 percent. Strategic force costs have dropped from greater than 6 percent of the Department of Defense spending in 1990 at the end of the Cold War to less than 3 percent today. That, in my mind, is a fairly significant Cold War "peace dividend." I would encourage you to think of our investment in strategic force as a cost-effective "premium" on what really is our Nation's "ultimate insurance policy."

As you are aware, the President has committed to "achieving a credible deterrent with the lowest possible numbers of nuclear weapons consistent with our national security needs." I believe that the defense strategy reviews and the Nuclear Posture Review that the Secretary of Defense has undertaken, provide an opportunity to develop a coherent approach to achieve the President's objective: a deterrence strategy with lower nuclear salience, reduced warhead levels, and of a less adversarial character.

These reviews and the emerging debate about further reductions in our nuclear forces are timely and should be informed by several guiding, fundamental principles:

First, strategic force reductions must be viewed as a means to an end—national security—and not as an end in itself. Stability is the most important criterion as we assess further initiatives to reduce our strategic forces to the lowest levels consistent with our security. Deterrence ultimately depends not on our capability to strike first, but on the assurance that we always have the capability to strike second.

Second, we need to focus more on capabilities rather than numbers. I think there is a naive and mistaken belief that the "nuclear danger" is directly proportional to the number of nuclear weapons and, accordingly, lower is inevitably better. As we reduce our strategic forces to lower levels, numerical parity or numbers alone really become less and less important. We must preserve sufficient deterrent capability to respond to future challenges, to provide a cushion against imperfect intelligence and technological surprises, and to preserve a reconstitution capability as a hedge against unwelcome political or strategic developments.

Finally, the third principle: Preservation of our capability to adapt our deterrent forces to a rapidly changing and unpredictable strategic future is critical. As the Secretary of Defense has already testified, our ability to predict the future is questionable, therefore, I believe that our ability to adapt to an uncertain future and

changing environments will be far more important than our ability to prepare for a future we cannot predict.

As we think about potential emerging threats, I believe an early strategist's metaphor that nuclear planners are like home-builders remains true today. A wise architect does not design only for benign environments, but for the worst weather conditions one can reasonably anticipate. We have to consistently maintain a "building code" for our nuclear forces to ensure they can "weather" the worst threats we can reasonably postulate.

The strategy reviews we have in progress create an opportunity for unilateral initiatives to formulate a more comprehensive, coherent strategy. Such an approach would recognize strategic force policy as a *journey* rather than a *destination,* and enable us to adapt our nuclear force postures and our levels compatible with emerging threats and our national security requirements. Our Nation must always maintain the ability to convince potential aggressors to choose peace rather than war, restraint rather than escalation, and termination rather than conflict continuation.

The safety, the surety, and the reliability of our strategic nuclear arsenal depend heavily on the Department of Energy's Stockpile Stewardship Program. We are pleased with the standup of the National Nuclear Security Administration under John Gordon. The organization is fostering improved morale and a greater sense of mission.

Nonetheless, there is a widening gap between stockpile program requirements and available resources. I fully agree with the concerns and recommendations identified by the Chiles Commission, the Foster Panel, and my own Strategic Advisory Group. The delays in many high priority stockpile stewardship programs because of aging infrastructure and inadequate funding must be addressed with greater urgency. To this end, the need for an unequivocal national commitment to support the Stockpile Stewardship Program has never been greater.

In closing, our strategic forces stand as America's "ultimate insurance policy." Since the end of World War II, the presence of nuclear weapons has had a great restraining effect. Nuclear weapons helped keep the Cold War cold and their existence is still extremely valuable in deterring crisis and conflict.

U.S. Strategic Command is committed to ensuring a viable deterrent for the Nation, and to maintaining and strengthening the stability of our strategic relationships as we further reduce our forces. Our motto, "Peace Is Our Profession," underscores our conviction that the costliest peace is a bargain compared to the least costly war.

Thank you very much, and I look forward to answering your questions.

[The prepared statement of Admiral Mies follows:]

PREPARED STATEMENT BY ADM. RICHARD W. MIES, USN

Mr. Chairman, Senator Allard, distinguished senators. I appreciate the opportunity to appear before your subcommittee to testify on strategic nuclear force policy, force structure, and force posture.

Before I begin, I would like to thank you for your sustained support of our strategic deterrent forces and your commitment to a safe, reliable, and secure nuclear

weapons stockpile through the National Nuclear Security Administration's (NNSA) Stockpile Stewardship Program.

STRATEGIC DETERRENCE POLICY

Deterrence of aggression and coercion remains a cornerstone of our national security strategy and our strategic nuclear forces serve as the most visible and important element of our commitment to this principle. President Bush reaffirmed the importance of our strategic deterrent forces to the security of the United States and its allies in his recent remarks at the National Defense University.

Our nuclear deterrent forces are structured and postured to:

- Deter the use of weapons of mass destruction and major conventional aggression against the United States and its allies
- Reassure our allies of our extended security commitments
- Dissuade regional powers from acquiring weapons of mass destruction and their means of delivery (e.g., ballistic missiles)
- Deter or control conflict escalation
- Terminate conflict

As outlined in our National Military Strategy, although our Nation is at peace and the Cold War has ended, a number of potentially serious threats to national security remain including regional instabilities, asymmetric challenges, transnational threats, and "wild cards." The proliferation of weapons of mass destruction and their means of delivery pose the greatest threat to global stability and security and the greatest challenge to strategic deterrence. Numerous commission reports, including the Report of the Commission to Assess the Ballistic Missile Threat to the United States (Rumsfeld Report) and Combating Proliferation of Weapons of Mass Destruction (Deutch Commission Report), have highlighted the pervasive dangers of proliferation of weapons of mass destruction and the means of their delivery. The first report of the Commission on National Security (Hart-Rudman Commission) focused on this threat as one of its most prominent themes:

> "America will become increasingly vulnerable to hostile attack.and our military superiority will not entirely protect us." Although, "the United States will be both absolutely and relatively stronger than any other state or combination of states, we will be vulnerable to an increasing range of threats against American forces and citizens overseas as well as at home. States, terrorists, and other disaffected groups will acquire weapons of mass destruction and mass disruption, and some will use them. Americans will likely die on American soil, possibly in large numbers."

In essence, the issue may not be *whether* weapons of mass destruction will be used against the West by a rogue nation or transnational actor, but *where and when.*

The post-Cold War world is a more chaotic place. Strategic deterrence, which worked well in the bipolar framework of the Cold War, may not work as well in a multi-polar world of unpredictable, asymmetric threats, and in some cases, it may fail. How do you deter a threat that has no return address? How do you dissuade a threat that is faceless? In recognition of this reality and as part of a comprehensive strategy to adapt our policies and forces to these emerging threats, the President and Secretary of Defense have articulated a need to move beyond classical, bipolar Cold War deterrence—the almost exclusive reliance on mutual vulnerability and assured response—to a more comprehensive framework that integrates other complementary elements of military strategy—elements including dissuasion, defense, and denial.

We need an updated approach to deterrence that includes both offenses and defenses. Missile defense would not be a replacement for an assured response but rather an added dimension to complement our existing deterrent capabilities and an insurance policy against a small-scale ballistic missile attack. It would also serve as a strategic element to dissuade countries from acquiring weapons of mass destruction and ballistic missiles.

STRATEGIC FORCE STRUCTURE

To deter a broad range of threats, our national security strategy rests on several factors, particularly on our demonstrated will and capability to uphold our security commitments when they are challenged. Our declaratory policy communicates costs to potential adversaries and our warfighting capability, including a robust triad of strategic forces, conveys credibility across the full spectrum of conflict—conventional to nuclear. The previous Nuclear Posture Review and Quadrennial Defense Review reaffirmed the wisdom of preserving the complementary strategic triad of land-

based intercontinental ballistic missiles, submarine-launched ballistic missiles, and strategic bombers. I am confident our ongoing strategic reviews will come to similar conclusions.

Each leg of the Nation's strategic triad possesses unique attributes that enhance deterrence and reduce risk. Intercontinental ballistic missiles (ICBM) provide prompt response; strategic submarines (SSBN) provide survivability; and bombers provide flexibility. The diversity of our strategic forces and the synergy created by these attributes are designed to complicate any adversary's offensive and defensive planning calculations while simultaneously providing protection against the failure of a single leg of the triad.

Intercontinental ballistic missiles continue to provide a reliable, low cost, prompt response capability with a high readiness rate. They also promote stability by ensuring that a potential adversary takes their geographically dispersed capabilities into account if contemplating a disarming first strike. Without a capable ICBM force, the prospect of destroying a significant percentage of America's strategic infrastructure with a handful of weapons might be tempting to a potential adversary in a crisis.

Ballistic missile submarines continue to carry the largest portion of our strategic nuclear deterrent force. With approximately two-thirds of the force at sea at any one time, the strategic submarine force is the most survivable leg of the triad, providing the United States with a powerful, assured response capability against any adversary. Submarines at sea are inherently survivable and hence stabilizing. Submarines in port, however, are more vulnerable and could offer an extremely lucrative target in crisis. Thus, in any foreseeable force structure, the United States must preserve a sufficiently large strategic nuclear submarine force to enable two-ocean operations with sufficient assets to ensure an at-sea response force capable of deterring any adversary in a crisis.

Strategic bombers are the most flexible leg of our strategic nuclear triad. The "man in the loop" allows force dispersal to improve survivability and aircraft recall during mission execution. The low-observable technology of the B–2 bomber enables it to penetrate heavily defended areas and hold high-value targets at risk deep inside an adversary's territory. In contrast, the B–52 bomber can be employed in a standoff role using long-range cruise missiles to attack from outside enemy air defenses. This mixed bomber force can generate to alert status when necessary to deter escalation or provide assured response should deterrence fail.

We are presently maintaining our strategic forces at the following START I levels:

- 50 PEACEKEEPER and 500 MINUTEMAN III ICBMs
- 18 TRIDENT SSBNs each equipped with either 24 TRIDENT I (C^4) or TRIDENT II (D5) missiles
- 76 B–52 and 21 B–2 bombers

With no new forces in development, this triad of forces will remain the backbone of our Nation's strategic deterrent capability for the foreseeable future. As such, we must ensure these forces remain robust, reliable, and secure.

STRATEGIC FORCE POSTURE

Our strategic forces are postured to provide an assured response capability to inflict unacceptable damage to a potential enemy. Our strategic plans provide a wide range of deliberative, preplanned options and adaptive planning capabilities to ensure our Nation can respond appropriately to any provocation rather than an "all or nothing" response. Additionally, our forces are postured such that we have the capability to respond promptly to any attack, while at the same time, not relying upon "launch on warning" or "launch under attack."

With the end of the Cold War, we have dramatically transformed our strategic force posture. Our strategic forces no longer target other countries during peacetime operations. Our strategic bombers and their supporting tankers have not been on alert since 1991. Our strategic submarine force, while positioned at sea for survivability, patrols under comparatively relaxed alert conditions. Our strategic command and control aircraft no longer maintain continuous 24-hour airborne alert operations.

We must be cautious, however, as we consider further changes in our force posture. Reducing the alert status of our forces, in isolation, can diminish their credibility and survivability. Many "de-alerting" proposals jeopardize the existing stability against a preemptive first strike because they increase our vulnerability and create a premium for attacking first. As Albert Wohlstetter wrote many years ago:

> "Relaxation of tension, which everyone thinks is good, is not easily distinguished from relaxing one's guard, which almost everyone thinks is bad."

Most de-alerting proposals create an incentive to be the first to rearm. Like the railroad mobilization dilemma of World War I, any unilateral act to restore de-alerted assets, or any act which might be perceived as restoring de-alerted forces, creates a potential for instability. If a de-alerting initiative can relax tension and not create a perception that a strategic advantage could be gained by a preemptive strike, I believe our National Command Authorities would support it. But, in general, de-alerting initiatives should not be adopted unless they are stabilizing.

I would also like to challenge the perception that our forces are on "hair-trigger" alert—a characterization routinely used to justify de-alerting proposals. Multiple, stringent procedural and technical safeguards have been in place, and will remain in place, to guard against accidental or inadvertent launch. Rigorous safeguards exist to ensure the highest levels of nuclear weapon safety, security, reliability, and command and control. Additionally, the policy of the United States is *not* to rely on "launch on warning." As I stated earlier, our forces are postured such that while we have the capability to respond promptly to any attack, we will never need to rely upon "launch on warning." The diversity, flexibility, and survivability of our strategic forces and our command and control networks are designed to ensure we are *never* faced with a "use them or lose them" dilemma and we are *always* capable of an assured response. As Thomas Schelling has written:

> "If both sides have weapons that need not go first to avoid their own destruction so that neither side can gain great advantage in jumping the gun and each is aware the other cannot, it will be a good deal harder to get a war started. Both sides can afford the rule: when in doubt, wait."

Our trigger is built so we can always wait—the "hair-trigger" characterization is inaccurate.

STRATEGIC FORCE MODERNIZATION AND SUSTAINMENT

Today we have no new strategic systems under development. With the exception of the TRIDENT II (D5) missile, which is still in low-rate production, the United States has in-hand all of its major strategic systems. Therefore, as our Nation comes to rely on a smaller strategic force, the imperative for modernizing and sustaining that force becomes even more critical to ensure a continued viable deterrent. Since we must maintain these existing systems for the foreseeable future, it is also crucial to sustain the industrial base that provides key components and systems unique to our strategic forces.

Our strategic forces are in a period of dramatic transition. We have commenced a decade-long effort to extend the MINUTEMAN III ICBM force's service life for another 20 years. Replacement of aging guidance units and the aging propellant for the MINUTEMAN III boosters is in progress. Strong congressional support of the guidance and propulsion replacement programs for the MINUTEMAN III ICBM is essential to ensure an effective and reliable ICBM force for the next two decades. MINUTEMAN sustainment is especially important given the potential drawdown of the PEACEKEEPER ICBM. As Secretary Rumsfeld recently indicated, we will likely seek congressional approval to begin PEACEKEEPER deactivation.

Similarly, with congressional approval, we have commenced the conversion of our strategic submarine force from an 18 SSBN force with two different missiles to a 14 boat common missile force. At present two Pacific SSBNs are in a shipyard for missile conversion. We anticipate having a TRIDENT II (D5) missile capability in the Pacific beginning in fiscal year 2003. Congress' continued support for the TRIDENT II (D5) missile backfit program remains essential. The TRIDENT I (C^4) missile is already beyond its design service life and will be sustainable only at substantial cost. Backfit of four submarines to carry the TRIDENT II (D5) missile is the most cost-effective means to ensure a reliable sea-based deterrent well into the 21st century. In my estimation, a modernized 14 SSBN, all TRIDENT II (D5) missile force is in many ways a more robust, credible, and reliable deterrent than the present 18-boat force. I anticipate we will remove four submarines from strategic service beginning in fiscal year 2003.

Sustainment and modernization of the strategic bomber force is also critical to provide a force which can support our strategic deterrent requirements as well as the conventional needs of our theater commanders. The Air Force is planning to retain the B–52 bomber force in service until 2044; consequently, no replacement strategic bombers are on the drawing board. As such, modernization and sustainment of our aging bomber force is critical. Upgrades to avionics, situational awareness, electronic countermeasure capabilities, and survivable, secure two-way communications are essential. Not only is it important to continue to sustain our bomber forces, but life extension programs for our cruise missiles are equally vital. We have

worked closely with the Air Force to develop a long-range bomber roadmap to meet these objectives.

Vital to all of our flying operations are the tanker aircraft that support strategic operations—nearly 75 percent of which are flown by Air National Guard and Reserve. As CINCTRANSCOM, General Robertson recently testified the Air Force is facing sustainment challenges with the near 40-year-old KC–135 fleet similar to those it faces with the aging B–52 bomber force. We greatly appreciate the Air Force's many ongoing and planned initiatives to sustain our aging tanker force.

Finally, I would like to address what I call the unheralded "fourth leg" of the Nation's strategic "quadrad." This fourth leg is comprised of two key components—intelligence, surveillance and reconnaissance (ISR) assets and strategic command, control, communications, and computer systems (C^4).

Deterrence starts with our intelligence capabilities and USSTRATCOM relies heavily on the national intelligence architecture to support our deliberative and adaptive planning missions. Emerging threats such as strategic relocatable missiles and hard and deeply buried facilities demand robust intelligence support. Ongoing and future programs and technology developments are critical to delivering time-sensitive information to decision-makers and warfighters. Examples include:

- A modernized tasking, processing, exploitation, and dissemination (TPED) infrastructure to accommodate the increased volume and types of data from the intelligence community's Future Imagery Architecture (FIA) and Integrated Overhead SIGINT Architecture (IOSA)
- An enduring ground infrastructure for our space-based intelligence collection systems to protect against information outages due to single points of failure
- A revitalized intelligence workforce supported by technologically innovative tools, such as automated target recognition and the Joint Intelligence Virtual Architecture suite of tools
- The Space-Based Infrared System (SBIRS) to ensure tactical warning and attack characterization
- The Nuclear Detonation Detection System to assess battle damage and effectiveness of our strikes and support treaty monitoring

Our deterrent strategy is premised not only upon the National Command Authorities maintaining an appropriate level of global awareness but also an assured and survivable command and control system capable of directing our strategic forces during all phases of conflict—nuclear and conventional. These capabilities can only be provided by a C^4ISR architecture that is both flexible and robust. Certain programs are indispensable toward providing this capability:

- Advanced Extremely High Frequency (AEHF) satellites and terminals to provide survivable communications from the NCA to both tactical and strategic forces
- E–4 National Airborne Operations Center upgrades and modernization—necessary to provide a reliable alternate to the National Military Command Center
- E–6 Airborne Command Post sustainment program to ensure a survivable link to our nuclear forces

This "fourth leg" provides the enablers that make the other three legs an effective deterrent and warfighting force. It is critical that these systems, as well as their associated infrastructure, are adequately funded to ensure our capabilities are maintained.

STRATEGIC FORCE REDUCTIONS

From an historical perspective, the end of the Cold War has brought dramatic change to our strategic forces. Since the fall of the Berlin Wall, we have made great progress in reducing our nuclear arsenal and associated infrastructure. We have:

- Curtailed production of our most modern bomber (B–2) and ICBM (PEACEKEEPER)
- Stopped development of land-based mobile missiles—PEACEKEEPER rail-garrison and small ICBM road-mobile programs
- Capped production of sea-launched ballistic missile warheads (W–88)
- Removed all sea-launched nuclear cruise missiles from ships and submarines
- Removed all bombers from day-to-day alert
- Reduced the number of command and control aircraft from 59 to 20
- Terminated the Ground Wave Emergency Network
- Converted the B–1 bomber to conventional-only use

- Eliminated the MINUTEMAN II ICBM force
- Eliminated all nuclear short range attack missiles from the bomber force
- Eliminated all ground-launched intermediate- and short-range nuclear weapons
- Halted underground nuclear testing
- Closed major portions of our nuclear weapons production complex (Mound, Pinella, Rocky Flats)

All these changes reflect a consistent trend toward reduced reliance on strategic systems. Since the end of the Cold War, we have reduced our strategic nuclear systems by over 50 percent and non-strategic nuclear warheads by over 80 percent. We have reduced the number of people involved in our strategic forces by over one-half and the number of military bases supporting them by approximately 60 percent. While overall defense spending has declined roughly 20 percent since the end of the Cold War, strategic force spending has declined approximately 70 percent; as a consequence, strategic force costs have dropped from 6.3 percent of Department of Defense total obligation authority in 1990 to less than 2.2 percent for fiscal year 2000. That, in my mind, is a fairly significant Cold War "peace dividend" and a cost-effective "premium" on our Nation's "ultimate insurance policy."

Cooperative threat reduction, arms control, Presidential initiatives, and numerous confidence-building measures have also brought about many positive developments in the strategic postures of the U.S. and Russia. These changes reflect a new, constructive relationship between our nations—a relationship in which stability is a central consideration. As the President and Secretary of Defense have indicated, Russia is not our strategic adversary and we seek an improved relationship based on common responsibilities and common interests.

STRATEGIC DEFENSE AND NUCLEAR POSTURE REVIEWS

The President has committed to "achieving a credible deterrent with the lowest possible numbers of nuclear weapons consistent with our national security needs including our obligations to our allies." I believe the defense strategy reviews and the Nuclear Posture Review the Secretary of Defense has undertaken provide an opportunity to develop a coherent strategy-based approach to future force structure, capabilities, and posture which will achieve the President's objective—a deterrent strategy with lower nuclear salience, reduced warhead numbers, and less adversarial character. These reviews and the emerging debate about further reductions in our nuclear forces are timely and should be informed by several guiding, fundamental principles: First, strategic force reductions must be viewed as means to an end—national security—not as an end in itself. As articulated by both a former National Security Advisor and a former Special Assistant to the President on Arms Control:

> "We should focus on measures which directly and demonstrably enhance stability and reduce the risks of war. Given present circumstances in Russia, for example, this principle suggests that rather than spending our energies on radical cuts in our respective nuclear arsenals, we should be concentrating our efforts on strengthening the security and safety of Russian weapons and enhancing the integrity of the Russian command and control system."

Stability is the most important criterion as we assess further initiatives to reduce our strategic forces to the lowest levels consistent with national security. As Thomas Schelling has written:

> "The dimension of 'strength' is an important one, but so is the dimension of 'stability'—the assurance against being caught by surprise, the safety in waiting, the absence of a premium on jumping the gun." Deterrence ultimately depends not on our capability to strike first but on the assurance that we always have a capability to strike second.

Second, we need to focus more on capabilities rather than numbers. There is a naive and mistaken belief that the "nuclear danger" is directly proportional to the number of nuclear weapons and, accordingly, lower is inevitably better. As we reduce our strategic forces to lower levels, numerical parity or numbers alone become less and less important—issues such as transparency, irreversibility, production capacity, aggregate warhead inventories, and verifiability become more and more significant. It is ultimately the character and the posture of our strategic forces—characteristics like assured command and control, survivability, and reliability—more than their numbers alone that make the strategic environment stable or unstable. Additionally, there is a tyranny in very deep numerical reductions that inhibits flexibility and induces instability in certain situations. We must preserve sufficient

deterrent capability to respond to future challenges, to provide a cushion against imperfect intelligence and surprises, and to preserve a reconstitution capability as a hedge against unwelcome political or strategic developments. As articulated by the two former Presidential advisors,

> "Given the clear risks and the elusive benefits inherent in additional deep cuts, the burden of proof should be on those who advocate such reductions to demonstrate exactly how and why such cuts would serve to enhance U.S. security."

Third, preservation of our capability to adapt our deterrent forces to a rapidly changing and unpredictable strategic future is critical. As the Secretary of Defense has testified, our ability to predict the future is questionable; therefore, I believe our ability to adapt to an uncertain future and changing environments will be far more important than our ability to prepare for what we can't predict. As a noted historian has stated, "It is less important for armies to predict the future than it is to adapt quickly when it arrives." Because our weapons were designed primarily to counter a large-scale attack from the former Soviet Union, we need to think about how we should adapt our existing capabilities to keep them credible against emerging threats. Because of the diversity and uncertainty of the threat, we need forces which are capabilities-based and effects-based rather than purely threat-based. Otherwise we run the risk of being self-deterred—of sustaining weapons irrelevant to the threats at hand. As we think about the potential emerging threats we might need to deter, I believe an early strategist's metaphor that nuclear planners are like homebuilders remains true today. A wise architect doesn't design only for benign environments but for the worst weather conditions that one can reasonably anticipate: hurricanes, earthquakes, floods and the like. We have to consistently maintain a "building code" for our nuclear forces to ensure they can "weather" the most stressed environments. As we look to further reductions, we need to maintain our strategic deterrent force structure with the wise architect's prudent design criterion in mind—our force structure needs to be robust, flexible, and credible enough to meet the worst threats we can reasonably postulate.

These principles weigh heavily against continuing the traditional, bilateral, Cold War approach to arms control. The strategy reviews in progress create an opportunity for unilateral initiatives to formulate a more comprehensive, coherent strategy which focuses not just on numerical reductions but on broader issues, such as:

- Confidence building and threat reduction measures which enhance stability and predictability
- The implications of deploying strategic defensive systems
- The impact of reductions on our extended deterrence security commitments to our allies
- Multi-polar stability and the relationship of third party nuclear weapon stockpiles
- Increased stockpile transparency including greater accountability for asymmetries in non-strategic nuclear warheads and nuclear weapon production capacities.

I believe the approach outlined in the National Institute for Public Policy study, Rationale and Requirements for U.S. Nuclear Forces and Arms Control, is a good blueprint to adopt. Such an approach would recognize strategic force policy as a *journey* rather than a *destination* and enable us to adapt our nuclear force postures and levels compatible with emerging threats and national security requirements. Our Nation must always maintain the ability to convince potential aggressors to choose peace rather than war, restraint rather than escalation, and termination rather than conflict continuation.

NUCLEAR COMMAND AND CONTROL SYSTEM (NCCS) END-TO-END REVIEW

With Secretary of Defense approval, we have convened an independent end-to-end review of the NCCS under a Federal advisory committee headed by General Brent Scowcroft. The review will focus on safety, security, and surety issues that transcend strategic force size, structure, and strategy. Our goal is to assess the effectiveness of the present and projected NCCS capabilities to provide the President with an assured, responsive, survivable, and flexible capability to exercise command and control of strategic forces through the spectrum of conflict while simultaneously ensuring against unauthorized or inadvertent use.

STOCKPILE STEWARDSHIP PROGRAM

The safety, surety, and reliability of our strategic nuclear arsenal depend heavily on the strength of the Department of Energy's (DOE) Stockpile Stewardship Pro-

gram. We are pleased with the standup of the National Nuclear Security Administration under John Gordon. The organization is fostering improved morale and a greater sense of mission. Work within NNSA has begun on a multiyear planning, programming, and budgeting process. The ongoing refurbishment of the W87 warhead has marked an important technical milestone for stewardship, as it is the first major refurbishment of a nuclear warhead in over a decade. Approval has also been given for several critical warhead life extension programs—the B61, the W76, and the W80. Together these four systems will comprise a significant portion of our country's enduring nuclear stockpile.

Nonetheless, there is a widening gap between stockpile program requirements and available resources. I fully agree with the concerns and recommendations identified by the Commission on Maintaining U.S. Nuclear Weapons Expertise (Admiral Chiles Commission), the Panel to assess the Reliability, Safety and Security of the U.S. Nuclear Stockpile (Foster Panel), and my own Strategic Advisory Group, which plays an instrumental role in the annual assessment of our nuclear weapon stockpile. The delays in many high-priority stockpile stewardship programs because of aging infrastructure and inadequate funding must be addressed with greater urgency. Increased design work must be undertaken to recruit, train, and retain the next generation of nuclear weapon design experts. We must realize that a robust, agile, and flexible nuclear weapons complex—infrastructure and people to research, design, develop and manufacture or refurbish nuclear weapons as necessary—provides us with the ability to respond to a changing national security environment and is itself a deterrent which complements our military forces. To this end, the need for an unequivocal national commitment to support both NNSA's Stockpile Stewardship Program and DOD's Nuclear Mission Management Plan has never been greater.

SUMMARY

In closing, our strategic forces stand as America's "ultimate insurance policy"—a cost effective force which is the underpinning of our National Security Strategy. Since the end of World War II, the presence of nuclear weapons has had a great restraining effect. Nuclear weapons helped keep the Cold War cold and their existence is still extremely valuable in deterring crisis and conflict. As Sir Michael Quinlan has stated:

> "The absence of war between advanced states is a key success. We must seek to perpetuate it. Weapons are instrumental and secondary; the basic aim is to avoid war. Better a world with nuclear weapons but no major war than one with major war but no nuclear weapons."

Strategic deterrence will be a fundamental pillar of our national security for the foreseeable future. Short of universal brain surgery, the design of nuclear weapons cannot be disinvented or erased from memory. U.S. Strategic Command is committed to ensuring a viable deterrent for the Nation, and to maintaining and strengthening the stability of our strategic relationships as we further reduce our forces. Our motto, "Peace is our profession," underscores our conviction that the costliest peace is a bargain compared to the least costly war. Thank you very much. I look forward to your questions.

Senator REED. Thank you very much, Admiral, for your comprehensive statement.

General Blaisdell or Admiral Dwyer, do you have statements that you would like to make at this time?

General BLAISDELL. No, sir. It is a pleasure to be here to support Admiral Mies and answer questions for this panel.

Senator REED. Thank you, sir.

Admiral DWYER. No, sir. It is also a pleasure to be here.

Senator REED. Thank you very much.

Let me start off with a round of 7 minutes and then, since there are just 3 of us here, in the end we will do as we did before, simply solicit questions if you have questions.

Admiral Mies, you have clearly indicated the importance of the ongoing Nuclear Posture Review. Essentially, the review will try to determine a relationship between policy and force structure, and part of the policy determination must include who are we deter-

ring, how do we make selections of targets to deter nation states, and also grasping the overall policy of deterrence that has been effective so far.

Could you give us some insights into how you see the Nuclear Posture Review going forward to determine appropriate nuclear force structure?

Admiral MIES. Yes, sir. I think you have captured the heart of the issue in the sense that to some degree as we think about our deterrent strategy and our ultimate force structure it starts really with strategy and any approach we take to force structure decisions to a certain degree needs to be driven by an overall strategy-based approach.

The strategy involves not only what countries you want to deter, but then a determination to some degree, of what your potential adversaries value, and that certainly can vary from potential adversary to potential adversary. That, to a certain degree, then drives a targeting policy of what kind of targets should you hold at risk for a given adversary. Then the capabilities required to hold that target at risk ultimately drive you to what kind of forces you need and in what kind of numbers you need them.

Inevitably, as you go through that chain from strategy to targeting policy to force structure, you are doing risk assessment as well, with due regard to what is acceptable risk versus unacceptable risk as you make those considerations.

The Nuclear Posture Review and the terms of reference, while we have yet to approve a phased approach, we are already beginning the initial phase, which is the near-term phase of looking at a number of potential force reductions we can take within the existing strategy—reductions that don't require a dramatic strategy change.

Those near-term potential force reductions are also important because they have some near-term budget implications and, therefore, it is important we address them as rapidly as possible. That analysis is presently underway and we are hoping to complete it by the end of July, the end of this month, or August at the latest. We will make a presentation to the Joint Chiefs and the Secretary of Defense and his staff.

The second phase involves a more comprehensive look at strategy and strategy changes as we continue to evolve our deterrent planning, and that is intended to really begin after the first phase and really culminate some time around the November–December time frame.

Then there is a longer phase which is a more futuristic look at where we possibly think we need to be as we think about adapting our forces and about the aging of our forces well into the future. That is a project that will probably go on into the spring.

But that is the general approach we are taking and we are certainly desirous of completing the initial report to Congress to support your request.

Senator REED. Thank you, Admiral. In listening to your response, it does not appear that in the short- or even the intermediate-run your analysis is conditioned upon deployment of a national missile defense. Rather, it seems that your analysis is based upon

potential threats and sufficient nuclear forces to destroy those. Is that fair?

Admiral MIES. That is a very fair characterization and I think an important point to make, because, as I indicated in my oral statement and also in my written submitted testimony, missile defenses are not really a replacement for our strategic offensive forces. They are a complement to those forces. Defenses are designed only to protect us against a relatively small-scale attack. They will never be able, as presently envisioned, to handle the large-scale kinds of attack which our offensive forces are intended to deter.

So, it is important from our standpoint that we not necessarily look at the defenses as being a replacement, but we look at them as a complement. I would also say that as we think about making reductions, therefore, we are not looking at the effectiveness of the defenses as much as we are trying to make reductions because we have excess force capacity that we do not require to meet the objectives of our deterrent strategy.

Senator REED. Thank you.

One other area you have emphasized consistently in your testimony is the notion of strategic stability. You talked about those advocates for de-alerting our systems and cautioned that you have to be careful to look carefully to see what, not the immediate effect, but the ripple effect, in terms of strategic stability.

This aspect has also been brought up by people who have questioned the deployment of the national missile defense, saying that such a deployment might be destabilizing, not perhaps giving an incentive to strike first, but giving a real incentive to increase the number of warheads that an adversary might have and, perhaps ironically, reverse what you are doing right now in terms of being able to scale down our forces.

But just as a general principle, I presume you would adhere to the notion that strategic stability has to be considered as part of any decision with respect to both the nuclear forces and a missile defense system?

Admiral MIES. Certainly. I mean, in the end stability and national security are the objectives we are striving to achieve and that is the principal goal. So just like our strategic forces, stability and its impact on our national security is important in any consideration of defenses as well.

Senator REED. Thank you very much.

Senator Allard.

Senator ALLARD. Mr. Chairman, thank you.

I had an opportunity to visit F. E. Warren Air Force Base and visited both the Minuteman and the Peacekeeper silos and talked with the individuals out there that are operating those systems. There is a good deal of frustration as far as the Peacekeeper is concerned because you have it in a system of limbo between the START II Treaty and what we passed in Congress as far as prohibiting retirement of strategic nuclear delivery vehicles. Basically, we have been in a hold-steady mode with no sustainment plan out in the future.

Do you support the repeal of the limit on retirement of strategic nuclear delivery vehicles?

Admiral MIES. I am going to give you a qualified answer on that, in the sense that I think we could live with the language as it is and we certainly could comply with the existing language. We could conduct our business without any significant problems and conduct the force reductions we are contemplating or envision with congressional approval.

In principle, I would support the repeal of the language because I think the language in a certain way creates or fosters an atmosphere of distrust, which I think does not necessarily contribute to a healthy dialogue and relationship between the administration and Congress. To that degree, I would support repeal of the language. But I do not think the language will preclude us from doing the force reductions we feel are necessary as we complete the Nuclear Posture Review.

Senator ALLARD. In talking out in the field with the individuals who are operating the systems, they all agree pretty much that the Peacekeeper is the more modern of the systems. So the question that comes to mind is would the retirement of the Peacekeeper have a significant impact on the ability of the United States to deter its adversaries?

Admiral MIES. Senator, Peacekeeper was one of the systems that was intended to be inactivated if START II ever entered into force as part of the agreement with the Russians that we would de-MIRV or bring our ICBM force down to single warhead ICBMs because multiple warhead ICBMs were perceived as the most destabilizing of the existing weapons. Therefore, the elimination of that class of weapons, MIRV'ed ICBMs, would contribute to stability on both sides.

In anticipation of START II entering into force, we have always had plans to prepare to inactivate Peacekeeper should that ever happen. We have been in a situation where we have only had single-year funding for the Peacekeeper ICBM, I believe, since 1996, and we have never had either multi-year funding to sustain or retain Peacekeeper or funding to inactivate Peacekeeper. In essence, we had less funding than if we had made a decision to go either way.

So it has not been a good situation. I believe, particularly with the new administration and their desire to move in unilateral directions, that we really have an opportunity to make the fundamental decision with regard to Peacekeeper. I think as long as we do a phased inactivation, our preliminary analysis, which still requires the Secretary of Defense's approval, seems to indicate that we do not require Peacekeeper and that a phased inactivation would be acceptable, as long as we do it in a deliberate and phased manner to support the Air Force's needs.

Senator ALLARD. One of the comments I have, they just need a decision out there.

Admiral MIES. Yes, sir. Part of that is we have to come back to you and seek your approval to inactivate Peacekeeper, and I think we are fully preparing to do that as part of the Nuclear Posture Review process.

Senator ALLARD. Going on to that Nuclear Posture Review process, it is not completed and I realize that, but can you share any

general views on the appropriate level for U.S. nuclear forces and the lowest level that would be consistent with U.S. security?

Admiral MIES. I think it is premature to speculate on that, Senator. It also harkens back to the second principle I mentioned in my opening statement. I really do not think we should be focusing or fixated on numbers as much as we ought to focus on capabilities. The numbers that are frequently thrown around are numbers that really exclude a whole category of nuclear weapons. They ignore non-strategic nuclear weapons and they focus only on those strategic nuclear weapons that fall under the START accountability rules.

They really do not focus on warheads, in essence. They focus on launchers attributed to carry a certain number of warheads. So, I think it is much more important to not focus on numbers and really focus on capabilities and how those capabilities affect stability and security, because I think the numbers can be very misleading and it is naive to just approach it from a numerical standpoint.

Senator ALLARD. I want to change to a different subject here now and talk a little bit about the Trident II D5 missile program.

Admiral MIES. Yes, sir.

Senator ALLARD. Now, the fiscal year 2002 budget requests to begin the service life extension program, SLEP, for the Trident II D5 missile program. The SLEP will include upgrades for D5 guidance systems, missile electronics, and replacement of rocket motors.

Apparently the new production of rocket motors is scheduled to end in 2002, this year, but there is no production of rocket motors for the SLEP that is scheduled out in the future years. So we must be going into a gap here of several years, a path that could increase costs and technical risks. How high a priority is the D5 SLEP?

Senator REED. Also it raises an industrial base issue as to whether you will have the contractors out there in a few years.

Admiral MIES. Yes, sir, very much. This is a very high priority issue with us. The transition from an 18-boat force with 2-missiles—the first 8 Trident submarines with the older Trident I missiles in the Pacific right now, and the 10 newer boats with the Trident II missile in the Atlantic—to a modernized 14 boat force with a common Trident II missile is a very important issue for us. I feel very strongly that it makes great cost-effective, economic sense to complete the transition to a 14-boat force with a common missile, the Trident II missile rather than extending the life of the C^4 missile, which is really near the end of its design life and cannot be extended without substantial cost.

The other factor that really plays in this is we have extended the life of the Trident submarine from 30 years to 44 years. That 14-year life extension in the Trident submarine will save the American taxpayer about $25 billion. But the problem we have as a result of that life extension is the missile. The Trident II missile does not have an equivalent 44-year life and, therefore, it is important ultimately to buy additional missiles as the older Trident II missiles will begin to age-out as we look to the future.

So the production of rocket motors is a very important issue. The Navy has made a tentative decision which will be reviewed during the next budget cycle for the fiscal year 2003 and out-year budgets,

to break the production line and then resume the production line at some future time.

I have expressed my concern about this tentative decision to the Navy because I am concerned about the technological risks and the restart risks associated with that production line breakage. That is an above-core issue that the Navy, I think, is committed to addressing with us.

I would ask Admiral Dwyer if he wants to amplify or clarify anything I have said.

Admiral DWYER. Senator, what you see in the fiscal year 2002 budget is the first year of continuation of critical components for the D5 missile. So that would continue the production line for components that have key processes or technologies or facilities that we could not recover from if they broke. So we have that funded in 2002.

The future for 2003 and beyond is under review in the Navy right now to see what that program entails.

Senator REED. Thank you very much.

Senator ALLARD. My time is expired, Mr. Chairman.

Senator REED. Senator Sessions.

Senator SESSIONS. Thank you.

Admiral Mies, do you consider the nuclear deterrent the ultimate insurance policy?

Admiral MIES. Yes, sir.

Senator SESSIONS. So apparently you believe that we can still draw down some and still have all the insurance we need. Would you just give some general comment on what kind of drawdown is still possible without undermining our basic deterrence? I know you shared the view that if you are not on alert you are more vulnerable to attack and other things. But where are we there?

Admiral MIES. Clearly in the ICBM force we are committed to modernizing our Minuteman ICBMs which will be the centerpiece of our ICBM force for the next 2 decades.

Senator SESSIONS. Is that on track?

Admiral MIES. Yes, sir, it currently is on track. The key elements are the guidance replacement program, which is really the centerpiece, and then the propulsion replacement program, essentially putting new propellant in all of the Minuteman III boosters, and that program is also on track.

Our current plans are to take the modernized warhead, the W87 warhead, that exists on the Peacekeeper system and ultimately transition that warhead over to the Minuteman system to replace the aging W62 warheads which exist on the Minuteman system today. The Minuteman system currently has two warheads, the W62, one of our oldest warheads in the stockpile, and the W78.

The W62 reaches the end of its life in about the 2009 time frame. So we are committed, whether we retain Peacekeeper or whether we inactivate Peacekeeper, to ultimately move a number of W87 warheads over to the Minuteman force to ultimately replace the existing W62 warheads on that force and avoid a very expensive life extension program on the W62.

We feel comfortable proceeding in that direction. So again, I think the elements we are looking at in the near term are standing down the Peacekeeper force and transitioning those warheads over

to the Minuteman force. That cannot occur until about 2006 because of the programmatic constraints in designing a new bulkhead that will support that warhead. Again, that is all funded and planned.

Then part of that transition as we look to the Minuteman force of the future is warhead loading: How comfortable do we feel maintaining existing warhead loading or gradually bringing the warhead loading down, conceivably to a single warhead? That is part of the Nuclear Posture Review.

Senator SESSIONS. Warhead loading?

Admiral MIES. The Minuteman III has multiple warheads and it conceivably can be reduced to a single warhead ICBM. So one of the considerations we are looking at is to what level would we want to do that and how would we phase that drawdown. That is the picture for the ICBM force.

Senator SESSIONS. Are there cost savings in that?

Admiral MIES. No, sir, there are no significant cost savings in that. It would purely be a drawdown that would give us capabilities at the lowest level possible consistent with our national security means, as the President has expressed. In general, there are no significant savings in the near term nuclear force reductions. If anything, like Peacekeeper, there are only additional costs to be paid to inactivate the systems. In this case, in de-MIRV'ing the ICBM force, the costs would not be as significant as inactivating an entire system.

With respect to the submarine force, we have already begun to transition to go from an 18-boat mixed missile force to the 14-boat common missile force. As we look at the 14-boat force, the missiles have multiple warheads and so part of the Nuclear Posture Review is to look at warhead loading and whether we should reduce warhead loading.

Senator SESSIONS. Why would you do that? It seems you would have less missiles with a multiple warhead.

Admiral MIES. You would have the same number of missiles with fewer warheads. To some degree, it depends on the kind of threats you are trying to deter. In certain scenarios, a multiple warhead missile is not a very attractive capability because you have warheads that you literally do not need in certain situation.

Senator SESSIONS. It could not be as narrowly targeted?

Admiral MIES. Exactly, targeting and operational considerations might come into play.

So again, we will take a look as part of the Nuclear Posture Review of how should our warhead loading change as a function of our strategy and our targeting requirements. Again, that defines the path for the submarine force, at least for the near future.

Then as we look to our bomber force, one of the issues we are looking at is warhead loading and whether we should move to lower warhead loading numbers. I would make two generalizations and they are truly generalizations. First, as we think about force reductions—at least in the range of force structures that we have talked about in conjunction with past START II or START III considerations—as a very general rule, the strategic triad force structures play better in war-gaming and in dynamic analysis than

more narrow force structures. They tend to be preferred over forces that only have a dyad or a monad.

Second, I would also say that, in general, in most of our force structure analysis, reducing warhead loading and preserving platforms is preferable, again as a general rule, compared to reducing platforms and keeping warhead loading at relatively high levels. It equates to the age-old problem of "too many eggs in one basket." It results in an operational loss of flexibility and other considerations.

So for a number of reasons, I think that is how we are looking at some of the force reductions we are talking about.

Senator REED. Thank you, Senator Sessions.

I have just been advised that we have a vote scheduled at 4:10. So, what I would propose to do now is to, presuming there are additional questions, I will ask a question and then Senator Allard, etc. But I would like, if you would agree, to plan to end the hearing at 4:10 and then proceed to the vote.

Senator SESSIONS. I do not know that I have any more.

Senator ALLARD. I have one question.

Senator REED. Then let me just proceed with a question and then we will go back and forth.

Admiral Dwyer, yesterday I had the opportunity to ask the CNO about the plans for the SSGN and he indicated that they are planning for converting at least two SSGNs today. In the budget there is $100 million as a down payment for the conversion. The question I have is that we are retiring four and the two convertees, if that is the appropriate term, could be the first two with the option for the two others or they could be the last two.

I am wondering if you can clarify whether or not the two will be the first to be retired or the last two to retire? If they are the last two, how do we preserve the option to have all four? Presumably we would have to put more money in. Admiral Mies or Admiral Dwyer?

Admiral MIES. I will let you go first.

Admiral DWYER. That is a very good question, Senator. We do not have the answer for that right now. We got funded for two. We have some dates coming up on us right now. Two of them will run out of fuel in 2003 and two in 2004. The dollar figures we have now, the $100 million, looks like it is targeted to the 2004 boats. What do we actually do with the 2003 boats to protect the option for conversion to SSGNs?

That is currently a question that we have under review in the Navy to see how we provide that protection.

Senator REED. Just a follow-on point. In our discussions, Admiral Mies, you made the point that simply having two boats would not really be operationally effective, since we have two rather big oceans, and four would allow one boat on station practically at all times, one in the Pacific, one in the Atlantic. So it seems that I think I would like to have it and I think the recommendation of the CINCs would be four boats, not just two. Is that fair?

Admiral MIES. Since those assets, those SSGNs, would not be strategic platforms, certainly they would not fall under my province. But I think as the Navy has looked at them that certainly was one of the concepts that was under consideration. I think that

same issue will be a serious part of the review the Navy is undertaking with regard to the decision of whether it will convert two submarines or whether it will convert four to SSGNs. Obviously, there are competing resources that play into this. But certainly I believe that will be a serious consideration as that issue gets addressed within the Navy.

Senator REED. Let me yield to Senator Allard for a question and then I have one additional question.

Senator ALLARD. This has to do with the stockpile stewardship. Do you believe that we have the science-based stockpile stewardship in a position where you can assure safety, reliability, and effectiveness of the nuclear stockpile in the indefinite future?

Admiral MIES. I do not think anybody can promise you that we can ensure the safety, security, and reliability of the stockpile into the indefinite future. I think we can do our annual assessments and tell you what we know. But I certainly do not believe we are in a position where we could provide a guarantee that lasts to an indefinite future.

I think as we develop the new tools, models, and the capabilities to better understand how our weapons are aging and have a more complete scientific understanding of how those weapons function, then to a certain degree we will be able to give you a more accurate assessment. I would not be surprised that as we go down that path we will actually find some operational problems that we previously did not know existed, because we will have new, more powerful capabilities to examine our stockpile.

But at the same time, we are committed to doing a very thorough annual, independent assessment. Each of the laboratories and U.S. Strategic Command are committed to that annual process and providing the Secretary of Defense and the Secretary of Energy an independent assessment of the safety, security, and reliability of the stockpile. I have no doubt that if we find a problem it will be reported.

Senator ALLARD. On the stockpile stewardship program, as we speak today do you think its operational effectiveness is any cause for concern as far as our strategic forces are concerned?

Admiral MIES. I think in the near-term it has been effective, and I have been optimistic at the progress we have made since its inception. You have to realize that stockpile stewardship is only about 5 or 6 years old. But at the same time, I think it is important we not be complacent and we not assume that, because it is effective today, it will be effective tomorrow. We have to continue to work at it.

There are a number of campaigns that have been outlined in the Stockpile Stewardship Program that need to be addressed. There is a tremendous aging infrastructure problem that John Gordon, I believe, has brought to your attention, which needs to be addressed. There is a workforce challenge in terms of not just morale, but the training and the retaining of the next generation of our stockpile stewards, that needs to be addressed.

Those are daunting challenges and that is why in my oral statement I emphasized the importance of a national commitment to this program, because I honestly believe it is the foundation of our strategic deterrent capabilities. At the end of the day, that program

has to be effective if we are going to have a credible effective deterrent.

Senator ALLARD. Thank you, Mr. Chairman.

Senator REED. Thank you, Senator Allard.

One final question. General Blaisdell, we do not want you to feel neglected or shunned.

General BLAISDELL. I think you are doing a great job of questioning, Senator. [Laughter.]

Senator REED. Let me return to the Peacekeeper. As I understand it, there is $5 million in the budget for equipment to begin retirement. Is that sufficient money to just buy the equipment?

General BLAISDELL. No, sir, it is not. As a matter of fact, in the near-term we need a total of $17 million. We are $12 million short. We have warhead containers and end-rings that we need to buy initially, and it is going to take us at least 12 to 18 months to make that happen. We do have a residual, if you will, that helps us in our life extension program. But we are short about $12 million.

In addition, to complete retirement of Peacekeeper, that whole program is a little over $500 million over the 5 years. We are not funded beyond 2002. So we need some help.

Senator REED. So the scenario is that if the Nuclear Posture Review concludes that Peacekeeper is not needed for deterrence, it will be retired. Can we expect next year a request from the Department of Defense for $100 million in the 2003 budget to retire the Peacekeeper?

General BLAISDELL. Yes, sir.

Senator REED. That begs the question, where is the money, because I do not think that is in any projection going forward. Am I right or wrong?

Admiral MIES. Certainly I think at the service level the Air Force is well aware of the inactivation funding requirements and that will have to be addressed in the fiscal year 2003 and out-year budget process.

General BLAISDELL. General Ryan is well aware of that, sir.

Admiral MIES. Again, the services had to, because of the START II implications, have a plan to inactivate Peacekeeper, that we have kept on the drawing boards for a long period of time. So there is a strong, clear recognition of the funding requirements involved in inactivating that weapon system.

Senator REED. Thank you very much again, gentlemen. Thank you for your testimony today and also for your extraordinary service.

Do you have a final comment?

Admiral MIES. I would just like to make one amplification with regard to your question on the SSGN. It frequently comes up whether the four SSGNs or the two SSGNs will have any impact on our START accountability. I would just emphasize that we can live with four SSGNs under the terms of the START I accountability rules.

Senator REED. Thank you very much, Admiral. Again, thank you for your testimony, gentlemen, and for your service.

We will keep the record open for 48 hours for additional questions from our members. The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR DANIEL K. AKAKA

1. Senator AKAKA. General Eberhart, on May 8, 2001, Secretary Rumsfeld announced plans to implement the Space Commission recommendations to Congress. At the time, he denied that these changes were designed to lay the groundwork for the eventual orbiting of space weapons. On May 20, 2001, General Anderson, Deputy Commander of the U.S. Space Command, told the House Armed Services Military Procurement and Military Research Subcommittees "that they are tasked to plan for force application from space." He stated that even though we are precluded at this time from deploying weapons in space, we must prepare now to push up "the space superiority throttle." General Anderson went on to state that, "the mere fact that the United States is developing means to employ force in space may serve as a significant deterrent." I appreciate the need to protect our space assets. However, I am concerned that some may interpret such planning as a call for other nations to develop their own space weapon capabilities. Such perceptions could lead to a new arms race. What are your thoughts about this perception and what steps will be taken to prevent this from turning into another arms race in space?

General EBERHART. We in USSPACECOM advocate for space capabilities and the need to protect them because they play a vital role in the defense and economic well-being of our Nation. Space control will ensure U.S. access to space, as well as unimpeded use of it. When appropriate, it will also allow the U.S. to deny space capabilities to our adversaries. We currently do not have a compelling need for near-term deployment of defensive space-based weapons. However, we see the need to think about the events that would justify such weapons. Such thinking allows us the opportunity to anticipate and prepare for changes and shifts in offensive capabilities worldwide so that we are not caught by surprise. Understandably, anticipation and planning for such activities can generate speculation that may foster varying perceptions. That is why it is very important that we are clear our intent is defensive in nature. We see research into space weapons technologies as the best hedge against another arms race in space.

2. Senator AKAKA. General Eberhart, many comments from Space Command and DOD center on ensuring our use of space when we want it and denying it to others when we feel it necessary. One of the provisions of the ABM Treaty states that parties will undertake not to interfere with the national technical means of verification. Comments about denying the use of space to others, specifically denying their use of surveillance satellites, would constitute interfering with the national technical means of another country.

Is the administration's desire to find a "new framework" with respect to the ABM Treaty influenced at all by the ABM Treaty's restrictions on anti-satellite weapons?

General EBERHART. The concept of denying the use of space to others is derived from the space mission known as space control. Space control refers to operations to ensure freedom of action in space for the United States and its allies and, when directed, deny an adversary freedom of action in space. Specifically, the space control mission area consists of not only the surveillance of space, but also the protection of U.S. and friendly space systems, the prevention of an adversary's ability to use space systems and services for purposes hostile to U.S. national security interests, and the negation of space systems and services used for purposes hostile to U.S. national security interests. Each of these parts of the space control mission area can be conducted within the current international legal framework. Regarding your question on a "new framework", I defer to the administration as to whether they have been influenced by particular provisions of the ABM Treaty.

3. Senator AKAKA. General Eberhart, yesterday you discussed the possible use and advantages of the airborne or space laser as a boost phase missile defense system. You said the laser is an attractive alternative because it would destroy the missile soon after its launch, and that any fall-out would fall back on the country of origin. It is my understanding that the laser in question would be used to disrupt a missile's booster, not to destroy or disable the warhead because the warhead is built to survive re-entry and could not be affected by a laser. With the booster disabled, the missile will continue, albeit along a different path, but it would not just fall straight from the sky on top of the county of origin.

Are you concerned about knocking out a booster to prevent the warhead from hitting U.S. territory only to then send that warhead falling on some other territory, such as Canada, Japan, or Europe where we have American troops and allies present?

General EBERHART. In the case of a boost-phase engagement, it is possible the missiles payload may survive destruction of the rocket. As a result, we are certainly

concerned about having capabilities to predict the collateral consequences of any missile defense engagement and to have active measures (both technical and procedural) at our disposal to mitigate the potential risks of the engagement as much as possible. Nonetheless, the purpose of an active missile defense capability is to blunt and if possible negate the enemy's objective for the attack. If we can destroy a missile in its boost phase, the primary purpose is achieved because the missile will not fly to its intended target. In addition, the capability of boost-phase missile defense will create uncertainty in the enemy's mind because he will have to consider the possibility of our defense prevailing over his territory, instead of over friendly territory such as Canada, Japan, or Europe. Thus, boost-phase missile defense would be a powerful addition to U.S. deterrent capabilities.

4. Senator AKAKA. General Eberhart, some may argue that a warhead is traditionally not armed until re-entry, so that it would not present a great danger to another territory upon impact. This argument may hold true for U.S. missiles, which are not armed until re-entry, but what would prevent an adversary from arming the warhead immediately after launch?

General EBERHART. There is nothing from a technology standpoint that would prevent an adversary from changing the fusing and arming to one of its warheads immediately upon launch. As you pointed out, it is more an issue of practicality, military doctrine, and national policy. The question becomes how much risk, to his own territory or a neighbor's territory, is an adversary willing to accept from a catastrophic launch failure, errant missile, accidental or unauthorized launch, or lack of positive control.

[Whereupon, at 4:09 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 2002

WEDNESDAY, JULY 25, 2001

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

GLOBAL POWER PROJECTION

The subcommittee met, pursuant to notice, at 9:05 a.m. in room SD–124, Dirksen Senate Office Building, Senator Jack Reed (chairman of the subcommittee) presiding.

Committee members present: Senators Cleland, Reed, Ben Nelson, Carnahan, Inhofe, Roberts, and Allard.

Committee staff members present: David S. Lyles, staff director; and Anita R. Raiford, deputy chief clerk.

Majority staff member present: Madelyn R. Creedon, counsel.

Minority staff members present: Thomas L. MacKenzie, professional staff member; and Scott W. Stucky, minority counsel.

Staff assistants present: Gabriella Eisen, Thomas C. Moore, and Jennifer L. Naccari.

Committee members' assistants present: Andrew Vanlandingham, assistant to Senator Cleland; Elizabeth King, assistant to Senator Reed; Eric Pierce, assistant to Senator Ben Nelson; Neal Orringer, assistant to Senator Carnahan; J. Mark Powers, assistant to Senator Inhofe; Robert Alan McCurry and James Beauchamp, assistants to Senator Roberts; and Douglas Flanders, assistant to Senator Allard.

OPENING STATEMENT OF SENATOR JACK REED, CHAIRMAN

Senator REED. Let me call the hearing to order. Good morning, thank you very much, and I would like to welcome our distinguished panel of witnesses this morning.

This subcommittee meets today to discuss the role of long-range bombers. Given the importance of this topic, Senator Allard and I have invited all the members of the Armed Services Committee.

The witnesses this morning are the Honorable James Roche, Secretary of the Air Force; Gen. John Jumper, Commander of the Air Combat Command; Maj. Gen. John R. Baker, Office of the Chief of Staff for Air and Space Operations; Lt. Gen. Joseph Wehrle, Deputy Chief of Staff for Plans and Programs; Maj. Gen. Paul Weaver, Director of the Air National Guard; and Brig. Gen. John Corley,

Mission Area Director of Global Power Programs, Office of the Assistant Secretary of the Air Force for Acquisition.

As we have repeatedly seen since the end of the Cold War, long-range bombers are a critical element of U.S. assets. In both Desert Storm and Allied Force, the ability and flexibility of our bomber force to meet these requirements was well-demonstrated. The recent Air Force decision to retire 30 B–1s, remove the bomber mission from the Air Guard, and to consolidate the remaining B–1s at two bases generated this hearing, but it also generated a focus on long-range bombers.

Solid and reliable, the bomber fleet has probably not received the attention or support it deserves either from the Defense Department or the Air Force. The importance of long-range bombers with standoff precision strike capability will continue to grow, but to remain effective these reliable platforms must keep pace with the development of the advanced position of the Air Force.

Over the past several years, the upgrade programs needed to maintain the bomber force have been consistently underfunded. Just this year the Air Force shows $731 million in unfunded bomber upgrades on its unfunded priority lists. We are planning to rely on these bombers for a long time, and we must make sure that we can rely on these bombers.

The last time the Air Force did a comprehensive study of long-range bombers was at the direction of Congress in 1998. This report, titled "U.S. Air Force White Paper on Long-Range Bombers" was completed in March 1999. The report concluded that long-range bombers are integral components of the Air Force's role and engagement vision. To achieve this vision, a total of 93 B–1s, 21 B–2s, and 76 B–52s will be needed for many years to come. B–1s would retire in 2037, B–2s in 2040, and B–52s would retire in 2047, 90 years after they entered service.

To achieve this goal, the report concluded that we must sustain bombers by improving capabilities, upgrading systems, and survivability and connectivity, and deployability. When I look at the budget request for bombers, it is not at all clear to me that we are sustaining them in this fashion.

Gentlemen, right now you have the responsibility to maintain, sustain, and improve the bomber force. How you plan to accomplish this mission is the primary subject of today's hearing and we very much want to hear from you.

We would also like to understand the process by which the decision to retire the 33 B–1s was made, the analysis that went into this decision, and how and when you plan to implement the decision.

Part of this decision to retire the airplanes is the related decision to remove the combat mission from the Air Guard. We would also like to understand the process by which this decision was made, and the analysis that went into this decision to remove the mission from the Guard.

Again, we appreciate all the witnesses being here this morning, particularly given the relatively short notice that you received. I thank you all very much for accommodating this hearing.

Now I would like to turn to the ranking member, Senator Allard, for his opening statement.

STATEMENT OF SENATOR WAYNE ALLARD

Senator ALLARD. Thank you, Mr. Chairman. I would like to thank you, Senator Reed, for calling this hearing today to consider the budget request for our Air Force global power projection platforms. That is our long-range bomber forces.

There is no doubt that many were surprised by one aspect of the budget request, which was the proposed consolidation of the B–1 bomber from five operating to two operating locations, in parallel with the force structure reduction in B–1 bombers from 93 to 60 aircraft. I am sure this issue will be clearly explored at today's hearing.

Since the end of the Cold War, there have been significant changes in both the missions and capabilities of our long-range bombers. Yet, they have proven their versatility time and again across the spectrum from deterrence to precision, all-weather attack. The B–2 and B–52 remain key elements of the strategic triad. While all of our bombers are integrating systems and weapons which enhance their lethality and survivability, in March 1999 the committee received the U.S. Air Force Report on Long-Term Bomber Force Restructure.

One of the starting points of this report was the assumption of a bomber force structure based on the results of the 1997 Quadrennial Defense Review. A total fleet of 187 bombers, consisting of 95 B–1s, 21 B–2s, and 71 B–52s. The road map presented in the report identified near-, mid- and long-term upgrades for each of these three bombers that would make them viable for decades to come.

We are interested in hearing the latest iterations of these road maps and what analysis led the Air Force to change the conclusions it arrived at just 2 years ago, especially since the results of the updated Quadrennial Defense Review are not yet known. Review of the Department of Defense guidance in the Terms of Reference for the 2001 Quadrennial Defense Review would indicate, however, that the long-range precision strike capability being developed in the bomber fleet is without the forward basing and large logistics footprints required by other response options that should be a key area of Department investment.

I want to welcome our witnesses today. I want to thank you, Secretary Roche, for taking time out of your busy schedule to be with us today. General Jumper, congratulations on your nomination to be the next Air Force Chief of Staff. General Weaver, we look forward to hearing your vision of the role the Air National Guard will play in the Air Force, as the Air Force embarks on the path it plans to make.

Senator REED. Thank you very much, Senator ALLARD. Now I would like to recognize Senator Roberts for his opening statement.

STATEMENT OF SENATOR PAT ROBERTS

Senator ROBERTS. Yes, thank you, Mr. Chairman. I truly appreciate your leadership in holding this hearing on this extremely important topic. I am not a member of this subcommittee, but as a member of the Airland Subcommittee, the Readiness and Management Support Subcommittee, and the Emerging Threats and Capabilities Subcommittee, I think obviously we have a very strong interest in this. I especially want to thank the Secretary for taking

time out of his very valuable schedule; he is up to his ears in alligators in regard to making decisions that are extremely important. I want to also thank Maj. Gen. Paul Weaver, who does such a great job with the Air National Guard. I am picking and choosing here.

I have accolades for all of you gentlemen, but I especially want to thank General Joe Wehrle, who came to Wichita and McConnell Air Force Base, and also made some trips to Georgia in regards to this issue. I understand that this is the first time that General Wehrle, despite many years in trying to bring cost efficiency to the Air Force, has had the opportunity to testify before Congress. General Wehrle is known in some circles as the prince of darkness, but he tries to shine the light of truth into cost effectiveness and has done an outstanding job. I want to thank you for taking the time to come to Wichita, and I want to congratulate you, sir, on the job which you have done and that you are trying to do.

Now, with that opening, Mr. Chairman, thank you for holding this hearing. Some of the discussion, it seems to me, regarding the decision by the United States Air Force in regard to the B–1 bomber force has focused on the suggestion that members of Congress are somehow blindly objecting to the cuts or change in policy only because of the loss of jobs in their states, and I want to make this very clear. I am going to look out for the interest of my state of Kansas just as Senator Cleland will for Georgia and all senators will, and all congressmen will. That's true for every member of Congress in regard to their states, but to suggest that I will take action that will harm our national defense in deference to jobs is offensive.

I make this point because there has been some editorial comment to that effect. I noticed in the *Washington Times* that the former Speaker of the House Newt Gingrich had an article indicating that that is the case. Newt, you are wrong. I have worked with the Speaker in the past. I wish he had called me. I take issue with that and I take personal umbrage, and I know that Senator Cleland certainly does as well.

The suggestion is that the Air Force and the Department of Defense decision to reverse the current long-range strike policy in the role of the Guard is based, or should be based on a well-thought out strategy. I simply want proof that that assertion is correct. What I also question is the notion that just simply because the DOD or the Air Force, or the Navy asks for a cut in force structure, Congress is obliged to simply accept that without the proper oversight. I do not think that is correct. We authorize, we appropriate, and we are elected to do that job.

Now this administration has stated that changes to the military should be based on strategy rather than budget lines or numbers, and I was heartened by that statement. I strongly opposed the last QDR because it was budget-driven in my personal opinion, rather than strategy driven. My fear is that this decision to cut the B–1B force and to change the role of the Guard may well be or could be a green eyeshade cut rather than the strategy call for such a cut.

I applaud good business practices and cost savings, but I do not support arbitrary cuts that fly in the face of well-documented capability. The Air National Guard has demonstrated superb capability

with the B–1 bomber and the B–1 bomber performs superbly when properly funded. So in the words of the famous ad, where's the beef, or to be more accurate, where's the Guard?

As chairman and now ranking member of the Emerging Threats and Capabilities Subcommittee, I have been strongly committed to aligning our military force structure to the threats of this new century, but we must move forward on a well-thought out strategy and plan. What we must not do is blindly simply cut force structure to save resources.

This is a timely hearing, Mr. Chairman, not only in regards to long-range strategic capability. The *Washington Post,* the fountain of all knowledge in this town, indicates that military cuts are implied in a new strategy, and we're going to be going after force structure in regard to strategy across the board, not only with the B–1B but in regard to the overall transformation that we must face.

So it seems to me that we must make smart military cuts and adjustments that fit squarely into the overall defense-wide strategy based on our national strategy. [Child crying.]

There is a youngster of a B–1 pilot right back there. [Laughter.]

Senator REED. Maybe a B–1 pilot.

Senator ROBERTS. So to make that strictly for fiscal reasons I think is irresponsible, and I am just as much as a budget cutter as anybody else around this place.

Second, I am concerned that the justification for taking combat capability from the Guard sends a signal that is not desired, that is the nicest way I can put it, to those proud Americans that willingly defend our Nation as a member of the Air National Guard and Air Reserve. The signal is that despite evidence to the contrary, the Guard and Reserves are not worthy of a combat mission. I know the Secretary is going to indicate that is not the case and I am going to back him in that regard, but the Air Force leadership has indicated—I want to repeat that that is not the case. As we all know, actions speak louder than words, and this action takes combat capability away from the Guard and gives it to the Active-Duty Force.

The Secretary has said that those in support roles are just as important as those at the weapons release point and I agree with that. That is true. I agree that all those proud service members that play a supporting role in regard to, also those at the release point are critical, but to suggest that supporting roles are viewed the same as those that are at the release point is a little disingenuous.

If there is doubt, look at the promotion rates, look at who fills the senior leadership roles between the combatant and support personnel, and look at the list of medals for heroism and count the number of combatants versus support personnel. Being at the release point matters, and it also matters in regards to experience.

What I hope we can achieve today is a better understanding of where the Air Force is heading with their long-range precision strike capabilities, their justification based on our defense strategy for the cuts in the B–1B force structure, and why the National Guard has their combat capability pulled away from them when

every indication is that they do this mission just as well, in my view better, and they do it cheaper than the active force.

I will have quite a few questions. I apologize for the length of my statement—well, no, I really do not. I hope we have enough time, Mr. Chairman, with your indulgence and the indulgence of the witnesses, to get into these questions as we should, and I thank you, sir, for the hearing.

Senator REED. Thank you, Senator Roberts. Now I would like to turn to Senator Cleland for his opening statement.

STATEMENT OF SENATOR MAX CLELAND

Senator CLELAND. Thank you very much, Mr. Chairman. It is a pleasure to be here with members of the committee, especially my good colleague the Senator from Kansas.

I might say that he and I have been working on a number of issues over the last 2 or 3 years. First of all, last year, we took the floor of the Senate about five or six different times trying to articulate America's global strategy in the wake of the Cold War being over and exactly what was the mission of the United States, what was expected of us, what was in our interests, what was not in our interests, especially in terms of deployment of people and weapons systems. Interestingly enough, we spoke to pretty much an empty Senate and a lot of deaf ears.

Maybe that was the level of our eloquence, but the truth of the matter is that any time we've looked at cutting forces or redeploying forces or managing our equipment for those forces, I think first of all we have to look at our global strategy to find out exactly how strategically this decision that fits in. So in many ways, Mr. Chairman, we thank you for this special access to your subcommittee.

Along with Senator Roberts, I am on the Airland Subcommittee and the Subcommittee on Readiness and Management Support. He and I have been in this venue for a long time looking at the impact on our global strategy of what we do. When we were confronted with the B–1 decision, immediately both of us asked the question, how does this fit into our strategic plan? We also asked the question, how does this affect our state, but one of the questions we both asked at the same time was, how does this fit into our global strategy?

One of the things that we are here today to talk about is how does this impact our manned bomber forces, how does this affect our B–52s, how does this impact our B–2s, where are we going in that regard?

Second, if you are seeking to do a cut based on cost effectiveness, why do you fly in the face of a GAO report that just 2 years ago indicated that the Secretary of Defense ought to order or direct the Secretary of the Air Force to turn more of the B–1 bomber program over to the Guard, because "millions" could be saved in that regard.

So, there were several things that kind of set us off. One, the impact on our states, which is not negligible. Two, the impact on our global strategy and where we go from here. Three, the impact on the men and women who are part and parcel of a decision that was made about a decade ago to walk down a path that we have just now reversed.

Let us look at the time line. Within the last 10 years, President George H.W. Bush, Secretary of Defense Dick Cheney, and Chairman of the Joint Chiefs of Staff General Colin Powell, decided the Cold War is over and that there was a new role for the B–1 bomber, more in a conventional role than a strategic bomber role, and the forces were dispersed.

One of the points of dispersion was Warner Robins Air Force Base. B–1s were also dispersed to Kansas and Idaho, along with Texas and South Dakota. So $70 million was invested in infrastructure and some 800 to 1,000 people were invested in maintaining that B–1 bomber wing at Warner Robins.

One of my first questions, Mr. Secretary, is what are your plans for that, this decision if it continues, what are your plans regarding the 800 to 1,000 personnel, particularly at Warner Robins? What are those people going to do? What missions do you contemplate for them? What is going to happen to them, Mr. Secretary?

Senator REED. Senator, could we conclude your opening statement, and then we will open the floor to all the senators for questions.

Senator CLELAND. That was a question, and basically that is my opening statement.

Senator REED. Thank you very much. Senator Nelson, do you have an opening statement?

Senator Ben NELSON. I will pass on opening statement to get to the questions.

Senator REED. Senator Carnahan.

Senator CARNAHAN. I will have to leave shortly, and am not a member of this subcommittee officially.

Senator REED. Thank you very much. Before we proceed with your testimony, Mr. Secretary, and without objection, I would like to place into the record at this point a statement from Senator Crapo, whose state will also be affected by any changes to the B–1 program.

[The information referred to follows:]

PREPARED STATEMENT BY SENATOR MICHAEL D. CRAPO

Mr. Chairman, as you are aware, the Air Force included a decision in their fiscal year 2002 budget that would reduce and consolidate the B–1 bomber fleet. This program decision would leave B–1s at bases in Texas and South Dakota while removing them from locations in Idaho, Georgia, and Kansas. While the Air Force points to consolidation and reduction as necessary to best use their limited resources to maintain the B–1 fleet that would remain, its decision was made without appropriate input and is not made based on sound future military strategy.

The Department of Defense is now in the early stages of releasing its strategic plan for our Armed Forces. Most of the discussions have focused on future technologies that have gained attention before the full Armed Services Committee in recent weeks. While I do not question the importance of technological advancements, I want to stress the importance of ensuring our military's readiness today. The B–1 is a vital and essential component of that readiness.

Today's strategic environment includes limited access to overseas bases and requires that our military possess a long-range precision strike capability. That is the mission of the B–1. It is our Nation's fastest long-range strategic bomber, capable of flying intercontinental missions without refueling. The B–1 also has a large diverse weapons carrying capability.

The decision by the Air Force to reduce the B–1 force by one-third at this time is questionable. Until there is strategic backing for this decision, it seems premature and problematic to reduce the rapid reaction long-range capabilities that the B–1B fleet provides. For the active duty component such as found at Mountain Home Air Force Base in my home state, removal of the B–1 is contrary to the concept of a

composite wing as it removes a vital component to the wing's air power projection that is needed in today's strategic environment.

Mr. Chairman, I realize you and your colleagues have difficult choices to make as you work with the Department of Defense. However, the B–1 decision needs a great deal of scrutiny. When reviewed in further detail, reducing and consolidating our B–1 bomber resources is not in line with military strategic planning or effective and efficient uses of our military resources. I appreciate your consideration of these factors and the work of my colleagues from Kansas and Georgia on this issue. I look forward to reviewing the committee's findings. Thank you, Mr. Chairman.

Senator REED. Mr. Secretary, you have already submitted a written statement which we made part of the record. You may make your oral comments at this time.

STATEMENT OF JAMES G. ROCHE, SECRETARY OF THE AIR FORCE; ACCOMPANIED BY GEN. JOHN P. JUMPER, COMMANDER, AIR COMBAT COMMAND, USAF; LT. GEN. JOSEPH H. WEHRLE, JR., DEPUTY CHIEF OF STAFF FOR PLANS AND PROGRAMS, USAF; MAJ. GEN. JOHN R. BAKER, ASSISTANT DEPUTY CHIEF OF STAFF, AIR AND SPACE OPERATIONS, AIR FORCE STAFF; MAJ. GEN. PAUL A. WEAVER, JR., DIRECTOR, AIR NATIONAL GUARD, ANG; AND BRIG. GEN. JOHN D. W. CORLEY, MISSION AREA DIRECTOR OF GLOBAL POWER PROGRAMS, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION, USAF

Secretary ROCHE. Thank you, Mr. Chairman. Chairman Reed, Senator Allard, members of the subcommittee, I am very pleased to be here this morning to provide you with our thoughts on the long-range strike requirements and capabilities of the United States Air Force in support of potential joint operations of our Nation's Armed Forces.

Coleridge once wrote, that language is the armory of the human mind that once contains the trophies of its past and the weapons of future conquests. Thus, I do appreciate the opportunity we have today to exercise our minds and exchange thoughts and views on the real strategic trophies of the past, and how we can apply them to insure a new century of peace and freedom.

I am here with my colleagues today to discuss the strategic context of long-range strike operations and our perspectives on how we may move forward with you to arrive at a fruitful understanding of our current systems as well as the future role and systems we envision.

In the early days of the bomber, the strategic implications of long-range strike were well-understood in language related to Warsaw, London, Berlin and Tokyo. Recently, those implications are understood in the languages of Baghdad and Belgrade. In the 50-year period between World War II and Operation Allied Force, tremendous advances in range, speed, survivability, intelligence, communications, precision weapons have contributed to the aerospace advantages of our United States Air Force and our national strategy.

Mr. Chairman, seated with me at this table are some of the aerospace leaders of today who can personally attest to the meaning of those technological leaps. General John Jumper, currently the Commander of our Air Combat Command, was the highly respected commander of United States Air Force Europe (USAFE) during Operation Allied Force. He brings to this table more than three dec-

ades of experience as an air warrior. He is intimately familiar with the stark differences between the planning and execution of air power missions as experienced in the Vietnam War, and the joint coalition and network strategic operation conducted in the Balkans just over 2 years ago.

As an aside, Mr. Chairman, I would like to take just a moment to give him my heartiest congratulations on his nomination to be the next Chief of Staff of the United States Air Force. Should he be confirmed, I am confident that he will be a marvelous successor to General Mike Ryan, who you know I believe is a class act, and should I have the opportunity, I look forward to working alongside such an exemplary officer.

Also with me today is Lt. Gen. Joe Wehrle, a West Point graduate and weapons systems officer by trade, who has had extensive stateside and overseas operational experience in command. Currently he is in charge of planning and programming the future of the Air Force, no small endeavor even for a West Point man, but he does like to refer to himself as the prince of darkness.

Senator REED. Not a particularly small West Point man.

Secretary ROCHE. Not a particularly small West Point man.

Next to Joe is Maj. Gen. John Baker, who is our assistant Deputy Chief of Staff for Air and Space Operations and as such helps to determine our operational requirements. John is a command pilot whose aviation career includes more than 2,800 flying hours in a variety of weapons systems. He has a keen awareness of the capabilities and training necessary to support a global reconnaissance and strike mission.

Mr. Chairman, we are a fully integrated total force in the Air Force. In order to carry out our operations, including our global reconnaissance and strike mission, we are pleased to rely upon our Air National Guard and Reserve units, as well as our Active-Duty Forces. Maj. Gen. Paul Weaver, Director of the Air National Guard, a commander well-equipped to discuss the long-range needs of our strategic operations, is also here with me today.

Finally, let me introduce, if I may, Brigadier General John Corley, who served as a member of General Jumper's USAFE staff during the operations over Serbia and was the author of the Air Force's analysis of that operation. He is a remarkable warrior scholar and he has both chronicled the success of that conflict considering its wider lessons regarding long-range precision strike concepts and capabilities for the future.

Mr. Chairman, I have a written statement that you are putting into the record and I thank you for that, sir. In that statement I describe an Air Force that has traditionally worked in a progressive and indeed transformative fashion, put into place the best technologies and capabilities, the most forward-looking concepts of operations, with the most talented and well-equipped warriors. I can report with a high degree of confidence that today's Air Force is an incredibly robust and motivated organization.

The leaders who sit with me today and their colleagues, building upon the hard work of their predecessors, have seen to that, but it is the long-range health and vitality of the Air Force that is of primary concern to us today. In my brief period as Secretary, I have already been immensely impressed by the enthusiasm of my

colleagues and the capabilities of our airmen. To a person, they have their sights set on both the immediacy of today's mission as well as the immense potential to illustrate power in the decades to come.

Long-range strike is an essential part of that future, and I am privileged to work with them in the field as we shape it. Now, sir, my colleagues and I would be delighted to answer any questions you may have in any order you may choose.

[The prepared statement of Secretary Roche follows:]

PREPARED STATEMENT BY HON. JAMES G. ROCHE

Mr. Chairman, members of the subcommittee, we thank you for the opportunity to come before you on behalf of the dedicated men and women of the finest aerospace force in the world. From the beginning of the last century, air power pioneers have debated and anticipated the strategic potential of long-range [global] strike operations. That potential is summarized in the ability to overfly two-dimensional land or sea forces to strike an enemy at the heart of his political, economic, and/or military power. Properly realized, such operations confer an asymmetric advantage in warfare, and the United States Air Force believes that aerospace power is America's asymmetric advantage. The application of this capability began influencing operations during the strategic bombing campaign in the European theater of World War II, and continued with the delivery of atomic bombs on Japan in 1945. However, the Army Air Corps and the early Air Force lacked the accurate intelligence, range, speed, and precision to truly create decisive strategic effects. As technology progressed and intelligence systems improved, strategically-applied air power revolutionized modern warfare. A glimpse of its potential was seen during Operation Desert Storm and was demonstrated during Operation Allied Force and the capitulation of Slobodan Milosevic's regime to NATO.

Much of yesterday's airpower theory has evolved into today's aerospace reality, based upon comparable concepts and competencies originally envisioned by early air-pioneers, but with improved concepts of operation, organizations, and technologies. In the future, we will build on our enduring competencies by modernizing and integrating the proper mix of our existing air, space, and information systems. Our goal is to provide intelligence, reconnaissance, and surveillance capabilities in real-time, 24-hours a day, 7-days a week, and reap the deterrent effect of being able to strike any target with requisite speed, range, and near-perfect accuracy. Our current goal is to find, fix, assess, track, target, and engage any target, anywhere in the world, within hours or minutes, as appropriate. Tomorrow, our vision is to provide global reconnaissance and strike capabilities near-instantaneously.

Our ability to reach out and influence potential adversaries in support of our national objectives provides this country a method to prosecute the full-spectrum of contingencies from humanitarian assistance to major theater war, and from dissuading an adversary from considering an option to deterring an enemy from an attack. The ability to create these strategic effects ultimately helps us and our allies shape a strategic environment that is consonant with our values and interests. Our hope is that through maintaining our global reconnaissance and strike preeminence, potential enemies will think twice while our friends and allies will sleep easier.

The DOD is now engaged in a number of strategy development exercises, including the Quadrennial Defense Review. The results of these studies will undoubtedly influence our future military and aerospace power strategies. When these efforts are concluded, we will be able to elaborate on specific recommendations for forces, doctrines, and resources. However, the Air Force's enduring competencies have been and remain the ability to provide global reconnaissance and strike capability which we believe will remain relevant well into the future. Inherent in this vision is the understanding that "strike" means creating the right effect at the right place at the right time, regardless of an adversary's attempts to deny access to our forces. Using all of our capabilities from computer network attack, to humanitarian pallets, to directed-energy, to manned and unmanned aerospace platforms we now strive to achieve strategic effects versus quantitative target list assessments. As technology improves into the future, the Air Force will rely less upon conventional platforms and more on transformational capabilities, manned and unmanned. However, for the foreseeable future, until many of these technologies mature, the most effective method to deliver precision strike weapons over great distances with mass is with our bomber fleet.

Today's reality, however, is that we remain limited by budgetary constraints. The Air Force realizes it must enable its existing long-range strike fleet to migrate successfully from a force developed during the Cold War for nuclear employment to a force relevant in global expeditionary operations within a much broader spectrum of operations. Our current bomber force must be able to target and retarget in real-time through airborne data links with standoff weapons and large payloads of precision and near-precision munitions in order to meet the requirements of the uncertain future.

In the coming years, several factors will affect our force planning considerations and budgetary decisions. President Bush clearly articulated three overriding objectives that have and will guide our decisions in the DOD. In essence, they are to: (1) improve the quality of life and quality of service of military personnel, giving them a renewed sense of purpose; (2) modernize our aging force after a decade of neglect while concurrently addressing new strategic realities and technologies; and, (3) manage the dollars of our taxpayers in the most efficient manner possible, introducing more business-like practices and processes into the Pentagon. I wholeheartedly believe that our recent fiscal year 2002 budget deliberations and proposals reflect a solid down payment for our people and the readiness of our forces.

Second, the global security environment has changed dramatically from the Cold War garrison force of the last century. The Air Force has transformed its organizational structure and operating principles in two crucial ways to address this world, as well as the budgetary and personnel declines of the last 10 years. Our first major change was to take our historic garrison and forward-deployed force and create an Expeditionary Aerospace Force (AEF). This organizational structure gives the regional Commanders in Chief (CINCs) expeditionary aerospace packages that are tailored and trained-to-task to meet their full mission requirements. The AEF has given us a more sustainable, flexible, and responsive force while enhancing the stability of our people's lives and families. In addition to the AEF reorganization, we have developed a "Total" Force culture, building upon the high standards and strong cooperation between our active, Reserve, Guard, civilian, and contractor personnel. Simply stated, we could not perform our mission without the combined contributions of all these components.

The changing global security environment will also require us to deploy in various threat scenarios. These scenarios represent the full spectrum of conflict, from a high threat and limited access scenario, to a medium threat or aggressive offensive action, to a lower threat scenario where we have established air superiority with accompanying low threat conditions. Our long-range precision strike platforms play unique and complementary roles in potential threat scenarios because of their flexibility to adapt to evolving threat situations.

In the future, we expect adversaries with advanced technologies to try to deny the U.S. military access to a region. The Air Force is carefully evaluating this possibility and proposing a concept of operations called the Global Strike Task Force to counter threats to access and to prepare the region for deployment and employment of joint forces. This scenario requires forces that capitalize on recent advances in speed, range, stealth, super-cruise, and precision. We believe that, used in appropriate combination, our B–2 and F–22 forces can quickly and decisively destroy the most threatening anti-access air, ballistic and cruise missile, and sea defense systems. For example, during Operation Allied Force, each B–2 destroyed multiple targets with an 83 percent hit rate, all while flying combat missions from Whiteman AFB, MO. However, the 20-plus-year old B–2 design requires continued modernization to remain effective, including the latest secure UHF/VHF communications, in-flight data-link, in-flight replanning, and advanced integration of follow-on hard target and other munitions. This transformational capability can enable joint forces to enter into the region, quickly limit the adversary's initiative, and perhaps plant doubts or cause reevaluation of his objectives. The Air Force believes the full complement of F–22s, our current force of B–2s, a reconstituted force of B–1s, standoff B–52s, and a full complement of precision and standoff weapons (e.g., enhanced CALCMs, JDAMs, JASSMs, and small smart munitions) will work in concert with submarine launched missiles, unmanned aerial vehicles, and special operations forces to ensure our allied and U.S. forces timely access to future high-threat theaters.

As an adversary takes an offensive action toward or on friendly territory, our Nation must rapidly apply its combined instruments of power to halt him, allowing friendly forces to regain the initiative. This scenario requires a "rapid-halt" capability that is best accomplished with long-range precision strike systems. Our force of B–2s, B–52s and transformed B–1s will be employed to halt forces rapidly.

However, to utilize either the B–1 or B–52, they must have the weapons, be mission capable, and be able to adequately protect the airmen risking their lives in our

Nation's service. The Air Force has found that as our systems age, parts are becoming obsolete and maintenance costs are skyrocketing. The B–1 aircraft's mission capable rates have remained between 51 and 62 percent during fiscal year 2000 and fiscal year 2001 below the goal of 75 percent. The B–1 aircraft missed Operation Desert Storm because of its poor reliability and its limited survivability in high-threat environments. Furthermore, only 5 Block-D modified aircraft were available for deployment to Operation Allied Force. Although the five aircraft dropped approximately 20 percent of all bombs over Kosovo, they could only be deployed during the second week of the war following suppression of enemy air defenses.

We believe that cutting the B–1B force from 93 less-effective aircraft down to 60 mission-ready aircraft will reap over $1.5 billion in savings over the future years defense plan (FYDP). Similarly, by reducing the B–1 support infrastructure from 5 bases to 2, we will gain additional economies of scale and harness real property maintenance and military construction dollars. The choice of how to consolidate the bases was selected using two criteria. The first criterion was to find the maximum gain of potential savings available by consolidating multiple, small squadrons. The second criterion was to minimize the impact of this reduction on the base, looking for other missions and operations as possible transitions for these units. We plan to apply savings from consolidation to upgrade the remaining B–1 aircraft and improve both its mission capable rates and modernize its precision weaponry, self-protection systems, and combat reliability. The Air Force believes strongly that this plan will make the B–1 bomber into the survivable, effective, long-range precision strike platform in this century that had been envisioned when it was built in the last century.

In yet another scenario, as we obtain greater air-dominance or in the face of limited air defense capabilities, the B–52 can effectively overfly adversary airspace and dramatically increase the amount of ordnance placed on target. For the last seven years, the Air Force has attempted to cut 18 B–52 aircraft from Minot AFB, ND, and use the savings to help us modernize the rest of the B–52 fleet. The Air Force believes maintaining 76 B–52 aircraft meets the current force structure requirement called for in today's national security strategy, especially as we see it principally as a standoff, conventional cruise missile carrier. To keep the B–52 relevant in the near future, we need to modernize this aircraft with an avionics mid-life improvement, the situational awareness defensive improvement, and some electronic countermeasures improvement. Other important upgrades include the Link–16 datalink, advanced weapons integration into the internal bomb bay, Global Air Traffic Management compliance, and advanced munitions capability. When completed, these combined upgrades will meet our vision to provide real-time targeting and retargeting and long-range precision strike with mass capability. The B–52 is the only aircraft we envision capable of launching the conventional air-launched cruise missile from standoff distances. This capability allows it to participate in high-threat missions from a standoff position. We want to develop conventional cruise missiles with even greater range to add to the plane's effectiveness. The B–52 also continues to play a role in the Nation's nuclear triad. In summary, continued aggressive modernization and investment will allow the B–52 to remain an effective long-range strike platform through 2040.

The scenarios described above show that each of our three bombers play complementary roles in our long-range global strike capability. The B–2 will provide high-altitude stealth with uncanny precision, the B–1 will provide precision standoff strike capability, and finally the B–52 can swing from an extended standoff conventional cruise missile launcher to a low threat enabled conventional precision workhorse. Further, they can often best operate and are complemented by an environment of air supremacy established by the F–22 and, eventually, the Joint Strike Fighter (JSF).

Finally, the Air Force has been faced with maintaining and modernizing these platforms in an environment of numerous competing budgetary priorities. The current B–1 force alone has some $2 billion in unfunded requirements. As our recent next-generation bomber study showed, aggressive modernization of the current bomber force will fill the gap before a future strategic bomber capability can be funded and developed. However, the Air Force simply does not have sufficient funding to modernize our current bomber inventory at a pace commensurate with the need to transform or adapt to a new era. That said, we have made significant advances in bomber modernization the last few years fielding Joint Direct Attack Munition (JDAM) and Global Positioning System (GPS) navigation on the bombers. In the next few years we expect to further enhance our long-range bombers' lethality, survivability, and sustainability. By fiscal year 2004, we expect each bomber to be capable of employing Wind Corrected Munitions Dispensers, the Joint Stand Off Weapon, and the Joint Air-to-Surface Standoff Munition. These weapons greatly im-

prove the long-range strike portfolio's lethality and contribute to survivability by allowing platforms to strike from longer distances. However, we face serious challenges ahead in modernizing the onboard computers for each of our bombers, as well as the necessity for funding data links, and beyond-line-of-sight communication for en-route mission updates.

All three current long-range strike platforms face serious sustainability issues. Modernizing the B–2's stealth technology will improve its maintainability by 8 percent. The B–2 requires significant upgrades to cockpit displays and in-flight replanning tools before we can fully capitalize on the tremendous advances inherent in our new precision guided weapons. The B–1 is confronted with serious sustainment problems such as depot tooling, avionics test equipment replacement, reliability & maintainability upgrades to aircraft subsystems, and depot engineering. Plus, the B–1 must be equipped with standoff weapons like the JASSM. Additionally, the B–52 requires modernization to its avionics for it to remain effective. With the realization that we simply cannot fund all the bomber modernization efforts and meet other obligations, we believe we must develop better solutions. With the required upgrades unfunded, the B–1 would be unable to fill its role even in the medium threat environment, and the Air Force has been funded to maintain more outmoded B–52s than we believe are required to meet our current national security strategy. Therefore, I ask you to evaluate these decisions in the context outlined by the President. How can we modernize our systems to restore their relevancy and combat capability for the next war without demanding more funds? How can we be better stewards of our Nation's tax dollars and take advantage of potential economies of scale, efficiencies, and force consolidation? Finally, how can we provide our people higher quality and more survivable weapon systems worthy of the service they have dedicated to our Nation? We appreciate the opportunity to testify before you regarding the future of our global strike capabilities.

Senator REED. Thank you, Mr. Secretary. I wonder if any of your colleagues also have opening remarks.

Secretary ROCHE. In the interest of being able to save time for questions and answers, we all pooled our comments into one which I read, and we're all prepared collectively and individually to address the issues.

Senator REED. Thank you very much, Mr. Secretary. Let me thank all of you for joining us this morning. I join with my colleagues and the Secretary in commending you, General Jumper, for your nomination as Chief of Staff of the Air Force. Thank you for joining us this morning.

We have a number of senators here today, but let us take about a 7-minute round of questions, and we can be flexible about that. I will begin.

In 1999, General Jumper, the Air Force long-range bomber white paper identified the size of the bomber fleet and projected retirement dates and under this white paper, the structure of the bomber fleet was established. Also, there was an explicit assumption that no new bomber production would begin until 2034, that you would have a peacetime loss rate and two other factors; one is that to maintain capability, you would have a continuous upgrade to existing airframes, and second, that the administrations going forward until 2034 or 2037, had to support and fund these aircraft or have a very good reason for retiring them, because there are no more bombers coming into the force structure for a very long time.

These are the assumptions in 1999. Are they still valid, and if they are not valid, what has changed with them?

General JUMPER. Mr. Chairman, the world around us has indeed changed. As we look toward the development and the evolution of strategies, the development of other technologies such as different smaller and more capable weapons, and the fact that we have just not been able through the decade of the 1990s to support the up-

grades and the modernization on any of our bombers the way we had anticipated, all lead us now to different sets of conclusions about the way ahead from this point.

Those, sir, are the things that have led to the decisions we've made with regard to the long-range strike force.

Senator REED. Thank you, General. Secretary Roche, the same question really, but the bottom line decision to move the bomber force down to about 157 bombers from the current totals, again, from your perspective, how can you justify that?

Secretary ROCHE. Yes, sir. Here's what we face, Senator. We face a situation where the B–2, which performed magnificently, had only upgrades showing through the 2002 budget when we put some in. Beyond that, they weren't there, even though you have to do this to long-range aircraft if you're going to keep them what I will call competitive.

The B–52, similarly but it's not quite as important.

The B–1 faced a situation, as I talked over with my colleagues, was $2 billion behind in maintenance and upgrades, and this bow wave that was building was becoming very very scary.

I think the logic of the study, the 1999 study, is impeccable. It is the execution of it. General Ryan, and I've gone back and checked the citations with him, has said that the Air Force was $5 billion shy each year. Secretary Rumsfeld has pointed out that even in the amended 02, it is not enough to catch up. So we faced a situation where our long-range strike force was facing an obsolescence that was gaining year by year, and the most dramatic part of it was the B–1.

So we sat back and said what do we want, what are these forces especially good for. Long-range strike from Hap Arnold to this day is terrific at fixed point targets. So we said, how can we maximize our force to strike fixed point targets, and to do it in a portfolio way so that if any one part had a problem, the other parts could make up the difference, or at least hold its own.

We found in the case of the B–52, even though it's old, if we don't try and fly low, if we don't try and put it over heavy defenses, it's a very very good truck and it has a long life. It's been refurbished and modernized the airplane. We can hang 12 long-range conventional air launch cruise missiles.

If, by the way, there was a redo of the arms control constraints, we could make use of the three rotary launchers inside and put 24 more on. We said, well, let's just assume that has to stay in this nuclear triad, and let's have the 12 on there. If we have 74 or 70 planes, let's assume in any given conflict we can get 35 going right away, that's 35 times 12 long-range standoff missiles.

We then looked at the B–2. The B–2 did a superb job dropping JDAMs or JASSMs, which was basically the predecessor of JDAM, could carry 80, and highly precise 500-pound weapons.

When we looked at the B–1, we observed it can't fly high enough to avoid being targeted not stealthy, it requires a lot of ECM. The ECM was not being funded over a period of time. Upgrades were not being funded. We said, this is a plane that if we don't do anything, one of these days the entire force is going to be retired. I can tell you, there are a lot of outsiders who when they looked at the

building in general, continually recommended, these things are not going to be suitable in the long-range future, retire them.

What we came up with was a way to say wait a minute. If we don't put them on top of the most heavily defended things, what we call medium threat today, which grows over time, and give them a standoff capability, we get to exploit the fact that they carry three rotary launchers, not just two like the B–2 does, and they are not constrained by arms control because they were removed from the nuclear mission. Therefore, we could carry 24 standoff missiles on the interior.

If you were to take just half the existing fleet as we see it, that means 35 B–52s without the arms control limit, 10 of the B–2s, and 24 of the B–1s, it means in one sortie, one sortie, we can drop roughly 1,800 either 500-pound or 1,000-pound weapons in one sortie.

Now the target set in the Gulf War, and we can ask General Jumper, was on the order of 200 some targets. That means in one day we can drop nine of these large weapons on these fixed points, and if not the first day, the sortie of the second day, the sortie of the third day. So what we were trying to do is to maximize the long-range strike force, the ability to hit point targets.

Recognizing that the problem of the new era is not just point targets, they will always be important to a conflict, the new era is bringing up things that move deep behind an enemy's line, but that move. We did terribly looking for Scuds in the 1991 conflict.

The technology of hunting for these is getting tougher and what we needed to do was to start to concentrate the notion of long-range strike being aircraft and systems on the ground and other intelligence systems that allow us to very very quickly hunt and kill, but that the fixed point target problem was basically well in hand if we could take the B–1 force and transform it into something that was longer range. We didn't see—excuse me, longer range standoff.

We did not see the kinds of money coming that just applied to the B–1, nor when we looked at trades could we see taking money away from maintenance of F–15s, or to take strike units away from other units, F–15s, F–16s, etc. So we said what is the least cost way of getting the efficiency from the B–1 so that we can generate as much savings, and plow those savings back into the plane, and that was to take the two bases that had the greatest concentration where we had to spend no MilCon, where we had to do no additions.

In fact, we take more planes away from Dyess than we do from anyplace else. We took some aircraft—we actually take more aircraft out of active units than we do Guard units. We could not take airplanes from Ellsworth because that would shut the base down since they have only one mission. We took aircraft both from McConnell and from Warner Robins as well as from other missions, and we wanted to think of other things associated with the Guard which I will answer either to you, sir, or to Senator Cleland.

So the least cost way of doing this to generate the most funds to plow back was the plan we came forward with. That stops people from saying let's do away with these, because we've actually demonstrated inside the building to our military colleagues that now

the B–1 will have a long-range future, and we can get the monies to put back in because we have gone to the Secretary of Defense, and he has authorized us that anything we can save, we can plow back into the remainder.

Therefore, we will have a viable force that you can count on shortly, 1,800 or if arms control restraints are released, something like 2,600 big weapons, highly precise, one pass. When we go to small diameter weapons, Mr. Chairman, we're talking about 5,000 weapons in one sortie.

We have basically solved the fixed point problem; we are a long way from solving deep movers, which was something not present in the last era but is very much going to be present in this era.

Senator REED. Thank you, Mr. Secretary, my time has expired.

Senator Allard.

Senator ALLARD. Thank you, Mr. Chairman. I want to ask a little bit about how you view the role of the National Guard, because we are, it looks like we could be looking at a possible change here in mission, at least in part, and I wonder if you could comment, a little bit about what the Air Force is planning as far as the role of the Air National Guard. Are you moving it from support, which is an air refueling and lift role, rather than one of combat operations, that's the question.

Secretary ROCHE. Yes, sir, I'm delighted to answer. One of the things that we're looking at and this decision certainly, this accelerates our look, and I'm delighted to do that is, just as we're looking at our whole Air Force and as any business person would do, to say would we want it to be the way it is, how would we change it, a new era, how should we adapt or transform it, we have the same question of the Air Guard.

Right now, one-third of our strike force is in the Air Guard. You can take out the B–1, and there is still enormous strike aircraft in the Guard. The Guard's flying hours are two and a half times the flying hours of the Air Force Reserve, so the Guard is an integral part. But there were parts of our systems where the Guard was not excluded, but weren't part of.

Increasingly, we are going to be an information technology force. Even our F–22, it is highly dependent and exploits air combat because each plane can interlink with the other in real time, and therefore, if you turn away from a target you don't have to worry because you can use the other guy's radar as well as your own. Joint Stars, AWACS, systems like this are increasingly intellectual in content. It isn't just going to a place and then pulling a lanyard, there is a lot to it; yet the Guard wasn't part of that.

The Reserve was part of AWACS, but the Guard was not part of Joint Stars, not part of AWACS, not part of River Joint, not part of a couple of things. When I asked why, it was because well, things were the way they were, and I said why don't we just take a fresh look at everything, why don't we look across the board.

Where is the inherent advantage of the Guard? The inherent advantage of the Guard, and the Reserve by the way, is that you have experienced people who in many cases commit for the second time to the Air Force; they were in the Air Force, they come out and they get into the Guard, so it's a second commitment. They tend to be older, you have consistency.

One of the points that Senator Roberts and Senator Cleland both make is true, when you have a consistent group of people maintaining an airplane, they get very good at it, and so that's their advantage. Where is their disadvantage? They have jobs. It's difficult to think of how to deploy them.

What we're working on now, and we hope to come back to you on, is again a portfolio, a portfolio of a Guard, Reserve, active, where the Guard can participate in everything, be part of strike complexes, be more a part of our space force, and in fact the Reserves are a part of the space force and so is the Guard, but more so. But in the complex, to assume that there may be certain circumstances where we would prefer to see a unit be an active duty unit but with Guard as associate members.

But we want to look for other cases where we would have a Guard unit with Active Forces as the associate. It makes no difference; we can put two logos on an airplane, one on each side of the tail, and say okay, if you're the Guard, photograph the plane from the port side, if you're active, photograph it from the starboard side. But it's the crews—these planes can work, work, work; it's the crews who wear out, the crews who tire, and we want to try and put them together.

So my sense is they are going to be more a part of the larger Air Force and really be more a part of the total force than they have been in the past.

Senator ALLARD. Major General Weaver, do you think the National Guard would be willing to become more a part of the national force and have that, be able to meet that sort of increased volume?

General WEAVER. Yes, sir, those are great words for our guardsmen and women. If you look down the Chief of Staff's ops summary this morning, you see about 8,000 active duty men and women deployed doing our Nation's work and in my ops summary, you will see about 3,200 men and women of the Air National Guard doing our Nation's work as well. What makes that so great is that they are side by side everywhere in the world together, and that didn't come about overnight.

Since Desert Shield-Desert Storm, we've evolved a total force better than any other service, and I am very proud to say that, because of the leadership of our Air Force, the inclusiveness of the Guard and Reserve in everything that we have accomplished, especially in the last 10 years.

When the AEF evolved, it was a welcome opportunity for us in the Guard and Reserve to be a part and to be invited to the fight, something we had been trained so long to do. I can tell you that our OPTEMPO today in the Air National Guard alone is equal and exceeds that of our Desert Shield-Desert Storm experience daily. That is a tremendous personnel OPTEMPO for the Guard. It's also interesting to note that we have the highest retention rate of any component, any component in the entire DOD, in the Air National Guard of approximately 92 percent. Our best retention of our Guard units are the ones that are the busiest.

This happened because of the leadership in our Air Force included us in our day-to-day activities. We cannot back up. We have a success story second to none. General Jumper specifically asked

for our A–10 capability during Kosovo. As we were notified, we flowed three units into that fight. 55 hours from the time they left CONUS we had bombs on target and we were flying out of Trapani. It is a tremendous success story.

So when the Secretary talks about the future and what, he's looking for us in a new look, we welcome that new look as well, and we're ready and prepared to stand up to that.

Senator ALLARD. Mr. Secretary, how involved, have you brought in the adjutants general, the state adjutants general, have they been brought in to a lot of this discussion, and if they haven't been brought in, why weren't they? In other words, to what degree were they brought into any discussion?

Secretary ROCHE. With respect to the adjutants general of specific states, I have not had to speak with them yet, although I will be going to Indiana early next month, but I think General Weaver certainly has.

We have set up three integrated product teams to take a look at this, and this is what we had hoped to say had this not come out so badly. One is for each of the bases, actually there are four, to look at the different bases from where we are making withdrawals. The other is to take a look at the relationships with the new era of the Guard, Reserve and the active force across the board. It has General Weaver touching base with the adjutants general. It has our senior personnel general, and it has our operations unit, General Fogelsong and General Baker.

So we have a sense of where is the comparative advantage and where can we separate commitment from enthusiasm. So General Weaver is wonderfully enthusiastic that his folks can make everything. We're saying okay, but what if you can't. We have more of a temporal strategy that sets up gates. When you start to maybe take a unit, turn it over to the Guard, have the active as an associate, and get through Phase A, then Phase B, and by gates, get to the point so that we don't create a situation of failure.

So I think General Weaver is our primary contact to the adjutants, but I welcome their views. I mean, there is no God-given truth here, Senator. We are trying to take talented people in three categories and apply them to a set of assets that in many cases has not been modernized the way it should to be able to fight in a joint domain.

Senator ALLARD. Mr. Chairman, I see my time has expired.

Senator REED. Thank you, Senator Allard.

Senator Cleland.

Senator CLELAND. Thank you very much, Mr. Chairman. Mr. Secretary, and gentlemen, I know that this is an awkward moment here, and that both this subcommittee and you wish the timing of this had been much better. If we can look at this hearing as maybe the beginning of the process and see it as something that is a normal part of the process of your decision making, maybe this will go much better.

The point being, we would have these questions anyway. Had you had better time to prepare, better time to coordinate and consult with us, these questions would have flowed normally in the course of events. We are all having to play a little catch-up ball here, so let me see if I can go directly to a point.

First of all, again, in terms of the global dialogue Senator Roberts and I attempted last year, one of the things we realized was that you cannot reduce American forces and equipment unless you begin to reduce our commitments abroad. I notice today that the President was in Camp Bondsteel in Kosovo and reiterated the NATO line "in together, out together" and it looks like they will be there for years. The point being, we see no know way out of the Balkans; we see no way of reducing that commitment.

I do not see anywhere on the globe where commitments are being reviewed. Therefore, I have a problem with willy-nilly, arbitrarily reducing forces and infrastructure and equipment. But I do see your point about modernization. General Jumper, and Mr. Secretary, I may be crazy, but I'm not stupid.

I mean, I understand you have to have some money to modernize and to adopt a new strategic plan, leaner, meaner, longer strike, more lethality on the target. General Jumper, I just finished reading General Clark's book on *Waging Modern War* in which you played a key role. One of these days we want to get into specifically some of the lessons you have learned. But, I know you have to make some changes.

If the change that you wanted to make in terms of the B–1 bomber program was driven by cost effectiveness, one of the major questions I have had with the decision is why, in the face of the cost effective operation that the Guard provides, specifically at Warner Robins Air Force Base in Georgia and McConnell Air Force Base in Kansas. That was validated by a GAO study 2 years ago that indicated it was the Guard that ran the most cost effective efficient B–1 bomber program in the country and therefore, the GAO recommendation 2 years ago was that the Secretary of Defense ought to direct the Secretary of the Air Force to turn more of the program over to the Guard if the goal was, and could save millions by this. If this was driven by cost effectiveness, there is at least a legitimate question as to why you did not consolidate around the Guard.

Now, I understand your problem about deployment, the ability to strike long, strike quick, and in the Guard they have jobs and so forth. But with the concept of one Air Force, and probably the Air Force does the one service better than most, it does seem to me that that's a legitimate question. Did you and your staff consider at least the option of consolidating around the Guard as opposed to walking off 180 degrees in the other direction and consolidating the whole program around the active force and in effect leaving the Guard out?

Secretary ROCHE. Senator, when we did this, as I said over and over, this was a decision looking at the B–1 weapon system and it was not a decision as a Guard, that was a fallout. What we found once we decided what kind of monies we needed to be able to reach a break point so that you could modernize without having to go in and rob other things, which as General Ryan has pointed out, are equally behind, but how can we make this an effective force, among other things so that we avoid in 5 years being told to do away with the whole thing.

We looked at where, what is the cheapest way to do this. Well, it turns out the most planes were at Ellsworth and at Dyess. Sec-

ond, Dyess was the schoolhouse. Therefore, to move from there to say McConnell or Mountain Home, or Warner Robins, was going to cost us more money.

I want to make sure that I agree with you and Senator Roberts, although we may differ in the distance between how effective a Guard unit is and how effective an active unit is, the fact that you have experienced people who stay with a particular plane over a long period of time pays off. That is absolutely correct. But the same talented people could work on other planes. So it was a B–1 decision and now we're working to say that we have pools of talent.

With people for instance from Mountain Home, we are actually going to redeploy elsewhere. We have open billets elsewhere in the Air Force to make our expeditionary forces work. Now those are the active folks. Same thing at Dyess; we're actually going to move a number of those folks out.

With regard to the Guard units at McConnell and Warner Robins, we have a process to work with those units, with the Guard, with the operations part of the staff, with my colleagues, and we owe you an answer in 30 days. We have some idea ideas that we think are exciting.

Now someone else may not say they are as exciting, but if we think of trying to meet the Nation's requirements in general, I know Senator Roberts would agree with this, that being at the end of the lanyard to me is part of a strike complex. If you're on a Joint Stars and you are the person that says that's the appropriate target for people to attack now, I think that's a terribly terribly important thing as part of the reconnaissance strike complex that we're building.

So the issue was not a Guard issue, it was a B–1 issue. With respect to the bases, it had to do with what was the most efficient. It was small numbers at the two Guard units, and that is why we consolidated at places where we had to spend no more MilCon, had no more expenses, and we could not shut down Ellsworth because it would be a pratfall.

Senator CLELAND. Just for the record, it seems that the National Guard units in the Air Force seem to have a better ability to deal with the B–1 program, have a better mission capable rate, 15 percent higher than active duty, and the National Guard operates B–1s at 25 percent less cost. I just thought I might point that out.

Another point here in terms of the Guard role, do you foresee that, or do you intend to keep combat capability, and by that I mean bomber and fighter units, in the Air Guard?

Secretary ROCHE. Senator, I want to make sure my semantics are right here. I consider a strike complex as a combat capability.

Certainly, and I'll use Senator Roberts' metaphor, pulling the lanyard, which I have used before, we will have F–15s, F–16s, and in time we are going to have Joint Strike Fighters, hopefully F–22s, in the force. With regard to the bomber force, the most efficient picture we have currently is the B–2s are at Whiteman, they're active; the B–52s have a reserve force and an active force; the B–1s are now consolidated to these two, or would be consolidated to these two bases.

But there are other aspects of strike, both in terms of F–15s, F–16s, which remain. One-third of all of our program strike aircraft is in the Guard and it's going to be there, unless we have to have some wholesale closing of things based on future budgets at some point. But we don't envision taking them out of that, as much as we envision having the Guard looking across the board, and where you have comparative advantage, which in many cases, it does.

Senator CLELAND. Let me talk about infrastructure just for a second. Over the last 8 to 10 years, the Air Force has invested, just in Warner Robins alone, $70 million worth of infrastructure. Just 2 months ago we dedicated a $40 million brand-new hangar for nine B–1s.

Secretary ROCHE. The Joint Stars will go in there great, Senator.

Senator CLELAND. That would be nice. But may I say that it is a little bit hard to believe that walking away from infrastructure, that kind of infrastructure at Warner Robins and in Kansas and in Idaho, walking away from that infrastructure, and that somehow that saves money and you do not have to duplicate that hardware, software and training capability somewhere else when those planes come in, I mean, you seem to indicate that it would not really cost any more money if you deployed them to Dyess and to South Dakota.

Secretary ROCHE. These are not being deployed, sir. What we are doing is just keeping some there. In fact, we are reducing the number at Dyess and keeping the same at Ellsworth, so no change occurs there, there are no costs there.

The test equipment which is currently at three other places, we are going to consolidate, and one of the points that General Jumper's folks have come up with is that if we can predeploy those, one to the Atlantic area and on to the Pacific area, we can in fact move B–1s much more rapidly into a region and have them there before conflict begins.

Senator CLELAND. My time is up. By default I am now the chairman, which gets us all in trouble. Senator Roberts is next.

Senator ROBERTS. Well, there has been a false change in the Senate, that is for sure. [Laughter.]

I want to go back to the budget and strategy business, and General Jumper, by the way, mega-dittos in regards to Chairman Reed's comments on your soon-to-be appointment. We look forward to working with you. I think—I am paraphrasing here, I used to be in the newspaper business, I could write it down but I could not read my writing—the world has changed, we have not been able to fund the bomber fleet as we would have liked. The comments by the Secretary, yourself, and I am sure any other witness that will respond to this is that this seems to be, again, to be primarily budget-driven, although we are making a pretty good stab at what the strategy will be with the budget numbers that we have to live with.

That is still of concern to me and so my first question is sort of a larger issue question, you referred to it, Mr. Secretary, but feel free to say it again. I am a little concerned that this is an example or may set a precedent for any other capability that would be underfunded. Now we have the F–22, we have the C–17, and we have some funding pressures in that regard. Are we going to plan to cut

the force structure for those programs to match the funds available, and if not, why not, and why was this approach taken for the B–1? Get me into the larger framework here, and I think I probably ought to go to you, General Jumper. Secretary Roche answers the questions too well and goes on, and we cannot ask another question.

General JUMPER. Yes, sir, I understand. Sir, from my point of view as the commander of Air Combat Command, this is a capabilities question. We had 93 bombers out there in the B–1 force, part of the bomber road map, part of our plan a decade ago that ended up not being capable of being used in actual combat. In Operation Allied Force, we put the B–1 into combat but only after we had to rush through final testing of that airplane in the last few minutes; as a matter of fact, it was test crews that deployed with the airplane.

I sat and watched the first night as we deployed the B–1s, as it came around the peninsula. We watched the radars in Montenegro look at the airplanes as they came up through Macedonia, and watched them hand them off to the SA–6s, the surface to air missiles in Kosovo, we watched the missiles come off the rail, and it was the ALE–50 decoy, towed decoy, that saved the lives of those pilots that first night.

That airplane went on to serve with distinction throughout the rest of the Kosovo war and dropped a great percentage of the tons of bombs that we put in that night. But the question that we had to address right up front was that we had to employ this airplane in a medium threat environment and in the construct of the way we employ our bomber force, the B–2 is the one that's able to penetrate. When we're able to join the B–2 up with the F–22, we will be able to penetrate 24 hours a day. Right now, we use our stealth assets only at night.

The B–52 stands off, as the Secretary said earlier, with a standoff force, and we're able to exploit its great carrying capability for standoff, and the B–1——

Senator ROBERTS. Let me interrupt you, and I apologize for doing this, and I really appreciate the experience that you are citing to us on the role of the B–1, but that really was not my question. My question was, and I want to go back to Secretary Roche, and I apologize for doing this, but basically, is this an example for a blueprint? As has been noted today, we are going to have a lot more funding problems, it is $18 billion that I think we are going to come up with in regard to the military, some say even $118 billion, but is this a blueprint? We are going to have problems with the C–17 and the F–22. Are we going to be cutting force structure to meet these budget-driven decisions, Mr. Secretary?

Secretary ROCHE. Sir, that's a decision that the Secretary of Defense and the President would have to make. I certainly hope not, but I don't think you want us to give you a hollow force. I think you want us to be very straight with you and if something can't go into combat, and General Jumper is trying to make that point, sir, that that plane went in on the ninth night, the B–2 was there on the first night, the B–52 was there on the first night. If you underfund over time a force like that, you don't catch up. So in the future, I'm hoping this is not a model.

Senator ROBERTS. Do not misunderstand me and the members of this committee because every member of this committee, we were all there 3 or 4 years ago when the service chiefs were there, and the Chairman of the Joint Chiefs and all of them with the exception of General Krulak indicated that well, we think we can do this. General Krulak said no, we will do the mission but we cannot do this with the proper funding. Now that was about a spring meeting and we got into September and basically your Senate Armed Services Committee and others on the House side stepped up and said we cannot continue this business of being stressed, drained and hauled, so I would agree with you. I am worried that this is going to be a blueprint for what we do down the road, you do not want that and I do not want that either.

Now, here is a statement made by your predecessor, F. Whitten Peters. Are you familiar with the report? Here is the report from 1999 "Long-Term Bomber Force Structure." It describes the long-range bomber's significance in protecting U.S. national security interests and articulates the Air Force vision of long-range bomber employment in support of national security and military strategy.

Pardon me for reading this whole thing. "From this vision emerges an overall concept of operation both current and evolving that harnessed potential long-range bomber capabilities integrated across the whole spectrum of conflict. To insure the continued viability of the long-range bomber fleet, this road map identifies near-term, mid-term, long-term modernization priorities, with the intent of guiding current and future strategies."

That is the kind of report that Senator Cleland and I and others are referring to as the total picture of where the Air Force is going with its bomber fleet, and I support such a look. I also say that this plan should be part of a defense wide effort to integrate all weapons platforms into the defense strategy. Again, I emphasize the word strategy rather than service specific. But it is better than a back-of-the-envelope, resource-driven budget cut which we have all apologized for and we are trying to understand.

Now, we have several reports that are due. The National Security Strategy Reports, pursuant to Section 603, Public Law 99–433, due date not known yet, but it is fairly quick. The QDR, September 30 of this year; National Defense Strategy consistent with 901 of Public Law 106–65, due date September 30; and the Revised Nuclear Posture Review, I am not sure that is relevant.

My question is, in reference to that report cited by F. Whitten Peters, our former Air Force Secretary, these strategy reports, was this decision made prior, other than it is budget-driven, prior to these studies? I mean, if we are going to be making decisions like this and other decisions that I think could be forthcoming, why have the study?

Secretary ROCHE. Senator, in all of our looks, long reach is important. The B–1 fleet as it was progressing was not going to be viable in future threats, that's part one. We wanted to stop that and to make it viable.

Second, when we looked at what we could deliver under those circumstances, the 1,800, just take the minimum, the 1,800 weapons just using one half of the fleet that would be around, per sortie, said we will exhaust the fixed point target set very very quickly.

Increasingly as we have looked at things, it is these other problems that are more important to us, missile launchers, things that move, command posts, mobile SAMs, and that's a problem we have to address.

If we can fix the problem of the fixed point targets, which we believe we have, that is strategy driven. We could turn to the Joint Staff, we could turn to the Secretary and say, we believe this is robust and can take on with minimal loss of aircraft that many attack targets per sortie.

Senator ROBERTS. Okay. Now your decision to go from 93 to 60 really speaks to that in regards to points you are, making and I do not think anybody here is really objecting that much to 93 to 60. I can go back and refer to statements from General Lowe, and I have a great statement that has been in the press by a major who flies the B–1, and we can get into all that, but I do not think that is the question we have.

The question we have basically is what Senator Cleland indicated, the role of the Guard, the role of Congress in really giving this mission to the Guard, the change in that policy and where we could do it better at less cost to achieve the very things that we both want.

My time has expired, but I have several other questions more particularly for General Jumper and also General Weaver.

Senator CLELAND. Thank you very much, Senator.

Senator Nelson.

Senator BEN NELSON. Thank you, Mr. Chairman. Secretary Roche, I appreciated the opportunity we had last week to visit on a number of issues. I appreciate very much that occasion, and I also want to thank you and your colleagues for being here today.

Among the things we spoke about last week included, were the discussions about how you develop the total force and how you integrate Reserve, Guard, and active service personnel. We spoke also briefly about what is happening at Offutt Air Force Base with the Flying 55th integrating the Nebraska National Guard, the Air Force part of the Nebraska Air National Guard, with the future total force initiative where there is an integration of the available personnel certainly in the area of pilots filling the void left by departing and transitioning senior pilots.

So I know, General Weaver, that Major General Lempke, who is the Adjutant General for the Nebraska Air National Guard, and the National Guard as a whole unit, is very excited about what this portends not only for the Nebraska-based National Guard, but that it can serve as a model for other areas and certainly for other branches of the military as well.

Mr. Secretary, and then, of course, General Weaver, can you give me some idea of what is happening without regard to the B–1, for Senator Roberts has not been so upset since Nebraska beat Kansas State in football a few years ago, about B–1, so I do not want to bring that up again. [Laughter.]

Senator ROBERTS. It has been a few years ago since you beat us.

Senator BEN NELSON. I know. I am playing the straight man for you, Senator.

But what is being done in other bases, other branches and other parts of the spectrum of getting a total force, what is happening elsewhere?

Secretary ROCHE. I'll start and then I'll turn it over to Paul.

We would like to look at everything and have everything on top of the table. We also would like to look at where does it make sense to have the active unit have the unit equipment as part of its organization, or where should the Guard or where should the Reserve unit. Where we have tried these associate squadrons, they work very very well because the equipment can be used more, it's the people who are the stressing part.

We want to look at, as I said, areas which have this high intellectual content in terms of the stress. An operator in the back of an AWACS, an operator in the back of a Joint Stars, is an extraordinarily stressful job, and piloting a high speed airplane is also very stressful, but the hours that are involved in some of these surveillance reconnaissance strike aircraft are very stressful.

Here we are trying to integrate the Guard into those, trying to find areas where it makes more sense for the Guard to do things. For instance I looked at one point and said if I were governor, this was just me speaking, the notion of lift and tankers have advantages, because tankers have a lot of room to haul stuff and if there were an emergency in the state, then there is something there that can be easily used.

I think the Secretary of Defense sees the National Guard having a major role in homeland defense in terms of potential biological weapons or something else, and we are trying to think of how can our Air National Guard be a good adjunct to that, what can we do for the state or for a local region as well.

So all of this is on the table and what we are trying to do is to say what makes sense, what's the right kind of long-range planning for this. Paul.

General WEAVER. Senator, your great Adjutant General, Major General Lempke, has been really instrumental and helpful in a lot of these things that——

Senator BEN NELSON. Excuse me. He is very enthusiastic, as you well understand.

General WEAVER. We looked at a few years ago, and General Wehrle, our Air Force expedia also assisted us as we looked at the retention challenges within our Air Force, of people getting off active duty and staying there in the local area of their Air Force base, and then having that experience there, we looked at the possibility of stepping into what was new for us, an associate program, and Air National Guard associate program.

We had many wing commanders on the active force come up on the net by saying we have many people who are getting off active duty here, would you consider an Air National Guard associate program. We've been working with ACC and Air Mobility Command as well at these different locations. For instance, we started an Air National Guard associate program down at Tyndall Air Force Base, our F–15 training facility there which will eventually get F–22s, so we will be involved in that.

We're looking at setting up an Air National Guard associate program right here at Offutt Air Force Base to employ those men and

women getting off of active duty. We are not encouraging that, we want them to stay on active duty, but if they do make that decision, that they can still be wearing the uniform and be part of that total force program that we have been so effective in creating.

So we are looking and exploring, and the Secretary has promised us that he wants to explore that even more, and that has been very encouraging to us as well.

Senator BEN NELSON. I applaud your efforts in this regard and encourage you to continue to look for similar ways of dealing with retention issues and certainly many of the personnel that you are working with here are retiring from the military but continue to be active pilots, generally in the commercial area. So it clearly is an advantage to the budget but also to beyond the budget considerations, just simply hanging on to well-trained personnel and keeping them integrated into the total force structure.

General WEAVER. Sir, the best business case that I can make on that is all of the training and well over 50 to 60 percent of our people are prior active service, and all of the money that we as American taxpayers pay for their training were retained in the Guard and Reserve to continue to do that work that they so love doing. We do create that stability of the work force, and thanks to the Congressman Montgomerys of the world, the GI Bill has also helped us greatly in our retention efforts as well in those areas.

So again, it's a great total force partnership that we're very proud of.

Senator BEN NELSON. I raised this question with other branches, whether or not they are looking at similar types of programs, and that's not up to you to explain what your colleagues in the other branches are doing, but I hope that they will look at what you are doing as well as you may in fact look at what they are doing and get a lot of cross pollination if you will, certainly a lot of ideas that could be shared back and forth among the branches. I think it is one of the critical ways to deal with the personnel and the issues they have with respect to recruitment and retention.

So, thank you very much.

General WEAVER. Sir, if I may have one more comment, that's not only going for the aviators as well. In September of this year, Beale AFB, which is one of our AEF locations, will be almost entirely run by Guard and Reserve for the first time in history. That shows how seamless we are.

Senator BEN NELSON. I think the importance of this project, this initiative, is that we are not dumping down the structure, because you are keeping in place people who are highly trained, highly skilled, and as you say, in whom you have invested great sums of taxpayer dollars, so this is not weekend warrior games, it's a legitimate decision by the military and it has not only good military strategies associated with it but good business considerations as well.

General WEAVER. Thank you, sir.

Senator REED. Thank you, Senator Nelson. This completes our first round and I think with the concurrence of my colleagues, we will initiate a second round of questioning.

Senator ROBERTS. Three.

Senator REED. I thought I would get a good response to that question.

Mr. Secretary, in the course of our discussion this morning, most of what we have been talking about rests upon the capabilities of the airframes, and the B–1 has always been a plane in search of a mission in many respects. It was designed to be a low-altitude high speed penetrating bomber, but now you appear to be configuring it as a high-altitude standoff platform. Are we in a situation where for many reasons, strategic as well as budgetary, we are trying once again to transform the B–1 into something it is not and the resulting cost of that transformation affects decisions about how many aircraft we will have, where we will station them? Can you allude or give us some context of your views on this?

Secretary ROCHE. Yes, Senator. In fact you're quite right, the B–1 was designed to be a nuclear delivery vehicle, very high speed, very low. We can't convert it into a high-altitude plane, it just doesn't fly that high, but we can fly it at economic levels. If it's a standoff aircraft then it can contribute to attacking fixed point targets without having to risk the four persons on board going on top and dropping precise weapons.

B–1s have been outfitted, a number of them, with JDAMs, that requires they get very close to a target. We recognized that over time because it can't fly high and it's not stealthy, that that's going to be a problem. So the transformation is to take something that exists, and I think the B–52 is in the same category, and to take a system that was meant to be a nuclear bomber, it no longer can really hold its light if you start going in at very low altitudes. You don't have to anymore, it can stand off, it can fly high, easier on the plane, easier on the crew, and launch its missiles to do the work.

It is the same thing with the B–1. The B–1 has this advantage of the three rotary launchers; even the B–2 only has two. Those three rotary launchers means everything is internal, you have less drag, and you in fact can drop 24 weapons on one pass, and 24 standoff weapons. So the transformation of a platform into a new era is not an unreasonable thing; we do it with aircraft carriers all the time just be changing the type of airplanes on board.

This was driven by the fact that it was quite clear that the bow wave of maintenance and upgrades to this plane was just getting worse, it was the worst of the three. We didn't see how we were going to get money from someplace else. We did believe we had an obligation to not just come here and beg for more, but to look at it and say could we get something that was better, and without adding additional costs, and that's what we did, sir.

Senator REED. Will you recapture these costs for the improvements in the B–1 you must make?

Secretary ROCHE. Secretary Rumsfeld has given his word and directed to do that, and the fiscal year 2002 budget was, in fact, the beginning of that.

Senator REED. Let me ask General Wehrle, not just with respect to the B–1 but across the spectrum of the bomber fleet, has the Air Force program provided sufficient resources to continue to support the vision of the bomber as outlined in the white paper?

General WEHRLE. Sir, we wish we had enough money to do it exactly the way we had laid it out. We have been under, as you well know, an umbrella of a 30 percent decrease in resources since 1989 and you have to make trades, you have to set priorities and you have to take risks.

Currently for example in the B–52 fleet, there is $4 billion devoted to the B–52 right now, with $1.4 billion disconnected. Disconnected means where we would like to be versus where we are, primarily in avionics upgrades, data links, etc.

Senator REED. That's over 1 year?

General WEHRLE. Over the FYDP. The B–2, we have $3.7 billion in the budget over the FYDP. It is $600 million disconnected, you will see a portion of that in our 2002 unfunded priority list. The same with B–52s. The B–1 on the other hand, with 93 aircraft, is a $6 billion program over FYDP, and $2 billion disconnected.

As we look capabilities based, as General Jumper just talked about a few minutes ago, the issue is not how many airplanes can you put in the air, the issue is what's the capability you want to be able to do. The capability of the B–1, as was so eloquently said earlier, is on the fixed target capability and precision long-range standoff, because it is not survivable in its current setup.

So our key was all right, if we can at least, as the Secretary just said, is there something that we can do to try to make the B–1 fleet as whole as we possibly can, because we just didn't see somebody laying in $2 billion over the FYDP to fix that one particular airplane when they are so broke in other areas. The answer was yes.

Of course, we have to go to the operators and say, what's the issue here? Well, the issue is the capabilities, can we do the mission as the vision outlined of hitting fixed targets with the amount of aircraft that we're talking about, and reducing the B–1s from 93 to 60. The answer was yes, just as Secretary Roche said.

With that, we thought that we would propose a solution to be able to try to fix within our own means a problem that we just didn't have enough money to fund.

Senator REED. Across the whole bomber fleet though, you still have significant unfunded requirements?

General WEHRLE. Absolutely, sir. If you add that up over the FYDP, $2 billion just for B–1, and $2 billion for the B–2 and the B–52 combined, and that's the whole FYDP, so that's $4 billion disconnected over the FYDP.

Senator REED. To what extent does this represent a deterioration rather than not just upgrading, are you at that point?

General WEHRLE. Sir, most of my AQ colleagues, acquisition colleagues, get more into it, but for most of the upgrades, for example in the B–52 data links, avionics upgrades, 1760 bus, which is a smart, ability to carry smart weapons, etc. Into the B–2, we're talking about communications that we found out problems in Kosovo. We're talking also the data links, beyond line of sight and the line of sight data links. Stealth material in the B–2.

The B–1, not only is it the conventional munitions upgrade and the defensive capability, but it is also the spare parts, the shortage of spare parts and shortage of support equipment for that particular aircraft, spread among five bases. Again, the plan would be to

consolidate that and hopefully if the operators would like to do that, preposition those into places where we think the B–1 would deploy to. It takes a lot of lift to get these special test stands and support equipment forward deployed. So that was our thinking on that.

Senator REED. Thank you, General.

Senator Allard.

Senator ALLARD. Now, maybe General Wehrle, you are the one to ask this question, or maybe Secretary Roche, I am not sure which one, but anyhow—they are pointing at each other here—but the figure you used to upgrade the B–1, did you say 9.3 to take care of everything?

General WEHRLE. No, sir. $2 billion over the FYDP. The total amount that we have in our budget right now for the B–1 is $6 billion over the FYDP. However——

Senator ALLARD. Then you add another 2.

General WEHRLE. Another 2 to do the spare parts, the support equipment and the conventional and defensive weaponry that you want to do.

Senator ALLARD. Okay.

General WEHRLE. Currently right now, sir——

Senator ALLARD. Let me interrupt. That would be, just assuming that you wanted, instead of taking the 93, you drop down to 60 to get the money to upgrade them. That's assuming that we just kept it at 93 and brought everything up.

General WEHRLE. Yes, sir. If we reduced it to 60 and if we had started in October of this year, which obviously we are trying to take all of this to work on, the savings was $1.5 billion, 165 roughly in fiscal year 2002, which we're not going to realize, because we are not going to make that change as quickly as we were directed to initially.

So it's about 1.3 billion out of the 2 billion that we will be allowed to directly put into the B–1 fleet; obviously, your math will tell you it's still disconnected, but we have to work that, and we can work with a number like that. When you end up with $2 billion, it's difficult.

Secretary ROCHE. Senator, if I may?

Senator ALLARD. Yes.

Senator ROCHE. The big difference is in the case of the B–52 and the B–2, the upgrades that we're behind are things that will make it even better. There are things about stealth we'll worry about with the B–2, we'll take care of those. We're talking about enhancing its capability, which means that we don't fear putting them into combat, either one. The B–52 will stand off, the B–2 will go on top.

The B–1, the problem is we fear putting it into combat without these.

Senator ALLARD. Okay. Now, if the Quadrennial Defense Review is going to emphasize a requirement to project power at a wider range than you have addressed it, and indications are it will, aren't bomber forces more responsible to this need for forces which require bases within a theater? I would just like to hear you discuss a little bit as to theater forces versus the long-range bomber, and how you would react to that question.

General JUMPER. Sir, we demonstrated in the Kosovo crisis taking bombers and fighters out of England over 2,000 miles one way to targets, and with the help of our tankers we can use both the bombers and fighters in a long-range role. In the case of the B–1, the issue was certainly to take advantage of the range of the aircraft, but the capability of the aircraft once it arrives becomes the major issue with the B–1. So these trades in the B–1 were made to make it capable as it arrives.

Also, I might add that one of the capabilities that we used on the B–1 in Kosovo was actually more in the close air support mission where they orbited and were able to respond quickly to short-term time critical targets. We were able to put the B–1 to use there too and its ability to carry a great load will become more viable there, again, in the immediate threat. So, the capability of the airplane is what we emphasize as we make these changes.

Secretary ROCHE. Senator, your point about the reach is relevant. Bombers are long-range strike aircraft. We have long-range, medium-range and short-range. Long-range strike aircraft are very very important, but they have been oriented principally, and we don't see a way out of this, to the fixed target. What we are doing is taking sets of razors and producing families of razor blades which really handle that problem.

Where we are facing difficulty are things that move that are deep, which is very different from the past. Things that move tend to be close to what's called the forward edge of the battle area (FEBA), close to the line of battle. Now we are seeing a world where things in the back can get you, and we saw that in 1991, and we have to make real progress in that area.

There the bombers are not as helpful. Something like the F–22, which if it has a target can be over hostile territory in an air defense environment and it can get to the area where it can drop a weapon, becomes much more attractive in these circumstances.

Senator ALLARD. Thank you. General Wehrle, you spoke of disconnect over the fiscal, the fiscal defense budget. Would you submit for the record the disconnect over the last 5 years for the B–1, B–52 and B–2?

General WEHRLE. Absolutely.

[The information referred to follows:]

General WEHRLE. The tables below show the estimated additional funding each platform could have executed (over and above approved budgets) in pursuit of bomber roadmap modifications in an unconstrained fiscal environment.

[In millions of dollars]

	Fiscal Year				
	1998	1999	2000	2001	2002
B–1	47.6	10.8	10.2	49.5	131.1
B–2	348.0	436.0	512.0	603.0	735.0
B–52	0.0	23.0	6.0	7.0	42.0

Senator ALLARD. Thank you. Mr. Chairman, I still have some time remaining, and I would like to recognize Senator Roberts to use the rest of my time.

Senator REED. Then Senator Cleland.

Senator Roberts.

Senator ALLARD. I still have some time left, which I am yielding.

Senator ROBERTS. Or you can use a bank, an ATM kind of thing.

If I could sum up the testimony today, I think it has been good testimony and it has been an excellent hearing. The first question seems to me to be, is the B–1 a viable aircraft to perform long-range strike capability in view of the access denial challenges we face in today's world? I think the answer is yes, but obviously we have budget problems to upgrade the airplane as we want to, and the decision has been made to go from 93 to 60. But if it is yes, then the question is, is that figure right, from 93 to 60. Of course, the obvious next question is who performs the mission.

But let me just say that in regards to the B–52, B–2, B–1, all of them were designed because of the threat of the former Soviet Union, and to sort of pick on the B–1 doesn't seem to be entirely fair. But if, in fact, the 60 is viable, why can we not go to 93? Well, the answer to that is the budget, and I want to get back to strategy and when we get back to strategy, I want to get back to process in regard to who had input in regard to this decision.

So I am going to ask the question of General Jumper and General Weaver. As has been indicated, this decision has a lot of implications for both the Guard and the active duty, and my question is, did you play a role in the decision to remove the B–1B fleet from the Air National Guard and then did you play a role in the decision of determining the number of aircraft to cut, and is the decision to take the B–1B away from the Guard supported by each of you. I will start with General Weaver.

General WEAVER. Sir, this was a tough decision for us in the Guard: I have been in the building now almost 8 years and I can say that this was the toughest, especially from where we were in the Air National Guard in both of the facilities, both at Robins, at Dobbins and at McConnell. We had 72 F–16s, a great training unit at McConnell, we had an outstanding F–15 unit in Georgia. We asked all of our guardsmen and women in both places because of the needs of the Air Force at that time to give us both those missions, of which we were extremely happy with and we were very proficient in, in Georgia's case not only to pick up and move our families but then to go into a new weapon system, and in Kansas's case, taking a great training unit and going into the B–1s, turning in 72 F–16s into 8 B–1s.

That was difficult, and it's even more difficult right now with our 2,400 men and women at both places, with this decision.

Senator ROBERTS. General, pardon me again for interrupting, but the question was, what role did you play in the decision making process, not only in regards to the Guard decision but also the number. I mean, was this——

General WEAVER. This started out as a "what if drill," sir, but I had also seen this "what if drill" 7, almost 8 years ago when I first came into the building.

Senator ROBERTS. I understand that, but I mean in the process of it, did you have input, or was this a *fait accompli* and then you were asked to comment?

General WEAVER. As we were going through many what if drills, I was asked to comment, what would the Guard feel about leaving, getting out of the B–1.

Senator ALLARD. Thank you. General Jumper, where are you on this in terms of the process, the role you played?

General JUMPER. Sir, I had input certainly on the number coming from 93 to 60, on the capabilities, and from our point of view, having the 60 airplanes that were capable, more capable to do the mission, was very important in my mind.

Senator ROBERTS. So the bottom line, we had the advice and counsel of both you in the process from the strategy standpoint as well as the budget numbers; is that correct?

General JUMPER. Yes, sir.

General WEAVER. I can't say that I was on the strategy part of it, say. It was more or less asking my personal comment on it.

Senator ROBERTS. I have a follow-up question.

Senator REED. Senator Allard's time has expired, and Senator Cleland has yielded to Senator Inhofe, who is chairing a hearing simultaneously. Senator.

Senator INHOFE. Thank you, Senator Reed, and thank you, Senator Cleland, for accommodating me. We have an Environment and Public Works Committee hearing that I am involved in right now. My staff, my very efficient staff back here, has told me that all but one question I was going to ask has already been asked, so I will get your answers.

Dr. Roche, first of all, thank you for showing and expressing a personal hands-on concern over some of our bases, and what you have done in this very brief period of time that you have served in this capacity. I personally do appreciate it.

I never let the opportunity to go by, General Jumper, without complimenting you for being the first one in my opinion to stand up and admit that we really need to have a modernization program, back when it was not very popular to do so, because that was a courageous statement and got America thinking again about this.

Dr. Roche, the concern I have, and which you and I have talked about before, is on the B–2 upgrades. You had stated in a written statement that, "Our current bomber force must be able to target and retarget in real time through airborne data links and with standoff weapons and large payloads of precision and near precision munitions in order to meet the requirements of an uncertain future." Well, I agree with that. However, in the President's budget we didn't have the Link 16 and some of the other things in there that would be necessary.

My concern is this. I think we are going to get to this in the future. But if we have to restart, I am sure it would be an additional cost. Have you given some thought to where that upgrade is going to be, if not this year, when and how much more it would cost at that time?

Secretary ROCHE. Yes, Senator. I very much agree with your philosophy on this and as we chatted about it. There was no money in fiscal year 2003 and beyond; there will be. We cannot allow the B–2 to go the route of the B–1, where we don't put in the upgrades, and then all of a sudden find ourselves in a position because we don't have the flexibility of 93 to 60 in the case of the B–2. We are very committed to doing that and I can assure you that when you see the fiscal year 2003 budget you will see a plan over time.

The things we want to get in there are Link 16, their communications systems, as well as some materials upgrade, etc., but that's a force that it is now the only one we feel comfortable putting on top of a high threat area, and we have to keep it that way. So I think you will see us with a richer strategy for upgrades on the B–2.

Senator INHOFE. I think that is very significant, particularly with the success we have had in this past operation, we know what its needs are going to be for the future.

The only other thing I had, I understand the question was already asked about the switching of the combat vehicles out of the National Guard, and your answer I believe was, you said one-third of the strike force will remain there if future budgets will allow. Is that essentially what your response was?

Secretary ROCHE. What I said is that if you take our F–15 and F–16 fleet, roughly one-third of our medium-range strike is already in the Guard and we don't see any change to that. The Guard as a proportion to total force is very large, that's what led us to say we have to relook at its role, because we use these folks in things they have not been used in before. We may want to take whole units and assign them as U/E equipment to the Guard and let the active people be associates. We are trying to start with a clean sheet of paper. It is a new millennium, a new force, a new era.

Senator INHOFE. I appreciate that, because you know how hysteria sets in. It is kind of like when the 507 turned into a lift operation out of Tinker and the F–16s went someplace else. At least I would like to be warned as to what the future plans are, because I am going to hear from those guys.

Thank you very much, and thank you, Mr. Chairman and Senator Cleland, for being kind enough to allow me to be heard.

Senator REED. Thank you, Senator.

Senator Cleland.

Senator CLELAND. Thank you very much.

Mr. Secretary and General Jumper, I want to explore this issue of targeting targets in real time, and General Jumper, again in reference to General Clark's book *Waging Modern War* you were kind of his eyes and ears, keeping him posted as the NATO commander on what was going on, so you probably had as good a view of the air war as anybody there.

You mentioned J-Stars. How important to you was the J-Stars capability? General Clark testified before our committee about a year ago about the lessons of the Balkan War, that one of the things he felt we needed was a greater surveillance and reconnaissance capability, particularly underscoring J-Stars. You were right there where the water met the wheel, and tell us about that capability.

General JUMPER. Senator, you don't want to get me started on this because I have an all-day lecture on that very subject, but suffice it to say that we absolutely have to do better with a horizontal integration of manned, unmanned and space. The Joint Stars is key to that capability. This is essentially the functional equivalent of an airborne surveillance projected to the ground and our ability to find these targets in all weather, and then to combine with the assets of unmanned aircraft in space to identify and precisely lo-

cate, identification being the key criteria which General Clark pointed out in his book, being able to identify that, get decision quality information in front of commanders so they can confidently assign weapons to that target is a capability we absolutely have to produce in this decade that we're in today.

The Joint Stars and the intelligence, surveillance and reconnaissance assets that go along with that have to be integrated at the machine level, and that's what we plan to press on.

Senator CLELAND. In terms of locating a Joint Stars unit at Warner Robins, and the Secretary may have alluded to it, that we have $70 million of infrastructure standing in effect empty there, do you see the possibility of maybe increased J-Stars activity there filling that vacancy and using that infrastructure?

General JUMPER. Well, with the Secretary and General Weaver, we would certainly plan to explore those possibilities. We're going to grow to 19 Joint Stars in the current plan, and the assets that we have available there today would from my personal point of view be well spent to flesh out that capability.

Senator CLELAND. Mr. Secretary, I am looking forward to you coming to Warner Robins August 8, and we look forward to exploring those possibilities.

General Weaver, take me back a few years. Obviously there was some rationale, I wasn't in the Senate, but there was some rationale for the fighter wing at Dobbins being, in effect, converted and becoming a bomber wing at Warner Robins. There was obviously some rationale, because people back in those days, members of the Air Force, members of the administration, obviously thought that there was some merit in all of that, and thought that sinking $70 million worth of infrastructure, and just 2 months ago building brand new hangars, there was some merit to all of that. Did it fit in with some kind of war plan or some kind of capability that the country needed? I think part of the thing that has caught us flat footed is that we were walking down a road and we were all relatively confident that it seemed cost effective and it was a win, win, win for everybody, and all of a sudden, boom, in the dark of night, we change course and march 180 degrees in the other direction. I am sure for the Guard members, that is traumatic.

Give me a little bit of history, if you can, about some of the rationale for the plan we were in up to about 6 or 8 weeks ago.

General WEAVER. As we speak, sir, we have an Air Force operational readiness inspection there at the 116th today. I mean, to show what these guardsmen and women are made of, with this announcement, they pressed ahead and they could have easily said we don't desire the operational readiness inspection. They wanted it, they wanted to prove how great they are, and they are in the middle of it right now, so it talks a great deal about our men and women in uniform, especially at the 116th.

Sir, I wasn't privy to all the decisions that were made, how we got from the F–15 to the B–1. I knew that there were a lot of decisions at that time made by individuals that have long gone and retired. I only know that once we got into it, and the deputy director during that time and a member of the last BRAC or the BCAG, which is the Air Force's advisory group to the BRAC, we even ques-

tioned at that time would we still, are we still going to do this? The answer from the leadership at that time, yes, we will.

We questioned it even during the BCAG process that if you're spending this amount of money, and I had a chance 3 weeks ago to spend some time with our guardsmen down there Congressman Chambliss in that new hangar, and decision at that time was still to go ahead with the conversion, and we did a great job at both places, as evident.

You can argue numbers and who's better or who's not, but what it was was a total force operation that they did extremely well, they continue to do extremely well, and with the great support of leadership at this table, whatever they are given, they are going to do extremely well in that future mission as well.

Senator CLELAND. Now the Guardsmen and women in Georgia and Kansas are asked to change missions and adapt. Do you have any idea what they would be ready for, trained to do?

General WEAVER. Sir, as we go in, as we're discussing the IPTs within, as looked upon by the Secretary and the Chief, and the Chief to be, we are looking at all possibilities, and to leverage the strength of the Air National Guard at both places given the stability and the capability of that work force and what they're able to do and what we can provide, and be a part of the total Air Force meaningfully for the long distance future.

We are totally involved in that process and I'm happy to be able to report to you and say that. We are getting things back in balance here again and feel very confident that we are going to have a mission that—I converted an Air National Guard unit from an 02 Skymaster to a C–5. We in the Air National Guard can do anything, and as I told the Secretary, give us the most complicated, give it to us and we can do it.

Senator CLELAND. Thank you for your service. My time is up. Thank you, Mr. Chairman.

Senator REED. Senator Roberts.

Senator ROBERTS. It is cold in here, Mr. Chairman, like a meat locker. This might be a pretraining exercise by the Air Force to make us used to South Dakota, I don't know. [Laughter.]

Secretary ROCHE. It's warm down here, Senator. [Laughter.]

Senator ROBERTS. General Weaver, I have here the so-called official position of the National Guard in reference to the PBD–824. PBD stands for program budget decision. It says here basically, although the Air Force has been examining numerous force structure options, the decision was unexpected by the Air National Guard. The B–1 mission is a good fit for the ANG, the Air Guard has a better personnel retention rate, statistics reflect their higher maintenance capability, we have proven our ability to provide AEF support. Notwithstanding the difficult conversions, these units have excelled, with four bullets down here in regards to their progress. It may be necessary to delay the implementation of this decision until fiscal year 2003 or 2004. Ceasing operation in less than 10 weeks is extremely aggressive. The PBD left no O&M funds to operate either unit after 30 September 2001; they are going to be zapped. Secretary Roche did not go zap. We had meaningful dialog.

But I guess my question is, when the official position is of the Guard as I understand it 2 weeks ago, the implementation of this

decision raises a number of critical issues, again moving back to strategy, not budget numbers, we all agree in regards to the budget situation, does this reflect your position?

General WEAVER. Yes, sir, it reflects the Guard Bureau's position.

Senator ROBERTS. I want to get to process too in regard to the proper kind of strategy decision. Mr. Secretary, was the decision to cut the B–1B force structure coordinated through the Department of Defense, and specifically, was the Assistant Secretary of Defense for Reserve Affairs consulted on the decision? I have asked both generals here whether they were in on the ground floor so to speak, and it is the time line here that bothers me to get all the benefit of the strategy decisions that I think we need to make the proper decisions.

So with that little speech, did we ask whether the Assistant Secretary of Defense for Reserve Affairs was consulted? Let's explore the general question of how well-coordinated the decision was through the Department of Defense.

Secretary ROCHE. Senator, this was done as part of the development of the amended fiscal year 2002 budget and therefore, a number of people in OSD were certainly privy to it. I don't know, I honestly don't know, you might have to go back to one of my colleagues, General Wehrle or someone else, whether the Assistant Secretary or the Acting Assistant Secretary of Defense for Reserve Affairs was consulted. I don't know the answer. General, do you?

General WEHRLE. No, sir, I don't know. We took it down into the comptroller room and who they coordinated with, I'm not exactly sure.

Secretary ROCHE. We could have done a better job of that, Senator, and we blame——

Senator ROBERTS. You correct me if I am wrong but as I understand this, since we are faced with the very severe budget challenge, and we all agree on that, that our new Comptroller General at the Department of Defense, Dov Zakheim, who testified before the full committee, indicated that they have something called a new efficiency initiative. I can't remember the acronym for it. I applauded this at that time and I thought that the design of this, and Mr. Secretary, you correct me if I am wrong, is that in the past, what happened is that the Pentagon tells all the service chiefs, here is the budget, here is the decision, no, you cannot have this, and that we think this is appropriate.

Then, of course, what happens is that each service comes up to Capitol Hill and whispers sweet nothings in the ears of their defenders and the people who believe in that particular capability or project, and it ends up on the underfunded list, and bingo, the legacy weapons continue. I know General Wehrle has had personal experience with that.

Well, we were going to change that, and the change was rather than go through that exercise, went through an efficiency initiative, and the new Comptroller General and Secretary of Defense, we asked you, we meaning the Pentagon, asked you, you come up, you tell us what you can live with, what are your efficiency suggestions.

I think that is a pretty good idea, I applaud it if in fact it isn't just driven by budget numbers and coming down with a PBD–824,

which is now sort of an acronym in infamy or something in terms of procedure, but we do it in a regular strategy based, where everybody is informed and everybody has input, not to mention consulting with Congress.

Am I sort of on track here in regards to how that impacts?

Secretary ROCHE. There are two parts to it, Senator. One is the work on force structure, the other is the business initiatives council. The business initiatives council, which you addressed a number of comments to earlier, was our way of turning to the services to say look, there's probably things you could do better. It's not force structure as much as process, procedures, there's probably some things we could ask Congress for help on, let's catalog those, and oh by the way, you are not doing this just to replenish the money to the national treasury, but the Secretary has said that the monies that you develop from doing things smarter, faster, cheaper in your service can be redirected into the your service, including being put into accounts which will become advanced authorization and appropriations for more of something, more planes. So that's the business initiatives counsel. That's a continuous process improvement that will hopefully go on for a long period of time.

General Wehrle and I were members of that, along with the other services, and the Vice Chair of the Joint Chiefs, the Deputy Secretary of Defense.

The force structure issues tend to come in the QDR, etc. We could sense early enough that strike, long-range strike was important. We then had to go take a look at ourselves and look at the situation with the B–1s, and that's what led to this decision on the B–1. It was not part of the efficiency operation as much as it was trying to make this an effective force.

Senator ROBERTS. Didn't I understand that, here we go again, didn't I understand—I gather I didn't understand——

Senator REED. If I may, with your question, we will finish the second round. Senator Allard and I have no more questions so we are prepared to be here as long as you and Senator Cleland have questions.

Senator ROBERTS. I appreciate your indulgence, Mr. Chairman. Can I continue with this?

Senator REED. Please continue.

Senator ROBERTS. It was my understanding that these would go from the various floors to the third floor in the Pentagon, which I finally got straightened out, and that under this efficiency initiative, the effort was made, I'm assuming to all services but more particularly the Air Force, please come up with something prior to the PBD–824.

That you made a number of suggestions, and the one that finally made it to the table was this one. I guess my question is, I hope the other five or six or seven or whatever, we discussed some of those, and I think they are darned good suggestions, in regards to the budget and force structure and strategy, that that would be ongoing. The thing that really puzzles me, though, is how that got to the third floor and the other five did not, and it does involve strategy and involves the National Guard, involves the intent of Congress, and involves 2,400 people. I still do not understand from a strategy standpoint, we did not include everybody.

Now I do not want to go over past history and say it was badly handled and all of that, and we do not do a real good job of facing up to budget realities here so that you can do a good job. Now, is my take on that still accurate or am I off base?

Secretary ROCHE. You are right on. There were seven things we proposed, two of the seven made it, the B–1 and the Peacekeeper. The issue was, we pressed the B–1 because we wanted to be able to get that part of the total force taken care of and we felt this was a good thing to do. We recognized there would be secondary effects of that. We wanted to deal with those.

The others, and yours and my favorite one, Iceland, we have to do some work and——

Senator ROBERTS. I think that is a great deal.

Secretary ROCHE. There are some others, and of the other five or ten, they are coming back.

Senator ROBERTS. I would yield to the Senator from Iceland, but I do not see him here. [Laughter.]

Secretary ROCHE. We have NATO obligations, we have other obligations, so we have to do some advance work. We have to make sure that the State Department is properly on board before we can do any of these. The sorts of things that you quite rightly point out we did not do as good a job and in this case, we had hoped to have a decision and then have the opportunity to work with the others, and we didn't. But those others are coming back.

Senator ROBERTS. I thank you.

Senator REED. Senator Cleland, do you have additional questions?

Senator CLELAND. Mr. Secretary, I would like for you to elucidate just a little bit on this concept of associate squadrons, either in the fighter wing or J-Stars. I'm still looking at the backfield, and I am still sensing the fact that over 2,000 people have been disaffected here, and a lot of equipment and a lot of infrastructure left in effect twisting slowly in the wind. It does seem to me that that carries a cost with it. Also, is there not a cost associated with retraining people, so I just have some questions on costs.

Do you have any idea what the projected annual cost is of operating and maintaining the 60 remaining B–1s split between Dyess Air Force Base in Texas, and Ellsworth Air Force Base in South Dakota? Do you have any idea what that is going to cost, General Wehrle?

General WEHRLE. Sir, to get you the exact numbers, I will come back for the record.

Senator CLELAND. Just generally.

General WEHRLE. As I mentioned to you, the program right now is $6 billion over the FYDP, with the disconnect as I mentioned of about $2 billion. We plan on keeping the current funding in the B–1 program, we need that additional money to fix that disconnect. So my assumption, and I will get you exact numbers, is that we are going to need that amount of money to keep those 60 aircraft flying. The most important thing is to fix the spare parts, the support equipment, and this conventional munitions upgrade, and the defensive system upgrade, so that we can actually use it if a conflict arises.

[The information referred to follows:]

General WEHRLE. The table below shows the anticipated annual B–1 Operation and Maintenance (O&M) costs for a 60-jet B–1 fleet.

[In millions of dollars]

	Fiscal Year				
	2003	2004	2005	2006	2007
B–1 O&M	514.9	608.4	544.9	536.6	584.0

Secretary ROCHE. There are people costs in there, Senator. Of that roughly $2 billion, about $1.3 billion is O&M, spare parts upgrades; the other 700 million over the FYDP is people, and we're not taking that out of the budget. Those are the Guardsfolks. My colleague, General Jumper, is fond to point out on this issue, we're not cutting anybody from the team, we are just asking them to take a new position on the team, so yes, there will be some training costs for that.

Senator CLELAND. Are you saying that the 800 to 1,000 people at Warner Robins will keep their jobs and still be in the Guard, they will just be focused on another mission?

Secretary ROCHE. That's our intent. We have to work out the details of it, and the associate squadron work is one that has been tried. I will let, certainly General Baker can tell you more about it, where it's been used, since he is our ops person. Also, he hasn't had a chance to speak.

General BAKER. There is a key point I think we haven't addressed here about associate units. We have a lot of trouble in all active commands in keeping some of our highly trained ISR and CT specialists, and once they leave the active duty, there's very few places for them to go in the Guard or Reserves. So, we see this as an opportunity to leverage the people that are exiting active duty that bring that expertise in CT and ISR into a unit where they can work as an associate of an active unit, whether it's in Georgia or Kansas. Right now we really need to fix that problem, and it was a disappointment to me in my last command to lose a lot of really talented people and not have the Guard or Reserve for them to go to because that mission was not in the Guard or Reserve and it wasn't robust enough to appeal to these people.

Secretary ROCHE. Communications, intelligence, surveillance, reconnaissance, a lot of these young people are very very computer literate, and we need tap them as well as others.

Senator CLELAND. The very assets General Jumper was talking about that he could give us a speech on all day long and that we need when we wage modern war, and that if we are going to have a seamless force, that we need throughout the force; is that your concept?

General BAKER. Yes, sir.

Senator CLELAND. Let me just say that we want to thank you from my perspective for being here, and we look forward to working with you. Again, Mr. Secretary, I look forward to going down to Georgia August 8 and going over this issue on the B–1 and dealing with the Guardspeople, and dealing with the depot issues there, to tell which community is totally engaged in all these issues, and we appreciate being able to finally visit with you all and get your views.

Mr. Chairman, I have no further questions.

Senator REED. Thank you, Senator Cleland. Senator Roberts, do you have additional questions?

Senator ROBERTS. Yes, just a couple, Mr. Chairman.

In your testimony, Mr. Secretary, you stated the B–1 aircraft mission capable rates have remained between 51 and 62 percent during fiscal years 2000 and 2001, certainly below the goal of 75 percent. I have a chart here in regards to the mission capable rate, and my question is how long the mission capable rate goal has been at 75 percent. This chart shows that the 75 percent goal is not the number until 2002, and the chart also shows that the mission capable rate for the B–1 is very close to the fleet standard. In fact, it shows that the Air National Guard has been greater than the mission capable goal, and I suspect certainly greater than the rate for the B–2 during this same period and for the B–52.

As you look here, I have to stop and think a minute, I know you cannot see that, but at any rate——

Secretary ROCHE. I am familiar with the chart, Senator.

Senator ROBERTS. There is the B–1 and I think it fits right in the category there. I just did not want the impression to be left that we are not doing as well as the other aircraft and I guess my question—well, just comment on that, if you would.

Secretary ROCHE. Mission capability rates bounce around. Historically, the B–1 has been below what we wanted to see. It is also true that those B–1s in the hands of the Guard have on average done better than the active force, and there is good reasons for that. The standard, and here General Jumper is the expert, ACC set a lower standard in the past because they wanted to have something that the planes could get to, to be honest, but we want a higher standard.

Senator ROBERTS. Thank you for your candor and we will talk about a higher standard.

General Wehrle, you were going to scrub the numbers for us?

General WEHRLE. Yes, sir.

Senator ROBERTS. If the numbers help us, announce them; if not, keep scrubbing. [Laughter.]

Where are you with that?

General WEHRLE. We will keep scrubbing, sir.

Secretary ROCHE. If I may add, we both agree, we have looked at these, we may not have the deltas that the folks from McConnell have, but it is very clear that on average, that both the cost per flying hour, maintenance, etc., the group at McConnell has done a superb job and they are above standard.

Senator ROBERTS. The only other comment I would make, Mr. Chairman, and it echoes that of my colleague from Georgia. We want to do the right thing. Mr. Secretary, when you came to first visit with me on a courtesy call and we looked at your past record, your experience and your commitment, the effort that all three Secretaries have worked in concert to bring about the cost effectiveness that General Wehrle has worked so hard to achieve, we were extremely supportive, and I think we remain supportive.

The bottom line I think, I'm not really telling tales out of school, when I asked the Secretary what his goal was, he said to leave the Air Force in better shape than when I came on board in terms of

its mission, more especially with our national security. I have every confidence you will do that. That is why all of us on this committee serve on this committee in terms of our dedication and our commitment. I must say that with regard to what we are about and having the budget drive these figures, that what the Senator has indicated in the past is exactly right.

When we maintained our dialogue on the senate floor, we kept saying what are our vital national interests, how does the threat, what are the threats that really pose these serious threats? What kind of strategy can we come up with and let that strategy drive the numbers, not just the budget. That is needless to say, tough to do, so I applaud your effort.

Our responsibility here on the authorizing committee, and I am an honorary appropriator from time to time, and on the Appropriations Committee, is to make sure that that strategy is appropriate. I know that you want to do the best you could on PBD–824. I think we got the cart before the horse. I am more comfortable after this hearing, and knowing that you are going to factor in all the strategy decisions, but guys, please consult with us.

We are on the same team here; we want the same goals. I know over that long-term business council that you referred to, BIC, do not let the ink run dry on BIC? You can just keep consulting. Senator Cleland and I, the distinguished chairman, would be happy to come down and have lunch so we can talk about it.

We have held hearing after hearing after hearing after hearing on emerging threats and where we are and then to be promised by the Secretary that we will be consulted and then having the need to hold this hearing. I think we have had some lessons learned here.

I want to thank you, Mr. Chairman, for your leadership and I think you held a very fine hearing.

Senator REED. Thank you, Senator, and thank you, Senator Cleland.

For the record, let me announce that we will maintain an open record for 48 hours for additional questions. I already presume, given the questions today, that there will be specific written requests for budget data. We would hope that you would respond promptly.

Secretary ROCHE. Yes, sir.

Senator REED. Let me thank all of you not only for your testimony today but for your service to the Nation and to the Air Force. Thank you very much.

The hearing is adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR MAX CLELAND

1. Senator CLELAND. The Army has a lot of combat capability in its Army National Guard. We've seen Army Guard combat units, including Georgia's 48th Brigade, deploy on operational missions to the Balkans and to Southwest Asia in recent years.

Do you intend to keep combat capability, and by that I mean bomber and fighter units, in the Air Guard?

Secretary ROCHE. As you are aware the Air Force intends to consolidate the B–1 from 93 to 60 aircraft in fiscal year 2002. However, it plans to retain the remaining fighter capability in the Air National Guard during fiscal year 2002. It is still an important Air Force priority to capture the superb experience, capability and

service the Air National Guard men and women bring to the Air Force combat mission.

2. Senator CLELAND. What are the Air Force plans for the Air Guard units affected by your decision to cut and re-base the B–1 fleet?

Secretary ROCHE. For Georgia: Although final planning is not complete, the 116th Bomb Wing at Robins AFB will transition to the 116th Air Control Wing. The Air Force has identified a requirement for 19 Joint Surveillance Target Attack Radar System (JSTARS) aircraft, and this is a tremendous opportunity to introduce America's Air National Guard to the Information Technology mission.

For Kansas: Although final planning is not complete—At McConnell AFB the 184th Bomb Wing will transition to the 184th Refueling Wing. It will be independently unit-equipped with 10 KC–135Rs. Additionally, a Phoenix Raven Security Force Team and an Information Operations unit will be activated. The 184th will retain its B–1 engine repair shop and an avionics repair capability. The 184th manning will continue at current levels. The Air Force will seriously consider McConnell as a candidate for the Airborne Laser. At Forbes Field the 190th Air Refueling Wing will increase its authorizations by 52. This will provide full-time manning for the 190th's validated manpower requirements.

In the long-term, we envision that the Air Force will evolve to a new organizational concept—the Future Total Force—which would be a blending of traditional Air National Guard men and women side-by-side with their active counterparts in a single unit—a true total force. We are hopeful that the Georgia and Kansas Guard Units will lead this cutting-edge transformation concept, but we still face many challenges.

3. Senator CLELAND. What are the Air Force's plans for our strategic power projection?

Secretary ROCHE. Our current plans include upgrading the lethality, survivability, and sustainability of the B–1, B–2, and B–52. In the future we anticipate beginning Mission Area Assessments and possible risk-reduction studies to further define the next generation strike aircraft.

4. Senator CLELAND. As you mentioned recently, the Air Force is consolidating B–1s, but what will be the platform of choice when it comes to our bomber capabilities?

Secretary ROCHE. The platform of choice is always situation dependent, based on threat environment and desired effects. While all of our bombers share the common characteristics of large payload, long range, and precision strike, each also has a unique niche in the warfighting scheme. B–52s operate in the low-threat environment and provide long-range standoff using Conventional Air Launched Cruise Missiles (CALCM)—a key enabler in any conflict. B–1s are our medium-threat platform, using the largest payload of any U.S. aircraft and high performance to seamlessly integrate with composite strike packages. The B–2 uses stealth technology to penetrate sophisticated high-threat air defenses and deny enemy sanctuary.

5. Senator CLELAND. Will we be investing in more B–2s—which are very expensive?

Secretary ROCHE. The Department of Defense and the Air Force are currently analyzing our National Military Strategy. Force structure priorities, including an alternative to restart B–2 production, are being considered as part of that analysis. Recommendations resulting from this review will be made available to you upon completion.

6. Senator CLELAND. B–52s are decades old, much older than B–1s; where do they fit in?

Secretary ROCHE. The B–52 has both conventional and SIOP tasking—our long-range standoff shooter. It is the only bomber that carries the Advanced Cruise Missile (ACM), Air Launched Cruise Missile (ALCM), and Conventional Air Launched Cruise Missile (CALCM). The B–52/CALCM combination degrades enemy air defense systems and destroys time-critical targets during initial phases of conventional conflict. Simultaneously, the F–22 and B–2, serving as a "kick-down-the-door" force, will penetrate defenses and strike targets to enable employment of our non-stealthy fighters and bombers. After the defenses are suppressed, the B–52, along with the other non-stealth aircraft, will add mass to the air campaign, attacking targets to support CINC objectives.

7. Senator CLELAND. How is the basing decision on the B–1 bomber going to save money?

Secretary ROCHE. Savings will occur primarily via reductions in both the active and Air National Guard operations and maintenance through reductions in their flying hour programs. There will also be a manpower savings that will be spread across the Air Force for other high priority missions. Finally, an additional cost avoidance will be achieved through reductions in procurement required to modify a smaller B–1 fleet.

8. Senator CLELAND. What is the projected annual cost of operating and maintaining the 60 remaining B1s split between Dyess AFB, Texas, and Ellsworth AFB, South Dakota?

Secretary ROCHE. The operations and maintenance request for the B–1 in the FY02PB was approximately $640 million. Due to changes in the consolidation plan however, this will increase over the original request due to the continued flying of the Mountain Home, Robins and McConnell B–1 units. We do not have a further estimate as consolidation planning is still on-going.

9. Senator CLELAND. What is the projected annual cost of operating and maintaining these B–1s split between Warner Robins AFB, Georgia and McConnell AFB, Kansas?

Secretary ROCHE. The projected costs for just these units would require a detailed study. This particular option was not looked at in depth since it did not meet two of the original criteria for the consolidation: to create the minimum disruption at an affected base and generate no MILCON bills as a result of the action. To place over 12 B–1s at either location would necessitate additional construction or would require relocation of other aircraft or units. Since neither of these cases would generate sufficient consolidation savings to fund the required modernization, no data for up to 30 aircraft at each base was calculated.

10. Senator CLELAND. What is the projected cost of retraining the 116th Bomb Wing as an F–15E fighter unit?

General JUMPER. The Integrated Process Team (IPT) has looked at various alternatives to effectively utilize the men and women of the 116th Bomb Wing. While options are still under consideration, it is our intent to minimize the impact on the men and women in the 116th and 184th Bomb Wings. At this point the IPT is focused on addressing vital Air Force needs in a manner that is operationally sound. The IPT concept results will carry forward to the Major Commands (MAJCOMs) for further development. The MAJCOMs will build timelines that accomplish the necessary actions ranging from re-training of personnel to the relocation of equipment. Until those details have been worked, any cost estimates would be premature.

11. Senator CLELAND. What is the projected cost of retraining the 116th Bomb Wing as a J–STARS associate squadron?

General JUMPER. The Integrated Process Team (IPT) has looked at various alternatives to effectively utilize the men and women of the 116th Bomb Wing. While options are still under consideration, it is our intent to minimize the impact on the men and women in the 116th and 184th Bomb Wings. At this point the IPT is focused on addressing vital Air Force needs in a manner that is operationally sound. The IPT concept results will carry forward to the Major Commands (MAJCOMs) for further development. The MAJCOMs will build timelines that accomplish the necessary actions ranging from re-training of personnel to the relocation of equipment. Until those details have been worked, any cost estimates would be premature.

QUESTIONS SUBMITTED BY SENATOR BILL NELSON

12. Senator BILL NELSON. Were you asked to participate in the Air Force decision to organize 10 Aerospace Expeditionary Forces (AEF)?

General WEAVER. Yes, the Air National Guard (ANG) was an active participant in the development and implementation of the Aerospace Expeditionary Forces (AEF) concept from the very beginning. At the upcoming conclusion of second complete AEF cycle, nearly half of the ANG, about 50,000 of our troops, will have deployed as part of an AEF.

13. Senator BILL NELSON. Has the new structure been positive for the Guard?

General WEAVER. Yes, the Aerospace Expeditionary Forces (AEF) concept has proven to be positive for the Air National Guard (ANG). It has allowed ANG men and women to apply their training to real world missions and contingencies. The AEF concept has also increased the interaction, integration and training with our

active duty counterparts. With scheduled AEF deployments and our shorter rotational policies (typically 15 days in theater plus travel time), our people, their families and employers are afforded better predictability. Dedicated rotators ensure our people depart and return on time. The AEF initiative allows the ANG to be more accessible than ever before for Unified Command and Service requirements while reducing the TEMPO burdens on our active duty partners and their families. It does this without shifting associated negative OPTEMPO impacts to our people.

14. Senator BILL NELSON. How is it affecting your people?

General WEAVER. Air National Guard (ANG) recruiting and retention figures are very high—in fact, the Air Guard has the highest retention figures of any Service or any component. Morale appears to be higher among those units who get to exercise a lifetime's worth of training and experience in real world contingencies—as long as we maintain the agreed upon rotational policies; provide modernized and capable weapon systems that ensure their safety and effectiveness; and take care of their families while they are deployed.

The ANG has taken many steps to ensure these deployments remain "doable." We established short duration rotation rules; ensured dedicated rotators; increased some modernization of our weapon systems—specifically those with precision guided munitions and battlefield awareness capabilities; and created the first-ever ANG contract support program dedicated to family readiness at all our flying wings.

Aerospace Expeditionary Forces (AEF) predictability and short rotations work well for our employers. In a recent survey, over 84 percent of employers report "no problems" with their employees' military obligation over the past 3 years, while 72 percent felt that Guard or Reserve training made the employee more valuable to the company.

15. Senator BILL NELSON. Is your equipment and training comparable with the active force?

General WEAVER. The Air National Guard (ANG) provides highly trained and experienced people to the full spectrum of aerospace forces and missions. In fact, over half of our personnel are expensively trained, prior-service members who had previously made the decision to leave active duty service. Nearly 95 percent of our pilots have much more than 500 hours flying experience compared to 40 percent of their active component peers. The greater portion of our aircrews and maintenance personnel is in the highly experienced, 8 to 15-year group. This is the very same group the active component is challenged to retain, the very same group that provides leadership and experience, as well as the "combat sense" required in dangerous combat situations.

ANG units have won coveted Air Force flying competitions like William Tell and Gunsmoke, and have been recognized for outstanding flying safety statistics over the last 4 years with the lowest flight mishap rate in Air Force history in fiscal year 1998. ANG full-time and traditional guard aircrews fly comparable numbers of sorties and the flying hours per individual each month is to the same standards of evaluation and safety. In fact, nearly all our functional areas train to and are evaluated by the same standards as their active component counterparts.

Aging weapon systems are a Total Force challenge for this Nation's aerospace force. In comparison to our active counterparts, the ANG lacks comparable modernized equipment. Of the seven major weapon systems the Air Force operates, the ANG has the oldest systems in every one except the C–130. We sustain the oldest fleet in the Air Force often on the sheer ingenuity of our exceptional maintenance and logistics personnel. Asked to fight alongside our active component partners, we should be modernized accordingly. The C–17 unit in Jackson, MS, is a good example of putting new frontline equipment early into the ANG.

16. Senator BILL NELSON. What is your experience with the Guard and Reserve?

General JUMPER. The ANG and AFRES are significant partners and contributors to our Nation's fighting force. They annually participate in all major contingencies, exercises, and competitions. Additionally, they are the linchpins of our humanitarian and North American Aerospace Defense efforts. The ANG and AFRES also play an integral part in reducing active duty tempo and we will continue to look for additional ways to use them in support of AF requirements.

17. Senator BILL NELSON. What is your view of their capabilities?

General JUMPER. I am a firm believer in the total force concept. The ARC conducts a majority of our nation's combat search and rescue operations, a critical high-demand/low-density mission. Additionally, they perform almost all of our nation's air defense mission. Simply put, we cannot complete our mission successfully with-

out them. The Air Force is a recognized leader in the integration of its Guard and Reserve Forces. The ARC is a full partner in the AF's corporate programming and budget process. Additionally, Guard and Reserve units participate in combat and combat support operations on a daily basis.

18. Senator BILL NELSON. Assuming you are confirmed as Chief of Staff, how will you modernize and integrate the Guard and Reserve into the Total Force?

General JUMPER. The ARC is already fully integrated into our AEF concept where they fully participate hand in hand with their active duty counterparts during each AEF rotation. AEF rotation cycles provide predictability and stability to our ARC service members and employers. This schedule will enhance their ability to support the AEF over the long term. The ARC is currently supporting over 10 percent of our steady state AEF commitments. On a larger scale, to be relevant in the present and future AF, which is key to funding and survival, the ARC must at all times mirror their active duty (AD) counterparts. If the missions ever separate into an ARC vs AD mission, then funding, organization, training, equipping, etc. becomes threatened. As we field new weapons systems, we will gradually replace all aging aircraft/equipment across the AF to include the ARC.

19. Senator Bill NELSON. What steps will you take to preclude a recurrence of the "not well handled" decision/announcement on the B–1?

Secretary ROCHE. I believe the close-working relationships I am establishing with members of both Congress and the Office of the Secretary of Defense will preclude a recurrence. As you recall, this occurred soon after I assumed my duties. Since then we have made, and will continue to make, a concerted effort to ensure such information is provided in a timely manner through the proper channels to the appropriate parties.

20. Senator Bill NELSON. What do you see as the emerging role for the Guard and Reserve?

Secretary ROCHE. If the QDR approves the Bush administration's new National Security and Military Strategy, the Air Reserve components will have a growing and expanded role in the U.S. Homeland Defense Mission in support of the other military services, particularly the Army and other Federal agencies, as affirmed in the AF policy submitted to the 1998 Reserve Component Employment-2005 DOD Report. AF policy was and continues to be that Homeland Defense is primarily the task of the Reserve components. In the new Joint Reserve Information Operations unit assigned to the Deputy Secretary of Defense, AFRC will provide a majority of personnel. The ARC role in medical, technical, as well as training and operational commands will continue to grow as we leverage access to the ARC technical and professional expertise, and civil and military experience.

QUESTIONS SUBMITTED BY SENATOR JEAN CARNAHAN

21. Senator CARNAHAN. Secretary Roche, I know that you have extensive experience with the B–2 program. At the full committee hearing 2 weeks ago, you explained that you have spent 18 years of your life at level 4 clearance for the B–2 program. As you may recall, I asked you to comment on the administration's commitment to B–2 upgrades. In your response, you reiterated the Defense Department's support for these enhancement programs.

Would you once again comment on the importance of maintaining a modernized B–2 fleet?

Secretary ROCHE. Along with the F–22, the Air Force will use the B–2 to "kick-down-the-door" during Global Strike Task Force operations. This force will overcome the anti-access environment during initial phases of the conflict and allow sustained combat operations with the JSF and our legacy systems. The B–2 is an essential enabler in current and future conflict scenarios. Continued modernization will keep the B–2 viable and effective for decades to come.

22. Senator CARNAHAN. General Jumper, in his last appearance before this committee, Secretary Roche indicated that in our future force, F–22s may be required to escort B–2s in battle. General Jumper, I understand that you have been developing a concept for such deployments in your Global Strike Task Force plan.

Would you describe the circumstances which would require such deployments?

General JUMPER. Global Strike Task Force (GSTF) empowers us to overcome access barriers while providing the means to rapidly roll back adversary threats. Barriers to access include the new double-digit surface to air missiles, the SA–10s, SA–

12s and SA–20s, as well as weapons of mass destruction. Proliferation of these weapons continue at an alarming rate. GSTF provides the capability to rapidly establish air dominance, allowing freedom from attack and freedom to attack. It creates the conditions for access so that we can safely deploy our follow-on joint forces and provide the war-winning persistence we need. The F–22's contribution to GSTF enables for the first time 24-hour-a-day stealth operations. It's supercruise and stealth allow it to penetrate and can take out the most difficult defenses while at the same time protecting and enabling the stealth capabilities of the B–2s and F–117s. GSTF is a rapid-reaction, leading edge, power-projection concept that delivers massive around-the-clock firepower. It will mass effects early with more precision, and fewer platforms, than our current capabilities and most importantly, it will give adversaries pause to quit. This new capability will ultimately save lives by reducing the time it takes to resolve a conflict.

23. Senator CARNAHAN. If the B–2 will be escorted by F–22s, it seem to me, that the B–2 will be required to enhance its communications abilities to make it more inter-operable with other aircraft. I understand that some of the upgrades that were cut in the 2002 budget would hone these capabilities of the B–2.

Would you please explain the importance of upgrading the B–2's communications abilities for transmissions with other aircraft, as well as with command and control headquarters on the ground?

General CORLEY. The Air Force is upgrading the B–2's connectivity with two projects, UHF SATCOM and EHF SATCOM, which emphasize the importance of communication with other aircraft and command and control units on the ground. UHF SATCOM integrates the Airborne Integrated Terminal (AIT) radio to provide secure, long-range UHF voice and data capability and interoperability with other Have Quick II users, and EHF SATCOM provides global, survivable nuclear connectivity to National Command Authority (NCA).

24. Senator CARNAHAN. Again, the upgrades that I mentioned in my opening statement SATCOM, Link-16, and the Enhanced Guided Bomb Units are critical for enhancing the B–2's flexibility and lethality.

General Corley, would you please indicate to this committee the significance of continuing these programs?

General CORLEY. SATCOM, Link-16 and EGBU–28 programs are an important part of modernizing the B–2 fleet and support the lessons learned from the Air War over Serbia. B–2 communications upgrades are critical to meeting Air Combat Command and STRATCOM connectivity requirements. The UHF and EHF SATCOM upgrades will improve the ability of the B–2 to communicate with other aircraft and command and control units on the ground. The UHF SATCOM effort will correct the inability of the B–2 to communicate with other HAVE QUICK II users while the EHF program provides survivable connectivity to the National Command Authority (NCA). The integration of the Link-16 system on the B–2 provides the capability to receive threat updates necessary for in-flight re-planning. The Enhanced Guided Bomb Units effort will enable the B–2 to attack deeply buried and hardened targets. These programs were funded in the fiscal year 2002 PB to the extent possible within the constraints of available funding and Air Force priorities. The future of the B–2 modernization program, and commensurate funding requirements, will be re-evaluated when the DOD Strategic Review and the QDR are complete. Pending the outcome of these efforts, we will adjust the B–2 modernization program and funding as required.

QUESTIONS SUBMITTED BY SENATOR JEFF BINGAMAN

B–1B BOMBER PROGRAM INFORMATION

25. Senator BINGAMAN. Please provide the committee with some historical information about the acquisition history of the B–1B bomber.

When did the Air Force purchase the B–1B, how many aircraft were purchased, and under what type of contract?

Secretary ROCHE. The AF purchased 100 B-1Bs in 1981–1982 on a fixed price incentive (FPI) multi-year contract.

26. Senator BINGAMAN. When were deliveries made?

Secretary ROCHE. The first B–1B was delivered to the flight test program in October 1984. The first operational aircraft was delivered to Dyess AFB, TX in June 1985. Delivery of the final aircraft was in April 1988.

27. Senator BINGAMAN. On what dates did delivered aircraft become operational?

Secretary ROCHE. B–1B achieved Initial Operational Capability (IOC) on October 1, 1986.

28. Senator BINGAMAN. How many hours of operational testing had the B–1B as a fully integrated system or its major components completed at the time of purchase?

Secretary ROCHE. No B–1B specific Operational Testing was conducted prior to the purchase decision, although the purchase was based on the original B–1A program. Initial Operational Test and Evaluation (IOT&E) was conducted by the Air Force Operational Test and Evaluation Center (AFOTEC) on the original B–1A program from December 1974 to October 1976. This IOT&E consisted of 69 sorties and 365 flight hours and provided an assessment of operational effectiveness and suitability which was largely applicable to the B–1B. AFOTEC published its B–1A IOT&E Final Report in March 1977. This report was available at the time the B–1B full-scale development and Lot 1 production contracts were concurrently awarded in January 1982.

Nevertheless, AFOTEC and the Air Force Flight Test Center conducted a combined operational/developmental test program from July 1984 to June 1989. The B–1B full scale development program accumulated 529 sorties and 2,765 flight hours. Additionally, AFOTEC conducted a Follow-on Operational Test & Evaluation (FOT&E) from October 1986 to June 1989 using operational B–1Bs. This FOT&E included another 174 sorties and 1,067 flight hours. Both operational test programs were documented in an AFOTEC IOT&E/FOT&E Final Report published in September 1989.

AFOTEC also conducted an Integrated Operational Test (IOT) between September 1989 and January 1990 at the request of the Director, Operational Test and Evaluation. This test consisted of 18 sorties and 147.6 flight hours. A final report was published in May 1990.

29. Senator BINGAMAN. What were the initial program, unit cost, and life cycle cost estimates of the B–1B at the time of purchase expressed in today's dollars?

Secretary ROCHE. The initial cost estimates for the B–1B are shown below:

Initial Program Estimate ($M) [1]	FY81$	FY01$
EMD	2,538.9	4,582.9
Prod	17,961.1	35,217.8
Total	20,500.0	39,800.7
Program Unit Cost (100 a/c $M) [1]	205.0	398.0
20 year—O&S Cost ($B) [2]	9.2	18.0

[1] B-1B Dec 81 SAR.
[2] Sep 81 ICA (ACC 505.850).

30. Senator BINGAMAN. What are current estimates of program, unit, and life cycle costs of the B–1B?

Secretary ROCHE. A current life cycle cost estimate is not available. However, the development and production estimates for the current programs, Average Procurement Unit Cost (APUC), and the incremental changes in estimated O&S costs, are shown below:

[In millions of dollars]

Block D	Fiscal Year	
	1999	2001
EMD	327.7	337.5
Prod	213.1	219.5
Total	540.8	557.0
APUC	2.291	2.360

(93 a/c).

[In millions of dollars]

Block E	Fiscal Year	
	1995	2001
EMD	234.6	255.5
Prod	119.3	129.9
Total	353.9	385.4
APUC	1.181	1.286

(93 a/c & 8 simulators).

[In millions of dollars]

Block F	Fiscal Year	
	1996	2001
EMD	376.5	402.1
Prod	427.9	457.0
Total	804.4	859.1
APUC	4.601	4.914

(93 a/c—excluding simulators, decoys, and technique generators).

O&S COSTS

Block D	Average Annual Cost Fiscal Year	
	1997$	2001$
Mission Pay & Allowances	52.1	58.5
Unit Level Consumption	31.8	35.1
Interrnediate Maintenance	N/A	N/A
Depot Maintenance	N/A	N/A
Contractor Support	N/A	N/A
Sustaining Support	32.7	36.1
Indirect Support	5.9	6.6
Total	122.5	136.3

O&S COSTS

Block E	Average Annual Cost Fiscal Year	
	1995$	2001$
Mission Pay & Allowances	N/A	N/A
UnitLevel Consumption	0.5	0.6
Intermediate Maintenance	N/A	N/A
Depot Maintenance	N/A	N/A
Contractor Support	N/A	N/A
Sustaining Support	6.7	7.5
Indirect Support	N/A	N/A
Total	7.2	8.1

O&S COSTS

Block F	Average Annual Cost Fiscal Year	
	1996$	2001$
Mission Pay & Allowances	1.6	1.8
Unit Level Consumption	6.0	6.8
Intermediate Maintenance	N/A	N/A
Depot Maintenance	N/A	N/A
Contractor Support	N/A	N/A
Sustaining Support	1.7	1.9
Indirect Support	0.1	0.1
Total	9.4	10.6
Grand Total	.....	155.0

31. Senator BINGAMAN. Were major modifications of the B–1B or its major components made subsequent to the initial purchase? If so, please describe those modifications, indicate when and why they were made and an estimate of their total cost.

Secretary ROCHE. HQ Air Combat Command specified the need for an improved conventional mission capability on the B–1B in 1992. This is in the process of being accomplished via the Conventional Mission Upgrade Program (CMUP). For greater economy and efficiency, the B–1 program pursues CMUP upgrades in integrated blocks.

A description of the currently defined upgrade blocks follows:

Block C: Provided the B–1 with the capability to carry 10 Cluster Bomb Units (CBUs) per bay—for a total of 30 per aircraft. In addition, the B–1's Conventional Bomb Modules (CBM) were modified from their original 28-carry configuration to the 10-carry configuration required for the new CBUs. Three variants of the CBU were certified—the CBU 87, CBU 89, and CBU 97.

Status: Block C is complete. Full Operational Capability was achieved in September 1997.

Contract Cost:

EMD: $7.9 million

Produetion: 18.6 million

Total: $26.5 million

Block D: Provides the B–1 with the capability to perform near precision attacks against targets deep in enemy airspace by employing up to 24 Joint Direct Attack Munitions (JDAMs)—8 per bay. The modification includes installation of a MIL–STD–1760 electrical interconnect system, Global Positioning System (GPS) capability, and aircraft communications upgrades. In addition, the program includes modification of the B–1's rotary launchers to provide the capability to carry and employ the JDAM.

Status: Block D is in production. To date, 84 aircraft have been modified to the Block D configuration.

Total Cost:

EMD: $337.5 million

Production: $219.5 million

Total: $557.0 million

ALE–50 Towed Decoy System: Installs the Navy's ALE–50 Towed Decoy System on the B–1 to enhance aircraft survivability in the near-term prior to the production and installation of the Defensive System Upgrade Program (Block F).

Status: Modifications to incorporate the ALE–50 Towed Decoy System are now being done in conjunction with the Block D modifications. As of 15 August, 35 aircraft have been modified with the ALE–50.

Total Cost:

EMD: $45.0 million

Production: $144.5 million

Total: $189.5 million

O&S Costs: Included in Block F

Block E: Six existing computers will be replaced with four new computers and the avionics flight software will be converted/rehosted from JOVIAL to Ada. The objective is to increase memory capacity, throughput, input/output bandwidth, and growth potential; to improve reliability and maintainability; and to provide a flexible weapons capability. The current Data Transfer System (DTS) will be replaced with

a new DTS. In addition to these modifications, Block E provides for the integration of three new weapons on the B–1: Wind Corrected Munitions Dispenser (WCMD), Joint Standoff Weapon (JSOW), and Joint Air-to-Surface Stand off Missile (JASSM).

Status: Block E is currently in development. Flight testing began in December 2000. A production decision will be made in 2QFY03.

Total Cost:

EMD: $255.5 million

Production: $129.9 million

Total: $385.4 million

Block F: The existing ALQ–161 defensive system, designed and optimized for the strategic nuclear mission, has limited effectiveness in the B–1's conventional mission. The last of the currently approved CMUP blocks, the Defensive System Upgrade Program (DSUP), will remove most of the ALQ–161 system and replace it with an upgraded AN/ALR–56M radar warning receiver and the RF Countermeasures (RFCM) portion of the Navy's IDECM program. The RFCM portion includes a techniques generator and a fiber optic towed decoy (FOTD). A non-developmental item (NDI) low band transmitter for on-board jamming will be installed to provide the requisite threat coverage. These new systems will significantly improve aircrew situational awareness and the survivability of the B–1 against the emerging threat. In addition, the new systems will substantially reduce defensive system operating costs while improving reliability and maintainability.

32. Senator BINGAMAN. Identify time and place and number of aircraft used in operational missions since the initial purchase of the B–1B.

Secretary ROCHE. Operation DESERT FOX (Iraq), December 1998. Six B–1s deployed, four strike missions flown.

Operation Allied Force (Serbia), April–May 1999. Five B–1s deployed, 74 strike missions flown.

33. Senator BINGAMAN. Identify the annual average readiness rate of the B–1B since deployment.

Secretary ROCHE. The current average annual aircraft mission capable (MC) rate for the B–1B fleet is 59.4 percent which includes active duty and ANG forces. This is an increase of 2.8 percent from the fiscal year 1991 MC rate of 56.6 percent. During this period the highest annual MC rate was in fiscal year 1996 at 68.6 percent and the lowest was in fiscal year 1998 at 52.3 percent.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
B–1 Overall MC	56.6	58.3	59	67.1	65.3	68.6	62.5	52.3	55.2	53.7	59.4

Source: MERLIN as of 1 Jun 01.

34. Senator BINGAMAN. Identify dates and time periods when the B–1B fleet in whole or part was grounded and indicate the reason.

Secretary ROCHE. The following table provides B–1 grounding information:

TITLE	DATE	COMMENTS
Replacement/Rework of RAM Air Precooler Duct Assemblies	18 Jan 86	Only two operational aircraft were affected by this Time Change Technical Order (TCTO). Remaining 97 aircraft were modified during production. Both of the affected aircraft were return to operational status within 10 days.
Inspection of F101-GE-102 Series Engines for Proper Install of Accessory Gearbox 75 - Tooth Spur Gear Shift	27 Jan 86	TCTO was issued to inspect the aircraft engines to ensure the correct installation of the 75- tooth spur gearshaft. B-1B fleet only had 4 operational aircraft at the time of issuance of this inspection. All four were returned to an operational status in less than 10 days.
Mod of Offensive Sys Operator (OSO) Instrument Panel Electrical Wiring "PREP TO EJECT" Warning Bell	25 Jan 86	This modification was implemented to limit transient spikes on the 28 V DC power line to the coil of the OSO warning bell. Only 4 aircraft grounded, all 4 were returned to an operational status within 10 days.
Replacement of EMUX Control Units	27 Jan 86	TCTO was issued to update software for the EMUX control boxes to support the weapons preload tester checkout. This grounding TCTO was not issued to correct any safety defects to the aircraft. All affected aircraft (3) were returned to an operational status within 5 days.
Install Provisions for Supporting the Launcher Electrical Cables in FWD Intermediate & Aft Weapons Bay	18 Mar 86	TCTO was issued to install brackets and clamping devised to support electrical cables located on the forward bulkheads of all 3 weapons bays. There was only 1 operational aircraft at the time of TCTO release. Aircraft was returned to an operational status within 10 days.
Replacement of Fire Warning & Extinguishing Panel	11 Mar 86	TCTO was issued to modify the lamp retaining pins in the fire warning extinguishing panel. Only 4 aircraft were operational at the time of release of this TCTO, all 4 were returned to an operational status within 10 days.
Removal of Power to the Left & Right Vane Electrical Heating System	14 May 86	TCTO was issued to electrically disconnect the vane electrical heating system to prevent potential shorting of circuitry. Only 7 operational aircraft were affected, all 7 were returned to an operational status within 10 days.
Inspect of Molecular Sieve Oxygen Generator System (MSOGS) Concentrator Precooler for Coolanol Leak	16 May 86	TCTO was issued to inspect the MSOGS concentrator precooler for leaks. Grounding action only affected 7 operational aircraft, all 7 were returned to an operational status within 10 days.
Inspect of Nacelle Electrical Wire Harness Assemblies	24 May 86	TCTO was issued to inspect for damage to connectors, connector backshells, and overbraid on the wire harness in the overwing fairing area due to external forces applied to cables during AFT wing sweep condition. Grounding action affected 8 operational aircraft and 1 test aircraft. All operational aircraft were returned to operational status within 10 days.
Mod of Angle of Attack (AOA) Transducer Wiring	9 Oct 86	TCTO was issued to provide redundant power source for the AOA transducers. Only 2 aircraft were processed by the Air Force at the time of issuance, both were returned to an operational status within 10 days
Inspect Wiggins Couplings for Proper Dimensions	21 Feb 87	TCTO was issued to inspect the forward refuel/transfer fittings and wiggins nut for proper dimensions and replace fittings and or wiggins nut if found out of tolerance. 28 aircraft affected by this grounding action, all 28 returned to operational status within 10 days.
Inspect Wing Sweep gear subassembly (GSA) for Improper Bearing Installation & Broken Feedback Quill Shaft	31 Mar 89	TCTO was issued to inspect the Wing Sweep GSA for improper bearing installation and/or broken feedback quill shaft. Grounding action affected 97 aircraft, All aircraft were returned to an op status within 10 days.
Inspect Seat Retraction Thruster	09 May 89	TCTO was issued to inspect the seat retraction thruster for internal oil leakage and SMDC lines, to ensure they had not been fired. This grounding action affected 97 aircraft, all 97 were returned to an operational status within 10 days.
Inspect Seat Retraction Thruster Input Cartridges	31 Mar 90	TCTO was issued to inspect seat retraction thruster input cartridge. Grounding action affected 97 aircraft, all 97 aircraft were returned to an operational status within 10 days.
Inspection for shipping or cotter pins in the safing hole of ejection initiators	21 Sep 90	During scheduled maintenance an ejection initiator was found with a cotter pin installed in the safing hole. This TCTO was issued to inspect the installation of the cotter pin. Grounding action affected 97 aircraft, all 97 were returned to an operational status within 10 days.
Inspection of Recovery Ejection Seat Sequencers	31 Oct 94	TCTO was issued to inspect the ejection seat sequencers. Grounding action affected 97 aircraft, all 97 were returned to an operational status within 10 days.
Replacement of Fire Warning Extinguisher control panel	27 Feb 98	This TCTO did not ground operational aircraft. Hq ACC issued a directive to the Main Operating Bases to stand down the fleet until the TCTO was complied with. All affected aircraft were returned to operational status within 15 days.
Inspection of Vertical Positioning Seat Actuator	16 Mar 01	TCTO was issued to inspect the vertical position actuator outer mounting flange area for crack. Inspection affected 93 aircraft. All affected aircraft with the exception of those in CANN status or in scheduled maintenance were returned to operational status in 10 days.

QUESTIONS SUBMITTED BY SENATOR PAT ROBERTS

35. Senator ROBERTS. You stated you participated in a "what if drill" with respect to possible reductions of the B–1. The official National Guard Bureau position paper on this matter, however, indicates you were surprised by the OSD decision, which leads one to believe you were not included in the process when the final decision was made.

Were you, or were you not, included in the final decision process?

General WEAVER. I was involved in a number of internal Air Force "what if" drills on several force structure issues, including the B–1. However, I was not involved in the final decision process on the B–1 as the concept went from a "what if" to an OSD budget decision.

36. Senator ROBERTS. Were any Adjutants General included in the B–1 reduction/consolidation decision?

General WEAVER. No, neither the Kansas or Georgia Adjutant General was included in the B–1 reduction/consolidation decision process.

37. Senator ROBERTS. If they were not, do you believe they should be included in these kinds of decisions, and how would you suggest that be done?

General WEAVER. There is a point in any decision process affecting ANG force structure and manpower where ANG senior leadership must include the appropriate senior leaders in the States. Depending on the extent and impact of the issue, early involvement is best. The State leadership's insights and inputs are invaluable tools, particularly as significant "what-if" drills are developed.

The State leadership, especially the Adjutant General, is a valuable link between the National Guard Bureau and the field units, which also include the family and employer segments. The Adjutants General can provide in-depth and seasoned guidance on potential decisions and the associated impacts, and expertise on their unit's ability to recruit and retain qualified people for force structure, mission or basing changes. They can also assist in the strategies to best implement and communicate sensitive issues and decisions to their personnel and communities.

When and how the Adjutants General are involved is the responsibility of the National Guard Bureau. If informed well in advance of a decision, the Guard Bureau can effectively engage the State leadership within the decision process loop as opposed to at the end of a completed decision.

38. Senator ROBERTS. As the USAF took the B–1 out of the nuclear role and considered putting B–1s in the National Guard in 1992, I believe the USAF position was "placing bombers in the Reserve component is considered fiscally prudent with no loss in warfighting capability" and that "Reserve component maintenance programs and performance records are exceptional and they will perform the bomber mission credibly."

Has this position now changed?

General JUMPER. No. The decision is not based on credibility or lack thereof of the Reserve component. The decision is based on a requirement to maintain the B–1 as viable, survivable and lethal throughout the next decade. Our studies have indicated that 60 fully capable B–1s, in synergy with the remaining bomber fleet, will meet the Nation's global security requirements we foresee today. Within today's constraints, increased savings were available by consolidating the remaining B–1 force structure at Dyess and Ellsworth. This generated no construction requirements and released both active and ANG personnel for other high priority Air Force missions.

39. Senator ROBERTS. I understand that to pay for the B–1 Block D upgrade the USAF employed an internal funding strategy of temporarily reducing the primary combat aircraft (those that were fully funded with aircrew and maintenance), adding the B–1 to the Guard, and leaving the remainder in Attrition Reserve status with a plan to buy them back after the upgrade was complete. I understand that was done successfully and today we have all 93 B–1s upgraded and capable of employing the JDAM. Instead of using that internal USAF funding strategy again, however, this time USAF leadership proposes to eliminate 33 of our largest weapons delivery platforms, accept a higher level of risk, and end up with a much smaller bomber force.

Why not use the same upgrade funding strategy now the USAF used for the Block D upgrade?

General JUMPER. The internal funding strategy you describe placed mission aircraft in attrition Reserve and captured the operations and maintenance savings to support modernization. This strategy was successful in supplying additional funding for the JDAM capability, DSUP development and addition of the ALE–50 towed decoy.

The reason an additional internal savings strategy would not work lies in the goals of the consolidation—reducing duplicative small scale operations, cost avoidance associated with larger units and not to aggravate potential base closure issues. Reduction of the ANG units with a plan to resurrect them in a few years detracts from the key elements of experience and stability the ANG brings to the Air Force and complete retraining to a new mission with an intention to revert to the B–1

at a later date would not be practical. Reductions at Ellsworth and Dyess would result in four B–1 bases rather than the current five, which would work counter to the increased savings and efficiencies we seek to achieve with B–1 consolidation.

40. Senator ROBERTS. With the B–1 getting the Joint Air to Surface Standoff Missile (JASSM) in 2003, why would the USAF choose to reduce the B–1 fleet when each B–1 carries twice as many JASSMs as a B–52 and B–52 (planned) upgrades are more expensive per aircraft than the B–1?

General JUMPER. As of 6 August 2001, there were 82 JDAM-capable (Block D upgrade) B–1s. Block D modifications will be complete by Spring 2002.

The B–1 does carry more JASSMs per aircraft than either the B–52 or the B–2. The B–1 consolidation decision was based on current fiscal constraints and total bomber concept of operations, not bomber versus bomber. The AF will use savings incurred from B–1 consolidation to upgrade the remaining B–1 force and enhance overall mission effectiveness.

41. Senator ROBERTS. I understand the B–2 and B–52 cost more to upgrade (per aircraft) over the FYDP than the B–1. Is it possible we may have to cut force structure in those two programs to pay for upgrades?

General JUMPER. There is no current plan to cut B–2 or B–52 force structure as a method to fund modernization. Although the B–52 currently has 17 aircraft that are excess to need, these aircraft are unfunded within the Air Force program and would result in no savings with their retirement.

42. Senator ROBERTS. Please inform me as to the estimated cost of funding an additional 12 combat coded B–1s, bringing the reduction/consolidation plan for a 60 B–1 force with 36 combat coded aircraft to a force of 72 with 48 combat coded B–1s.

General JUMPER. The costs to modify, operate, and sustain an additional 12 combat coded B-1s is presented below. The requirements assume the B–1 consolidation proposal, as described in the fiscal year 2002 PB, is implemented. Any deviation from the proposed consolidation would result in a revised funding profile for an additional 12 aircraft.

	Fiscal Year						Total
	2002	2003	2004	2005	2006	2007	
APAF	98.5	60.3	50.3	44.7	53.6	59.6	367.0
O&M	16.5	15.7	14.7	15.4	14.4	14.1	90.8
Guard O&M/MILPERS	126.7	123.0	124.5	122.2	115.2	107.6	719.2
Total	241.7	199.0	189.5	182.3	183.2	181.3	1,777.0

In addition to the 12 additional combat coded jets, the funding requirements include 2 backup aircraft, 2 attrition Reserve aircraft, and 3 training coded jets necessary to support an additional 12 combat coded jets. The resulting force structure would be 79 B–1 aircraft with 48 combat coded. Finally, the estimate includes the cost to increase independent and dependent Mobility Readiness Spares Packages (2 each) for the additional 12 combat coded jets and the necessary modifications to improve their lethality, survivability, and supportability.

43. Senator ROBERTS. Please assess and report on the additional combat capability (i.e., JDAM deliveries) you get by employing this larger force and the measure of risk you reduce by doing so.

General JUMPER. Twelve additional combat coded B–1s would be able to employ 288 JDAMs per mission (24 JDAMs per B–1). However, combat capability and risk are situation dependent and difficult to quantify. The aircraft/weapon combination selected for any combat mission is dictated by threat environment and desired effects.

For example, a B–1 loaded with JDAM can theoretically destroy more targets on a single mission than a B–2 can. However, a B–1 cannot penetrate into a high threat environment like a B–2 can. In a permissive environment, the B–1/JDAM combination might be the weapon system of choice. But a higher threat environment would require either a more survivable platform or the use of standoff weapons, e.g., JASSM, JSOW, and/or CALCM.

44. Senator ROBERTS. After a recent Congressional Air Force Caucus Breakfast, a number of Air Force supporters were left with the impression that you do not believe any fighter aircraft (F–16, F–15) should be operated by the National Guard.

Is it your intention to attempt to remove fighter aircraft from the National Guard and make that organization primarily a support element?

Secretary ROCHE. Fighter aircraft units in the National Guard are integral aspects of our Total Aerospace Force. The Guard today performs about 34 percent of the Air Force mission, with only about 7.2 percent of the budget.

The real issue is, do we have the right combinations of things for the century we are in today and tomorrow, not the century from which we have just come. As part of the current military review process we are taking a hard look at our organizations and our total capabilities, together with the Guard and Reserve.

The Air Force is in the business of global reconnaissance and strike, and we will employ all the assets that we have—active force, Guard, and Reserve. For each of those components, we're determining the appropriate division of labor and responsibility. The things that are information-based on the reconnaissance part and the strike part are so stressing that we need people with experience, with good judgment, and brains—those are surely Guard characteristics. To date, we've excluded the Guard from some very applicable missions and we need to rectify that. However, we can not at this time promise any specific roles and missions. But I can pledge that the views of the Guard and the Reserves will be fully considered and represented as we prepare the Air Force of tomorrow.

"Strike" really means "strike system"—F–15s, F–16s, for example, are a part of strike—but so are the Joint Stars, AWACS, and the space and information systems that participate in significant ways in the strike operations. There is much, much more involved in strike than just flying an airplane. In the future we're going to need the Guard to be an integral part of our strike mission across the spectrum of conflict.

45. Senator ROBERTS. I believe Congress and the Secretary of Defense agree with you that the future will call for changing the way USAF does business. Accordingly, would you consider an Air Force Associate concept where the National Guard owns and operates the aircraft that are also flown by active crews (similar to today's Reserve Associate units who have reservists that fly active aircraft)?

Secretary ROCHE. Yes. The AF already has an active associate unit in Florida where the aircraft are primarily managed by the AFRC with a complement of active duty personnel, including pilots, assigned to the Reserve unit at Duke Field. AF Future Total Force Project planning and concept development has advocated, for several years, increased use of "active associate" personnel assignment to ARC operated bases. Current planning is underway, led by the Air Mobility Command, to increase the use of active duty personnel assigned to Reserve units across the Nation. The new C–17 unit for the Mississippi Air National Guard will include a significant assignment of active duty aircrews while utilizing increased numbers of ANG full time technician maintenance personnel. AMC is also currently analyzing possible assignment of AD aircrews and some other personnel to the ARC managed C–5 units in Massachusetts, Texas, and New York. Future Total Force has several recent studies that validate the cost effectiveness of such "active associate" organizational structures in the air refueling and transport missions, and the Reserve Component 2005 study, completed by AF on fighters, also indicated potential for such increased integration if certain policy parameters were expanded. Current structures, organization, and personnel policy do not adequately provide needed flexibility to meet the new situation. A blending of the personnel characteristics of the current components, some restructured organizational design, particularly at the intermediate Headquarters levels, and changes in attitude will be required to most effectively utilize all three current AF components. Some of this change is already underway, and expansion of active associate type units will permit lowered infrastructure costs, increased capability and responsiveness of ARC units, and "seamless" readiness training in time of mobilization and full wartime operations.

[Whereupon, at 11:05 a.m. the subcommittee adjourned.]