1033
95 Y4
Ap 6/2
In 8/16
pt 6

Senate Hearings

Before the Committee on Appropriations

Department of the Interior and Related Agencies Appropriations

CUMENTS
OV 16 1977
LIBRARY
STATE UNIVERSITY
KSU LIBRARIES
A11900 470813

Fiscal Year 1978

95th CONGRESS, FIRST SESSION

H.R. 7636

Part 6 (Pages 2517–3176)

Department of Agriculture
Energy Research and Development Administration
Federal Energy Administration
Smithsonian Institution

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1978

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS UNITED STATES SENATE

NINETY-FIFTH CONGRESS

FIRST SESSION

ON

H.R. 7636

AN ACT MAKING APPROPRIATIONS FOR THE DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1978, AND FOR OTHER PURPOSES

Printed for the use of the Committee on Appropriations

PART 6 (Pages 2517–3176)

Department of Agriculture
Energy Research and Development Administration
Federal Energy Administration
Smithsonian Institution



U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1977

83-107 O

COMMITTEE ON APPROPRIATIONS

SUBCOMMITTEE ON DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES

ROBERT C. BYRD, West Virginia, *Chairman*

JOHN L. McCLELLAN, Arkansas
ERNEST F. HOLLINGS, South Carolina
BIRCH BAYH, Indiana
J. BENNETT JOHNSTON, Louisiana
WALTER D. HUDDLESTON, Kentucky
PATRICK J. LEAHY, Vermont
DENNIS DeCONCINI, Arizona

TED STEVENS, Alaska
MILTON R. YOUNG, North Dakota
MARK O. HATFIELD, Oregon
HENRY BELLMON, Oklahoma

JAMES R. CALLOWAY, *Chief Counsel and Staff Director*
DWIGHT E. DYER
JOHN GNORSKI
DAVID LOHMAN (*Minority*)
Staff Assistants, Department of the Interior and Related Agencies

CONTENTS

MONDAY, APRIL 25, 1977

Page

Department of Agriculture:
Forest Service---------- 2517

TUESDAY, APRIL 26, 1977

Federal Energy Administration (FEA)---------- 2627

THURSDAY, APRIL 28, 1977

Energy Research and Development Administration (ERDA)---------- 2801

TUESDAY, MAY 3, 1977

Smithsonian Institution---------- 3095

DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1978

MONDAY, APRIL 25, 1977

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 9:30 a.m., in room 1114, Everett McKinley Dirksen Office Building, Hon. Mark Hatfield presiding.
Present: Senator Hatfield.

U.S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE

STATEMENTS OF:

M. RUPERT CUTLER, ASSISTANT SECRETARY FOR CONSERVATION, RESEARCH, AND EDUCATION, DEPARTMENT OF AGRICULTURE

JOHN R. McGUIRE, CHIEF, FOREST SERVICE

ACCOMPANIED BY:

REXFORD A. RESLER, ASSOCIATE CHIEF

ROBERT E. BUCKMAN, DEPUTY CHIEF, RESEARCH

THOMAS C. NELSON, DEPUTY CHIEF, NATIONAL FOREST SYSTEM

R. MAX PETERSON, DEPUTY CHIEF, PROGRAMS AND LEGISLATION

PHILIP L. THORNTON, DEPUTY CHIEF, STATE AND PRIVATE FORESTRY

LEON H. ANDERSON, DIRECTOR, HUMAN RESOURCE PROGRAMS

ORRIN P. WITTIG, ASSISTANT DIRECTOR, PROGRAM DEVELOPMENT AND BUDGET

STEPHEN B. DEWHURST, DEPUTY DIRECTOR FOR BUDGET

FISCAL YEAR 1978 BUDGET REQUEST AND FISCAL YEAR 1977 SUPPLEMENTAL

Senator HATFIELD. This morning we are scheduled to hear the fiscal year 1978 budget request for the Forest Service. It totals $947.2 million, which is roughly $204 million over appropriations to date for fiscal year 1977. The justification has been included in part 2

of the hearing record. The justification for the Youth Conservation Corps amendment will be inserted at this point.

It should be noted here that Congress has just completed action on a major supplemental appropriation bill for the 1977 fiscal year. Included in that bill, in addition to firefighting, land acquisition, and pay cost funds, is a total of $120.3 million for timber sales, road construction, and recreation improvements.

This will substantially narrow the gap between 1977 and 1978 program levels and will obviously have an impact on the 1978 budget. It would be helpful for the record to include a table on the supplemental appropriations, and we will also insert that at this point.

[The information follows:]

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

BUDGET AMENDMENT

Budget Appendix page	Heading	Fiscal Year 1978 Request pending	Proposed amendment	Revised request
176	Youth Conservation Corps	$16,200,000	$14,175,000	$30,375,000

Additional funds would be used to increase summer employment of youths under the Act of August 13, 1970 (84 Stat. 794), as amended, from the original estimate of 10,400 to 20,400.

The proposed amendment consists of:

(1) Increase of $14,000,000 to restore the program to the fiscal year 1977 appropriated level.

(2) Increase of $175,000 in additional pay costs (Executive Order 11941, effective October 1, 1976) which is related to the restored program level.

Justification of Budget Amendment for
Youth Conservation Corps

Project	Fiscal Year 1978 Request pending	Proposed amendment	Revised request
Youth Conservation Corps	$16,200,000	$14,175,000	$30,375,000

This amendment proposes that funds be provided for use in gainfully employing about 10,000 additional young men and women in conservation work which will also offer a broad variety of educational experiences as they learn ways to improve the quality and productivity of land, air, and water.

The Act of August 13, 1970 (84 Stat. 794), as amended, authorizes the Youth Conservation Corps program on Federal lands and a grant program to assist States in establishing YCC projects on non-Federal public lands. Thirty percent of the appropriated funds are allocated for the State Grant Program. In the past, all States have participated. The Departments of the Interior and Agriculture jointly administer the program.

This integrated conservation work, learn, and employment program is designed to accomplish needed conservation work, provide employment and income to youth, teach proper work habits, encourage greater appreciation of the management of natural resources, and increase individual pride and dignity. Conservation work-learn projects on public lands include recreation facilities maintenance and construction, range and wildlife habitat improvement, timber stand improvement, trail maintenance and construction, and visitor information services.

Program and Financing (in thousands of dollars)

Identification code 12-1125-3-1-302	19 actual	19 78 Request pending	19 78 Proposed amendment	1978 Revised request
Program by activities:				
Program development (program costs, funded) 1/		18,200	12,175	30,375
Change in selected resources (undelivered orders)		-2,000	2,000	.....
10.00 Total obligations		16,200	14,175	30,375
40.00 Budget authority (appropriation)		16,200	14,175	30,375
Relation of obligations to outlays:				
71.00 Obligations incurred, net		16,200	14,175	30,375
72.00 Obligated balance, start of period		4,338	.....	4,338
74.00 Obligated balance, end of period		-2,154	-2,000	-4,154
90.00 Outlays		18,384	12,175	30,559

1/ Includes capital outlay as follows: 1978, $150 thousand

OBJECT CLASSIFICATION (in thousands of dollars)

Identification code 12-1125-3-1-302	19 actual	19 78 Request pending	19 78 Proposed amendment	19 78 Revised request
Personnel compensation:				
11.1 Permanent positions		1,097	1,025	2,122
11.3 Positions other than permanent		1,206	1,075	2,281
11.5 Other personnel compensation		75	75	150
11.8 Special personal services payments		1,400	1,300	2,700
Total personnel compensation		3,778	3,475	7,253
Personnel benefits:				
12.1 Civilian		222	208	430
21.0 Travel and transportation of persons		300	230	530
22.0 Transportation of things		150	115	265
Rent, communications, and utilities:				
23.2 Other rent, communications, and utilities		125	95	220
24.0 Printing and reproduction		5	5	10
25.0 Other services		740	580	1,320
26.0 Supplies and materials		575	445	1,020
31.0 Equipment		50	40	90
32.0 Lands and structures		15	10	25
Subtotal		5,960	5,203	11,163
95.0 Quarters and subsistence charges		-20	-5	-25
99.0 Total obligations, Forest Service		5,940	5,198	11,138

OBJECT CLASSIFICATION (in thousands of dollars)

Identification code
12-1125-3-1-302

ALLOCATION TO THE DEPARTMENT OF THE INTERIOR

		19 actual	19 78 Request pending	19 78 Proposed amendment	19 78 Revised request
	Personnel compensation:				
11.1	Permanent positions		1,322	478	1,800
11.3	Positions other than permanent		1,321	679	2,000
11.5	Other personnel compensation		20	10	30
	Total personnel compensation		2,663	1,167	3,830
	Personnel benefits:				
12.1	Civilian		187	158	345
21.0	Travel and transportation of persons		250	250	500
22.0	Transportation of things		60	90	150
	Rent, communications, and utilities:				
23.1	Standard level user charges		20	5	25
23.2	Other rent, communications, and utilities		30	70	100
24.0	Printing and reproduction		40	60	100
25.0	Other services		2,000	2,637	4,637
26.0	Supplies and materials		350	400	750
31.0	Equipment		100	150	250
41.0	Grants, subsidies, and contributions		4,560	3,990	8,550
	Total obligations, Department of the Interior		10,260	8,977	19,237
99.0	Total obligations		16,200	14,175	30,375

Personnel Summary

Identification code 12-1125-3-1-302	19 actual	19 78 Request pending	19 78 Proposed amendment	19 78 Revised request
FOREST SERVICE				
Total number of permanent positions		72	58	130
Full-time equivalent of other positions		140	125	265
Average paid employment		264	230	494
Average GS grade		8.74	.....	8.74
Average GS salary		$16,905	.....	$16,905
Average salary of ungraded positions		$12,199	.....	$12,199
ALLOCATION TO THE DEPARTMENT OF THE INTERIOR				
Total number of permanent positions		46	46	92
Full-time equivalent of other positions		203	203	406
Average paid employment		247	251	498
Average GS grade		10.00	.....	10.00
Average GS salary		$18,300	.....	$18,300
Average salary of ungraded positions		$9,000	$600	$9,600

Fiscal Year 1977 Supplemental Appropriations
(in thousands)

Forest Protection and Utilization:		
Forest Land Management:		
National Forest protection and management:		
Timber sales	$9,200	
Nursery expansion and development	3,650	
Fire protection (Bull Run Watershed)	180	
Recreation operation and maintenance	12,000	
Minerals management (coal leasing)	975	
Subtotal, National Forest protection and management		$26,005
Fighting Forest Fires		207,000
Forest Roads		33,800
Forest Roads and Trails		6,000
Construction and Land Acquisition:		
Recreation construction	21,339	
Alpine Lakes planning	534	
Subtotal, Construction and Land Acquisition		21,873
Youth Conservation Corps		29,650
Salvage Timber Sales		3,000
Pay Act:		
Forest Protection and Utilization:		
National Forest protection and management	10,771	
Cooperative Law Enforcement	46	
Forest Insect and Disease Management	286	
Forest Research	2,698	
State and Private Forestry Cooperation	226	
Subtotal, Forest Protection and Utilization		14,027
Youth Conservation Corps		350
Construction and Land Acquisition		270
Construction and Operation of Recreation Facilities		77
Forest Roads and Trails		6,952
Assistance to States for Tree Improvement		12
Total, Supplemental Appropriation		349,016
Land and Water Conservation Fund		18,800

Senator HATFIELD. Secretary Cutler and Chief McGuire, welcome before the committee. If you would introduce your associates, we will begin with Secretary Cutler's statement and proceed with your statement, Chief McGuire. Both prepared statements will be placed in the record at this point.

You may either highlight or summarize, as you see fit.

[The statements follow:]

STATEMENT OF M. RUPERT CUTLER

Mr. Chairman and Members of the Committee, we are pleased to have the opportunity to appear and discuss with you the 1978 budget. Chief McGuire is also available to discuss any questions you may have.

Time has not permitted me to review in detail all of the decisions associated with the budget currently pending before the Congress. However, we have recommended an increase of $14 million for the Youth Conservation Corps program above the budget submitted by the previous Administration.

The 1978 budget reflects the Department's second year of working toward meeting the requirements for long-range planning under the Resources Planning Act. A significant portion of the funds in the Forest Service budget are investments that have a direct bearing on our ability to maintain or increase outputs from forest and related rangeland in future years.

The Resources Planning Act program recommendations were forwarded to Congress in March 1976. Development of the long-range program recommendations included consideration of comments received from the public in response to the draft program alternatives released in August 1975. Further, an attempt was made to weigh more explicitly the environmental consequences of the alternative long-range programs. The Forest Service is giving high priority attention to the update of the 1980 RPA assessment and program.

The National Forest Management Act of 1976, enacted late last year, affects the Forest Service significantly. We are assessing the budgetary impact of the Act. Since this is a new Act and our experience with it is very limited, we have deferred final decisions on Forest Service funding to implement the Act until a later date.

I am looking forward to working with the Forest Service in fulfilling their three basic missions of managing the National Forest System, cooperating in State and private forestry, and conducting forestry research.

Chief McGuire is prepared to provide additional information on the 1978 budget and we both will be available to discuss with you any questions which you have.

STATEMENT OF JOHN R. McGUIRE

Mr. Chairman and Members of the Committee, I appreciate this opportunity to discuss with you the proposed fiscal year 1978 budget for the Forest Service because I consider it one of the most significant in the Agency's recent history. On a program level basis the total 1978 budget is almost the same as that in 1977. There are some increases and decreases which I will explain later.

I have with me today Rexford A. Resler, Associate Chief; Robert E. Buckman, Deputy Chief for Research; Thomas C. Nelson, Deputy Chief for National Forest System; R. Max Peterson, Deputy Chief for Programs and Legislation; Philip L. Thornton, Deputy Chief for State and Private Forestry; Orrin P. Wittig, Assistant Director of Program Development and Budget; Leon H. Anderson, Director of Human Resource Programs; and Stephen Dewhurst, Deputy Director for Budget, Department of Agriculture.

I believe this budget is extremely significant because it is being presented in the midst of a number of circumstances which now make it very difficult to accurately estimate our financial requirements. These circumstances include:

-- The need to assess the impact of the severe weather conditions which have occurred in the past few months;

-- The possible involvement of the Forest Service in the Economic Stimulus Program, particularly in the area of reducing unemployment;

-- The recent requirement of new legislation with heavy impact on the Forest Service, including the Forest and Rangeland Renewable Resources Planning Act of 1974, the National Forest Management Act of 1976, and the Federal Land Policy and Management Act of 1976; and

-- The need to work closely with a new Administration to thoroughly evaluate the objectives of the Forest Service and their related financial requirements.

Weather

As you know the Nation has been plagued by two extreme and opposite weather patterns this year, both of them adverse to the forest and ranges and the people who depend upon them. In the East, we have had heavy snows and bitter cold. In the West, a lack of rain and snow, coupled with continuing warm weather, has set the stage for major drought conditions.

The cold weather in the East has emphasized a fuel shortage. It is obvious the interest in coal as an alternative to gas and oil as an energy source will continue to grow. This will mean pressure to increase development of that resource from National Forest System and other forest and range land. We are working closely with the Department of the Interior to assure safe development of the mineral resources with adequate planning to assure rehabilitation.

The concern over lack of precipitation in most of the West is also growing because of the promise it has for extreme drought next summer. It means a reduction in water consumption and establishment of rigid water conservation measures. But it means more than that. Hydroelectric power will be drastically diminished. Fish habitat will suffer. Recreation areas depending on water will be adversely affected. Grazing activities will be restricted. Fire hazards will intensify. Reforestation will be difficult and the damaging effects of high insect populations to the timber stands will increase.

We are investigating possibilities for meeting these crises, but because of their sudden and unpredictable nature, we cannot, with any degree of certainty, predict what the financial implications might be.

Unemployment

The Committee has long recognized the importance of labor-intensive activities. The current budget includes a number of programs which provide work opportunities in areas suffering from high unemployment. In addition, the President has submitted and the Congress is now considering, further proposals to stimulate the economy through the use of temporary Federal employment. The Forest Service is prepared to cooperate to any extent in carrying out proposals along these lines. Since the details have not been settled, we cannot presently estimate the extent of our involvement or the related financial impact.

New Legislation

As you know, the new laws which I previously mentioned have required the Forest Service to completely restructure the way in which it develops its program and financial procedures. Our initial RPA assessment and program were developed in 1975. Because of the very tight timely requirement in developing these documents, they are not as good as we would like them to be. The law requires that we update both of them by 1980. A review draft of the 1980 assessment outline has been completed, and proposed alternative program directions have been established for review. Five such program directions are being suggested, spanning a broad range of possible program levels and mixes. We released the assessment and alternative program direction documents for full public review and comment on February 28, 1977. This is only the first of a number of public participation stages planned for development of the 1980 assessment and program.

Meanwhile, the 1978 budget was developed using the 1978 RPA plan as a guide. We recognize that it has not been possible for the Administration to provide all of the funding which would be required to attain the ultimate RPA program levels. However, we also recognize the need to hold down Federal expenditures wherever possible.

A further complicating factor has been the enactment in the last sessions of the Congress of the National Forest Management Act and the Federal Land Policy and Management Act. Because of the short time since passage of these two laws, our experience in implementing their provisions has been very limited. While we have made some headway in writing proposed guidelines and regulations to carry out requirements of these laws, we have not been able to develop solid budget estimates for their implementation. For example, we cannot at this time predict how many small timber operators will take advantage of the provisions allowing them to have the Forest Service build roads. In addition, there are still a number of key decisions which must be made on how to implement some of the other major provisions of these Acts.

In light of this situation, the budget being presented today includes funding only for increased payments of 25% of National Forest receipts, required by the National Forest Management Act, to States and the Rangeland Improvements fund provided for by the Federal Land Policy and Management Act. Additional proposals and estimates for implementing these new laws will be developed in coordination with the new Administration and forwarded to the Congress as soon as possible.

1978 Budget Specifics

I'll now discuss some of the specifics of the budget.

The budget estimates reflect the second year we have been working under the requirements of the RPA Recommended Program. With this goal in mind, and a desire to keep Federal spending at a minimum, we are asking for some increases in such high priority items as forestry research, recreation, wildlife, soil, water, minerals and general land management, insect and disease management, and construction.

Some of the details of the program request resulting in this increase are as follows:

Forestry Research

We are proposing increases in forestry research totaling $5.7 million. Major emphasis of this increase will be on renewable resources evaluation. Increased funding will allow the forest survey to shorten the reinventory cycle to about 12-13 years and to broaden the scope from a principally timber-orientation to a multi-resources inventory capability. Increased funding will help provide a high quality 1980 RPA Assessment. Our own resource data will be improved, and States will be encouraged to supply their physical, social and economic information as it applies to forest and range activities.

The proposed $5.7 million increase will also include increments for endangered species research, dispersed recreation research, and research on nonpoint water pollution.

Recreation

Proposed program increases in recreation management are focused on administration of concessions and recreation permits, operation and maintenance, planning and inventories as the basis for management of specially designated areas, wilderness administration and visitor information services.

As a major justification for these increases, we obviously expect continuing rises in National Forest recreation activities which even now represent almost 48 percent of the recreation days on all Federal lands.

Wildlife and Fish Habitat Management

We are proposing an increase in wildlife and fish habitat management of $1.8 million for endangered species.

The joint effort by the Forest Service and the State conservation departments for comprehensive fish and wildlife habitat programs has resulted in the preparation of 35 State-Forest Service plans.

This joint planning is paying off. The plans provide useful information for land managers as they make specific plans for the wildlife and fish habitat projects that will be carried out with the funds in this budget request.

Soil, Water and Minerals Management

The proposed increase for soil and water management is $2.1 million, and for minerals area management for energy resources and other activities, $2 million.

General Land Management

We are asking for an increase of $929,000 for marking land lines and monuments; $956,000 for geometronics products; $881,000 for maintenance of fire and general purpose facilities, $155,000 for administration of special uses, and $894,000 to reimburse the Employees' Compensation Fund.

Timber Management

The 1978 proposed budget will finance timber sale offerings of 10.25 billion board feet from National Forests. In addition, it will permit us to offer 250 million board feet from the inventory of prepared sales.

We think these new offerings will meet expected demand. Together with the approximately 30 billion board feet under contract, but still uncut, these new sale volumes should reasonably take care of demand from the National Forests. Housing starts this year are expected to increase sharply to between 1.7 million and 2 million.

While I'm on the subject of timber, I would be remiss in not mentioning the issue of permanent timber sale regulations required by the National Forest Management Act. We instituted temporary regulations late last year to allow time for preparation of permanent ones. The proposed permanent regulations went into the Federal Register February 23, 1977 for a 30-day comment period. During the period, a series of public meetings are to be held as a means of allowing the public an opportunity to give oral testimony.

Insect and Disease Management

We propose to increase the forest insect and disease management program funds by $1.8 million. The purpose is to broaden the scope and coverage of ongoing detection and evaluation activities to provide additional technical assistance to land managers.

The continuing damage caused by insect outbreaks is particularly serious. We estimate some 4.6 billion cubic feet of salvable sawtimber has been killed by insects in National Forests, just in the West. We shall soon be publishing our Western Forest Insects Study as the basis for developing action to deal with the problem of controlling damage of this magnitude in the future.

Construction

We are requesting construction funds in the amount of $22.6 million which includes increases for fire and administrative facilities and for pollution abatement projects.

Other Budget Changes

There are some budget reduction proposals.

For example, the overall road and trail program proposed reduction is $35 million. It reflects an increase in timber purchaser road construction of $39 million and a decrease in Federal construction of $74 million from the 1977 program level.

In addition, the 1978 budget request again proposes a major reduction in payments to States for the Federal share of the cooperative forest fire control program. Last year the Congress did not approve the reduction and maintained the funding at about the same level as 1976.

We have taken steps to tighten the management of fire control funds. We have budgeted an estimated amount of fighting forest fire funds for fire presuppression. We are also considering changes of procedures to provide funding for this program in the regular budget.

We are also investigating new approaches to better program and finance State and private cooperative activities. We are not satisfied with the current progress. We are trying to determine how we can perform the duties in this field with more effectiveness.

Work With Other Agencies

To complete the picture, there are a number of programs in which we have an interest but which are administered by other agencies. They do not come before your Subcommittee, but we thought we should bring them to your attention. Among the most notable are the CETA and Job Corps programs I mentioned earlier, the Forestry Incentives Program, and the Rural Community Fire Protection Grants Program. In addition, we receive research funding from agencies like EPA and ERDA, we conduct watershed planning and river basins studies, flood prevention work and resource conservation and development programs for the Soil Conservation Service.

This concludes my formal remarks on the 1978 budget. I would be pleased to answer any questions you may have.

INTRODUCTION OF ASSOCIATES

Mr. McGUIRE. Mr. Chairman, Secretary Cutler regrets that he cannot be here at the beginning of this hearing. There was a drought meeting at the White House and he had a conflict with a hearing at the House on wilderness. But he hopes to appear before you conclude the hearing.

With me on my left is Rex Resler, Associate Chief; on his left, Phil Thornton, Deputy Chief for State and Private Forestry; Leon Anderson, Director of Human Resource programs.

On my right, Tom Nelson, Deputy Chief for the National Forest System and Bob Buckman, Deputy for Research.

Also in the room is Mr. Steven Dewhurst representing the Department's Office of Management and Finance.

I can very briefly go over my opening statement with your permission, Mr. Chairman.

SUMMARY OF REQUEST

Just to summarize it, I point out, as you did, the distinctions between the 1977 appropriation and the 1978 budget request. I also point out that this is a very significant budget in our view. It was derived from the Resources Planning Act program which was sent to Congress by President Ford over a year ago. It is about $500 million below the level presented in that long-range program for 1978.

The budget is also significant because of rather unusual uncertainties that face the Forest Service at this time. For example, there is still an uncertainty about how severe weather conditions are going to be throughout the country. We have just come through a drought that undoubtedly will cause problems in the months ahead and in 1978.

The Forest Service is very likely to be involved in the economic stimulus program proposed by the President, particularly in the area of reducing unemployment by providing jobs in forest areas.

We are still in the process of implementing new legislation, the National Forest Management Act which was passed late last year. This includes developing the new regulations and guidelines that deal with timber sales and land management planning.

So it has been a little more difficult than usual to plan and to analyze our budget requirements for fiscal year 1978. I think perhaps with that brief summary of my general statement, Mr. Chairman, I will not go into the details. I will stop here and I will be glad to answer any questions you might have.

Senator HATFIELD. Your schedule is such that you can spend the rest of the day, Chief?

Mr. McGUIRE. That is correct, Senator.

TIMBER SALES SHORTFALL

Senator HATFIELD. You have provided the staff with material conerning adjustments necessary in fiscal year 1977 in order to avoid a shortfall of 360 million board feet in timber sales offerings. The dollar figure involved is $2.6 million. First of all, how did you happen to underestimate your needs by that much?

Mr. McGUIRE. Several impacts have contributed to the need for these adjustments. First, there is the impact of inflation on the costs of materials, equipment, and travel. Costs for these items are $1.2 million higher now than they were some 18 months ago when our fiscal year 1977 budget estimates were prepared.

Second, there are added costs in terms of both manpower and funding for the increased attention we must devote to the protection of endangered species, historic sites, and wild river studies. These costs could not be fully anticipated in our fiscal year 1977 budget estimates.

Third, there is an increasing incidence of challenges to the program decisions we have made favoring the harvest of timber in our land use plans, timber management plans, and NEPA statements. This forces us to expend manpower and funds in the preparation of unplanned replacement timber sales to substitute for the challenged sales.

Since all these uses of manpower and funds were unplanned in our fiscal year 1977 budget estimates, it requires reprograming from other program areas to meet our timber sale offerings program.

TIMBER SALES IN 1977 BUDGET

Senator HATFIELD. Before we get into the 1978 budget, I would like the record to show exactly where we stand on the 1977 budget. Let me give a brief résumé.

As I understand it—if I am incorrect at any point, please interrupt, Chief. First of all, I would like to keep this basic chart in mind here from which I am making some conclusions and drawing some of my questions. This is based on Forest Service budget requests in billion board feet from fiscal 1975, 1976, 1977, and 1978. It drops from 11.867 billion board feet in 1975 to 11.234 in 1976, to 10.4 in 1977, 10.25 in 1978.

If we were to superimpose upon that chart your personnel, it would be a very squiggly line, not terribly different from fiscal year to fiscal year. It would be about straight across the board. In fact, it would be about 1965 level, as I recall the statistics. You are operating today, 1977, on a 1965 level of personnel power.

Mr. McGUIRE. That is correct, Mr. Chairman.

Senator HATFIELD. Is that chart basically one that you would agree with?

Mr. McGUIRE. That chart is correct, Mr. Chairman.

Senator HATFIELD. I am talking about budget requests, what the Forest Service has asked for.

Mr. McGUIRE. That is correct for those years in terms of budget requests.

Senator HATFIELD. And now we will take up next what the Congress has done in terms of leadership. It's a totally different picture.

Let's take 1977. As I say, to make it illustrative, the administration—and you are the administration at this point—requested funds in 1977 for a sales program of 10.4 billion board feet. Congress added 350 million board feet last year, making a total of 10.75 billion board feet.

Just a few weeks ago in the fiscal 1977 supplemental, we added 520 million additional board feet plus 200 million board feet in

salvage, which in total would make the sales preparation program 11.47 billion board feet, plus salvage. Is this basically correct?

Mr. McGUIRE. That is correct, Mr. Chairman.

Senator HATFIELD. Last year, Chief, in testimony before this subcommittee and also in the House Appropriations Subcommittee, you stated that you had 1 billion board feet of sales prepared for sale, "on the shelf"—I believe that was your phraseology. It was prepared and was on the shelf.

Mr. McGUIRE. That is correct.

Senator HATFIELD. You said this volume was available for sale the moment the market justified it.

Mr. McGUIRE. That is correct.

MANPOWER NEEDS

Senator HATFIELD. Now with the market prices at or near an all-time high, my question is simply this: Can you sell the full 11.47 billion board feet of chargeable materials without additional manpower?

Mr. McGUIRE. No, sir.

Senator HATFIELD. Why not, if sales are already prepared and on the shelf?

Mr. McGUIRE. It still requires, Mr. Chairman, that we have manpower to supervise the sale operator. We would need funds to continue the layout of the roads in some cases. We are stretched too far on manpower, as you pointed out earlier.

We have about the same number of permanent people today as we had in the middle 1960's. In fact, we are not going to be able to spend the 1977 supplemental add-ons unless we have more manpower.

Senator HATFIELD. What manpower increases do you need for fiscal 1977?

Mr. McGUIRE. Taking all of the add-ons in the fiscal year 1977 supplemental appropriation, we would need 603 more permanent full-time and 3,132 other than permanent full-time people for a total of 3,735 positions.

Senator HATFIELD. Did you make that request?

Mr. McGUIRE. Yes, we did.

Senator HATFIELD. What happened?

Mr. McGUIRE. We haven't received an answer yet. But we are optimistic.

Senator HATFIELD. Where is it?

Mr. McGUIRE. I believe that it is still in the Department and I believe that the Department is anticipating Department allocations early next month.

Senator HATFIELD. That is the Department of Agriculture?

Mr. McGUIRE. That is correct.

Senator HATFIELD. Dr. Cutler will be the man reviewing that request?

Mr. McGUIRE. That is correct.

Senator HATFIELD. You made the request for the full funding of the 3,700-plus?

Mr. McGUIRE. That is correct.

Senator HATFIELD. Let's get the facts. Please supply for the record the employment totals for the Forest Service each year beginning with 1965. Give us both man-years and positions covering permanent and so-called part-time personnel.

Mr. MCGUIRE. Man-years and positions—PFT and other—since 1965. We will provide that for the record.

Senator HATFIELD. Also, please tell us how many of the so-called part-time positions which are actually working on a full-time basis should, in your judgment, be converted to permanent positions.

Mr. MCGUIRE. Nine thousand part-time positions could be converted to full-time capacity.

[The information follows:]

Fiscal year	Permanent full-time			Other		
	Positions	Man-years	End-of-year	Positions	Man-years	End-of-year
1965	21,481	18,721	19,666	20,582	11,561	20,582
1966	23,289	20,298	21,790	19,737	11,760	19,737
1967	23,914	22,028	22,574	20,849	11,738	20,849
1968	24,542	20,459	22,107	21,428	11,563	21,428
1969	23,764	19,183	21,528	22,240	10,306	22,240
1970	22,761	19,367	20,914	20,377	10,853	20,377
1971	22,525	19,207	21,444	21,134	11,604	21,134
1972	21,846	19,955	20,683	19,490	12,394	19,490
1973	22,331	18,916	19,979	19,059	13,416	19,059
1974	22,176	17,988	19,469	22,269	14,426	22,269
1975	22,741	18,144	19,590	28,055	15,993	28,055
1976	23,363	19,050	19,815	32,133	19,292	32,133
1977 estimate	23,778	20,657	20,100	[1]20,850	14,483	20,850
1978 estimate	23,916	20,862	20,100	21,075	13,909	21,075

[1]Our best estimate is that 30,315 people will be on the rolls to accomplish the work for which funded. The 1977 and 1978 estimated figures are amounts shown in the President's 1978 budget request.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Man-Years of Employment in the 1978 Budget Estimates

Program Development and Budget
March 2, 1977

Appropriations	Fiscal Year 1976 Actual			Fiscal Year 1977 President's Budget			Fiscal Year 1978 President's Budget			Increase or Decrease 1978 over 1977		
	Permanent	All Other	Total	Permanent	All Other	Total	Permanent	All Other	Total	Permanent	All Other	Total
Forest Protection and Utilization:												
Forest Land Management	9,543	10,484	20,027	9,782	6,278	16,060	10,089	6,453	16,542	307	175	482
Forest Research	2,620	423	3,043	2,759	414	3,173	2,883	438	3,321	124	24	148
State and Private Forestry Cooperation	187	24	211	215	24	239	215	24	239	- -	- -	- -
Total, Forest Protection and Utilization	12,350	10,931	23,281	12,756	6,716	19,472	13,187	6,915	20,102	431	199	630
Construction and Land Acquisition	325	171	496	226	117	343	254	134	388	28	17	45
Forest Roads and Trails	3,920	2,977	6,897	3,939	2,981	6,920	3,590	2,702	6,292	-349	-279	-628
Construction and Operation of Recreation Facilities	71	83	154	64	67	131	70	74	144	6	7	13
Assistance to States for Tree Improvement	15	3	18	15	3	18	15	3	18	- -	- -	- -
Rangeland Improvements	- -	- -	- -	- -	- -	- -	67	31	98	67	31	98
Expenses, Brush Disposal	444	928	1,372	494	1,078	1,572	533	1,166	1,699	39	88	127
Other Forest Service Permanent Appropriations	3	2	5	4	2	6	4	2	6	- -	- -	- -
Consolidated Working Fund	62	2,035	2,097	25	604	629	- -	- -	- -	-25	-604	-629
Working Capital Fund	560	477	1,037	570	487	1,057	660	562	1,222	90	75	165
Cooperative Work (Trust Fund)	1,223	1,535	2,758	1,240	1,564	2,804	1,240	1,564	2,804	- -	- -	- -
Youth Conservation Corps	75	151	226	101	193	294	62	140	202	-39	-53	-92
Watershed and Flood Prevention, SCS	142	191	333	151	183	334	114	130	244	-37	-53	-90
River Basin Surveys and Investigations, SCS	56	12	68	56	12	68	56	12	68	- -	- -	- -
Watershed Planning, SCS	22	4	26	23	4	27	22	4	26	-1	- -	-1
Resource Conservation and Development, SCS	3	1	4	3	1	4	3	1	4	- -	- -	- -
Salaries and Expenses, ARS	8	9	17	8	9	17	- -	- -	- -	-8	-9	-17
Forestry Incentives, ASCS	3	1	4	2	1	3	- -	- -	- -	-2	-1	-3
Rural Community Fire Protection Grants, FmHA	2	- -	2	2	- -	2	- -	- -	- -	-2	- -	-2
Oregon and California Grant Lands, BLM	17	11	28	24	15	39	26	18	44	2	3	5
Land and Water Conservation Fund, BOR	197	42	239	248	56	304	248	56	304	- -	- -	- -
Manpower Training Activities, DOL	647	305	952	622	306	928	613	297	910	-9	-9	-18
Federal-Aid Highway Trust Fund, DOT	105	101	206	84	84	168	98	98	196	14	14	28
Grand Total, Forest Service	20,250	19,970	40,220	20,657	14,483	35,140	20,862	13,909	34,771	205	-574	-369

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

End-of-Year Employment in the 1978 Budget Estimates

Appropriations	Fiscal Year 1976 Actual			Fiscal Year 1977 President's Budget			Fiscal Year 1978 President's Budget			Increase or Decrease 1978 over 1977		
	Permanent	All Other	Total	Permanent	All Other	Total	Permanent	All Other	Total	Permanent	All Other	Total
Forest Protection and Utilization:												
Forest Land Management	9,363	17,837	27,200	9,514	10,389	19,903	9,611	10,739	20,350	97	350	447
Forest Research	2,647	716	3,363	2,778	781	3,559	2,902	829	3,731	124	48	172
State and Private Forestry Cooperation	181	45	226	204	58	262	204	58	262	- -	- -	- -
Total, Forest Protection and Utilization	12,191	18,598	30,789	12,496	11,228	23,724	12,717	11,626	24,343	221	398	619
Construction and Land Acquisition	275	239	514	205	185	390	233	219	452	28	34	62
Forest Roads and Trails	3,816	4,915	8,731	3,826	3,309	7,135	3,477	2,881	6,358	-349	-428	-777
Construction and Operation of Recreation Facilities	69	128	197	63	110	173	69	124	193	6	14	20
Assistance to States for Tree Improvement	11	5	16	15	7	22	15	7	22	- -	- -	- -
Rangeland Improvements	- -	- -	- -	- -	- -	- -	67	62	129	67	62	129
Expenses, Brush Disposal	462	1,511	1,973	512	1,737	2,249	551	1,913	2,464	39	176	215
Other Forest Service Permanent Appropriations	3	3	6	4	2	6	4	2	6	- -	- -	- -
Consolidated Working Fund	55	2,627	2,682	21	- -	21	- -	- -	- -	-21	- -	-21
Working Capital Fund	550	661	1,211	504	633	1,137	594	783	1,377	90	150	240
Cooperative Work (Trust Fund)	1,248	2,333	3,581	1,252	2,440	3,692	1,252	2,440	3,692	- -	- -	- -
Youth Conservation Corps	70	207	277	97	304	401	58	198	256	-39	-106	-145
Watershed and Flood Prevention, SCS	137	284	421	127	211	338	90	136	226	-37	-75	-112
River Basin Surveys and Investigations, SCS	54	22	76	54	28	82	54	28	82	- -	- -	- -
Watershed Planning, SCS	20	8	28	20	13	33	19	13	32	-1	- -	-1
Resource Conservation and Development, SCS	3	1	4	1	1	2	1	1	2	- -	- -	- -
Salaries and Expenses, ARS	7	15	22	7	15	22	- -	- -	- -	-7	-15	-22
Forestry Incentives, ASCS	2	2	4	2	1	3	- -	- -	- -	-2	-1	-3
Rural Community Fire Protection Grants, FmHA	1	- -	1	2	- -	2	- -	- -	- -	-2	- -	-2
Oregon and California Grant Lands, BLM	16	9	25	23	13	36	25	19	44	2	6	8
Land and Water Conservation Fund, BOR	191	64	255	200	90	290	200	90	290	- -	- -	- -
Manpower Training Activities, DOL	529	313	842	612	413	1,025	603	395	998	-9	-18	-27
Federal-Aid Highway Trust Fund, DOT	105	188	293	57	110	167	71	138	209	14	28	42
Grand Total, Forest Service	19,815	32,133	51,948	20,100	20,850	40,950	20,100	21,075	41,175	- -	225	225

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Position Summary in the 1978 Budget Estimates

Appropriations	Fiscal Year 1976 Actual			Fiscal Year 1977 President's Budget			Fiscal Year 1978 President's Budget			Increase or Decrease 1978 over 1977		
	Permanent	All Other	Total	Permanent	All Other	Total	Permanent	All Other	Total	Permanent	All Other	Total
Forest Protection and Utilization:												
Forest Land Management	11,192	17,837	29,029	11,609	10,389	21,998	11,916	10,739	22,655	307	350	657
Forest Research	2,742	716	3,458	2,831	781	3,612	2,955	829	3,784	124	48	172
State and Private Forestry Cooperation	211	45	256	243	58	301	243	58	301	- -	- -	- -
Total, Forest Protection and Utilization	14,145	18,598	32,743	14,683	11,228	25,911	15,114	11,626	26,740	431	398	829
Construction and Land Acquisition	345	239	584	242	185	427	270	219	489	28	34	62
Forest Roads and Trails	4,616	4,915	9,531	4,600	3,309	7,909	4,251	2,881	7,132	-349	-428	-777
Construction and Operation of Recreation Facilities	84	128	212	73	110	183	79	124	203	6	14	20
Assistance to States for Tree Improvement	13	5	18	17	7	24	17	7	24	- -	- -	- -
Rangeland Improvements	- -	- -	- -	- -	- -	- -	67	62	129	67	62	129
Expenses, Brush Disposal	580	1,511	2,091	663	1,737	2,400	702	1,913	2,615	39	176	215
Other Forest Service Permanent Appropriations	3	3	6	5	2	7	5	2	7	- -	- -	- -
Consolidated Working Fund	60	2,627	2,687	32	- -	32	- -	- -	- -	-32	- -	-32
Working Capital Fund	694	661	1,3 5	646	633	1,279	736	783	1,519	90	150	240
Cooperative Work (Trust Fund)	1,455	2,333	3,788	1,451	2,440	3,891	1,451	2,440	3,891	- -	- -	- -
Youth Conservation Corps	74	207	281	111	304	415	72	198	270	-39	-106	-145
Watershed and Flood Prevention, SCS	194	284	478	173	211	384	136	136	272	-37	-75	-112
River Basin Surveys and Investigations, SCS	62	22	84	62	28	90	62	28	90	- -	- -	- -
Watershed Planning, SCS	24	8	32	26	13	39	25	13	38	-1	- -	-1
Resource Conservation and Development, SCS	3	1	4	2	1	3	2	1	3	- -	- -	- -
Salaries and Expenses, ARS	7	15	22	7	15	22	- -	- -	- -	-7	-15	-22
Forestry Incentives, ASCS	2	2	4	3	1	4	- -	- -	- -	-3	-1	-4
Rural Community Fire Protection Grants, FmHA	2	- -	2	2	- -	2	- -	- -	- -	-2	- -	-2
Oregon and California Grant Lands, BLM	17	9	26	24	13	37	26	19	45	2	6	8
Land and Water Conservation Fund, BOR	200	64	264	200	90	290	200	90	290	- -	- -	- -
Manpower Training Activities, DOL	650	313	963	684	413	1,097	675	395	1,070	-9	-18	-27
Federal-Aid Highway Trust Fund, DOT	133	188	321	72	110	182	26	138	164	-46	28	-18
Grand Total, Forest Service	23,363	32,133	55,496	23,778	20,850	44,628	23,916	21,075	44,991	138	225	363

RESOURCES PLANNING ACT SALE PREPARATION GOALS

Senator HATFIELD. What are the RPA sale preparation goals for fiscal 1978?

Mr. MCGUIRE. The RPA figure for 1978—and this was our initial budget request because we began with this program in all areas—was 13 billion board feet.

Senator HATFIELD. Thirteen billion board feet. And you made an initial request for funding to be in position to execute that goal?

Mr. MCGUIRE. That is correct.

Senator HATFIELD. Yet OMB only permitted you to come in with a request for 10.25 billion board feet?

Mr. MCGUIRE. Yes, 10.25 of sales preparation plus another 250 million of offerings.

HOUSING STARTS

Senator HATFIELD. Chief, tell me again a résumé of the new housing start picture.

Mr. MCGUIRE. Well, the newspapers report that housing starts last month were at the highest level they have been in a very long time. I think the figure was 1.8 million at an annual rate.

Senator HATFIELD. So the Wall Street Journal, I think it was, the New York Times and various industrial publications have all confirmed that figure pretty well. Don't you feel that that is a pretty accurate figure?

Mr. MCGUIRE. Yes; I think that is an accurate figure and statistics on new building permits bear it out.

Senator HATFIELD. Chief, in the past, what has happened when new housing starts have taken a sharp increase? I am talking about the last decade or so. And demand has increased.

Mr. MCGUIRE. Prices have jumped sharply and this has already started to happen. The last few increases in the wholesale price index showed a rather large contribution from the timber sector.

Senator HATFIELD. So we find the sharp increases in prices and low availability of material to meet those demands, and then Senator Proxmire calls a meeting of the Banking Committee to ask the industry why the prices are all sharply increasing.

Hasn't that been the litany of the past?

Mr. MCGUIRE. That certainly has, Mr. Chairman.

Senator HATFIELD. Then it comes back to a matter that industry has not been able to keep up with supply. Have you testified before those hearings of the Banking Committee?

Mr. MCGUIRE. No, sir. I have not testified before that committee for several years. I think the last crisis was the time of my last testimony.

PUBLIC SERVICE JOBS

Senator HATFIELD. You made an allusion or reference to the fact that you are not sure yet where the administration is going to come down on the role that the Forest Service may be asked to play in the unemployment picture.

Mr. MCGUIRE. We are fairly certain of the administration's position. It appears that now we will have about half of the Young Adult Conservation Corps program. The other half will go to Interior.

Senator HATFIELD. What will this be? Mostly reforestation?

Mr. MCGUIRE. It will include a great variety of jobs that have not been done over the past decade or so and that need to be done. Trail maintenance is another example, thinning, campground improvements, that sort of thing.

We have in total about $2 billion of needed work that has not been done and this is the kind of work that is labor intensive and could be done by these young adults who are now unemployed.

TIMBER SALE PREPARATION

Senator HATFIELD. When you mentioned about 3,700-plus in new positions to fully implement the level of funding that has been appropriated by the Congress for fiscal 1977, would this be a carryover of the same required number for fiscal 1978 if we were to move the cut from 10.25 billion board-feet requested in fiscal 1978 to the 11.47 billion board-feet which we have now appropriated money for in the fiscal 1977 supplemental?

Mr. MCGUIRE. It would be about the same, Mr. Chairman.

Senator HATFIELD. How much additional funding would you require to keep that level in fiscal 1978 at 11.47 billion board feet, the level of the supplemental? I asked about manpower. Now I am talking about the total budget requirement.

Mr. MCGUIRE. We don't have that worked out, but we can provide it.

Senator HATFIELD. Would you get that for us?

Also, when you are doing that for the record, would you see what additional funding you would need to reach the RPA goal of 13 billion board feet, both in money and manpower?

Mr. MCGUIRE. We will do that, Mr. Chairman.

[The information follows.]

FY 1978 FOREST SERVICE TIMBER SALE PROGRAM
AT AN 11.47 BILLION BOARD FEET LEVEL

Increased funding and manpower over the budget request needed to reach an 11.47 billion board feet timber sale offerings program level in fiscal year 1978 and maintain this level in subsequent years is distributed as follows. These increases do not include allowance for inflation on purchases of supplies, equipment, travel, contracts, etc., over the total program which amounts to $3,517,000 for sales administration and management in fiscal year 1978.

INCREASED FUNDING AND MANPOWER NEEDED OVER
BUDGET REQUEST TO MEET AN 11.47 BILLION
BOARD FEET SALE OFFERINGS PROGRAM IN FY 1978

Appropriation Item and Projects	Increased Funding Needed		Employment Increase of Permanent Full-Time Positions
	FY 1977	FY 1978	
FOREST PROTECTION AND UTILIZATION:			
FOREST LAND MANAGEMENT:			
National forest protection and management:			
Timber resource management:			
(a) Sales administration and management	4,223,000	17,371,000	561
- Preparation and management	(2,964,000)	(12,480,000)	(391)
- National Forest timber inventory, plans, and silvicultural examination	(1,259,000)	(4,891,000)	(170)
Recreation use	134,000	1,211,000	19
Wildlife and fish habitat management	130,000	704,000	13
Rangeland management	20,000	157,000	2
Soil and water management	140,000	1,219,000	23
Minerals area management	33,000	275,000	6
Forest fire protection	59,000	534,000	7
General land management activities	220,000	1,795,000	36
Special uses-non-recreation	(5,000)	(56,000)	(1)
Land classification, adjustments, and surveys	(215,000)	(1,739,000)	(35)
Total, National Forest protection and management	4,959,000	23,266,000	667
Cooperative law enforcement	-	21,000	-
TOTAL, FOREST LAND MANAGEMENT	4,959,000	23,287,000	667
TOTAL, FOREST PROTECTION AND UTILIZATION	4,959,000	23,287,000	667
FOREST ROADS AND TRAILS:			
Construction	12,741,000	47,842,000	335
Maintenance	300,000	2,302,000	9
Total	13,041,000	50,144,000	344
FOREST ROADS:			
Timber purchaser road construction	-	5,510,000	-

RESOURCES PLANNING ACT FY 1978 FOREST SERVICE TIMBER SALE PROGRAM

Increased funding and manpower over the budget request needed to reach and maintain the RPA Program level of 13.0 billion board feet, local scale, of timber sale preparation is distributed as follows. These increases do not include allowance for inflation on purchases of supplies, equipment, travel, contracts, etc., over the total program which amounts to $4,772,000 for sales administration and management in fiscal year 1978.

INCREASED FUNDING AND MANPOWER NEEDED OVER
BUDGET REQUEST TO MEET THE RPA PROGRAM
LEVEL OF 13.0 BILLION BOARD FEET IN FISCAL YEAR 1978

Appropriation Item and Projects	Increased funding Needed FY 1977	Increased funding Needed FY 1978	Employment Increase of Permanent Full-Time Positions
FOREST PROTECTION AND UTILIZATION:			
FOREST LAND MANAGEMENT:			
National forest protection and management:			
Timber resource management:			
(a) Sales administration and management	9,100,000	36,538,000	1,209
- Preparation and management	(7,300,000)	(29,341,000)	(963)
- National Forest timber inventory, plans, and silvicultural examination	(1,800,000)	(7,197,000)	(246)
Recreation use	240,000	2,073,000	34
Wildlife and fish habitat management	150,000	1,249,000	22
Rangeland management	30,000	262,000	3
Soil and water management	250,000	2,165,000	41
Minerals area management	60,000	486,000	11
Forest fire protection	110,000	957,000	13
General land management activities	360,000	3,049,000	59
Special uses--non-recreation.	(10,000)	(93,000)	(2)
Land classification, adjustments, and surveys	(350,000)	(2,956,000)	(57)
Total, National Forest protection and management	10,300,000	46,779,000	1,392
Cooperative law enforcement	-	54,000	-
TOTAL, FOREST LAND MANAGEMENT	10,300,000	46,833,000	1,392
TOTAL, FOREST PROTECTION AND UTILIZATION	10,300,000	46,833,000	1,392
FOREST ROADS AND TRAILS:			
Construction	15,300,000	102,582,000	401
Maintenance	400,000	3,158,000	12
Total	15,700,000	105,740,000	413
FOREST ROADS:			
Timber purchaser road construction.	-	31,791,000	-

ABILITY TO REACH RPA GOALS

Mr. McGUIRE. If I might add, Mr. Chairman, it is too late to get to the level of RPA. We need some lead time.

Senator HATFIELD. How much lead time?

Mr. McGUIRE. Probably by 1979. You see, RPA contemplated getting on a track and staying there. It is difficult to make annual adjustments of such magnitude. We could probably go to about 11.8 billion board feet instead of 13 billion board feet in 1978.

Senator HATFIELD. Chief, I am sure you feel as frustrated as we do here on the Hill because it appears that when we set a goal such as the RPA and it is heralded and acclaimed as a great positive step, it is ignored like a lot of other reports and goals. Now we, in the Congress, have increased your funding, but the administration evidently vetoed that effectively by limiting you in personnel. So even with increased funding available and a directive to use it for certain goals, we still have the Congress totally frustrated by the failure of the administration to provide you with the manpower to implement it.

How do we get around that particular problem? What can we do with you on the Hill to make sure that when we appropriate moneys for certain programs, that will is executed by the Executive Department through your agency?

Mr. McGUIRE. If there has been a failure, Mr. Chairman, it has been a bipartisan one. This administration has had very little time to look over the budget presented by President Ford.

Senator HATFIELD. I am not suggesting that there was anything partisan about it. I can go back to President Johnson and come through to President Nixon, and President Ford. I have not seen anything that indicated any great change under President Carter. That is the frustrating thing about it. It has been a rather consistent pattern followed by the executive branch for at least the 10 years that I have been here.

Mr. McGUIRE. As you know, the great hope when the Resources Planning Act was passed was that we would get away from this annual problem. We had hoped that Congress could somehow find time to hold hearings on the RPA program. Of course, that time was pretty much taken up with the National Forest Management Act as a result of the *Monongahela* decision.

The program is still before you and, again, I would urge that the Senate hold hearings on the program and it could thereby make a legislative record of oversight analysis and support or change the program.

Whether that would, in itself, result in higher budget requests, I don't know. We are, it is true, competing with many other worthy programs. We have not been able to achieve a higher priority for resource programs of any kind. It is not just timber. We are equally deficient, below program levels, in wildlife management, recreation and in other resource areas.

RECREATION

Senator HATFIELD. You had a backlog of $80 million the last I recall in park and campsite operation and maintenance.

Mr. McGUIRE. That is exactly right. Just take our trail system, for example. At one time we had about 150,000 miles of trails. Because of lack of maintenance, now we are down to about 90,000 miles. This is a very desirable form of recreation. It requires very little in the way of capital investment.

We have been unable to maintain the mileage we inherited from the old Civilian Conservation Corps. Yet the use of trails for back packing and hiking and so on is growing very rapidly.

Senator HATFIELD. Again, we had money not only for timber management, but we ordered $33 million, as I recall, for recreational purposes in the supplemental for you. And yet, money is of no consequence if you don't have the personnel to carry out the goals or even to carry out the appropriation levels. You are really a bastard child over there in that Agriculture Department; aren't you?

Mr. McGUIRE. I wouldn't say that, Mr. Chairman. [Laughter.]

I think it is the best place for us to be.

Senator HATFIELD. Oh, Chief, put a new prescription in your glasses. You would be so much better off in Interior. All you are over there is a stepchild to that Agriculture machine of research. It has not demonstrated much capacity in my opinion.

As I say, the last person who knew the difference between a birch and a fir tree was probably Secretary Freeman. I don't think we have had any secretary since that time who knew anything about forestry and I think it is reflected in this miserable record. That is a miserable record and if you had somebody over there who had some guts, they could go into OMB and knock a few eyeshades off those accountants and get some money for the Forest Service.

The trouble is they just lie down and let them run over you. I just can't understand how anyone can call himself an Assistant Secretary of Agriculture in charge of forestry who has not been able to do better than this.

I would be willing to take a chance in moving you over into the Department of Health, Education and Welfare. The record couldn't be much worse than what you have had in the Department of Agriculture.

Mr. McGUIRE. I hope you won't push that idea, sir. [Laughter.]

Senator HATFIELD. I am not going to push that very hard. When we talk about RPA hearings we will have to talk to our friends over in the Agriculture Committee to hold those hearings. Those do not come under this committee's jurisdiction, as I understand it.

DROUGHT SITUATION

You mentioned the drought problems in your statement, Chief McGuire. I realize that it is difficult to determine your needs to meet this problem, but could you give us some indication of where we might expect additional funding to be channeled?

Mr. McGUIRE. An immediate need is to channel additional funds into our cooperative fire program with the States for prevention and presuppression activities. A number of States in the drought areas have asked their legislatures for additional money. Our funds would be used to supplement new State moneys. Additional funds would also be used for stepped up detection surveys to provide early detection of insect outbreaks in high value stands of high susceptibility.

In some areas we will defer reforestation programs in favor of increased emphasis on timber stand improvement. Some range fencing and revegetation projects will be foregone in favor of development of water supplies. Additional funding will also be used for fish salvage projects.

Senator HATFIELD. What are the major programs that might need increased funding to handle drought problems?

Mr. MCGUIRE. Cooperation in Forest Fire Control and Forest Insect and Disease Management. However, a major need is for personnel ceiling relief to enable us to expend funds already made available, and to utilize new and expanded employment programs that would provide manpower for drought-related and other needed projects.

REFORESTATION AND TIMBER STAND IMPROVEMENT

Senator HATFIELD. As you know, this committee again, Chief, some 4 years ago decided to try to put the Forest Service on a 10-year base for reforestation. At that time I think we had somewhere between 3½ and 4 million acres of unreforested lands. In fiscal 1975 and 1976 this committee increased the money for these lands by nearly 30 percent.

In 1975 Congress raised the funding from $35.3 million to $51.3 million. In fiscal 1976 it was raised from $46.7 million to $61.9 million. Last year, for the first time, there was enough money to meet the 10-year schedule and I think we ought to raise a hearty commendation to the Ford administration for being the first, in my memory, that initially requested sufficient money to keep a 10-year schedule on the reforestation backlog.

Now, the National Forest Management Act, referred to as the Monongahela Act, requires the Forest Service to eliminate the backlog in 8 years and the act authorizes $200 million annually for this purpose. This year the reforestation budget was the same as last year, but the funds for timber stand improvement are reduced by about $3½ million.

My question is, does this level of funding put you within the 10-year schedule for eliminating the backlog and, if not, how much additional funding is needed to maintain that time schedule of 10 years?

Mr. MCGUIRE. It does not permit us to maintain that schedule, Mr. Chairman. To meet that schedule, including both timber stand improvement and reforestation, the RPA level was about $86 million as compared to about $65 million in the budget request. We would be about $20 million below, including timber stand improvement.

Senator HATFIELD. They reduced timber stand improvement by $2.6 million in the fiscal 1977 budget; didn't they?

Mr. MCGUIRE. That is correct.

Senator HATFIELD. How do they justify that kind of backward regression? That is redundancy but that is appropriate for this particular occasion.

Mr. MCGUIRE. When funds are limited, this is the kind of thing that always can be put off another year. If it had not been for your help and this committee's help, we would not even be at the level we are now.

Senator HATFIELD. So we had a $2.6 million reduction in fiscal 1977, for timber stand improvement and we had a reduction of $3.4 million in 1978; is that correct?

Mr. NELSON. Mr. Chairman, $21,805,000 was appropriated for timber stand improvement in fiscal year 1976, $25,284,000 in fiscal year 1977, and the figure is $21,937,000 in fiscal year 1978, a drop of $3.3 million.

Senator HATFIELD. Tell me again what the justification was—there are other priorities for spending, is that the kind of word you get back?

Mr. MCGUIRE. I think this has always been our problem with reforestation. It doesn't seem to carry the urgency some other programs have. We can put it off another year, and lose a year's growth. But the impact of that is not felt for several decades.

TIMBER SALES PREPARATION

Senator HATFIELD. Under timber sales you propose to increase the amount for sale preparation by $3 million and decrease harvest administration by the same amount. You say this adjustment is possible based on the assumption that harvest demand will be 10.5 billion board feet. How did you arrive at that assumption?

Mr. MCGUIRE. The 10.5 billion board feet harvest volume was the administration's estimate of demand for national forest timber in fiscal year 1978. This estimate was based upon an outlook for new construction that was rising slowly in 1976 for new housing but had declined for nonresidential construction. Market indicators showed growth in 1977 but at a slower pace as the economic recovery began to mature. The estimate assumed a slowly rising economy with a moderate demand for wood products.

Subsequent to preparation of the budget estimates, we find that markets for timber products have trended upward with good prospects for continued growth in the period immediately ahead. The longer run outlook is also one of fairly rapid growth. Based on these trends we now believe that the harvest of national forest timber will reach or exceed 11.5 billion board feet local scale in fiscal year 1978.

Senator HATFIELD. In the current supplemental for fiscal year 1977 we have increased the amount for timber sale preparation by $9.2 million. Won't that increase your 1978 harvesting program?

Mr. MCGUIRE. Yes. The additional national forest timber we will sell in fiscal year 1977 will give industry an increased flexibility to ogranize its harvesting program to best meet cost, accessibility, and marketing constraints. This will allow industry to respond to the rising demand for lumber and plywood by expanding production to near full capacity. And yet they will have a continuing supply of timber for future production. We would expect the harvest of national forest timber in fiscal year 1978 to reach or exceed 11.5 billion board feet, local scale.

Senator HATFIELD. Will you be able to administer the harvest properly with a reduction of $3 million?

Mr. MCGUIRE. We would expect to experience considerable difficulty in maintaining our quality standards in the administration of timber sales with this reduction. The administration of the harvest of timber

is oriented toward controlling the activities involved in harvesting rather than the volume of timber harvested. Any time harvesting activities are active on a timber sale they must be monitored or controlled regardless of the actual volume harvested. The difficulty is made more apparent when the funding is adjusted to 1973 constant dollars for comparision. In terms of 1973 constant dollars our funding request for harvest administration in fiscal year 1978 is approximately $3.3 million or 11 percent lower that it was in fiscal year 1973. During that same period our harvest administration responsibilities have increased. The effort required and the funding and manpower are going in opposite directions. Therein lies our difficulty.

Senator HATFIELD. Would your RPA estimates supplied earlier reflect a more realistic level? Why don't you break those estimates down by subactivity for the entire sales administration program and indicate your capability?

Mr. MCGUIRE. The RPA estimates do represent our projection of the realistic program needs for fiscal year 1978. We will supply a table to show the subactivities for the sales administration program.

[The information follows:]

Sales administration and management

[Dollars in thousands]

	Output	Funding estimate
Sale preparation—million board feet	13,000	$81,450
Harvest administration (estimated harvest in million board feet)	11,500	38,800
Enforcement of log export and substitution controls		500
Subtotal, preparation and harvest		120,750
Timber inventory, management planning, and stand management control—number of plans	45	9,793
Silvicultural examination—thousand acres	8,064	15,110
Subtotal, inventory and examination		24,903
Total		145,653

Mr. MCGUIRE. The RPA program could be met in fiscal year 1978 for all the subactivities in sales administration and management except for sales preparation. The Forest Service could prepare 12.1 billion board feet, local scale, and offer for sale 11.8 billion board feet of timber provided the buildup in manpower and program were begun in fiscal year 1977—by May 1—so that the necessary training of new employees and advance sale preparation for fiscal year 1978 sales could begin during the summer field season. The Forest Service could not now move from the current 11.47 billion board feet program to a 13 billion board feet program for fiscal year 1978. The necessity to operate under a constrained budget situation and restrictive employment ceilings has brought about serious reductions in the manpower and funding that could be committed to advance sale preparation of timber sale volumes for sales to be made in fiscal years 1978, 1979, and 1980. In addition, we expect a continuation of the many appeals and lawsuits we are experiencing in regard to our timber sale programs and the entering of roadless areas for timber harvest.

83-107 O - 77 - pt. 6 - 3

Senator HATFIELD. Tell me again about what you contribute to the general fund of the U.S. Treasury from timber sales, licenses, et cetera.

Mr. MCGUIRE. Our payments to the Treasury run in the neighborhood of $500 million.

Senator HATFIELD. $500 million. Half a billion dollars your agency contributes back to the general Treasury?

Mr. MCGUIRE. Yes, sir. Then there are other credits that ought to be recognized, that accrue to other accounts than ours. We do quite a bit of work in the minerals field but the payments there are credited to the Interior Department account. The capital investments we acquire in the way of roads paid for with timber, the nonmarket values produced, if you added all of those together, I am sure our receipts would equal our expenditures, well over $1 billion a year.

Senator HATFIELD. What other agency of the Government does that? None. We should try to take some of that money that is generated out of those revenues and reinvest it in good conservation practices, vis-a-vis reforestation, timber stand improvement, recreation, and the sales program. At a time when housing starts are booming, and materials are going to be in increasing demand, we get a budget like this. It is incomprehensible, to put it mildly. It is not good conservation. It is not good management. It is not good for housing. It is not good for the people of this country.

Of course, the people who will be cut out will be the poor people. They are the first to get cut out of anything when it comes to a matter of increased prices in the marketplace, and shortages of material. The rich can care for themselves, but it will be the poor and the middle class.

We note receipts for 1978 are projected to exceed $621 million, a 13-percent increase over the 1977 estimate. Is that still your best estimate?

Mr. MCGUIRE. Our best estimate is still $621 million for 1978.

Senator HATFIELD. Will the timber sale increases in the supplemental have any effect on the anticipated 1978 receipts?

Mr. MCGUIRE. Yes. We would expect that the additional timber volume we sell in fiscal year 1977 would provide industry the flexibility and option of increasing timber harvest from national forest lands. In response to the rising demand for lumber and plywood we would expect the national forest harvest to reach or exceed 11.5 billion board feet, local scale. An increase to 11.5 billion board feet would add about $55 million in anticipated fiscal year 1978 timber receipts.

Senator HATFIELD. Your figures show close to a $150 million increase in estimated receipts from 1976. What factors account for this rise?

Mr. MCGUIRE. The increase in timber receipts projected in fiscal year 1978 is based on a weighted average stumpage rate per million board-feet, and a forecast of harvest expectation in fiscal year 1978. Involved in this forecast are the historic pattern of business cycles, current housing starts trend, interest rates, expected Federal Government actions in the housing market, et cetera.

Senator HATFIELD. With the new legislation and its various taps on receipts, what is the total now estimated to be paid out of receipts under permanent appropriation authority?

Mr. MCGUIRE. $190.5 million to States and counties.

NURSERY PRODUCTION

Senator HATFIELD. Have you the capacity in your nursery or other sources for increasing reforestation—if this committee provides more funding, and I believe that this committee will maintain its good record of responsibility by increasing your reforestation budget up to a 10-year base period. What about the nursery stock?

Mr. NELSON. Mr. Chairman, in 1978 we could not plant many more acres than we have scheduled here, In 1977, we have had increases in nursery funding and these nurseries will be coming on line in several years.

Senator HATFIELD. Do we have a 2-year, 3-year leadtime on that?

Mr. NELSON. Yes, sir. It takes 2- to 3-year leadtime from the time we establish the nursery to the time we can get production on line.

Senator HATFIELD. Have you checked out the inventory of Weyerhauser and some of the others that might have an overstock or oversupply that you could buy up with any kind of increased funding?

Mr. NELSON. We usually do buy some stock. We have been buying about 20 million seedlings per year from other sources and we continue to look at these.

Senator HATFIELD. Do you have a priority of reforestation set, the ones that, say, would be considered the most productive sites to try to reforest them first? How do you set a priority?

Mr. NELSON. We set our priority in the manner you indicated, most productive sites first and those that are accessible, also.

TIMBER SALVAGE SALES

Senator HATFIELD. How much would be required to increase the budget in the area of timber salvage sales to maintain in 1978 the level that we set in 1977?

Mr. RESLER. Mr. Chairman, we have completed a study aimed at a long-range effort to get on top of the salvage problem. We estimate in addition to the $3 million set up in the fiscal 1977 supplemental, that we need $3.9 million in 1978. That will begin to prime the pump, hopefully, so that we can sustain a substantial effort on the order of 1 billion board feet a year of salvage, using the salvage fund authority in the National Forest Management Act.

Senator HATFIELD. Is this geared somewhat to the small operator? Is he in that picture significantly?

Mr. RESLER. I think that the small operator would be ideally suited to this program for the simple reason that in a lot of areas the type of timber that could be removed would be relatively small. It tends to be scattered. It requires small equipment and small crews to make an efficient operation. We think that this kind of program, while it will have offerings that are attractive to large firms, in the main, small business qualifying firms would be able to handle anything that would be offered.

Senator HATFIELD. I have had communications from many small operators trying to survive in this ever-growing cannibalistic economy where the big are eating up the small and they feel that this is one area, the forest salvage area, where they can not only more effectively handle the task, but it is really a survival question with them.

Mr. MCGUIRE. We would agree.

Senator HATFIELD. Besides funding and having personnel to make it available, are there other things that the Forest Service can do or is there authorization needed? Would that be something you could approach through the SBA set-aside program?

Mr. RESLER. Mr. Chairman, I believe that we have adequate authority for this program. Our biggest problem is to be able to move aggressively and efficiently in the preparation of primarily salvage-type operations. We are looking at a number of options that would include different appraisal techniques, different methods of laying out the offerings so that we can reduce our own manpower requirements and put the salvage-type operations up more expeditiously. They tend to be of relatively low value, at least, for instance, in the eastern half of your State.

The basic point is that we get in quickly and get that salvage done. As you know, over the last decade, major losses have occurred due to killing by insects in all of the mountainous west.

Our goal is to salvage as much of that material as we can afford to salvage on those areas that are planned to be managed for developed-types of uses. There is, obviously, a substantial amount of volume in areas that will be studied for wilderness and similar uses that would preclude salvage. But we have a tremendous area in which we can accelerate our efforts.

Senator HATFIELD. You feel that it is primarily a funding question then?

Mr. RESLER. Funding and manpower, yes. These sales are relatively high cost in terms of manpower requirements in relation to volume offered. We are trying to find ways to reduce costs of preparation.

Senator HATFIELD. What did you say that your total capability and additional money needs would be for that program?

Mr. RESLER. It depends a great deal on how rapidly we can clear some of the constraints such as land-use planning on a number of the areas. We think we can in 2 or 3 years get about 1 billion board feet of offerings, primarily in salvage that would be associated with the revolving fund account. A portion of our regular timber sale offerings includes salvage.

Senator HATFIELD. That would be in addition to the present level?

Mr. RESLER. Yes.

Senator HATFIELD. If you want to undertake an expanded role in the employment, particularly with young people, this would be one of the areas that the Chief referred to a while ago that would be very significant and an instructive area for them to work in.

Mr. RESLER. Yes, it would, especially in thinning of forest stands. Stocking control is of paramount importance in many species to prevent or minimize their susceptibility to insect attack. We need to do a great deal of work in the younger stands to gain stocking control.

In those areas where we would be operating, a great deal of effort is needed to create fuel breaks. We have vast areas in the Western States that are in a high state of risk from catastrophic fires. One of the things we would do is create fire breaks with the manpower program.

COOPERATIVE FIRE MANAGEMENT

Senator HATFIELD. In this area both of employment and related specifically to the drought, what was the requested level for Clark-McNary forest fire funds in this budget and what would be required in addition to maintain the level of the program from the previous year?

Mr. MCGUIRE. The budget request for 1978 is about one-half of the appropriation for 1977. It is around $11 million. It would take another $10 million approximately.

Senator HATFIELD. Did you make a full request to OMB?

Mr. MCGUIRE. Yes, we did.

Senator HATFIELD. Then they cut it in half?

Mr. MCGUIRE. Yes, sir.

Senator HATFIELD. How do you see that as a part of your way of dealing with this drought problem out there? Do you find it a significant program?

Mr. MCGUIRE. It is. In fact, because of the drought we have been in touch with the State foresters who receive this money. We find that they are also having problems in getting ready for the drought and possibly more fires.

They have suggested to us that they would like to see in 1978 a still higher level of about $30 million. Mr. Thornton may want to add to what I said.

Mr. THORNTON. I might point out, sir, that the RPA figure for this program is about $38 million and the history of it has been fairly constant at about $20 million, most of which is payments to States. This reduction, for some States now getting 50 percent of dollars from the Federal Government, would be severe.

Some of the States have strong capability and it only amounts to 15 percent or so of their total expenditure.

Senator HATFIELD. The history of that is pretty consistent. It was cut in half last year, cut in half again this year. It seems to me in a year of drought, a fire control program of this kind which has such an excellent record of performance and provability would be one of the high priorities.

Mr. THORNTON. We already have ample evidence in Minnesota and New Jersey. A severe testing of State forest agencies is coming on line.

Senator HATFIELD. Dr. Cutler this morning is over on a task force talking about what the Forest Service and Agriculture Department can do for the drought.

Mr. THORNTON. Yes.

Senator HATFIELD. But he has had no input into this budget at this point.

Mr. THORNTON. That is correct.

FOREST ROADS

Senator HATFIELD. Let's turn now to forest roads.

Again, Chief, you are aware of the action taken by the supplemental bill in reference to roads?

Mr. MCGUIRE. Yes, sir.

Senator HATFIELD. It appears to me that looking at the budget there is an overall reduction in the roads program for the 1978 budget. Why is there a reduction, particularly in the area of appropriated funds?

Mr. NELSON. In the 1978 budget we have elected to go to an increase in purchaser credit as opposed to the forest roads and trail funding. We received an add-on last year from the Congress of $72 million and that enabled us to get some of the layout and design prepared so we could go into purchaser credit in fiscal 1978 and get the sales on line faster.

Senator HATFIELD. At this level of funding, as your budget is presently before us, will there be a possible impact on the timber sales program?

Mr. NELSON. At the level of budgeting that we have for forest roads and trails and purchaser credit, we are planning a sales preparation program of 10.25 billion board feet and an additional offering of 250 million board feet of sales prepared.

Senator HATFIELD. What was the relative level suggested by RPA?

Mr. MCGUIRE. The RPA for fiscal year 1978 was $242 million as compared to $178 million in the budget request.

Senator HATFIELD. In fact——

Mr. MCGUIRE. Excuse me, Mr. Chairman. It should be $293 million instead of $242 million.

RPA AS COMPARED TO FISCAL YEAR 1978 BUDGET REQUEST

Senator HATFIELD. Chief, in fact, I believe you prepared at our request a chart here showing the fiscal 1978 budget estimate and the RPA level for 1978 with the percentage difference.

Mr. MCGUIRE. Yes. I am familiar with that, Mr. Chairman.

Senator HATFIELD. I believe that we will have that placed in the record at this point because I think that it highlights again the comparative figures, not only in the forest roads program, but every part of the Forest Service, from forest land management to forest research to forest protection, forest construction, land acquisition, trails, recreation, and forest roads.

[The information follows:]

U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Program Development and Budget
April 12, 1977

Appropriation	FY 1978 Budget Estimate	FY 1978 RPA Level	Difference Col. (2)-(1)	Percent of Column (1) to (2)	85% of RPA Level	Difference Col. (5)-(1)
	(1)	(2)	(3)	(4)	(5)	(6)
FOREST PROTECTION AND UTILIZATION:						
Forest land management:						
Sales administration and management	$109,115,000	$145,653,000	$36,538,000	75	$123,805,000	$14,690,000
Reforestation and stand improvement	65,227,000	85,877,000	20,650,000	76	72,995,000	7,768,000
Recreation use	65,587,000	105,862,000	40,275,000	62	89,983,000	24,396,000
Wildlife and fish habitat management	16,000,000	35,013,000	19,013,000	46	29,761,000	13,761,000
Rangeland management	22,536,000	36,475,000	13,939,000	62	31,004,000	8,468,000
Soil and water management	22,310,000	38,781,000	16,471,000	58	32,964,000	10,654,000
Minerals area management	10,360,000	12,939,000	2,579,000	80	10,998,000	638,000
Forest fire protection	44,644,000	76,130,000	31,486,000	59	64,711,000	20,067,000
General land management activities:	40,643,000	67,213,000	26,570,000	60	57,902,000	17,259,000
Special uses--non-recreation	(6,218,000)	(8,492,000)	(2,274,000)	73	(7,218,000)	(1,000,000)
Land classification, adjustments, and surveys	(15,596,000)	(34,174,000)	(18,578,000)	46	(29,048,000)	(13,452,000)
Maintenance of improvements for fire and general purposes (including communications)	(13,689,000)	(19,407,000)	(5,718,000)	71	(16,496,000)	(2,807,000)
Payments to Employees' Compensation Fund	(5,140,000)	(5,140,000)	(- -)	100	(5,140,000) 1/	(- -)
Total, Forest protection and management	396,422,000	603,943,000	207,521,000	66	514,123,000	117,701,000
Fighting forest fires	4,275,000	4,275,000	- -	100	4,275,000 1/	- -
Forest insect and disease management	18,011,000	29,006,000	10,995,000	62	24,655,000	6,644,000
Cooperative law enforcement	5,865,000	8,214,000	2,349,000	71	6,982,000	1,117,000
Total, Forest land management	424,573,000	645,438,000	220,865,000	66	550,035,000	125,462,000
Forest research:						
Forest and range management research:						
Trees and timber management research	15,903,000	21,125,000	5,222,000	75	17,956,000	2,053,000
Forest watershed management research	8,510,000	10,388,000	1,878,000	82	8,830,000	320,000
Wildlife, range, and fish habitat research	6,945,000	9,904,000	2,959,000	70	8,418,000	1,473,000
Forest recreation research	2,079,000	4,277,000	2,198,000	49	3,635,000	1,556,000
Surface environment and mining	2,603,000	2,612,000	9,000	99	2,603,000 2/	- -
Total, Forest and range management research	36,040,000	48,306,000	12,266,000	75	41,442,000	5,402,000
Forest protection research:						
Fire and atmospheric sciences research	8,769,000	10,790,000	2,021,000	81	9,172,000	403,000
Forest insects and disease research	19,966,000	23,459,000	3,493,000	85	19,966,000	- -
Total, Forest protection research	28,735,000	34,249,000	5,514,000	84	29,138,000	403,000

1/ 100% of RPA level.
2/ Budget estimate.

2551

Appropriation	FY 1978 Budget Estimate	FY 1978 RPA Level	Difference Col. (2)-(1)	Percent of Column (1) to (2)	85% of RPA Level	Difference Col. (5)-(1)
FOREST PROTECTION AND UTILIZATION--continued	(1)	(2)	(3)	(4)	(5)	(6)
Forest research--continued						
Forest products and engineering research:						
Forest products utilization research	$11,861,000	$13,182,000	$1,321,000	90	$11,861,000 3/	- -
Forest engineering research	1,649,000	3,354,000	1,705,000	49	2,851,000	$1,202,000
Total, Forest products and engineering research	13,510,000	16,536,000	3,026,000	82	14,712,000	1,202,000
Forest resource economics research:						
Renewable resources evaluation	13,202,000	15,816,000	2,614,000	83	13,444,000	242,000
Forest economics and marketing research	4,163,000	4,424,000	261,000	94	4,163,000 3/	- -
Total, Forest resource economics research	17,365,000	20,240,000	2,875,000	86	17,607,000	242,000
Total, Forest research	95,650,000	119,331,000	23,681,000	80	102,899,000	7,249,000
State and private forestry cooperation:						
Cooperation in forest fire control	11,861,000	38,271,000	26,410,000	31	32,530,000	20,669,000
Cooperation in forest tree production	345,000	942,000	597,000	37	801,000	456,000
Cooperation in forest management and processing	7,370,000	14,755,000	7,385,000	50	12,542,000	5,172,000
General forestry assistance	5,167,000	11,395,000	6,228,000	45	9,686,000	4,519,000
Total, State and private forestry cooperation	24,743,000	65,363,000	40,620,000	39	55,559,000	30,816,000
TOTAL, FOREST PROTECTION AND UTILIZATION	544,966,000	830,132,000	285,166,000	66	708,493,000	163,527,000
CONSTRUCTION AND LAND ACQUISITION:						
Recreation use areas	6,208,000	22,117,000	15,909,000	28	18,799,000	12,591,000
Construction for fire, administration and other purposes	6,102,000	13,234,000	7,132,000	46	11,249,000	5,147,000
Research construction	300,000	2,327,000	2,027,000	13	1,978,000	1,678,000
Pollution abatement	8,084,000	11,191,000	3,107,000	72	9,512,000	1,428,000
Land acquisition, Weeks Act	1,480,000	3,780,000	2,300,000	39	3,213,000	1,733,000
Land planning, Alpine Lakes Area Management Act	390,000	390,000	- -	100	390,000 1/	- -
TOTAL, CONSTRUCTION AND LAND ACQUISITION	22,564,000	53,039,000	30,475,000	43	45,141,000	22,577,000
FOREST ROADS AND TRAILS:						
Cash: 10% Fund	51,850,000	51,850,000	- -	100	51,850,000 1/	- -
Federal-Aid Highway Act of 1973	78,781,000	78,781,000	- -	100	78,781,000 1/	- -
Appropriation Act	126,241,000	241,183,000	114,942,000	52	197,229,000 2/	70,988,000
Total cash	256,872,000	371,814,000	114,942,000	69	327,860,000	70,988,000

1/ 100% of RPA level.

2/ Appropriated cash needed to cover program level. Balance of cash needs to be derived from National Forest Fund receipts (10% Fund).

3/ Budget estimate.

Appropriation	FY 1978 Budget Estimate	FY 1978 RPA Level	Difference Col. (2)-(1)	Percent of Column (1) to (2)	85% of RPA Level	Difference Col. (5)-(1)
FOREST ROADS AND TRAILS--continued	(1)	(2)	(3)	(4)	(5)	(6)
Program level and budget authority:						
Roads -- construction	$117,756,000	$212,203,000	$94,447,000	55	$180,373,000	$62,617,000
maintenance	48,862,000	60,929,000	12,067,000	80	51,790,000	2,928,000
Trails-- construction	4,697,000	8,961,000	4,264,000	52	7,617,000	2,920,000
maintenance	6,776,000	10,940,000	4,164,000	62	9,299,000	2,523,000
TOTAL, FOREST ROADS AND TRAILS--program level and budget authority	178,091,000	293,033,000	114,942,000	61	249,079,000	70,988,000
FOREST ROADS (timber purchaser construction)	212,115,000	200,876,000	-11,239,000	106	170,745,000	-41,370,000
RANGELAND IMPROVEMENTS	5,200,000	5,200,000	- -	100	5,200,000 1/	- -
ACQUISITION OF LANDS FOR NATIONAL FORESTS, SPECIAL ACTS	165,000	357,000	192,000	46	303,000	138,000
ACQUISITION OF LANDS TO COMPLETE LAND EXCHANGES	38,000	38,000	- -	100	38,000 1/	- -
ASSISTANCE TO STATES FOR TREE IMPROVEMENT	1,387,000	2,195,000	808,000	63	1,866,000	479,000
YOUTH CONSERVATION CORPS	30,375,000	60,000,000	29,625,000	51	51,000,000	20,625,000
CONSTRUCTION AND OPERATION OF RECREATION FACILITIES	4,084,000	4,084,000	- -	100	4,084,000 1/	- -
TOTALS:						
Program level and budget authority	998,985,000	1,448,954,000	449,969,000	69	1,235,949,000	236,964,000
Cash	1,077,766,000	1,527,735,000	449,969,000	71	1,314,730,000	236,964,000

1/ 100% of RPA level.

RPA PRIORITIES

Senator HATFIELD. I don't think in glancing over this hurriedly that there is a single part of the program of the Forest Service that comes close, even significantly approaches the RPA level of funding except as mandated by law.

Mr. MCGUIRE. That is correct.

Senator HATFIELD. I think it is very helpful in our overall assessment of the budget.

It would appear that timber production related activities are coming closer to the RPA goals than other programs such as soil and water management and the like. Can you explain the reason for this apparent trend?

Mr. MCGUIRE. RPA goals represent a balanced program with equal emphasis on all resources. Budgetary limits during the past several years have caused the budget to become somewhat unbalanced with emphasis on timber production activities. This emphasis was in response to national demands for wood products and the opportunity to provide substantial returns to the Treasury from the sale of national forest timber. Because of this past emphasis on the timber programs other resource programs have further to go to reach RPA goals.

Senator HATFIELD. Chief McGuire, could you point out some of the higher priorities for RPA funding? Are they in management, research, construction, or where?

Mr. MCGUIRE. Higher priorities for RPA funding are primarily in forest management and construction activities, including research construction. I will provide a list of priority activities and areas of emphasis for the record.

[The information follows:]

Forest management

1. Timber sales administration and management due to the increased housing market.
2. Silvicultural examinations to supply future timber needs.
3. Reforestation and timber stand improvement to meet commitments of the Resources Planning Act with regard to untreated timber stand acres and for development of tree nurseries to provide trees for future generations.
4. Operation and maintenance of recreation facilities in developed sites, to maintain wilderness areas and increase visitor information services.
5. Wildlife and fish habitat restoration and development.
6. To accelerate treatment of less productive rangeland and increase acres of rangeland planting.
7. Technical expertise in soil and water activities to support increased timber sales and develop detailed soil and water inventories.
8. Further develop and improve national fire protection plan.
9. To reduce facility maintenance backlog.

Construction

1. Increased construction of recreation facilities to supply the increasing demand for recreation experiences.
2. Increased construction of research laboratory facilities for resource-related research.

U.S. Department of Agriculture
(Forest Service)

Additional requirements to implement National Forest Management Act of 1976 (Public Law 94–588) and Federal Land Policy and Management Act of 1976 (Public Law 94–579)

	1977	1978
Forest protection and utilization:		
Forest land management:		
Sales administration and management:		
Sale preparation and administration	$9,239	$9,951
Timber inventory and plans	6,415	11,100
Reforestation and timber stand improvement	9,900	17,349
Recreation use	419	2,717
Wildlife and fish habitat management	105	679
Rangeland management	105	679
Soil and water management	210	1,359
Minerals area management	105	679
Forest fire protection	210	1,359
Total, forest land management	26,708	45,872
Forest research:		
Trees and timber management research		1,000
Renewable resources evaluation	493	833
Forest economics and marketing research	135	233
Total, forest research	628	2,066
Total, forest protection and utilization	27,336	47,938
Construction and land acquisition: Cash equalization on land exchanges [1]	2,500	2,000
Total, construction and land acquisition	2,500	2,000
Forest roads and trails	20,779	27,212
Forest roads (timber purchaser construction)	22,000	26,000
Payments to States, National Forests Fund [2]		59,500
Rangeland improvement [1] [2]		4,500
Grand total	72,615	167,150

[1] Federal Land Policy and Management Act of 1976 (Public Law 94–579) requirements.
[2] Fiscal year 1978 amounts have been included in the President's budget request.

PRIORITIES IN NEW PUBLIC LAWS

Senator HATFIELD. In your opinion, Chief McGuire, where do the priorities for added funding lie for the new management acts—management, research, or construction?

Mr. MCGUIRE. In the Resources Planning Act priorities lie primarily in resource inventory-related activities. In the National Forest Management Act priorities lie in land-use planning, timber sale preparation and administration, and in timber inventory plans.

Senator HATFIELD. Chief, again, we have a serious shortfall—some $103 million for 1978. Can we expect any budget amendments or supplemental requests to cover at least part of this estimated need?

Mr. MCGUIRE. The shortfall became known too late for us to submit a budget amendment. At this time no decision has been made whether to submit a supplemental request to cover this difference.

INSECT AND DISEASE MANAGEMENT

Senator HATFIELD. Let's turn now to insect and disease management. You know of the problems we have had with the use of certain pesticides. This has a great deal of interest, not only in our State, but everywhere else. You will recall our experience with the tussock moth in eastern Oregon and getting DDT exempted from the ban and put to use.

I noted here in the budget you have an increase in your insect and disease management programs but no increase in the research portion of this effort. First of all, what specific efforts will you address under the management program?

Mr. MCGUIRE. You are correct, Mr. Chairman. We have both a control program and a research program. Dr. Buckman handles the research. If you would like him to explain that, I believe he can go into it.

Senator HATFIELD. First of all, am I correct in observing that there is an increase in the management, but not in the research parts of the program?

Mr. THORNTON. That is correct. There is a $1.8 million increase in the President's budget for this program. This will include activities such as certification and training in pesticide application of certain chemicals, pilot testing of promising new insecticides, impact evaluations so that we can have a better handle on how much of an impact the insects are making and various training and detection activities in addition to that.

Senator HATFIELD. You mean we have reached the technological level at this point where we need the increase in management?

Mr. THORNTON. Yes. It is a continuous process. As the findings come onstream, we need to put them in action and that is what the management part of the operation is.

Senator HATFIELD. Don't you need an increase in the research? Did you ask for an increase in the research?

Mr. BUCKMAN. Yes, Mr. Chairman, we did ask for an increase under the RPA program.

Senator HATFIELD. But it was reduced by the action of OMB?

Mr. BUCKMAN. That is correct, sir.

Senator HATFIELD. What is the amount of increase you asked for over and above the present 1978 figure?

Mr. BUCKMAN. $3.2 million.

Senator HATFIELD. Tell me, Chief, are you making significant progress in this area? I notice the program is a large one, but tell me a little bit about what you would consider as progress.

Do you have some examples to cite for the record about where you feel the effectiveness of the program is improving?

Mr. MCGUIRE. I think we are making progress, Mr. Chairman, both in control programs and in research. The control programs are cooperative with the States and with other countries. For example, we are close to an agreement on spruce budworm with Canada because that is an international problem to both countries and neither country can solve it alone.

We plan to coordinate research in the two countries so that the Canadians work on those aspects for which they are best staffed

and equipped and we do the same on aspects that fit our capabilities in the United States.

With the tussock moth, as you know, the 3-year program paid off rather handsomely. We now have new tools. If that insect comes back—and it probably will—I think that we will be in much better shape than we were the last time around.

Senator HATFIELD. If they came around again, say, in the next season, would you still rely on DDT?

Mr. MCGUIRE. No. We will not.

Let me ask Dr. Buckman to explain this.

Mr. BUCKMAN. I think, Mr. Chairman, that the research and development effort for the tussock moth is one of the real scientific success stories in this country. We have a whole new array of tools to detect and predict Douglas fir tussock moth outbreaks and we have several chemical and microbial insecticides to combat the tussock moth.

We will never again—in my estimation—request the use of DDT to control Douglas fir tussock moth.

The skills, the manpower that were devoted to Douglas fir tussock moth will soon be redirected into control of the spruce budworm, as Mr. McGuire just pointed out. Many of the problems of the two insects are similar.

MOUNTAIN PINE BEETLE

Senator HATFIELD. Tell me about the mountain pine beetle. We added some money last year in the funding process to deal with that specific insect. Can you give us an assessment of that?

Mr. THORNTON. The mountain pine beetle and other western pine beetles are making terrific impacts on many States in the West. We have doubled for 1977 our control actions to a $2 million total spread across the various States, mostly on Federal land, but on some cooperative projects with the States. We anticipate even worse problems because of the drought.

As the trees are weakened and stressed by the lack of moisture, the beetles are attracted and oftentimes are intensified. The western pine beetle is one of our most severe problems.

Senator HATFIELD. Do you have any new weapons to deal with that out of your research program?

Mr. THORNTON. The solution there is to have a vigorous forest. In other words, do the precommercial thinning so that the trees are thrifty. We have a great deal of evidence that when that is done, the insects are warded off, you might say.

Senator HATFIELD. I mean funding for a program to deal specifically with that.

Mr. THORNTON. This gets back to the package Mr. Resler spoke about, the western forest insect issues report.

Senator HATFIELD. That would add another dimension to the forest land management activity which is underfunded. Both diseased stands and good timber are affected because of the failure to get funding.

CONTINGENCY FUND

Tell us how you have been utilizing the $5 million contingency fund for insect and disease management.

Mr. McGUIRE. In fiscal year 1977 the emergency contingency fund was established at $5,025,000. I will supply our proposed insect and disease suppression project needs for fiscal year 1977.

[The information follows:]

	1977 suppression project needs	Projects finalized and funds requested from OMB to apportion
Spruce budworm suppression in Maine	$1,206,000	$1,206,000
Spruce budworm suppression in New Mexico	428,219	
Western spruce budworm suppression in Washington and Oregon	4,650,870	
Mountain pine beetle suppression in Colorado, Wyoming, and South Dakota	[1] 767,400	579,900
Gypsy moth suppression in New Jersey and Pennsylvania	471,543	471,543
Southern pine beetle suppression in the Southeastern United States	956,672	956,672
U.S. Department of the Interior mountain pine beetle suppression in Colorado	97,000	97,000
Total	8,577,704	3,311,115

[1] $187,500 previously apportioned by OMB and funds allocated to field for mountain pine beetle suppression.

We are fortunate, that of the $10 million emergency contingency appropriated for fiscal year 1976, $3,350,600 was not used, and we were able to carry these funds forward to fiscal year 1977. If this had not occurred and I. & D. C. funds had not been a continuing appropriation, we would probably have had to request a supplemental appropriation in 1977 for approximately $3.5 million dollars to carry out high priority forest insect and disease suppression acitivities.

NOXIOUS WEED PROGRAM

Senator HATFIELD. You are maintaining the noxious weed program in the 1978 budget. How is that program progressing?

Mr. McGUIRE. The $880,000 appropriated for noxious weed control in fiscal year 1977 will be used this spring—April, May, and June, to treat noxious weeds on the national forests. Success of the first year treatment will not be evident until some months later.

In order for the program to be successful, there needs to be followup treatment for a period of 6 to 10 years. Funds appropriated in fiscal year 1978 for noxious weed control will be used for maintenance of the areas treated in fiscal year 1977 plus treatment of 7,000 additional acres in new areas. State weed control supervisors and local weed control districts have been very cooperative in working out control agreements with Forest Service personnel on the national forests. Increasing costs of chemicals, as well as labor, will be a limiting factor.

STATE AND PRIVATE COOPERATIVE PROGRAMS

Senator HATFIELD. Chief, your statement indicates some concern over the effectiveness of State and private cooperative programs. What are the problems?

Mr. McGUIRE. The basic problem is that effective Federal funding for cooperative forestry programs has fallen drastically. The relatively constant level of dollars has not matched inflationary costs much less permitted actions to meet emerging problems. Furthermore, the 1972 amendment to the CFM Act authorizing urban forestry activities, has never been funded. Fire prevention and control activities are not keeping up with increasing resource values and increased fire hazards. Landowner assistance programs are not reaching adequate numbers of owners to insure an increase in timber supply from private lands to meet the Nation's needs in the future.

Senator HATFIELD. Generally, what kind of changes are you considering?

Mr. McGUIRE. We are working with State foresters and other cooperators to identify unmet needs and to find ways to streamline and coordinate our cooperative efforts to make them more responsive to new opportunities and emerging needs. We are targeting accomplishments and directing the program to meet specific needs.

Senator HATFIELD. You mentioned in your statement that you are exploring new approaches to the State and Federal cooperative programs. Would you elaborate?

Mr. McGUIRE. At the request of Senator Talmadge, we prepared draft legislation in cooperation with the executive committee of the National Association of State Foresters and others. This would bring all of the various authorizations for cooperative forestry programs under one title as an amendment to the Forest and Rangeland Renewable Resources Planning Act of 1974. It would include the forestry incentives program and the rural community fire control program and integrate them into the total range of cooperative forestry programs. The draft includes emphasis on urban forestry, protection of urban trees from insects, technical forestry assistance to help get new research findings applied promptly, and assistance to the States in forest resource planning for State and local needs. It provides consolidated payment procedures to streamline the Federal role and promote greater flexibility at the State level in directing cooperative forestry activities most effectively to meet local, State and national needs. The draft also would encourage each State to develop a comprehensive forestry program designed to meet forestry needs within the State on a priority, and multi-year basis.

ROAD CONSTRUCTION

Senator HATFIELD. Your road construction budget is highlighted by a return to the emphasis on timber purchaser constructed roads. Please give us the policy thinking behind this proposal.

Mr. McGUIRE. This is an attempt to reduce direct Federal spending. Also, since purchaser credit construction no longer impacts the 25 percent return to the counties we felt an increase in purchaser construction would be advantageous to the Government.

Senator HATFIELD. Meanwhile, your total road construction program is down by some $35 million, even more if you consider the supplemental funding just approved. What program decisions caused this reduction?

Mr. McGUIRE. In fiscal year 1977 our forest roads and trails budget request was increased by $72 million. At the same time our budget request for forest roads was reduced by $27 million.

With the increase in forest roads and trails we were able to construct some roads in advance of timber sales. Normally, these roads would have been built as a part of the timber sale. In fiscal year 1978, again in the interest of economy, we believe we can eliminate some advance road construction without seriously impacting the delivery of goods and services from the national forests. The reduction in advance roading accounts for the reduction in the road program.

FOREST INVENTORY

Senator HATFIELD. You have budgeted a $3.8 million increase for renewable resources evaluation, to which everyone interested in the national forests seems to agree should have a high priority. But you are still well below the authorization. Do you consider your forest inventory budget to be adequate?

Mr. McGUIRE. Mr. Chairman, the budget increase is a little above 50 percent of the proposed RPA increase. The RPA increase for fiscal year 1978 was $6.4 million for renewable resources evaluation. This level would have allowed shortening the reinventory cycle to an average of about 10 years. Short cycles are needed to provide a firm basis for forest management decisionmaking.

FIRE CONTROL

Senator HATFIELD. Your statement, Chief, also mentions efforts to tighten the management of fire control funds. What are the problems, generally, and what kinds of solutions are you considering?

Mr. McGUIRE. We are concerned about increasing firefighting costs and want to determine if our program is cost effective. In order to accomplish this, it was necessary to control the expenditure of fire funds, to examine our firefighting strategies and evaluate our program or policy direction. The fire management fund was designed to budget all presuppression costs. Within this constrained dollar, we are looking at our firefighting costs and techniques, particularly the aviation operations, and are examining our fire-suppression philosophy to see if it can be made more responsive to land management planning and the values at risk.

ENVIRONMENTAL ASSESSMENT COSTS

Senator HATFIELD. The committee is well aware that the Forest Service is confronted with rising demands for wilderness preservation and increased environmental assessment costs. The question is: Will this budget permit you to begin resolving the basic conflict between preservation and multiple use?

Mr. McGUIRE. As you are aware, Mr. Chairman, there is increasing demand on the part of the American people for lands to be designated as wilderness within the National Forest System. The study process established by the Wilderness Act and the requirements made by the Congress includes a review of suitability, a minerals examination by USDI, and a public involvement process. The National Environmental Policy Act also requires that there be an environmental statement

process coupled with the wilderness study. The combination results in a process which costs between $3 and $4 per acre for wilderness reviews. We believe there can be a streamlining of this process, and we will be working with the Congress in the coming year on principles to assure adequate consideration of resources at less cost.

Environmental assessment does cost money, also. We have, however, integrated the process into the regular decisionmaking processes of the Forest Service, and find the system working well.

The question of wilderness allocation, Mr. Chairman, we would not characterize as a basic conflict between preservation and multiple use, rather, between product orientation and amenity orientation. Both can be essential elements in multiple use management. The hard questions are: How much of the land base, and which portions of it, should be allocated to developed use and to undeveloped use? The Forest Service can come up with recommendations, Mr. Chairman, but this very basic policy question ultimately must be answered by the Congress. This budget meets the needs to stay on schedule for those wilderness studies mandated by the Congress. It also provides for environmental assessments for the national forest projects to be financed by this budget.

ALLOWABLE CUT

Senator HATFIELD. Chief, I would like to go back to the allowable cut. Last week I had the opportunity to preside over a hearing on this budget that invited outside witnesses. I don't know whether you have had a chance to read the transcript from that hearing or not, but there were some interesting points that were raised by some of the public and private witnesses who appeared.

A number of the witnesses challenged the Forest Service timber management program and its allowable cut. An interesting thing is that both conservationists and industry felt that you could do a better job of increasing timber sales and managing the resources generally. I will make the transcript available, if you have not already had the opportunity to read the entire record. But for the moment, let me give you an example of what was brought up in these hearings.

The Sierra Club, for instance, thinks that you ought to intensify timber management and narrow it to existing commercial stands. I suppose that you have heard that before.

Mr. MCGUIRE. Yes, I have, Mr. Chairman. And I have read some of that testimony because the witnesses furnished copies to me. I have not seen the transcript. The objective, as I understand it, would be to avoid road building in areas that are now unroaded and produce an equivalent amount of timber, perhaps, by more intensive management in roaded areas.

Senator HATFIELD. That is right. Concentrated on where known, good stands exist and where there is a great growing season, terrain and so forth.

Mr. MCGUIRE. To some extent I think that we have taken that possibility into account in our long-range planning. We do plan for more wilderness. We have substantial acreages now out of the timber base. They are not all timber covered, but some of them are.

We could go farther than 20 or 30 million acres of wilderness and take more land out of the timber base. We may have to do that in any event because of the new direction in the National Forest Management Act.

However, I think you would find problems in maintaining the present allowable cut if you reduce the land base. We would not be able to offset immediately through the allowable cut effect, for example.

Senator HATFIELD. That is on the existing base of how you compute the allowable cut?

Mr. MCGUIRE. That is true.

Senator HATFIELD. There are ways to change that formula to recognize this fact. If you could reduce road construction and the cost factors there are significant, not only money, but other costs as well. If you could concentrate on those more highly productive areas, you might, in effect, create a greater timber base.

Mr. MCGUIRE. Eventually that is true. But you have to assume that the funds for continuing intensification of timber management on those sites, on the roaded sites, would come. Thus far we have not been willing to go that far.

But we have made estimates of what could be done. The other problem is that we foresee increasing demands for timber in the future. We think that we are going to need a good part of our present timber base to meet those demands.

Perhaps it would be possible to defer decisions about future production until some later time and stay out of some of the presently unroaded areas in the meantime.

Senator HATFIELD. Those demands are really upon us now.

Mr. MCGUIRE. They are upon us now and they are going to increase, I believe.

Senator HATFIELD. Some representatives of industry also offer an argument that the Forest Service could simply make available more mature timber, harvestable timber, in the existing sale areas and increase the allowable cut, say, from anywhere to 13 to 16 billion board feet. The new road construction could be reduced and market demands more realistically considered.

This is based, too, on a premise or two and I think that one of the premises was that too much mature timber is being withheld from sale and permitted to deteriorate under the present practice.

Would you care to comment on that basis?

Mr. MCGUIRE. I have heard that comment, Mr. Chairman. Our policy has been one of nondeclining evenflow. We could follow some other policy. It would take a change in the law. It is true that these public forests could be operated so that they would be more responsive to fluctuations in demand. If we did that, we would undoubtedly encounter a time when we would not be able to maintain the level of offerings. There are several possible ways of increasing the harvest.

We calculate that potentially we could get up to a level of 16.2 billion board feet. This is our potential yield at present, if we wanted to put in the dollars necessary for prompt reforestation and roads and so forth.

NON-DECLINING EVENFLOW

Senator HATFIELD. Chief, didn't we give you a greater degree of flexibility in the nondeclining yield and evenflow?

I had something to do with writing that section of the Monongahela bill, just for that purpose, to be able to deal more realistically with this.

Mr. MCGUIRE. Yes. You set the policy as one of nondeclining evenflow, but then you specified that the Secretary could depart from that policy if his departure was consistent with the land management plan for the area of the forest and if the departure was consistent with multiple-use objectives.

So you did leave some leeway there. At the moment we are no where close nationwide to the potential yield.

Also, we do not have the regulations under which these land management plans are to be prepared and operated. We have just reached the point of appointing a committee of scientists, for example, to advise the Secretary in developing regulations and guidelines for planning. So the way in which departures from nondeclining evenflow will be permitted in the future will depend on the kind of regulations that the Secretary finally decides to implement.

Senator HATFIELD. Don't you feel that you have to very aggressively crank into that Secretarial level decision the fact—or is it a fact, that the growing cycle of the tree is such that it reaches a point of maturity where it begins to decline and deteriorate and actually become a threat to the rest of the forest?

Is that a fair observation?

Mr. MCGUIRE. Well, that is hardly an immediate problem. It varies with the forest. It is true that you do lose trees that die of old age before you get to harvest them. But I don't think that we have looked at the maximum utilization of timber production as the primary objective. Our objective has been to keep a level of production that represents a fairly stable source of supply.

Senator HATFIELD. I agree that we are not looking at a dominant use forest. But you have many considerations here. You have community stability, I believe that is in the Organic Act and restated on several occasions since.

MORTALITY OF TIMBER

We had one witness talking about the mortality of timber who said that today—he blamed it on the lack of roads available for the salvage of such timber—we lose 6-billion board feet of annual mortality on the national forest and only about 10 percent of this is salvaged timber.

Mr. MCGUIRE. I think that is right. And I think we now have an approach that will solve at least part of this problem because with the funds that you will be appropriating in 1977, we will have seed money for salvage sales that we can plow back into more salvage sales.

Senator HATFIELD. When we are talking about mortality, I am assuming that we have reached a point where it is on the way to death. Is the word "mortality" a correct word to use?

Mr. MCGUIRE. Yes. I think "mortality" is a correct word to use.

Senator HATFIELD. But if we are only salvaging 10 percent of 6 billion board feet annual mortality, his conclusion and observation was that it is a national disgrace.

I would like to have your response to that.

Mr. MCGUIRE. I think that you have to look at each opportunity in terms of who benefits and who pays. Some of these trees are scattered. It would be quite expensive to prepare sales or build roads just to get to them.

Some of the mortality in younger stands is simply a matter of overcrowding. There is still board footage in those stands. The treatment would be thinning. Some mortality is due to fire, insects, and disease. This may occur in trees of any age or size.

Again, it could be scattered or it could be concentrated.

It is true, however, and I don't think that anyone would dispute the assertion that it is something of a disgrace to have so much waste and we would like to do something about it.

But our funds are limited and we try to keep up the production of total board feet, for the dollars available. We just get more board footage from green sales.

TIMBER UTILIZATION

Senator HATFIELD. But waste is bad conservation.

Mr. MCGUIRE. Waste is bad conservation. Also, we have opportunities to reduce waste in utilization.

There is more that could be done in utilizing the trees that are cut now. Perhaps we should go even further in requiring the logger to take more of the tree out of the forest in the hope that he would take it to the saw mill.

Senator HATFIELD. We are down to the Gifford Pinchot definition of wise utilization.

Mr. RESLER. Mr. Chairman, may I comment on a couple of points?

Senator HATFIELD. Certainly, Mr. Resler.

Mr. RESLER. First the estimate of 6 billion board feet came from the western insect study—I assume that is the basis of the information. Of that total, about one-third is currently accessible and the remainder is inaccessible. It is unroaded at the present time and one of the constraints that would have to be removed to permit recovery is access—roads.

Obviously, we cannot move into those areas until a land management decision is made as to what purpose that land should be devoted. If it includes roading and timber harvesting, that opens up a salvage opportunity.

The loss through mortality is staggering. It has been building up over a period of time. We are hopeful that we can mount and sustain a program on the roaded areas to salvage material for which there is both access and market.

Our standing direction for a number of years has been to concentrate on the roaded portions of the national forest system on salvage where there are adequate markets. For instance, in the Douglas-fir type, salvage has been a regular and continuing part of our regular timber sales offering.

Much can be done to accelerate growth and thereby reduce mortality. That is what we are proposing to do.

I want to address the point that we can sharply increase the rate of harvesting of the old growth on a reduced land base and maintain that higher level over time.

There is currently over 90 million acres classed as commercial forest land. Implementation of the National Forest Management Act will reduce that figure because of changes in the definition of operable or marginal lands.

Our studies show that if we accelerate the harvest level, particularly in those Western States that have high volumes of old growth, we do so at the peril of a substantial falldown at some point in the future. It has been argued that we can merely foreshorten the rotation age and thereby increase the rate of harvesting old growth. The consequence would be a gradual decline, or perhaps a sharp decline, in total volume that could be harvested annually from the national forests. Many of those acres are now carrying more volume on the 200-, 300-, 400-year-old stands, particularly in the Douglas-fir type, than will ever be put back on, even with intensive management on the national forests.

My key point is, yes, there are options that the public should address in the future in terms of management assumptions affecting allowable harvest level. But I would not want to let the issue stand that we can do both of those things, restrict our harvesting operations to the presently roaded portion of the national forest system and continue to increase the harvest levels.

Senator HATFIELD. Isn't there some relationship between what you say about volume and the shortening cycle of growth under the more intensively managed forest?

Mr. RESLER. We are operating in general in the Western States on a rotation age of 100 years or more on most stands. On the better sites, that growth span can be reduced with more intensive management techniques.

Senator HATFIELD. You know, Chief, I have talked to you before about some of the alternatives of trying to maintain a more even flow of sales. One of the projects that we have been working on has been the self-financing bonds for transmission lines, only in this instance it would be for reforestation so that you could move more certainly in your commitments down the road for reforestations, the development of growing stock, nursery supply, and so forth.

What comes to mind is that some of this additional manpower that you talk about—good morning, Secretary Cutler.

Dr. CUTLER. Good morning, sir.

CONTRACTING WORK ACCOMPLISHMENT

Senator HATFIELD. Some of this manpower increase you will need to increase the uses of the forest, some 3,700 positions—aren't there parts of those programs that can be contracted out rather than use permanent employees? There is a manpower level that you have to run against, there is a funding problem that you run up against. There is the constant problem of OMB and what have you.

My question is, Are there within academia and other areas of the profession and trade people, those who might want a contractual period relationship, but not a permanent relationship, to the Agency so that you could utilize those resources and that talent?

Mr. McGUIRE. Yes, there are, Mr. Chairman. In fact, we are doing some of that now. We have a program of bringing in the younger faculty members, particularly during the summer. This works to their advantage as well as to ours. It is not so much a contract arrangement.

There are, however, possibilities for contracting and we do quite a bit of this with timber stand improvement and reforestation. We can do some of this with inventories.

Senator HATFIELD. What about wilderness studies?

Mr. McGUIRE. I think that it would be possible, although what we need in most cases is an interdisciplinary team and to be sure that the contractor had all the right disciplines might be something of a problem.

Although if we created a market, I am sure that firms would spring up.

Senator HATFIELD. I would urge you to look at an alternative budget that would gear up for a number of these tasks where you think it would be applicable. You now are thinking in terms of the 3,700 additional employees, and we want to see what that figure could be reduced to, say, on a permanent basis as you would seek to contract out some of those tasks.

Could you give that to us?

Mr. McGUIRE. We would be glad to look into that.

[The information follows:]

As indicated above, we are contracting in areas where work can be accomplished through contracts. The nature of resource management and utilization work does not lend itself to as much contracting as do some other programs. We have considered the contracting aspects in our presentation for additional ceilings of 3,700. We will continue to explore contracting opportunities and will contract in those areas where competent contractors are available and where contracting is both feasible and economical.

COMMENTS OF ASSISTANT SECRETARY CUTLER

Senator HATFIELD. We have been discussing, Dr. Cutler, the farce we have had in forest management, at least in the decade that I have been here.

This is the record, one aspect of it, but it only symbolizes the total of what I call a miserable record. From 1975 to 1978, these are the budget requests of the Agency that have been presented to us on the Hill, but not what the initial request was to the Department or to OMB. But this is what came up here on the Hill.

Dr. CUTLER. The administration's request.

Senator HATFIELD. That is right. We, in Congress, have changed that picture recognizing the receipts that have been brought in from forest management to the general fund of this country.

Now, that is only one symbol of what the manifestation of this whole problem is and that is that we have not had sufficient moneys for disease control, insect control, research, road construction, recreation, wilderness, timber stand improvement—any of these and other forest programs. We are now reaching a point of the highest new housing starts in recent history, with the building permit increase and other indicators that show this particular fact.

Here we are considering a fiscal 1978 budget that takes into consideration none of these factors. We are right back down at the

bottom as if the Forest Service really was a static organization. Superimpose upon this chart the personnel level and it has not changed significantly since 1965, 12 years ago—a 12-year span that the personnel level has pretty much been the same, but the sale program has dropped sharply.

I indicated that I felt part of the problem was that the Forest Service has been considered a stepchild. I repeat myself now, but I don't think that we have had a Secretary of Agriculture since Mr. Freeman who knew the difference between a spruce and a flowering cherry tree on the Tidal Basin.

It has been treated that way and if we had a person in your slot who had some backbone to him, he would be there in OMB as an advocate and doing something about it and we would not have had this kind of a record. I have great expectation for you for changing that horrible precedent.

Anyway, we have been through that and I would not want to prejudice your testimony at all now that you have arrived. [Laughter.]

That is just a thumbnail sketch of the problem and I see this as bipartisan failure of the executive branch, and it has been a bipartisan effort on the Hill to try to do something about it.

Now, where we have increased money for programs, the executive has had its ultimate will because they have held down the manpower level, held them from being able to increase their present manpower to really execute those increases that the Congress has made in their program.

We have a new National Forest Management Act and Federal Land Policy Management Act and they have set goals and I have a chart here, RPA goals and what they would consider would be the adequate budget to meet those goals and what the budget estimates are and what we are considering for fiscal 1978, what they were in fiscal 1977, what they are by action of the regular budget and the supplemental budget on the part of the Congress.

Yet I noted in your testimony, your statement, that there is nothing in the budget for us to respond to those acts except for the increased payments to States from forest receipts.

I would be interested in hearing from you why the budget decisions on these new acts were deferred, if they are being deferred, and for how long.

Dr. CUTLER. I find myself in a position I would rather not be in, and that is testifying before your committee on an appropriation package I have had nothing to do with preparing.

The fact is that this is a budget that the Carter and Bergland administrations have not had much of an opportunity to influence. As you know, I have been on board officially less than a couple of weeks. I have been around a little longer than that but not long enough to have much influence on the 1978 budget.

I assure you that it will be different for fiscal 1979. I will be in on the evolution of that budget from the beginning, and I assure you I have those RPA goals in mind.

One thing that struck me very forcefully in the last few weeks is the unanimity with which all of the groups and individuals are interested in the national forests, across the spectrum of those groups, are supportive of realization of those RPA targets.

Senator HATFIELD. That is very true.

Dr. Cutler, I had the privilege of hearing from you the other day on our wilderness bill and I appreciate very much the statement that you made then, that you had been appointed a very short time and we are not going to make unreasonable demands.

But I would like to ask you two pertinent questions. You talked about fiscal 1979 being a different ball game. Could you put priority on these matters and perhaps have some influence on a supplemental that you could consider at a later time?

Dr. CUTLER. Yes, I could. As a matter of fact, I am sure that is under consideration. One of the realities of this ball game, as I am coming to learn it, is the importance of personal relationships within the executive branch and between agencies like our own and the Office of Management and Budget.

There are some new people there as well as new people in our Department who have yet to come to an understanding of each other's programs. That is under way right now.

Senator HATFIELD. As I indicated to you yesterday, there is a difference in timber economics and the economics one learns back at Paducah Junior College. You are looking at the roller coaster kind of economics that we have permitted to occur, almost stimulated, in the timber industry. These are economics that have to be thoroughly understood by OMB and I have not found much evidence that they have been in the past.

PERSONNEL CEILINGS

There is a second way that you could be helpful. I am strongly persuaded that Congress will follow its pattern over the last 6 years. That is, we are going to add money to these programs in the fiscal 1978 budget.

Could you indicate to us at this time your effort or desire to influence manpower ceilings which have been used in the past to frustrate some of our efforts on the part of the Congress to increase the program limits?

Dr. CUTLER. Chief McGuire and I sent a lengthy memorandum on personnel ceilings to Secretary Bergland recently which I will pursue shortly and take this on to OMB.

Senator HATFIELD. As I said to you the other day, you are a breath of fresh air and I hope you will continue to blow that kind of fresh air. It is very refreshing.

I think I should rephrase that. I don't think it came out the way that I intended.

Dr. CUTLER. We got into a "string of balogna" last time.

Senator HATFIELD. That is right. Mixing our metaphors.

Dr. CUTLER. I am looking forward to taking an active and positive role as Assistant Secretary and supporting the kind of investments that I am sure you are looking for.

The next time I am before this committee you will have a much better informed Assistant Secretary, I assure you.

Senator HATFIELD. As you know, these foresters are genteel people by their training and personality. They need someone like you to really go out there and be a real advocate. I mean bare knuckle politics with OMB and up here on the Hill and everywhere else.

They are tremendous people, as I say, but they are too genteel at times.

Dr. CUTLER. They have been very effective. They are in my office every day and the amount of paper they generate is considerable, but I will do my best to be supportive, Mr. Chairman.

Senator HATFIELD. Do you have anything further that you would like to add besides your written statement, Dr. Cutler?

Dr. CUTLER. No, Mr. Chairman. And I am due on the other side for a hearing on an Alaskan issue.

Senator HATFIELD. Chief, do you have anything further you would like to say or any of your colleagues?

Mr. MCGUIRE. No, I think not, Mr. Chairman, except to express our appreciation to the committee and to you personally for your long continued interest in our situation.

Senator HATFIELD. We are going to be with you all the way on this. We have a lot of road to cover.

Mr. MCGUIRE. We will continue to be genteel, but we will rely on our Assistant Secretary to do the brass knuckles.

ARKANSAS TIMBER MANAGEMENT RESEARCH

Senator HATFIELD. Senator McClellan could not be at the hearing this morning. He has provided us with a statement concerning timber management research in Arkansas. We will place that statement in the record at this point.

[The information follows:]

REMARKS OF SENATOR JOHN L. MCCLELLAN

Mr. Chairman, I welcome this opportunity to address the members of the Subcommittee and officials of the U.S. Forest Service who appear today in support of this agency's fiscal year 1978 budget request. I shall direct my remarks to a much needed program request now under consideration by the Forest Service.

It has been predicted that by the year 2000 the demand for roundwood from southern forests will have doubled that of 1970. The lumber and wood products industry currently contributes in excess of one billion dollars annually to this Nation's economy. My state of Arkansas currently ranks fourth nationally in the production of lumber and plywood and first in the South. In short, the future of the timber industry in the United States, and in Arkansas, should be a major concern for all of us.

In the South, 73 percent (140 million acres) of the commercial forest land is fragmented among more than one million private, nonindustrial ownerships. There are the forests that must supply the major portion of the predicted two-fold increase in demand for wood. In Arkansas, 160 thousand small landowners control 62 percent of the 18 million acres of commercial forest land. These Arkansas lands are currently producing approximately 36 cubic feet per acre annually, or about one-half of their estimated potential.

In 1976, the Congress enacted the National Forest Management Act which requires the Forest Service to conduct research on alternatives to even-aged management systems. Recent court litigation involving clearcutting practices on southern National Forests in Texas and Arkansas further emphasizes the need for developing additional methodology. Uneven-aged management systems represent a potentially viable alternative which could meet the objectives of the small landowner, with a minimum investment of time and money, and also provide the natural resource our Nation will need.

At the present time, there is no research under way by the Forest Service on uneven-aged management systems for the southern pine region. However, the University of Arkansas has proposed such a research unit to develop a management system for the loblolly-shortleaf pine type at its Monticello, Arkansas campus using also the facilities of the 1,675 acre Crossett Experimental Forest. The State of Arkansas has made a strong committment to expand and strengthen its programs in forestry education, research, and extension, and this proposal would provide a unique opportunity to establish a center of exellence for developing and disseminating management information to small landowners.

A successful research program and follow-up dissemination of information throughout the South could have a major impact on timber supplies and regional economy in just five years. In Arkansas alone, a 10 percent increase in the annual growth rate of pines would produce 18 million cubic feet of additional wood each year. This is sufficient wood to support a pulpmill or three major chip/sawmill operations. Thus small landowners in Arkansas could create 500 new jobs in harvesting, processing, and transporting timber with this modest 10 percent increase in growth of their pine trees. Additional jobs would be created in associated industries and service areas.

The Forest Service has indicated that $450,000 would be needed to carry out a program of sufficient size and quality to adequately address the research task needed. This is more than double the amount being presently spent in Arkansas on forestry research by the Southern Forest Experiment Station. For while Arkansas is the number one lumber and plywood producer in the South, it receives only 3.5 percent of the research funds spent, compared to Louisiana's 51 percent share of $4,750,000 and Mississippi's 35 percent share of $3,261,000. Creation of this research unit would help correct the obvious inequity in Federal spending at no harm to other programs.

I, therefore, commend the attention of the members of this Subcommittee to this worthy and needed request, and urge your favorable consideration of the necessary appropriation to implement it.

SUBMITTED QUESTIONS

Senator HATFIELD. We also have questions from several other Senators who could not be here today, as well as additional committee questions. We will submit these to you and ask that you answer them for the record.

Mr. MCGUIRE. We would be pleased to do so, Mr. Chairman.

[The following questions were not asked at the hearing, but were submitted to the Department for responses subsequent to the hearing:]

National Youth Conservation Corps

Question.--If pending legislation and appropriations to implement a major economic stimulation package are successful they will have a considerable impact on Forest Service programs, particularly the proposed National Youth Conservation Corps. Would these employment programs enable you to reduce the costs of your budgeted programs and the additional needs we have been discussing?

Answer.--These employment programs will not enable the Forest Service to reduce the cost of budgeted programs. The work to be done is over and above that which is budgeted. The type of work planned for the participants is the large backlog of high labor intensive work that has been deferred over the years. Participants will be persons that are unemployed and in many instances this may be their first work experience.

This will require providing the proper work experience to participants in skill areas to meet the individuals training needs. The purpose of the program is to provide employment and other benefits, including skill training, to participants. The available conservation work projects will be used to design this needed work experience.

Question.--We are talking about $350 million and some 35,000 jobs under the NYCC over the next year and a half, a big part of it going to the Forest Service. Please supply a statement on how this program would fit into your budgeted activities and what adjustments might be made to account for it.

Answer.--The NYCC program will be in addition to current budgeted activities.

Question.--What about the increases for the ongoing YCC program included in the supplemental and in your 1978 budget? Are you gearing up to utilize that additional funding?

Answer.--We have plans to utilize the YCC supplemental funding this summer and in fiscal year 1978. Both the Forest Service and the Department of the Interior have made a tentative allotment of funds to their field units and States. Once final authorization is approved, all units are prepared to put their plans into action.

Question.--Does Forest Service or Interior anticipate any problems in obligating the YCC expansion?

Answer.--Despite the late date of supplemental, neither the Forest Service nor the Department of Interior anticipate any problems in obligating the YCC Expansion Funds.

Environmental Protection

Question --How much is the Forest Service now spending on environmental protection, wilderness preservation, and the like?

Answer -- The exact amount is somewhat difficult to come by, Mr. Chairman, because many of the expenses are tied into project costs, costs of doing land management planning, and other planning efforts. We can give some general indications, however. In 1977 we will be spending about $21.5 million on land management planning. This planning guides the National Forest System administrators in most activities, some of which could be categorized as environmental protection and some as production oriented. The actual preparation of environmental statements under the National Environmental Policy Act will cost about $24.9 million this year. Wilderness management costs in the 1978 budget are $3.8 million, and wilderness studies will cost about $0.7 million. The funds for wilderness management and wilderness studies are sufficient to meet minimum needs and congressionally mandated studies, but do not permit doing the optimum job. Surveys for cultural resource values in advance of earth disturbing projects, required by Executive Order 11593, is costing us about $1.7 million in fiscal year 1977.

Question --Have not these increased protection costs largely been absorbed in your overall budget?

Answer --We have received some increases in budget since the Service began preparing environmental statements and doing cultural resources surveys, but for the most part the costs have been carried by project and planning funds taken from the overall budget. As an example, until the fiscal year 1977 budget, the costs for cultural resources surveys required by Executive Order 11593 were borne by the

project which would disturb the ground. We have since built into our budget requests the dollar needs for the surveys, but if, for instance, an archeological site is discovered and the project will impact the site, the costs of mitigation are still borne by the project.

Recreation Programs

Question.--For the recreation use program under Forest Land Management you are seeking an increase of $4.6 million which will give you a total program of $65.6 million.

In the supplemental, we added $12 million to the FY 1977 recreation program. Will that amount affect this request? Are any of the initiatives expressed going to be undertaken in FY 1977? Hells Canyon, for example?

Answer.--The $12 million supplemental to the FY 1977 recreation program will not affect the FY 1978 program. The $12 million is necessary in FY 1977 to keep essentially all developed sites open and operate them at a full level of services.

The recreation initiatives in the supplemental are operation and maintenance, deferred rehabilitation, construction, planning in Hells Canyon NRA and land exchange in Alpine Lakes. They will be undertaken and essentially all of the funds will be obligated in FY 1977.

Question.--Why don't you provide us with a new breakdown of the request under recreation use assuming that the supplemental contains $12 million passed by Congress is signed into law.

Answer.--Less than $2 million of the $4.6 million increase in FY 1978 is for operation and maintenance. We estimate that an additional $20 million would be necessary in FY 1978 to keep essentially all of the sites open for public use and provide a full level of services to the public.

Wildlife and Fish Habitat Management

Question.--Under wildlife and fish habitat management, you have an increase of slightly over $2 million, primarily for endangered species work. What kind of agreements do you have with the Fish and Wildlife Service in this area?

Answer.--The Forest Service has a broad Memorandum of Understanding with the Fish and Wildlife Service and is developing a supplemental Memorandum dealing with endangered species.

The Forest Service is cooperating with the Fish and Wildlife Service in the development and implementation of individual endangered species recovering plans and has agreed to carry out tasks identified for the Forest Service in each approved plan. Each plan constitutes a separate agreement.

In addition to species covered by recovery plans, the Forest Service is responsible under the Endangered Species Act of 1973 for the conservation of listed species and their habitats on National Forest System lands. More than 60 listed species occur on one or more National Forests or Grasslands. The Forest Service is conducting inventories and surveys, as well as developing habitat protection and enhancement practices and programs for these species, whether or not they are under a formal recovery plan.

Question.--Do you have any reimbursable costs in your budget for the Fish and Wildlife Service? We have been trying to clear up some problems with Fish and Wildlife Service and other Interior agencies in terms of who will budget for what work. Is that a problem with Forest Service?

Answer.--We do not have any reimbursable costs for the Fish and Wildlife Service in the Forest Service budget. At the field level, we sometimes contract with the Fish and Wildlife Service to do a very small amount of work, but usually we

work cooperatively and both agencies fund their respective activities. The Forest Service hasn't any problems in this area.

Question.--The Forest Service also drew criticism this year from wildlife groups who say your 1978 budget shortfall for wildlife management under your own RPA assessment is the most serious. Is this the case, and if so, why is it?

Answer.--The Forest Service requested $34.3 million, the Department approved $17 million, and the President's Budget is $16 million. It was the judgment of the Department and the President that, although important, noncommodity resource management, such as fish and wildlife could be postponed, whereas commodity resource management could not because of unemployment and the state of the economy.

Question.--We spent considerable time with the Fish and Wildlife Service this year discussing what that agency considers to be a serious situation. That is, while wildlife is often our most fragile resource, it gets the least attention when it comes to planning and budgeting. Isn't that also a problem in your budget?

Answer.--Historically, fish and wildlife habitat resources have not received as much emphasis in the Forest Service as other resources. However, there was a special effort made to give equal consideration to all resources in RPA planning. The needs of the expanded fish and wildlife habitat program in RPA were reflected in the $34.3 million budget request for fiscal year 1978 by the Forest Service. The problem is in appropriations adequate to carry out the program.

Sikes Act Implementation

Question.--How much is in your budget for the Federal-State fish and wildlife habitat program authorized under the Sikes Act?

Answer.--Approximately $2.5 million in the 1978 budget can be considered as applying to the Forest Service-State program authorized under the Sikes Act.

Question.--Do you consider the Sikes Act program to be an effective one?

Answer.--The Sikes Act program is effective because it caused the Forest Service and the respective States to jointly develop formal plans for the management of fish and wildlife on the National Forests. Currently, plans have been developed for 35 States (seven more are not completed). The amount of money needed to fund the first year of these programs is $26 million.

Question.--The Sikes Act has generally gone ignored in most resource agency budgets. We are told the Forest Service alone projects some $35 million under its RPA assessment. What amount do you think you could use effectively?

Answer.--The Forest Service could effectively use the amount for fish and wildlife habitat management as improvement identified in RPA, or approximately $34 million.

Minerals Areas Management

Question.--We discussed your minerals area management as it relates to the coal leasing program in the supplemental hearings. You have an increase for this effort in FY 1978 totaling $1.7 million. Is this all for coal leasing work?

Answer.--When the increase of about $1.7 million for energy resource activities was proposed, only about $100,000 of this was identified as needed for coal-related activities. Since then the Department of the Interior has set a schedule to complete 7 Regional Coal Environmental Impact Statements that require our participation in their preparation. Instead of the $100,000 originally requested for coal leasing activities, we will need approximately $1 million to meet the Department of the Interior's schedules.

Question.--Can you break out that total by the minerals involved? We would like that for the record.

Answer.--The increased energy resource activities in addition to coal that we had anticipated when we formulated this budget involved geothermal, oil and gas, and uranium. The increases planned were:

Coal	100,000
Geothermal	700,000
Oil and Gas	650,000
Uranium	250,000

Based on the new demands for participation in the Regional Coal EIS's, the budget will be distributed as follows:

Coal	1,000,000
Geothermal	200,000
Oil and Gas	350,000
Uranium	150,000

Question.--Please give me specifics on the need for the requested increase.

Answer.--Exploration for mineral resources on National Forest System lands has been increasing in recent years. Interest has focused primarily on the energy minerals (oil, natural gas, coal, uranium, and geothermal).

Many uranium mining claims have been staked under the General Mining Laws and lease applications for oil, natural gas, and geothermal resources have been received on about 8 million acres of National Forest System lands.

In order to be responsive to these applications, the Forest Service, as a land management agency, must evaluate the potential impacts that may occur from leasing and development of mineral resources. We are trying to evaluate these potential impacts through the Land Management Planning processes so that all resources may be inventoried and evaluated. Therefore, a portion of the requested increase will go toward completing Land Management Planning and increasing the quality of minerals input and evaluation of those plans. In other areas, such as Regional Coal Studies, the Forest Service has been very active in cooperation with the Department of the Interior preparing environmental analyses in order to evaluate the possible impacts.

Once the activity is approved by the granting of a lease or the approval of an operating plan, then there is increased administration to assure that impacts to other resources are minimized or prevented, and to assure that the prescription developed in the Land Management Plan is adhered to.

General Land Management

Question.--Your general land management activity proposes an increase of nearly $4 million, half of which is related to maps and surveying efforts.

You mention that the Bureau of Land Management does your cadastral survey work on a reimbursable basis--does this include land line location?

Answer.--Although the Bureau of Land Management survey work includes land line location, this amounts to only about 10 percent of the total land line location done annually within the National Forest Service.

Question.--You are asking for roughly $1 million additional funding for your mapping program. How much of your map work is done by Geological Survey?

Answer.--The Primary Base Series Map of the Forest Service is the U.S. Geological Survey (USGS) 7 1/2-minute quadrangle, 1:24,000 scale map. All Forest Service map products are derived from this base. We purchase the appropriate USGS data plates such as drainage, transportation, political boundaries, culture, etc., that cover National Forests or National Grasslands, and add only that information which is required for the administration of National Forest lands. This consists of such information as National Forest boundaries, land ownership, recreation sites, transportation network, etc. Our Forest Visitor Maps, Wilderness Maps, and Special Project Maps are all derivatives of the Primary Base Series with unique information for the specific application. We are currently consummating a cooperative agreement with USGS whereby our Geometronics Service Center will update or revise agreed to USGS 7 1/2-minute quads, covering National Forest lands, to USGS map accuracy standards. These maps will then be published by USGS as "standard" or "interim" products. In this way, we are contributing to, not duplicating, the National Mapping Program of the USGS.

Geometronics Service Center

Question.--Tell us a little about the Geometronics Service Center at Salt Lake City. You established it in the current year in an effort to reduce fragmentation and save money. Is it working out well?

Answer.--The Center is functioning very well in temporary quarters. We expect to move the entire operation into permanent quarters by the end of April.

As of April 1, we have 42 permanent and 21 other-than-permanent employees on board at the Center. We still need 51 permanent and 19 other employees to completely staff the Center.

We plan to produce the following products at the Center in fiscal year 1978:

1,700 quad sheets - using USGS maps as a base we produce maps which show Forest Service ownership, roads, recreation sites, administrative sites, etc.

48 map sheets (secondary base) - from these map sheets we will develop maps similar to this one of the Chequamegon National Forest. Our goal is to update Forest Service maps on a seven year cycle, however, the cycle may be shortened if ground conditions change substantially in less than seven years.

325 ortho-photos - photographs corrected for accuracy which are pictures of areas covered by quad sheets.

Special Use Administration

Question --We note you are seeking $6.2 million for special use administration, including five new positions, yet estimated receipts from permits is only estimated about $2 million. Why can't this activity do a better job of paying for itself?

Answer --Special use permits are granted only when they can be made consistent with land management prescriptions and guides and compatible with the public interest. Benefits accruing to the Federal government cannot always be measured directly by receipts alone. The value of free permits issued to governmental agencies or to further public programs is conservatively estimated to be $3 million. Additionally, the benefits passed on to consumers through reduced land use costs and by improving the availability of services to the general public, when National Forest lands are involved, are substantial but not measurable. The low level of funding for administration of special uses in recent years, plus limited anticipated fee increases in relation to the costs of fee appraisal has delayed periodic fee reviews. In addition, we believe the intangible returns from permitted use of National Forest lands represent a greater value return than the receipts indicate.

Question --Are you considering any fee changes on special use permits?

Answer --We are not considering changes in our current policy of requiring a fee commensurate with the value of the use authorized--or of providing for waiver of the fee when the permittee is so qualified. As indicated previously, however, a general increase in fees due to the escalating value of similarly used private lands can be expected when we are able to meet our periodic fee review schedules.

Our present fee regulations and policy are derived from the Fees and Charges Act of 1951 and the direction prescribed in Bureau of the Budget Circular A-25 and its supplementary Natural Resources User Charges Study. The Federal Land Policy and Management Act of 1976 has strengthened the premise developed in those earlier directions by specifically requiring that we obtain fair market value for permitted rights-of-way. The Bureau of Land Management and Forest Service are coordinating the development of fully compatible regulations and uniform field instructions in this connection. It is anticipated that full application of the "fair market value" concept to some uses which in the past has been valued on an empirical or minimum fee basis will result in substantial increases. We are also investigating the discretionary authority included in the Federal Land Policy and Management Act to recover our costs of handling application for rights-of-way and for monitoring the construction, operation, maintenance and termination of such uses.

Reforestation and Timber Stand Improvement

Question. -- You are proposing a language change under the Forest Protection and Utilization Account. The change would make reforestation and timber stand improvement funding available until expended. The Forest Management Act authorizes this, but why is it necessary now, since your request is so constrained?

Answer. -- The principal reason for this change is to provide more flexibility to the program. When the funding is restricted to a fiscal year basis we may not spend the funds when planned projects cannot be done as scheduled. Nature often upsets scheduled projects when it is too dry or too wet, or there may be too much snow in the planting area to plant as scheduled. The current year is an excellent example. We will want to delay some reforestation for a full year because of the drought. This would be in addition to next year's planned program. Nature also upsets schedules through emergency situations such as forest fires or flooding.

We sometimes have difficulty in finding enough contractors to take on all the planned work during certain periods or if they do bid on the job their price is too expensive. By delaying the timing of the work in these areas we can usually get bids at a reasonable price.

The reverse can also occur wherein a project planned for late in the fiscal year may no longer be feasible for some reason and more time is needed to replan the expenditure for other projects.

Question. -- Do you anticipate any unobligated balance at the end of 1978 for reforestation and TSI? (If so, why?)

Answer. -- No, we do not anticipate any unobligated balance at the end of fiscal year 1978. If there is any such balance, it would likely occur for one of the following reasons:

(1) Poor weather conditions, such as drought, which would make the survival of planted tree seedlings very doubtful.

(2) Local shortage of trained contractors and employees to do the work within fiscal year 1978.

(3) Restrictions or delays imposed by outside agencies on the materials that can be used or type of work that can be done. The notable example is the restriction on the use of herbicides imposed by courts and states.

Object Classification

Question.--Under Forest Land Management you are showing sharp declines in amounts budgeted for contractual services--from $78.8 million in 1976 to $53.8 million in 1977 and $31.5 million estimated for 1978. What is causing this change?

Answer.--The reason for the decline in amounts budgeted for contractual services from 1976 to 1978 is that the 1976 figures included totals for emergency forest firefighting funds, 1977 included some carryover emergency forest firefighting funds, whereas 1978 estimates exclude emergency forest firefighting funds altogether.

Question.--Why do you need a $5.5 million increase for transportation of goods?

Answer.--This is projected based on sizeable increases in transportation rates. Since this is only an estimate, actual obligations may differ considerably.

Question.--What is causing the variation in obligations for other rent, utilities and communications--$19.1 million in 1976, $4.7 million this year and some $6 million for 1978?

Answer.--Again the primary reason for the decline in 1977 is that the figure does not include amounts for emergency firefighting funds. The 1978 estimated increase over 1977 allows for projected rate increases in rents, utilities and communications.

Forest Research Priorities

Question. The overall research program has no increases for insect and disease, forest products utilization, or timber management. Why are these areas being maintained at the current level?

Answer. The research program funding levels for Forest Insect and Disease Research, Forest Products Utilization Research, and Timber Management Research were not raised toward the recommended RPA levels in order

to keep overall funding down. The agency request had indicated a need for a substantial increase in each of these items.

Question. The National Forest Management Act requires you to prepare a report on wood fiber and wood waste utilization. Is your research budget in this area adequate to allow you to prepare this report?

Answer. The research budget is not adequate to prepare reports on wood fiber and wood waste utilization required by the National Forest Management Act. We estimate that it would require an additional $830 thousand to develop the background for those reports.

Resource Evaluations

Question. The largest increase under Forest Research is $3.8 million to bolster your effort to complete the 1980 Forest Assessments. I can understand the need to speed up the work, but what specific goals will this allow you to accomplish?

Answer. The $3.8 million increase for Renewable Resources Evaluation will allow us to meet the following goals: 1) Develop an improved 1980 RPA assessment, 2) Reduce timber reinventory cycles from the current 15 year average to 12-13 years, and 3) Improve our capacity, often in cooperation with other Federal agencies and the States, to inventory non-timber resources, such as range, wildlife, water, and recreation.

Question. In view of RPA requirements, why isn't your inventory budget larger?

Answer. The budget was held below the recommended RPA level which indicated a $6.4 million increase, in order to keep overall spending down.

RPA Initiatives

Question. What are all the research initiatives recommended in the RPA, and which of these are funded in this request?

Answer. RPA recommended major increases for research on: Improving Timber Culture, Nonpoint Source Pollution, Range and Wildlife Habitat including Endangered Species, Dispersed Recreation, Urban Forestry, Fire Fuels Management, Managing Forest Pests, Harvesting Small Trees and Utilizing Eastern Hardwoods, and Renewable Resources Evaluation. None of these programs are proposed at their full funding level, but the President's budget allows an increase for Renewable Resources Evaluation. The budget will also allow a small increase in research on endangered species, dispersed recreation and nonpoint source pollution.

Forest Products Research

Question. You show no increase for forest products utilization research, but even so it is a $12 million program. Shouldn't some of this effort properly be in the realm of the industry?

Answer. The major responsibility of Forest Products Utilization Research in the Forest Service is to provide technology for the more effective use of timber resources. More efficient utilization of available timber is one of the most beneficial ways to stretch national wood supplies and facilitate optimum management practices on the Nation's National Forests. Our programs largely deal with basic, and conceptual studies. They also are concerned with providing new and improved technologies for the 40,000 small wood-processing operations, information on appropriate wood use to home builders and other wood fabricators, and technical support for the development of product grades and standards for consumers. Problems such as developing new products and technologies for using logging residues and wood manufacturing wastes, improved sawmilling practices, and new uses for low-quality eastern hardwood thinnings, all require a concentrated research effort for solution. Results of this research are available and useful to all public and private landowners, and also provide inputs for the development of public policy.

Our scientists often are called upon for impartial technical expertise during the development of wood product standards and building codes. In effect, our products utilization research serves many public purposes, and deals with issues that are typically broader than those with which industry is concerned.

We estimate that the Forest Industries spend about 165 million for improved plant processes, marketing and development research, much of it of a proprietory nature.

We do not believe that there are or would be incentives for industrial research to focus on the types of problems with which we are concerned. Industrial research on wood and fiber products is concentrated in a dozen or so of the very largest firms. Most smaller wood processing firms conduct little or no research. Research by these largest firms typically address proprietary problems--that is problems which deal with maintaining or improving their competitive position in an existing product or products market. Since their planning horizons tend to deal with the near term, public issues such as extending national timber supplies through relative high risk conceptual studies on new technologies are seldom pursued.

Question. You mention cooperative agreements with large industrial firms. Give us an idea of the cost sharing ratio in this type of agreement. Is the Forest Service investment a relatively low percentage of the total investment?

Answer. Cooperative research agreements with industry are set-up in a great variety of ways. The most common way is through research contracts. The FS contracts a private industry to do a particular job. The reverse also occurs.
In order to enter into such a contract, the work has to be of direct benefit to the agency and the results of the contract must be made available to the general public. Yes, the FS share is about 1/3 of the total investment.

Question. Is this work done primarily at the Forest Products Research Center, in Madison, Wisconsin, or do you have other faciltiies?

Answer. About 2/3 of the forest products research program in conducted at the Forest Products Laboratory in Madison, Wisconsin. We do conduct forest products research at other locations including: Delaware, Ohio; Princeton, West Virginia; Athens, Georgia; Alexandria, Louisiana; Carbondale, Illinois; Missoula, Montana; Fort Collins, Colorado; and Portland, Oregon.

The program at the Forest Products Laboratory is focused on solving national problems in utilization and the programs of the other laboratories are more regionally oriented.

Forest Economics and Marketing Research

Question. I would ask the same question about efforts under forest economics and marketing research - why shouldn't the industry be doing more of this work. For example, why should the Forest Service be doing research on the utilization of worn out railroad ties?

Answer. The Forest Service program of economics and marketing research deals with topics much broader than the interest of any single firm. We are concerned with the development of economic guidelines for managing the National Forests and all the nation's forestlands. For instance, much of our research provides economic information on technology aspects and decision-making on public forestlands and the hundreds of million of acres of small private holdings. These needs cover a host of specific management questions, multiple use aspects, market information, and appropriate technology and economic strategies. Typically these questions fall outside the context of industry interest, and hence are not addressed by corporate research.

Our research also is concerned with problems and information needs related to current and long-range public planning for the management and use of all the nation's forestlands. Studies of foreign trade in wood

products, research on the economics of forest protection programs such as Dutch elm disease control, and legislative issues dealing with timber management issues of national significance, all contribute essential information for the formulation of public forestry policies. Industry typically does not address such broad national problems, and in many instances may have particular special interest in the topic which precludes an analysis dealing with the broader public interest.

Our research on the utilization of worn out railroad ties addresses a subject of concern both from a resource conservation and environmental protection standpoint. Since the supply of railroad ties to rehabilitate the Nation's railways is a major use of Appalachian low grade hardwoods, Forest Service scientists at Princeton, West Virginia have conducted detailed analyses on economic relationships involved in tie production. Current environmental regulations in many states now prohibit the burning or chipping of used railroad ties along rights-of-way. A serious national problem is upgrading thousands of miles of track. This requires replacement of millions of worn out cross-ties which must be removed and disposed. The railroads do not have the expertise for research in recycling waste wood, nor is this expertise readily available from other private sources. Consequently, the railroads asked for cooperative research efforts by the Forest Service, the principal government source of expertise on wood uses and markets.

Forest Service researchers at Princeton, West Virginia evaluated economic uses for worn out cross-ties and suggested several alternatives, the most feasible of which was fuel for steam generation for such uses as treating new ties. Forest Service expenditure of a modest research effort now are resulting in substantial investment by the railroads in implementing research findings. The need for Forest Service recommendations on ways to reduce wood waste and encourage wood product recycling is cited specifically in the "National Forest Management Act of 1976."

Recreation Research

Question. Why do you need a $519,000 increase for recreation research--a one-third increase?

Answer. The increase for recreation research is needed to improve the ability to manage dispersed recreation, which is the major emphasis of the recommended RPA program for the Recreation "system".

This research will focus on analyses of supply and demand for dispersed recreation, integration of dispersed recreation with other resource management activities, and gaining a better understanding of the benefits of dispersed recreation. This will provide means for quantitative cost/benefit analyses of dispersed recreation which are needed for scientific management of the multiple use values of the Nation's forests.

Although the recreation research line item is comparatively small, it is important to note that it is the only federal funding earmarked for research to improve management of recreation on the Nation's forest and rangelands.

Question. Why can't recreation research be constrained so that more pressing needs, including recreation management, get more adequate funding?

Answer. The need for research on dispersed recreation is viewed by the Forest Service as just as pressing as are needs for recreation management. An investment in recreation research now will lead to more efficient recreation management in just a few years with a considerable cost savings to produce needed recreation outputs without damaging the resource base.

Rangeland Improvements

Question.--Your rangeland improvements account includes additional amounts as provided for in the Bureau of Land Management Organic Act. This involves one-half of the grazing fees collected in the eleven western States. First of all, you have

an estimate of $4.5 million in fiscal year 1978. Is that still your best estimate? You have no reason to adjust it in any way.

Answer.--The estimate of $4.5 million for the range betterment fund is based on retaining the 1976 grazing fee (average $1.60/AUM) for the 1977 grazing season. Therefore, the estimate should not change significantly unless there is a great reduction of AUM's used on the National Forest System lands. The drought situation in the West could affect number of AUM's. However, there have been some late snows and some good rains in some of the areas which may let us graze at normal rates. At this time, we do not anticipate any great changes. We will have a much better estimate by June.

Question.--The Act provides that the Secretary apply the funding after consultation with user representatives. How will you accomplish this?

Answer.--Consultation with user representatives can be handled through grazing advisory board meetings where boards are functioning. In those areas where we have no advisory boards, the Forest Supervisor will hold meetings at the local level to obtain advice. There will also be consultation with user groups representing interests other than grazing.

Question.--Half must go to the Forest or area from which the receipts were obtained, but what about the other half? Have you established a mechanism for distribution of the discretionary amounts?

Answer.--Our proposal being readied for publication in the Federal Register will provide for one-half of the range betterment fund to be expended on the National Forest where collected. The other half would be allocated by the Regional Forester based on such factors as greatest need, local resource, social and economic situation, and greatest return for expenditures.

Question.--As observed in your justifications, the $4.5 million increase under rangeland improvements fund is offset by a $3 million cutback in rangeland management under the direct appropriation. Wasn't the purpose of setting up the range fund to increase overall spending, not to permit cuts in direct funding?

Answer.--The Forest Service has interpreted Section 401(b)(1) of the Act to mean that range betterment funds would be appropriated to arrest continuing deterioration of the range and to substantially improve forage conditions with resulting benefits to wildlife habitat, watershed protection, and livestock production. It is our understanding that funds so appropriated would be in addition to any other funds appropriated for planning and administration of the range betterment program and for other range management activities.

Question.--Doesn't a corresponding decrease under range management defeat the intent of the range improvement fund?

Answer.--The Act indicates that substantial betterment is needed and could be accomplished if the fund were established. The Congress directs that the work be done. Progress toward eliminating poor range conditions will not be very great if corresponding decreases in range management funds are made.

The range betterment fund is for the purpose of on-the-ground range rehabilitation, protection, and improvement. Projects meeting the definitions of these terms, together with related support services, will be accomplished with funds made available under Section 401(b)(1) of the Act. However, other range activities necessary to provide for effective use of the National Forest System range will, of necessity, be curtailed with reductions in the rangeland management item. Maintenance of improved levels of management is one management item which will suffer from reduction of rangeland management funds. Reduction of range inspections and related range managerial efforts essential to assuring proper management of National Forest System ranges will also be a consequence of the fund reduction.

Question.--You also show 67 man-years under the range improvements account. Will those salaries be paid from this account?

Answer.-- Yes.

Question.--Is there any need to keep funding sources separate? Can you mix the money from the Granger-Thye Act with the Organic Act money?

Answer.--We need to assure that funds made available under each Act are used for the intended purposes, and plan to develop an accountability system toward that goal. However, if changes in appropriation language are approved as proposed, funds from Section 12 of the Granger-Thye Act of 1950 could be mixed with funds from Section 401(b)(1) of the Act of October 21, 1976 (PL 94-579).

Construction Account

Question.--In the pending supplemental we have added $21 million for rehabilitation and new construction. What effect will this have on your program as presented in the FY 1978 budget?

Answer.--This will have no effect on our program as presented in the fiscal year 1978 budget.

Question.--Are any of the projects listed in FY 1978 also covered in the supplemental amount?

Answer.--None of the projects listed in fiscal year 1978 is covered in the supplemental amount.

Question.--Why don't you provide us with a revised project list under your construction account which assumes passage of the amounts in the FY 1977 supplemental.

Answer.--There is no revised project list since none of the projects listed is covered in the fiscal year 1977 supplemental.

Alpine Lakes Area

Question.--Another item affected by the supplemental is Alpine Lakes. We added $300,000 to the amount requested in the supplemental. Will that result in a corresponding decrease in your FY 1978 request?

Answer.--The $300,000 in the supplemental is for land exchange activities. This does not affect the planning funds requested for FY 1978.

Question.--This request would exhaust the authorized amount for the land use plan, wouldn't it? (Authorized $500,000)

Answer.--Yes, our request for FY 1978 makes a total of $500,000 for the multiple use plan for Alpine Lakes. We have also requested $124,000 for wilderness planning but this does not count against the $500,000 maximum.

Question.--When we look at your construction program on an obligation basis we see some interesting figures. For example, although the appropriation for recreation construction decreases by $629,000 on an obligation basis it decreases by $2.7 million. How do you explain this?

Answer.--The differences are due to a carryover of funds from FY 1976 and Transition Quarter to FY 1977. This caused an increase in funds for FY 1977 and, consequently, a larger relative decrease on an obligation basis for FY 1978.

There are several reasons why construction funds must sometimes by carried forward to the next operating year. (1) Sometimes inclement weather conditions force the survey crews out of the field in the fall before plans can be completed. When this happens we have to wait until the following spring before field work can be completed and the final contract package put together. (2) Often a favorable bid is not received on a construction project and the project has to be re-advertised. This might necessitate obligating the funds in the following fiscal year. (3) If a contract package has been prepared and sitting on the shelf oftentimes changed conditions require that the contract package be re-evaluated and additional field work is required. (4) Sometimes funds are not available until the latter portion of the fiscal year. It then becomes difficult to prepare and award a contract prior to the end of the fiscal year.

We realize the need to currently obligate available funds and will continue to place emphasis on this aspect.

Question.--Why are you cutting back recreation construction?

Answer.--The following amounts have been appropriated or included in budget requests for recreation construction in recent years.

FY 1975 - $7,155,000
FY 1976 - 3,127,000
FY 1977 - 6,837,000
FY 1978 - 6,208,000

The Resource Planning Act (RPA) recommended program included $22,117,000 for recreation construction and deferred rehabilitation in FY 1978. Due to the need to economize, we were not able to include this amount in the President's Budget. Instead, we attempted to present a balanced program below the RPA level in our budget request.

Question.--You have a large increase in your general construction effort - up $3.4 million to a total of $6.1 million. Why do you need to more than double your general construction work in one year?

Answer.--The requested increase reflects basic needs to begin reducing the backlog of new replacement facilities, generated by deferral of badly needed projects because of constrained funding over the past eight or nine years.

Changes in program emphasis, as a result of the Resources Planning Act, and new requirements, such as the National Forest Management, and Occupational Safety and Health Acts, require new facilities and/or major reconstruction of existing facilities. Many existing facilities, though still needed, are so old that maintenance is no longer feasible or economical. For example, more than 60 percent of Forest Service-owned structures in the California Region are over 45 years old.

Leasing of facilities, using regular program funds, has been used to the extent possible. However, most work sites are in remote areas where privately-owned land and/or private investment capital does not exist.

Question.--What accounts for the sharp drop in obligations for pollution abatement construction? (Drops from $16.9 million to $8.1 million)

Answer.--We are reaching the conclusion of the pollution abatement program. PL 92-500 requires pollution abatement at Federal facilities by July 1, 1977. In essence we will comply with the law. However, we expect new sources of pollutions to occur due to the number of Forest Service installations. Where these new sources occur we will evaluate the social, environmental and economical impacts of remedial action against facility closure. If we decide to take remedial action we will fund the action through the resource program responsible for the facility causing the pollution.

Unobligated Balances

Question.--You show no unobligated balance for your FY 1978 construction program. If you can obligate all the funding, why does it need to be no-year money?

Answer.--When funds are requested to finance our construction program each year we expect to obligate all these funds within the budget year. However, due to the nature of resource management work, extenuating circumstances such as fire, flood, unusual weather and other unforeseeable problems often develop which prevent carrying out major projects within the planned time frame. For these reasons we frequently have carryover balances which must be obligated after the fiscal year ends in order to accomplish the needed work, thus necessitating no-year rather than annual funds.

Question.--In last year's budget you reported no unobligated balance in the construction program. Now you estimate a carryover of $15.5 million. For FY 1978 you also show no carryover. Why don't you provide us with a realistic assessment of anticipated unobligated construction funding in FY 1978.

Answer.--The $15.5 million was our actual carryover balance as of September 30, 1976, and involved primarily funds which were appropriated in the Transition Quarter. Due to some of the unforeseen problems stated above, sizeable balances

were carried into the Transition Quarter from fiscal year 1976. In our efforts to complete obligations for the fiscal year 1976 program many of the projects planned for the Transition Quarter had to be deferred until after September 30, 1976.

With the new fiscal year tying more directly to our field work season we expect to expedite our construction program in fiscal year 1978 more effectively than in prior years.

Forest Roads and Trails

Question.--For your Forest Road and Trails account you are requesting $205 million, a decrease of $5 million. On an obligation basis, this really represents a decrease of $75 million.

Answer.--That is correct. When comparing cash needs between fiscal year 1977 and fiscal year 1978 to liquidate obligations there is a net reduction in fiscal year 1978 of $5 million. And when comparing authorization needs to enter into new obligations between fiscal year 1977 and fiscal year 1978 there is a net reduction of $75 million.

Question.--First of all, what effect will the $6 million for roads and trails in the pending supplemental have on your FY 1978 request?

Answer.--This will not have a direct impact on our fiscal year 1978 program. The $6 million increase in FR&T will support the increase in our fiscal year 1977 timber sales program of 520 million board feet of timber. Some of the actual road construction will probably carry over into the fiscal year 1978 program and this will have a slight impact on our administrative capabilities because when we prepared the fiscal year 1978 program we did not anticipate the additional sales volume.

Question.--What is the current total miles within the National Forest Trails System?

Answer.--We have about 97,000 miles of trails within National Forest System.

Question.--Roughly, how many miles of trail are added to the system each year?

Answer.--We have constructed or reconstructed the following miles of trail in recent years.

1970	950
1971	950
1972	370
1973	400
1974	358
1975	298
1976	422
1976 TQ	258

Question.--With the high interest and recreation potential of the National Forests, why should not you be stressing trail work more than you are in this budget?

Answer.--The Resource Planning Act (RPA) recommended program included $10,051,000 for trail maintenance and $8,150,000 for construction in FY 1978. The maintenance amount would be instrumental in preventing resource degradation, allowing for increased use, and adequately providing for public safety. The trail construction funds would enable the Forest Service to meet the target of completing National Forest System portions of the two National Scenic Trails. It would also enable correction of many of the trail situations that are currently judged unsafe or inadequate.

Due to the need to economize, we were not able to include the RPA amounts in the President's Budget. Instead, we attempted to present a balanced program below the RPA level in our budget request.

Program Reductions

Question.--It is evident that you are proposing sharp decreases in Forest Service financed road work. For example, your direct financed portion of the road construction funding is $21.4 million, a decrease of $38.5 million from the 1977 program. Why the sharp decrease?

Answer.--In fiscal year 1977 our Forest Road and Trails budget request was increased by $72 million. This allowed us to preroad sale areas that we are going to enter in fiscal year 1977 and fiscal year 1978. The $38.5 million reduction is simply an economy move. Rather than continue to preroad sale areas in fiscal year 1978 we will construct roads as needed in individual timber sales.

Question.--What are you going to be able to accomplish with a $21 million program? What specific types of road construction do you plan?

Answer.--The $21 million coupled with the preroading we will do in fiscal year 1977 will allow us to accomplish our sales program. The $21 million will be used to construct approximately 168 miles of road and 20 bridges that will specifically benefit timber harvesting. These roads will primarily be local type roads.

Roads and Trails Planning

Question.--For location, survey and planning, you show nearly $6 million less than the current year. Why is this the case when the 10 percent receipt fund shows an increase? (The 10 percent fund increased by $38 million to a total of $51 million.)

Answer.--The 10 percent fund increase is due to the accounting procedure. The fiscal year 1977 10 percent funds programed are from those funds received in the previous fiscal year. In this case that was the 3-month transition period. The 10 percent funds programed in fiscal year 1978 are from the estimated receipts from the full fiscal year 1977 operations. Thus, an apparent large increase.

The 10 percent funds are merged with the Forest Road and Trail account and programed as a total authorization. The 6 million decrease therefore is not necessarily related to the 10 percent fund but rather to the need for road construction-reconstruction based on planned sale volumes over the next several years. The 1977 budget increases permitted us to get ahead in this area and the reduction represents a program on a more consistent level over time.

Question.--You also show a decrease in augmentation of timber purchaser roads from roughly $23 million down to only $3 million. Why is that since you are proposing such large increase in timber purchaser roads?

Answer.--In the fiscal year 1977 appropriations, the committees reduced the amount of requested authorization for purchaser credit (Forest Roads) and added Forest Roads and Trails authorization. This allowed the following:

1. Increased use of Public Works contracts for roads and bridges.

2. Increased use of augmentation for deficit sales situations. The result was eliminating the worst situations where the sales program was prepared but could not be sold due to road costs. The fiscal year 1978 program represents the estimated needs in an improving market condition and taking advantage of our 1977 accomplishments.

Question.--Your bridge program also decreased by a figure of $10 million. How can you manage a reduction of that amount?

Answer.--The $72 million add-on was programed into major projects which were bottlenecks in the road system. Bridges were one of the items which we barely funded from this increase. The cutback was made in this area to affect the overall reduction in Forest Roads and Trails account in interest of economy of budget. This appeared reasonable in light of expected accomplishments in fiscal year 1977.

Question.--Your whole approach to the road program is confusing. How can you keep the program moving with these significant decreases in the Forest Service financed portion?

Answer.--The Road Program is financed by three methods and combination of those methods.

1. Forest Road and Trail authorizations including 10 percent of receipts for National Forest goods and services.

2. Forest Road authorizations (Timber Credits).

3. Cooperative deposits by road users for non-National Forest commercial use.

Basically, in a given year, we place under contract for construction-reconstruction 10,000 miles of road per year by using all these authorities.

Forest Road and Trail authorizations are used for advanced work such as planning survey and design of all roads and for construction-reconstruction of those access roads which are needed before a resource activity can be implemented.

Forest Roads (Timber Credits) authorities are used for work included in Timber Sale contracts and are used concurrently with implementation of the annual sales program.

Co-op funds are a small part of the total and are used to usually complement one of the other two authorities for example, co-op deposits for maintenance or reconstruction.

It is indeed extremely difficult to plan an efficient road program with an annual change in funding method emphasis.

We can make adjustments from the advanced construction activity of the FR&T program which is a long-term investment strategy to the Timber Credits Program, which is a short-term (pay as you go) investment strategy.

This, however, has impacts on personnel and scheduling and it also requires heavy dependency on purchasers for engineering. To reverse fom short-term to long-term investments is more complex and requires a series of program changes over time.

Since 1973, increases in engineering personnel have not kept pace with increased workload, therefore, we have had to rely heavily on purchasers for engineering. This means that surveys and designs are not done until after sales are sold. To curtail the reliance on purchasers would take time. Time to: obtain additional personnel ceilings; hire or train skilled engineers; and so as not to interfere with timber outputs, prepare plans in advance of timber sales.

We were able to absorb the $72 million FR&T increase in fiscal year 1977 without additional personnel but we probably could not repeat this in fiscal year 1978, that is why we reversed back to purchaser construction.

Forest Roads Account

Question.--Under the Forest Roads account you are proposing an increase of $39 million for a total program of $212 million. We added $33.8 million for this program in the current supplemental. It would seem that the program will be given quite a boost by the increase. Will the supplemental amount effect your fiscal year 1978 request?

Answer.--The Forest Roads authority as set up in the fiscal year 1977 Appropriations Act, is a single year account. Its either used or expires at the end of the fiscal year. Also, the Forest Roads (Timber Credits) are directly related to advertised sales and volumes on a fiscal year basis. The supplemental amount of $33.8 million is directly related to the timber sales of fiscal year 1977. The $212 million is directly and totally related to the fiscal year 1978 sales program and volume.

Question.--In the long run, are purchaser constructed roads cheaper than those you construct yourself?

Answer.--Purchaser constructed roads are generally built to serve a single purpose of logging the immediate sale. Maintenance by the purchaser is for his use of the road during the time of sale. There is residual value in the road at the end of the sale, however, future sales would, more often than not, require reconstruction or major restoration. When we construct the road from appropriated funds we attempt to anticipate the use over longer periods of time and design the road for full service for at least 20 years. The difference is higher initial costs and lower operation and maintenance and the elimination of reconstruction costs with each new sale or activity. Generally, this is a less total cost approach.

Question.--What is the balance you are trying to achieve between purchaser constructed roads and roads built with appropriated funds? Is this budget request going to allow you to achieve this balance?

Answer.--RPA goals indicated a need to provide some road construction in advance of and also outside of the timber sale program. Strictly on a mileage basis this came out to be 30 percent of the total needed miles from FR&T appropriation and 70 percent of the total needed miles from the timber credit or Forest Road account by 1980. This budget is not based on meeting that objective in 1980.

Question.--You mention in the justification that increased market demands and higher costs of government construction have led you to seek increased funding for timber purchaser constructed roads. Can you back up that statement by figures? I would like to know the cost of the roads proposed under this account if they were constructed by the government. Give us that for the record if you would, Chief.

Answer.--This is a complex issue. First, to respond to demand on a one-year basis requires that roads be included in the timber sale contracts for increased timber volumes. Time will not permit advanced road construction before these added volumes are sold. Therefore, our increase represents our best estimate of total miles needed and included in timber sale contracts for fiscal year 1978.

Second, the question of costs has been one which we have attempted to verify this past year. To demonstrate how costs are developed for roads built by purchasers versus how costs are developed for public works contracts, the following example of one road project was prepared:

FOREST DEVELOPMENT ROAD & TRAIL PROGRAM

FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE

FOREST COLLECTOR SYSTEM

FUNCTION -	USUALLY CONNECTS LOCAL AND ARTERIAL SYSTEMS
	BALANCE BETWEEN MOBILITY AND LAND ACCESS
TRAFFIC VOLUME -	50 TO 200 VEHICLES PER DAY
USUALLY -	ONE LANE
	HARD OR GRAVEL SURFACE WITH DUST PALLIATIVE
	MEDIUM SPEED
EITHER -	PUBLIC WORKS CONTRACT
OR -	TIMBER PURCHASER CONSTRUCTION

ROAD CONSTRUCTION COST VARIANCES

TO DEVELOP A MORE PRECISE ANSWER TO THE OFTEN ASKED QUESTION, "WHY DOES CONSTRUCTION BY PUBLIC WORKS CONTRACT COST MORE THAN WHEN TIMBER PURCHASERS CONSTRUCT ROADS UNDER TIMBER SALE CONTRACTS?", A DETAILED REVIEW OF THE FOLLOWING SPECIFIC SALE CONTRACT WAS MADE.

SALE NAME:	MONA SALE
LOCATION:	WILLAMETTE NATIONAL FOREST, OREGON
DATE OF CONTRACT:	SEPTEMBER, 1976
TIMBER VOLUME:	4,100 MILLION BOARD FEET
SPECIFIED ROAD MILES:	2.1 MILES (2 PROJECTS)
ROAD COSTS (CREDITS ALLOWED):	$209,610
ROAD STANDARD	SINGLE LANE WITH TURNOUTS
	SPEED 10 MILES PER HOUR
	STEEP TOPOGRAPHY
	GRAVEL (AGGREGATE) SURFACING

THE FOLLOWING COMPARISONS WERE MADE USING THESE ASSUMPTIONS:

AFTER TIMBER SALE COMPLETE AND ROAD COMPLETE. UNDER EITHER ALTERNATIVE THE FOLLOWING ARE ASSUMED TO BE IDENTICAL AND NOT INCLUDED AS VALUES OR COSTS.

(A) THE ROAD IN PLACE
(B) TIMBER SALE ADMINISTRATION AND PREPARATION
(C) PRE-CONTRACT AWARD ENGINEERING IS DONE BY THE GOVERNMENT

THIS ANALYSIS IS BASED ON CURRENT PRACTICES. THE NTMA REQUIREMENTS ARE CURRENTLY BEING ANALYZED. IT IS ANTICIPATED THAT SOME CURRENT PRACTICES WILL BE MODIFIED.

COMPARISONS ARE DISPLAYED IN TWO TABLES.

TABLE 1

THIS SUMMARIZATION OF THE TIMBER SALE APPRAISAL ITEMS SHOWS THE PROPORTION OF THE TIMBER SALE COSTS ASSOCIATED WITH THE RIGHT-OF-WAY TIMBER AND THE CONSTRUCTION OF THE SPECIFIED ROAD.

[illegible] - [illegible] N.F.

SALE APPRAISAL - ROAD BUILDING

ITEM	PURCHASER	GOVERNMENT	DIFFERENCE	REMARKS
VOLUME	4,100	3,710	-390	R/W TIMBER
SELLING VALUE	$1,310,200	$1,185,600	-$124,600	$319.55
COSTS	1000 $	1000 $	1000 $	PER MBF
FELLING & BUCKING	$ 35.9	$ 32.5	-$ 3.4	$ 8.75
SKIDDING & LOADING	98.4	89.0	- 9.4	$ 23.99
HAUL AND SCALE	69.8	63.2	- 6.6	$ 17.01
ROAD MAINTENANCE	26.0	23.5	- 2.5	$ 6.34
GENERAL LOGGING OVERHEAD	48.8	46.9	- 1.9	$ 4.87
OTHER LOGGING COSTS	50.2	50.2	——	——
MANUFACTURING COSTS	463.2	419.1	- 44.1	$ 112.98
	792.3	724.4	- 67.9	
PURCHASER CREDIT	209.6	——	- 209.6	
TOTAL COSTS	1,001.9	724.4	-277.5	
CONVERSION RETURN	308.3	461.2	+152.9	
PROFIT & RISK - 13%	150.7	136.4	- 14.3	
STUMPAGE	157.6	324.8	+167.2	
NET BID	313.6	493.3	+179.7	

TABLE 2

THIS SUMMARIZES THE IDENTIFIABLE COSTS ASSOCIATED WITH BUILDING THE SPECIFIED ROAD (1) IF THE TIMBER PURCHASER BUILDS THE ROAD AND (2) IF A GOVERNMENT CONTRACTOR BUILDS THE ROAD.

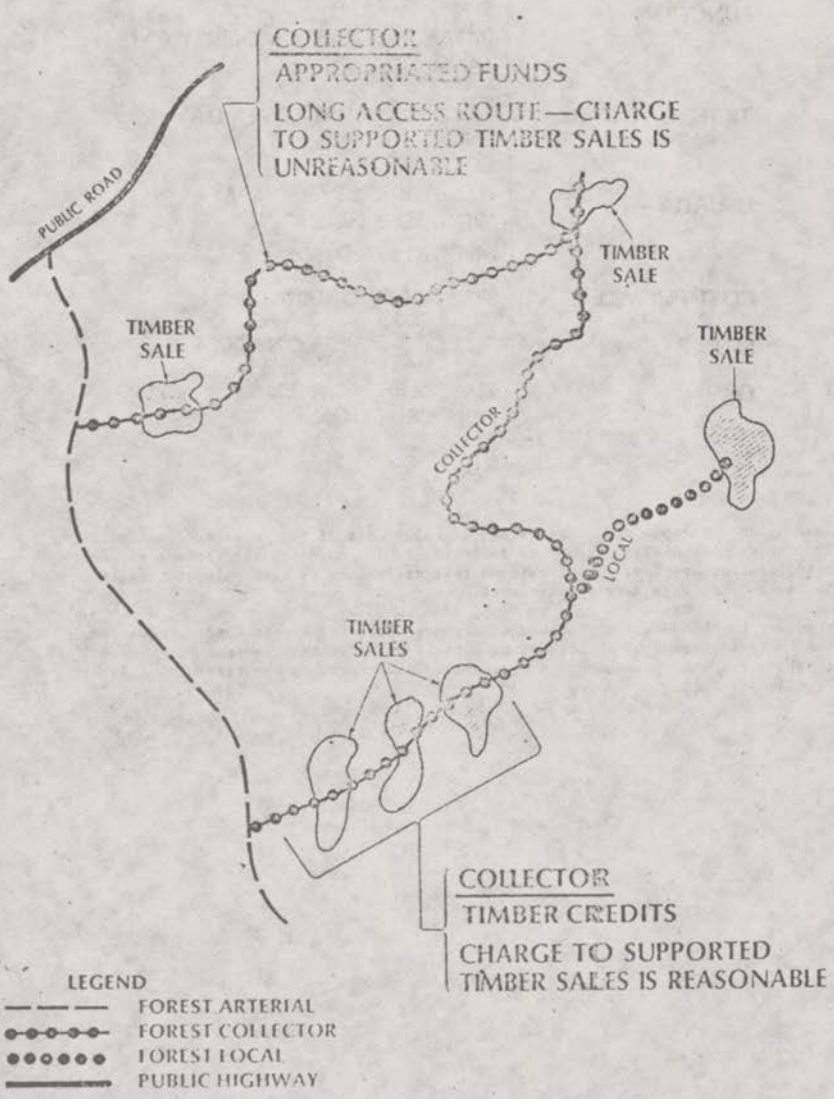
[illegible] TIMBER SALE - WILLAMETTE N.F.

COSTS ASSOCIATED WITH ROADBUILDING

ITEM	PURCHASER	GOVERNMENT	DIFFERENCE		REMARKS
			CURRENT	AFTER NFMA	
	1000 $	1000 $	1000 $		
ROAD COSTS (CREDIT ALLOWED)	$ 209.6	$ 209.6	—	—	
FELLING, BUCKING, SKIDDING, DECKING, ON 390 MBF OF R/W TIMBER	11.9	11.9	—	—	$30.51 PER MBF. CONTRACTOR DECKS LOGS. GOVERNMENT SELLS IN DECKS FOR $ 54,300
	$ 221.5				
MOVE IN - MOVE OUT EQUIPMENT	1.0	4.1	+ 3.1	ELIMINATE	
DAVIS - BACON WAGE RATES INCREASE	—	33.5	+ 33.5	NO CHANGE	38% HIGHER
SPECIFICATION VARIANCE	—	9.5	+ 9.5	ELIMINATE	CONSTRUCTION TOLERANCES
COST OF BONDING (FOR EXTRA BOND)	—	2.1	+ 2.1	NO CHANGE	$7.00 PER $1,000
PROFIT AND RISK ASSOCIATED WITH ROAD BUILDING	28.9	34.9	+ 6.0	REDUCE	13% OF COSTS
ROADBUILDER'S COSTS	251.4	305.6	+ 54.2		
ADDITIONAL GOVERNMENT COSTS					
REMEASUREMENT	—	6.0	+ 6.0	ELIMINATE	
ADMINISTRATIVE COSTS	3.7	20.7	+ 17.0	NO CHANGE	
TOTAL	3.7	26.7	+ 23.0		
TOTAL ALL COSTS	$ 255.1	$ 332.3	+ 77.2		

FOREST COLLECTOR SYSTEM

PUBLIC WORKS CONTRACT VS TIMBER PURCHASER CONSTRUCTION



FOREST COLLECTOR SYSTEM

FUNCTION -	USUALLY CONNECTS LOCAL AND ARTERIAL SYSTEMS BALANCE BETWEEN MOBILITY AND LAND ACCESS
TRAFFIC VOLUME -	50 TO 200 VEHICLES PER DAY
USUALLY -	ONE LANE HARD OR GRAVEL SURFACE WITH DUST PALLIATIVE MEDIUM SPEED
COST PER MILE -	$20,000 TO $90,000
EITHER -	PUBLIC WORKS CONTRACT
OR -	TIMBER PURCHASER CONSTRUCTION

Based on this example and considering the total cost of road construction including planning, survey design, etc., the following table indicates the various apparent cost difference ratios. The final and real difference is based almost totally on the Davis-Bacon Wage Rate requirements.

In answer to the question, the budget figures shown for Forest Roads account would have to be increased by 70 percent or more if built by the government. However, the actual cost to the government in terms of dollar impact on the treasury would be about 30 percent.

TIMBER COST RATIO VARIANCE

PURCHASER CONTRACT VS. PUBLIC WORKS CONTRACT

	Timber Purchaser	Public Works	Ratio
Timber Credit Less Preliminary Survey	$204,470	$347,595	1:70
Timber Credit (Including Survey)	$209,600	$347,595	1:66
Timber Credit + R/W Clearing Profit and Risk Move in Cost	$251,400	$347,595	1:38
Timber Credit + R/W Clearing Move in Cost Profit and Risk Government Cost Presale Eng. Construction Eng. Administration	$270,395	$347,595	1:29

This listing assumes same costs for public works contracts in all cases but indicates the successive additions of work and costs to the visible cost of purchaser credit allowance to achieve the same end product.

The National Forest Management Act will require changes which should adjust both sides raising timber credits and lowering public works costs to more closely reflect the value of the road facility in place.

Costs shown above include all pre sale engineering and administrative costs added to road construction costs.

Comparison of Wage Rates: Davis-Bacon vs. Woods Rates

Work Title	Public Works (Davis-Bacon)	Timber Sale (Woods Rate)
Crew Rig Driver	$9.23	$6.06
Woods Laborer	8.37	5.85
Powderman	8.67	6.54
Dozer Operator	9.77	7.92
Scraper Operator	9.77	7.49
Grader Operator	9.91	6.71
Shovel Operator	9.99	6.98
Front End Loader Operator	9.83	6.98
Rock Drill Operator	9.83	7.26
Roller Operator	9.61	7.69
Dump Truck Operator	9.53	6.32
Choker Setter	8.37	6.06
Totals	$112.88	$81.86

Ratio: $\frac{112.88}{81.86} = 1.38$

Labor costs on Mona timber sale road projects are: $88,264 (about 42% of total purchaser credits).

Labor costs for public works contract are:

88,264. x 1.38 = $121,804 (an increase of $33,540).

Question.--Your RPA estimates show you are budgeting for 106 percent of timber purchaser road needs. Why so high?

Answer.--The RPA estimates were based upon an assumption of adjusting the road program to provide 30 percent of needed miles of construction/reconstruction by Forest Road and Trail appropriation and 70 percent of needed miles of construction/reconstruction by Forest Roads authorization (Timber Credit). This program has not developed in the annual increments outlined in the RPA due to economic factors and therefore, we are programing more timber creidts to allow us to meet timber sale objectives.

Fire Control Programs

Question.--The Watershed Fire Council of Southern California has requested a total of $4.7 million in fiscal year 1978 for Chaparral Fuel Management. How much would be available for this program under the budget request?

Answer.--The current fire program provides for $1.5 million for fuel management within the five Southern California forests in fiscal year 1978.

Question.--Will your personnel ceilings necessitate the termination of firefighters at the end of the current fiscal year, which is the mid-point of the Southern California fire season?

Answer.--In order to meet our "other" personnel ceiling Service-wide it will be necessary to reduce our employment level from 30,315 to 20,850. A reduction of 9,465 employees. One problem that complicates our ability to manage and meet the "other" ceiling is the lack of sufficient permanent full-time ceiling. We have about 9,000 substantially full-time WAE employees who should be full-time, if we had the full-time ceiling for them. Every time we analyze our manpower needs, the substantially full-time employees relate very closely to the amount we are over the "other" ceiling. Approximately 9,000 of the 30,315 are employees that are hired for emergency work which includes firefighting activities and about 3,000 of this number would be in California.

Question.--The FIRESCOPE program was authorized in 1972. Why have no funds been requested to implement this program? We understand that the research and design phases have been completed.

Answer.--The RPA program includes implementation of FIRESCOPE. We had planned to finance the first phase of implementation in 1978. However, we were not able to include the initial effort in our 1978 budget because of the need to hold down expenditures.

Question: Would you provide for the record a cost-benefit analysis of the Fuel Management Program?

ANGELES NATIONAL FOREST STATISTICAL SUMMARY

COST/BENEFIT ANALYSIS

FIRE NAME		DATES	ACTUAL LOSSES 1/ (acres)	PROJECTED LOSSES 2/ (acres)
1.	Dry Fire	9/22/74	5,800	13,580
2.	Prospect Fire	9/22/74	3,120	5,488
3.	Rock Fire	6/16/74	1,815	4,780
4.	Mystic Fire	8/18/74	750	2,340
5.	Necktie Fire	8/31/74	426	2,686
6.	Forebay Fire	9/01/74	200	3/
7.	Pacoima Fire	8/09/75	7,300	14,600
		TOTAL ACREAGE	19,400	43,474
		TOTAL DOLLARS	$7,230,000	$16,095,300

1/ Includes actual suppression costs, watershed damages and resource loss.

2/ Includes the projected suppression costs, watershed damages and resource losses if the fuel breaks had not been in place.

3/ Projected burned acreage has been lumped together for both the Necktie and Forebay fires. Fire experts projected the Forebay fire would have burned over the same area as the Necktie fire.

Questions Submitted by Senator Byrd

Question.--Could you describe what research work the Forest Service is doing to combat Chestnut Blight?

Answer.--The Forest Service has only a small scale study of the nature of hypovirulence as a potential biological control mechanism. Hypovirulence is a less virulent form of the blight that offers promise of displacing the more virulent form.

Question.--What additional amount of funding in FY 1978 could the Forest Service effectively use to increase this research effort?

Answer.--As indicated in our RPA plans, the Forest Service could effectively use $100,000 in FY 1978 to initiate research on Chestnut Blight. Full implementation would cost $350,000.

Question.--Could work on this problem be carried out at both the Delaware, Ohio; and Morgantown, West Virginia, facilities in FY 1978?

Answer.--Yes.

Question.--What would be the total needs for this research for both facilities during FY 1978?

Answer.--The needs for FY 1978 would be $100,000; full implementation would require $350,000.

Question.--What is the status of the addition to the laboratory at Morgantown?

Answer.--Preliminary plans are in hand and final architectural plans are expected from GSA within a few days. We plan to negotiate the construction contract by July 15. Completion will be expected by August 1978.

Question.--What will this additional space be used for?

Answer.--The additional space will be used primarily for State and Private Forestry personnel of the U.S. Forest Service. The new offices and laboratories will be used by existing personnel now dispersed in three separate locations. The new facilities will house 12 to 14 additional people who will provide technical forestry services to State organizations, private industry, and private land owners. State and Private Forestry specialists have a major responsibility for implementing forestry research developed at Morgantown and elsewhere. In addition, it will also contain space for the Assistant Director for Research and two laboratories for the wildlife research program.

Question.--What research on alternative management systems could be accomplished in FY 1978 that are not now budgeted?

Answer.--We have plans for considerable expansion of research to address alternative management systems. These are included in part in our FY 1978 RPA plan for Improving Timber Culture and in part for direct response to the National Forest Management Act of 1976 which was enacted after our agency budget was prepared. This research would develop alternative management strategies for multi-forest resources with emphasis on uneven-aged management systems. It will address the long term question of continued site productivity as well as developing new techniques for improved management. This research will occur over a representative spectrum of the forest types that occur across the country.

Question.--What additional amounts would be needed in FY 1978 for these two fields of research?

Answer.--An additional $800,000 is needed for small tree harvesting research. We need at least an additional $2,500,000 to do the research needed on alternative management systems.

Question.--What about the Princeton Laboratory? What are you doing there?

Answer.--At Princeton the main thrust on our work is to make better use of hardwood timber and thus improve forest-based job opportunities in rural Appalachia. For example, we have found that the surplus, low-grade hardwood resource will support four plants in West Virginia for producing construction grade hardwood plywood. One manufacturer recently built a plant incorporating results of our research on log grade hardwood yields and process technology. Research on hardwood bark residues has stimulated use of this heretofore waste material. We have quantified and evaluated uses for logging residues. There is a vast quantity of material now left in the forest that is suitable for pulpwood, pallet parts, mine timbers, and fuelwood for industry and homes.

Question.--What is happening at the Timber and Watershed Laboratory at Parsons?

Answer.--We have been evaluating the impacts of various forest practices on timber and water resources. We now have an improved technique for predicting storm flow from small forested watersheds and both of the Parsons projects have been evaluating impacts of cable logging. The timber project is maintaining long-term studies of various harvest cutting practices. They have studied the economics of even-aged and uneven-aged management. However, we still have juch to learn to provide both public land managers and private owners guidance in managing their forest land for the best mix of uses, and still provide resources for a healthy industry. With a vast forest land base in eastern hardwoods, we have a big responsibility for meeting a significant part of the Nation's needs for wood, wildlife, water, and recreation.

Question.--What is the current thrust of research at Morgantown?

Answer.--We have two projects--one in wildlife and one in engineering. The wildlife project is learning how to improve habitat for wild turkeys and gray squirrels, both important forest wildlife. Results of this research will be useful to forest land managers in the Appalachian Region in meeting the needs of forest users.

In the engineering project, we are finding better ways to harvest hardwood trees with reduced environmental impact. Our studies in cable logging demonstrate that this system can be used in certain situations, and it is environmentally superior. In the future we expect more pressure on the eastern hardwood resources to help meet future national timber needs. These forests are capable of supplying more wood than we are now harvesting. One of the keys to such a development is more efficient harvesting technology suitable for steep lands, relatively small trees, and small logging enterprises.

Question.--Do you have the funds to do this kind of work at Morgantown?

Answer.--We have a small staff of scientists capable of undertaking part of the needed research, and we have excellent opportunities to work on a wide variety of forest conditions with willing State and Private cooperators. However, because of a tight budget situation, we have been unable to take on the job that needs to be done to improve harvesting of steep slopes within a reasonable time frame.

Question.--How much do you need?

Answer.--$400,000.

Question.--What plans does the Forest Service have for research on mobile yarding systems for harvesting small trees on the steep slopes such as those in the Appalachian Region.

Answer.--One of the most urgent needs is for research on timber harvesting systems and equipment to handle small trees and logs. Loggers in the Appalachians and elsewhere are limited to harvesting equipment that is too costly and/or excessively damaging to the forest environment when used in the area forests of small to medium sized trees. The logger is handicapped by this equipment limitation and judged unfairly when excessive forest damage results from harvesting small trees. The forest manager

cannot manage the forest properly through use of thinnings because of this damage.

To meet these needs, we have developed a comprehensive plan for small tree harvesting research. This research would test and modify available equipment such as the mobile cable logging system and would also develop new equipment such as our proposed "Peewee Yarder." The latter unit is in model form now and is a minature of the successful running-skyline systems that we developed for the Northwest. Through an expanded small tree harvesting research program, we can soon have working prototypes for testing and development for use in various parts of the country.

Question.--Are we going to have the technology soon enough to meet the needs?

Answer.--We have some of the technology now and we need to get it applied. Unfortunately, we have many unanswered questions about alternative land treatments that must be answered before they are put into practice. We need to intensify our research on these alternatives.

Question.--How much is needed to intensify this research?

Answer.--$150,000.

Question.--There are several recreation areas in the Monongahela National Forest that are in need of additional development work. Could you provide for the Committee the additional amount of funding that the Forest Service could use in FY 1978 and a brief description of how the funds would be used if appropriated for the following areas:

A. Lake Buffalo, Pocahontas County
B. Lake Sherwood Recreation Area, Greenbrier County
C. Horseshoe Recreation Area, Tucker County
D. Blue Bend Recreation Area, Greenbrier County

Answer.--The information requested follows:

Forest Priority #1

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

LAKE BUFFALO
MONONGAHELA NATIONAL FOREST

POCAHONTAS COUNTY
WEST VIRGINIA

	In FY 1978 Budget Request	Additional Increment for FY 1978
1. Appropriation Item and Projects:		
a. Construction and Land Acquisition: Recreation use areas	--	$33,000
b. Forest Roads and Trails	--	--

2. Feasibility and Desirability:

Lake Buffalo, 21 acres in size, is located 5 miles east of Bartow, West Virginia. Its purpose is to supplement low flow of the East Fork of the Greenbrier River for industrial purposes and to provide water-based recreation. Phase I would add filter material to toe of dam; Phase II includes construction of a boat launch and dock area with a 20-car parking area at upper end of the lake. Phase III is the possible development of a 22-unit campground and 22-unit picnic area to be constructed when the need is demonstrated.

An environmental analysis of the proposed picnic and campground is needed prior to Phase III construction. This will determine if these facilities are to be constructed.

The addition of filter material to the toe of dam structure is urgently needed in fiscal year 1977.

3. Description of Work:

Phase I - Add filter material to toe of dam.

Phase II - Construction of roads, road bridge, parking, and dock facilities associated with boat launch site.

Phase III - Construction of roads and recreation facilities associated with picnic site and campground. These needs will be determined by Environmental Analysis.

4. Time Required for the Project:

Phase II of this project could be completed in 2 years.

5. Total Estimated Cost:

To be determined after preparation of environmental analysis.

	Construction and Land Acquisition	Forest Roads and Trails
6. First Year Cost Estimates and Items of Construction:		
Item		
*Add filter material to toe of dam	$30,000	--
Environmental analysis	3,000	--
Design of roads, road bridges, and parking	--	$38,000
Preliminary planning and design of recreation facilities	7,000	
Total	40,000	38,000

*Must maintenance item.

7. Other Costs:		
Phase II design and construction	$50,000	$260,000
Phase III construction	84,000	190,000
Total	134,000	450,000

8. Accomplishments to Date:

Construction of the 12-car fisherman parking area, vault toilets, signing, and other work items associated with Phase I are complete.

9. Additional Personnel:

No additional.

Forest Priority #2

LAKE SHERWOOD RECREATION AREA
MONONGAHELA NATIONAL FOREST

GREENBRIER COUNTY
WEST VIRGINIA

	In FY 1978 Budget Request	Additional Increment for FY 1978
1. Appropriation Item and Projects:		
Construction and Land Acquisition:		
Recreation use areas	--	$22,000

2. Feasibility and Desirability:

Lake Sherwood is a 165 surface acre lake located 25 miles northwest of White Sulphur Springs, West Virginia. Developed sites include a 97 unit campground, 50 unit picnic ground, swimming beach for 500 people at one time, boat launch and docking area, foot trails, and an administrative site. People at one time capacity is 1,235.

The Lake Sherwood campgrounds receive about 100,000 visitor-days of use annually. Replacement of 6 pit toilets with vaults in West Shore Campground for off-season use and rehabilitation of 97 camp units is needed in this heavily used camping area.

Grading of the downstream toe of the dam structure is needed to prevent deterioration of the dam.

Repair of the dam gate must be coordinated with the West Virginia Department of Natural Resources fishery program for the lake.

3. Description of Work:

Repair of the dam gate and grading of the downstream toe of dam.

Replacement of 6 pit toilets with 2-4 unit vaults in West Shore Campground and rehabilitation of 97 camp units.

Planning and design of a 50 unit campground, playground area, including parking, and an amphitheater site.

4. Cost Estimates and Items of Construction:

	C&LA Phase I Costs
Grade and repair downstream toe of dam	$8,000
Repair dam gate	14,000

Other Costs:

	C&LA	FR&T	Total
Phase II			
Install two 4-unit toilets in West Shore Campground	$35,000	- -	$35,000
Phase III			
Prepare Environmental Analysis to determine need for additional recreation facilities	3,000	- -	3,000
Planning and design of 50-unit campground, playground, and amphitheater site	25,000	$25,000	50,000
Phase IV			
Construction of 50-unit campground playground, and amphitheater site .	395,000	250,000	645,000

5. Accomplishments to Date:

Campground sewage system construction is complete. The scheduling of dam gate repairs in fiscal year 1977 has been coordinated with West Virginia Department of Natural Resources.

6. Time Required for Project:

Phase I could be completed in 1 year; total project could be completed in 4 years.

7. Additional Personnel:

No additional.

Forest Priority #3

HORSESHOE RECREATION AREA
MONONGAHELA NATIONAL FOREST

TUCKER COUNTY
WEST VIRGINIA

	In FY 1978 Budget Request	Additional Increment for FY 1978
1. Appropriation Item and Projects:		
Construction and Land Acquisition:		
Recreation use areas	--	$186,000

2. Feasibility and Desirability:

Horseshoe Recreation Area is located 8 miles northeast of Parsons, West Virginia. Major facilities include a 10-unit campground, 12-unit picnic ground, group picnic shelter, playground, and a swimming site for 100 people at one time. The water and sanitation facilities were constructed in the mid-30's under the CCC program. Replacement of the facilities is needed to avoid high maintenance and assure high standards for water quality and pollution control.

3. Description of Work:

Phase I

Planning and design of water and sanitation systems to serve existing recreation facilities. (To be done in fiscal year 1977) Construction and Land Acquisition, $18,000.

Phase II

Construction of water and sanitation systems.

Landscaping associated with water and sewage line construction.

4. Time Required for the Project:

This project could be completed in two years.

5. Estimated Costs:

	C&LA Phase II (FY 1978)
Construct water system	$75,000
Construct sanitation system	103,000
Landscaping	8,000
Total	186,000

6. Accomplishments to Date:

The recreation site plan has been revised to reflect facility replacement needs. Preliminary engineering studies of the existing water and sanitation systems, including soil scientist and geologist reports, have been completed.

Design of water and sanitation systems now underway.

7. First Year Costs and Items of Construction:

See No. 5.

8. Additional Personnel:

No additional.

Forest Priority #4

BLUE BEND RECREATION AREA
MONONGAHELA NATIONAL FOREST

GREENBRIER COUNTY
WEST VIRGINIA

	In FY 1978 Budget Request	Additional Increment for FY 1978
1. Appropriation Item and Projects:		
Construction and Land Acquisition:		
Recreation use areas	- -	$24,000

2. Feasibility and Desirability:

Blue Bend Recreation Area is located 10 miles north of White Sulphur Springs, West Virginia. This recreation area was constructed in the mid-1930's under the CCC program. The water system and bath house facilities constructed during that period now need replacement to avoid high maintenance and to assure water quality and pollution control. The area has a 22-unit campground, 25-unit picnic ground, large picnic shelter, and a swimming site along Anthony Creek for 150 people at one time. Total facility will serve 500 people at one time.

3. Description of Work:

Engineering design of a new water system.

Architectural design and construction of a bath house to replace two substandard bath house structures.

Construction of a new water system which includes drilling a well.

Landscaping associated with replacement facilities.

A study of the existing septic tank sewage system for bath houses may disclose the need for a new sewage disposal or treatment system.

4. Time Required for the Project:

This project could be completed in 2 years.

5. Estimated Costs:

	C&LA Phase I
Engineering design of water system	$18,000
Design and site plan for bath house	6,000
Total	24,000

6. Other Costs:

	C&LA Phase II
Drill well and replace water system	Cost to be determined
Replace bath houses (2)	Cost to be determined
Replace 2 existing pit toilets with vaults .	Cost to be determined
Landscaping	Cost to be determined

7. Accomplishments to Date:

Preliminary engineering studies of the existing water system, including geology report on subsurface water sources and pollution control, have been completed. Additional information will be needed.

8. First Year Cost and Items of Construction:

See No. 5.

9. Additional Personnel:

No additional.

QUESTIONS SUBMITTED BY SENATOR HUDDLESTON

Question.--What is your request for cooperation in forest fire control?

Answer.--The request for funds in fiscal year 1978 is $11.8 million for Cooperative Fire Protection. This is a decrease of $8.8 million from fiscal year 1977. This decrease is to be accomplished principally through reduced payments to the States.

Question.--What are your projections in terms of use of recreation areas in FY 1978?

Answer.--With the funding proposed in the President's Budget ($65,587,000 for Recreation Use), we project a total of 213 million visitor-days of outdoor recreation on the National Forest System lands for FY 1978.

The Resource Planning Act (RPA) recommended program included $105,862,000 for Recreation Use for FY 1978 and projected 220,625,000 visitor-days of use.

Question.--How do these compare to FY 1977? To FY 1973?

Answer.--The recorded outdoor recreation use on the National Forest System lands for FYs 1977 and 1973 was 199,928,100 and 188,200,000 visitor-days, respectively.

Question.--Do you take into consideration changing patterns of use (increase or decrease) in allocating resources among recreation areas? If so, how?

Answer.--Yes, we take changing recreation use patterns into consideration when allocating resource among recreation areas.

When use of an area changes, or is expected to change, resources are shifted. For example, as in the summer of 1976, we expect decreased use at Shasta-Trinity National Recreation Area (NRA) in 1977 because of the drought-caused low water levels. Because of this situation, the Forest Supervisor will reduce seasonal employment at the NRA. He will shift manapower and funds to other areas the public will use as an alternate to the NRA.

Question.--Please explain the new funding system which was recently implemented for fire prevention and suppression in national forests.

Answer.--The fire management fund (FM) is an account composed of appropriated Forest Protection and Utilization - Fire Protection funds and an unauthorization to use on a preplanned basis Fighting Forest Fire funds (FFF) to finance all pre-suppression activities. Fire suppression activities will still be charged directly to the Fighting Forest Fire appropriation.

The fire management fund will provide better national control and direction in the funding of presuppression activities. If the current level of inflation continues,

and as protection standards become higher, the presuppression costs will continue to increase. In order to control this increase and to ascertain what these expenditures are accomplishing, it was decided to restrict the use of FFF financed presuppression to an allocated amount.

The presuppression activities, referred to here, include all activities done prior to the ignition of a fire. These activities are divided into six categories for budgetary purposes. They are prevention, detection, attack forces, aviation operations, fuels management, and support and facilitating services. These presuppression activities are now budgeted and charged against the FM account. The account is also assessed for General Administration.

The funding level of the FM account was based on the average of the past three fiscal years' actual expenditures adjusted for inflation.

Provisions have been made to determine the total presuppression needs and to develop an equitable distribution to the Regions. The allocations will be the amounts within which the Regions will operate during each fiscal year, unless specific changes are authorized. Guidelines have been issued that identify the conditions and the procedures that a Region will follow to request a change in funds to meet a fire emergency situation.

Question.--Have allotments been made for YCC slots for the upcoming summer (FY 1977 plus supplemental)? If so, could we have a State-by-State breakdown of slots available?

Answer.--We have made a tentative allocation of YCC dollars including the supplemental, by States, which would employ 43,000 youth. The allocation by State will be determined after the States reply to program dollar offers based on a fair share formula and the date when the supplemental funds are made available.

Question.--Could you advise what the Forest Service plans for this road are? Is it in the FY 1978 budget, where is it on the priority list, etc.?

Answer.--This project is not in the 1978 budget proposal. There are several sections to the project each with a different priority from National Forest Management point of view. We do have a relative high priority on the first section of the road extending from the Saltlick Bridge to Forest Road 918, a distance of 3.7 miles. This road construction must be coordinated with both State and county work as well as a proposed PL-566 project on Clear Creek. Should the economic picture change, the significant increases in recreation related road funds be permissible, then we could consider this section in near future budgets.

The second section from 918 to the lake shore is of low priority for reconstruction. The current road serves the National Forest Management needs.

Question.--There are three other Forest Development Roads in the Daniel Boone which could also use attention: FDR 968, Claylick; FDR 925, Site Twenty-six; and FDR 932, Bangor. Could you advise what the plans for these are?

Answer.--These roads are all existing and provide access to boat ramps on the upper end of Cave Run Lake.

The reservoir master plan called for ultimate developments which would include:

FDR 968, Claylick; two miles, two lane paved road and 75 car parking.

FDR 925, Site Twenty-six; one mile of two lane road (existing) paved and 66 car parking.

FDR 932, Bangor; one mile of two lane paved road and 40 car parking.

The current use of the area is being adequately served by the existing one land and two lane unpaved roads. The current need would not justify the cost of raising these roads to two lane paved secondary State standards at this time.

Question.--There is interest in Kentucky in the excavation of a rock house in the Red River Gorge. Is the Forest Service aware of this? Do you support such a project?

Answer.--Yes, we are aware of the interest in the excavation of rock houses in the Red River Gorge. They are being subjected to heavy vandalism.

We support such a project to extract, interpret, and preserve scientific values contained in those structures considered most significant. Estimated cost of the project is $50,000.

Question.--Some 9,000 acres of the 26,000-acre geological area of the Red River Gorge has been the subject of an archaeological survey. What are the plans for completion of the survey?

Answer.--The Red River Gorge is designated as a Special Interest Area under authorities included in 36 CFR 294.1. Funds are not currently programmed to complete this survey. We estimate that $40,000 would be required to complete the survey.

Question.--The Koomer Ridge Campground is apparently in need of modernization and of a barrier to protect users from a high cliff. Has the Forest Service looked into this?

Answer.--We have recognized the need to rehabilitate Koomer Ridge Campground for several years but have not had sufficient funds to accomplish the job. $75,000 is included in the FY 1977 supplemental act for this purpose. This includes funds for a protective barrier as well as complete rehabilitation of facilities.

Question.--I understand that the picnic units at Sky Bridge Recreation Area, Greys Arch Picnic Area and Rock Bridge Picnic Area need modernizing. Can the Forest Service do this any time soon?

Answer.--Heavy use has caused these sites to deteriorate. There is a need to rehabilitate the facilities. Protection of the soil and vegetation will be emphasized in the rehabilitation measures. Funds for this project are not presently included in the budget. Costs are estimated to be $22,000. The work could be done as soon as funds are available.

Question.--There is a need to remove dead trees along the channel of upper Licking River at Cave Run Lake. Will this be possible in the near future?

Answer.--In some instances it is beneficial to leave trees in lakes to provide fish habitat. The management plan for Cave Run Lakes calls for some trees to be left for this purpose. As a result, excellent Muskie fishing is being provided at Cave Run.

Funds are presently included in the budget to remove the debris and submerged logs from the channel of Upper Licking River in the early summer and again in the fall to improve access to the Lake.

Question.--On page 158 of the justifications, you project a drop in Weeks Act purchases in Kentucky from 7,250 acres in fiscal year 1977 to 4,000 acres in fiscal year 1978. What accounts for this decrease? Where are the 4,000 acres involved in fiscal year 1978 located?

Answer.--The 1977 fiscal year program included about $750,000 for land purchases in Kentucky totaling 7,250 acres. The 1978 request is $632,000 to purchase about 4,000 acres. The reduced dollar request plus a price escalation factor will result in less acres purchased. All of the moneys requested for Kentucky will be used for acquisition in the Redbird Unit.

Question.--Did the Forest Service request from the Department of Agriculture and OMB any funding for the program in the fiscal 1978 budget?

Answer.--No. The Department does not have authority to fund the RCFP program beyond fiscal year 1977. New legislation (S-275 and S-12) is currently being acted on by Congress.

Question.--Has the Forest Service requested funding in any of the past three years?

Answer.--Yes. The Forest Service has requested the full $7 million authorization annually for the three years of the pilot program.

Question.--Is the Forest Service disinterested in the program?

Answer.--The Forest Service is extremely interested in the RCFP program due to its compatibility with the Cooperative Fire Protection program which we administer. The three-year pilot project has demonstrated the need for and effectiveness of the program in improving the protection of lives, property, and natural resources in rural areas. At the present time there is no other Federal program which provides assistance for organizing, training, and equipping rural fire departments.

Question--What is your request for cooperation in forest tree planting?

Answer--Funding for assistance in tree planting is from two sources:

(1) Title IV, Assistance to States for Tree Improvement--$1.387 million

(2) CM-4, Cooperation in Forest Tree Planting (Nurseries)--$345,000

Question--Does this take into account losses resulting from the unusually severe winter which we had?

Answer--No. Title IV funds are used by States to apply genetic principles in order to produce improved strains of trees which will grow faster than run-of-the-mill tree stock. The development of forest tree seedlings is a highly specialized activity. It involves the installation of seed orchards whose progeny are genetically superior and the use of these trees in an advanced seed orchard. The advanced seed orchard is composed of selected, high-performance progeny whose seeds are used to produce nursery seedlings for outplanting. CM-4 funds are used by States to improve the efficiency of the forest nurseries with improved nursery equipment, nursery expansion, and storage facilities. There is an immediate need for cold storage facilities to hold tree seedlings in order to extend the planting season.

Most States can now maintain tree planting programs on their own land without Federal help. However, the assistance offered in Title IV and CM-4 has major positive effects on forest production on all lands. They bring to the landowner genetically superior stock which is in excellent condition for outplanting.

We do not know at this time the extent of plantation losses resulting from the unusually severe winter. Tree planting survival counts or surveys are made the year following the planting. These counts are made by private foresters, consultants, and service foresters of the State Foresters' organization in the planting areas in which they have been involved. Aside from the Cooperative Forest Management Program in which RPA estimates a funding need of $14.7 million, the Forest Service does not have a planting program which directly assures replacement of forest trees in the ground. The Forestry Incentives Program and the Agricultural Conservation Program do cost-share with landowners for the planting of forest trees. The Forest Service, through the State Foresters, provide technical assistance to landowners using these programs and works closely with ASCS in administering the forestry aspects of the cost-share programs.

Questions Submitted by Senator Leahy

Question. What is the status of the ERDA funded Forest Service study on the direct combustion of wood as an alternate energy source?

Answer. The ERDA study provides for: 1) site-specific studies to identify a series of pulp and paper mills where field trials might be conducted on attaining mill-energy self-sufficiency through the use of additional wood-residues fuel, and 2) field trials of a prototype mobile harvester that is capable of picking up forest residues or small trees and chipping them on site.

For the first objective, detailed, site-specific studies of forest residues availability and economics of potential use for filling the energy requirements of 10 selected pulp and paper mills in Northern Wisconsin and Upper Michigan are underway. The work is approximately 60 percent complete and a report will be written by October 1977. Preliminary results indicate that one ton of green wood chips, roughly equivalent to a barrel of oil, can be delivered to the mill for about $10 per ton.

The residues harvesting machine is in the stage of working out design details. It is expected that a new chipping concept will be developed and ready for test by July 1977. The harvester and chipper sections will be assembled and the complete mobile harvester (mobile hog) will be ready for field testing in February 1978.

Question. What is the Forest Service's capacity for expanding its wood energy research, what would that expansion cost, and has the Service requested any such funds, either through your own budget process or through ERDA?

Answer. A complete program for wood-energy research as currently visualized has been worked out. If fully implemented, the Agency program would cost $5,000,000 per year for five years. Construction and operation of pilot wood-fueled steam and power plants for primary wood processing plants would require additional funding.

The Forest Service has not requested these funds through its own budget process. We have submitted several proposals to ERDA for FY 1977 funding. These pending proposals are for research on: forest plantations for energy, $250,000; a wood-waste burner, $150,000; and in pine resin stimulation, $550,000.

Question. Does the Forest Service have any estimate of the amount of wood and wood waste which might be available on an annual basis for wood energy purposes? If not, what would the Service's attitude be toward such a study?

Answer. Yes, based on 1976 studies we estimate wood waste to be about 170 million dry tons of materials from logging and mill operations. In addition, there are currently about one billion tons of dead and defective trees that could be available for energy purposes. The National Forest Management Act of 1976 requires us to improve this estimate regionally and locally. We estimate the cost of such studies to be $830,000 per year. We favor said studies for they offer an opportunity to make better use of wood for forest products and energy simultaneously reducing wood waste problems in forests and in manufacturing plants.

Questions Submitted by Senator Stevens

Question. Is there any provision in this budget for research facility construction to accommodate the southeastern Alaska research effort?

Answer. No, there is nothing in the President's FY 1978 budget for research facility construction in Alaska.

Question. What are your plans for the research facilities in Fairbanks? Which studies of the interior forests are planned?

Answer. Our RPA plans indicate construction for the Institute of Northern Forestry in Fairbanks in 1981 and 1982. The multidisciplinary studies on ecology of the Tiaga of interior Alaska will continue. An acceleration of timber management, silviculture, economics, and resource evaluation studies are needed in order to provide guidance to State agencies, native corporations, forest industries, and others concerned with wise land use. New emphasis will be put on wildlife habitat research, terrestrial habitat classification, and research on recreation use and management.

Question. The Forest Service has recently completed a study of the feasibility of structural particleboard manufacture in Alaska. What are your plans for continuing economic and utilization research of that type for Alaska?

Answer. The study you refer to showed that it is not feasible under present economic conditions to manufacture particleboard in interior Alaska for export to Japan and other Pacific rim nations. However, the study indicated some possibilities for production of wood products for domestic consumption.

The Forest Service has developed plans for a series of studies on the potential of utilizing Alaska's vast interior forest for local markets and limited export. Both economic and environmental factors will be considered. It was not possible to include funding for these studies in the FY 1978 budget.

Question. What research efforts are being adversely affected by not funding the Alaska research program at the RPA recommended level for 1978.

Answer. The RPA recommended level for FY 1978 would include an additional: $150,000 at Juneau to accelerate renewable resources evaluation, $200,000 at Juneau for research on control of mass soil erosion on forest lands, $250,000 at Juneau to accelerate research on how to protect and enhance spawning and rearing habitat for anadromous fish, and $300,000 at Seattle, Washington, for development of technology and equipment to permit environmentally acceptable timber harvest on Alaska's steep slopes, and fragile forest lands.

Question. Last year, Congress added funds to accelerate the anadromous fish habitat research effort of the Forest Service in southeast Alaska. What has been accomplished by that acceleration? Can additional funding be used effectively? If so, how much is needed?

Answer. The anadromous fish habitat research effort at Juneau is part of a coordinated program involving research at Corvallis, Oregon; Boise, Idaho; and Arcata, California, as well as Juneau. The program in southeastern Alaska features research to address the effects of logging on fish habitat. The influence of factors such as stream debris, sedimentation, and stream temperatures, are under intensive studies.

The program would benefit from additional funding to implement Phase II of the plan. That would require an increase totaling $800,000 with $250,000 for Juneau, Alaska; $300,000 for Corvallis, Oregon; $130,000 for Arcata, California; and $120,000 for Boise, Idaho.

Question. How does this budget for Research compare to the RPA-recommended Research budget on a national level?

Answer. The President's budget for FY 1978 includes $95,650,000 for forest research compared to $119,331,000 at the recommended RPA level.

Question.--I understand there are a number of construction projects dealing with field work quarters for Forest Service employees in a number of cities in Alaska. What are the exact needs, in terms of money, for the construction of these facilities?

Answer.--The Alaska Region's fiscal year 1978 budget proposal identified construction projects totaling $1,751,000. Of these, projects totaling $108,000 were included in our Agency estimate based on consideration of national and regional priorities.

Question.--It is my understanding that there are currently three studies being conducted by the Forest Service to help eliminate the problems between the fishing and timber industries in Alaska. Phase I was completed last year. What are the Forest Service's plans for Phase II? What aspects of timber management will Phase III cover?

Answer.--This effort is part of a westwide Forest Service program of research on anadromous fish habitat. In Southeast Alaska, fish habitat studies were initiated on effects of logging debris on the rearing and spawning habitat of anadromous fish. Our first effort was to establish baseline data of stream conditions and fish production in natural unlogged forests. Current research will assess habitat characteristics and fish productivity of streams with

logging debris present and then followup by monitoring the changes in water, habitat, and fish as the logging debris is removed.

Preliminary findings suggest that relatively minor modifications in timber management practices will be necessary to protect the habitat of anadromous fish. Additional research is needed to develop adequate guidelines to protect and improve anadromous fish habitat in Alaskan forests.

Question.--As mandated by the Resources Planning Act, the Forest Service is supposed to maintain an inventory of the resources in Alaska. Is the current budget sufficient to meet this requirement? If not, how much additional appropriation is needed?

Answer.--The recommended Resources Planning Act level requires an additional $150,000 for inventory of resources in Alaska.

Question.--There is interest in the Forest Service developing a study of timber harvesting methods in Alaska which are environmentally acceptable and that would minimize soil erosion and damage and decrease the impact of timber harvesting on fish producing streams. If such a study were performed, what would be the budgetary requirements?

Answer.--We are planning to conduct an administrative study to demonstrate long-span skyline yarding techniques in Alaska. This study will be a cooperative effort involving the Pacific Northwest Station, Region 10, and the timber industry. We plan to use administrative sale procedures and accomplish the project within regularly programed finances.

In addition to the administrative study, the Forest Service research program at Seattle, Washington could be expanded to include further development of advanced techniques and accompanying new equipment for harvesting Alaska's steep slopes and fragile soils. The enhanced research program would require an additional $300,000 annually.

Question.--The Forest Service in Region 10 and the State of Alaska have reached a cooperative agreement as provided for under the Sikes Act. What are the details of the agreement? How much money would be needed to complete the projects that the State and the Forest Service have agreed upon?

Answer.--The cooperative agreement referred to above is what we call a Memorandum of Understanding. A supplement to the Master Memorandum of Understanding between the Forest Service and Alaska Department of Fish and Game was made for the purpose of implementing the Sikes Act on National Forest System lands in Alaska.

The funds needed to complete the projects agreed upon by the State and Forest Service are as follows:

Year	Funds Needed
First	$3,356,600
Second	2,414,100
Third	3,500,000
Fourth	3,750,000
Fifth	3,750,000

Question.-- The Visitor Center at Portage Glacier, which has a large number of visitors and tourists during the summer months, consists basically of two trailer houses and a bathroom facility. Are there plans to upgrade the center? If so, what type of budgetary request would be needed?

Answer.-- Plans are under way to construct a new Visitor Center at Portage Glacier. A team of specialists including interpretive naturalists, architects, engineers, and landscape architects have prepared preliminary plans which are presently being reviewed. We expect to complete the preliminary early in fiscal year 1978. Although not funded in the fiscal year 1978 budget, approximately $220,000 would be needed to prepare the detailed plan, engineering and architectural design, and interpretive plan. About $1.3 million will be needed in fiscal year 1979 if we are to complete the remaining planning and construct the Portage Glacier Visitor Center during that fiscal year.

Question.-- There is great pressure on the Forest Service to complete a number of wilderness studies in the Tongass and Chugach National Forests. There is $260,000 designated to complete studies on four of the areas: the Granite Fiord, Tracy Arm, Petersburg Creek, and King Salmon Cape areas -- a total of 1.4 million acres. A number of other areas are also under study. What is the status of these studies and how soon do you expect to have them finished? Are additional funds needed for their completion?

Answer.-- The FY 1978 budget for the Forest Service contains only about $700,000 for wilderness studies. This budget does not contain $260,000 for studies of potential wildernesses in Alaska; rather there is a minimal $7,000 for that Region. The funding provided by this budget is the minimum needed to meet the deadlines on Congressionally mandated wilderness studies. The areas of Alaska named above are not mandated for study, but were administratively selected for study by the Forest Service. Even with the streamlining we wish to do with the wilderness study process, to accomplish review of 12 million acres either Congressionally designated or administratively selected would take a significant increase in funding. To complete the reviews in about 15 years would cost about $2 million per year for the Forest Service. Additionally, the Congress has been expecting minerals reviews by the Interior Department on these wilderness study areas. We cannot speak to the funding needs of the U.S. Geological Survey and Bureau of Mines for this work.

Question.-- At this time, there are 52,000 acres in Alaska which could benefit from a reforestation program. How much money would be needed to develop such a program?

Answer.-- The 52,000 acres mentioned is a total need for both reforestation and timber stand improvement. Of this, it is estimated that 27,000 acres need reforestation. This could be accomplished over an 8-year period for 1.65 million dollars. This could not start until FY 1979 after a greenhouse has been built to produce containerized stock. ($350,000 in FY 78 in program.)

Question.-- How many board feet of timber would be salvaged annually in a beach salvage program in southeast Alaska?

Answer.-- The best estimate available indicates an annual salvage volume rangning between 5 and 10 million board feet.

Question.-- What is the status of the regulation change?

Answer.-- The proposed final Regulation 36 CFR 223.1 item 5 provides the legal basis for the proposed salvage program.

Question.-- What are the details of the Small Business Timber Set-Aside Program to be implemented on the National Forests of Alaska, and what is the status of the proposed regulation change?

Answer.-- We have approved an agreement with the Small Business Administration establishing an annual set-aside share of approximately 80 MMBF of timber on the Tongass National Forest and 5 MMBF on the Chugach. This agreement was signed by the Forest Supervisors, the Small Business Administration representative, and by me on March 18, 1977, and is now in effect. The share agreement is under the authority of the "Agreement between Department of Agriculture and the Small Business Administration for the Development and Operation of a Small Business Program in the sale of National Forest Timber and Related Forest Products," Part 4.c.

The share agreement contains the following statement:

> Rather than rely on the historical small business purchaser records accumulated during a time when a third pulpmill/timber sale contract held rights to a large share of the allowable harvest for the Tongass National Forest and during which time independent firms were being absorbed by the pulp companies, a more equitable solution is one which assures sufficient open sales for continuation at previous harvest levels by the pulpmills while establishing recurrent set-aside programs for each of the years remaining in the 1976-80 period.

> In order to fully recognize the obligation of the pulp firms to operate pulpmills in performance of the long-term contracts and at the same time facilitate the development of competitive enterprises and markets for timber resources, the Forest Service and the Small Business Administration have agreed to a set-aside program of approximately 80 MMBF of sawtimber (average annual target volumes) for the Tongass and 5 MMBF for the Chugach National Forest.

We have initiated an enlargement of the appraisal process in Alaska using chip and cant selling values on some sales and pulp and cant selling values on others.

The annual harvest on the Tongass National Forest will produce more pulp-type logs and chips than the existing pulpmills have used in the past. Therefore, the independent sale volume in excess of their capacity could create surplus of pulp-type logs (both small merchantable logs and utility logs) and chips from sawmill by-products. This surplus material must be disposed of and chip export appears to be a logical outlet. This was brought out by the testimony and written comments presented at the hearing in Juneau, Alaska, on February 16, 1977. Therefore, I have decided to expand our appraisals in Alaska to utilize chip and cant selling values as the starting point of appraisals for part of our independent timber sales on the Tongass National Forest. This process will also be applied to sales from the Chugach National Forest where there is no local outlet for chips made from pulp-type logs. This material on the long-term pulp sales will be appraised to pulp and cants as has been done in the past.

We are recommending that Secretary's Regulation CFR 221.25(c) be changed allowing the export of chips made from whole logs on sales other than the 50-year pulp sales. This is necessary to provide an outlet for the surplus material described under action No. 2 and recognizes the changed conditions that have resulted since the cancellation of the Juneau Unit pulp sale last year, as well as the requirement to remove utility grade logs on all timber sales approved since last spring. Each of these steps are crucial to our effort to establish a viable small business timber program in Alaska while at the same time maintaining our commitments to the mill complexes established under the long-term sales.

The change in Regulation 36 CFR 223.10(c)(2) to permit the export of chips manufactured from whole logs from timber sales in Alaska other than the two long-term pulp sales will be proposed at the close of the present rule making process involving 36 CFR 223.10.

Question. -- The Timber Industry in Alaska has struggled with the Forest Service Stumpage Appraisal System for a number of years. My office has repeatedly urged your office to adopt either a new system or change the existing system, in order that it reflect the actual economic situation that exists.

What actions has the Forest Service taken to reflect in the Stumpage Appraisal the high costs incurred by the Industry? The Stumpage Appraisal System changes often lag way behind the changes in the economic changes. What is your office doing to cut this time lag?

Answer. -- Timber appraisals currently are based on the use of about 50 percent of the timber for pulp, and the remaining 50 percent for export lumber or cants. Because the third pulpmill was not built, a surplus of material for pulp often develops--especially when lumber demand is up, but pulp demand is down. This puts small business competitors of the pulpmills at a disadvantage, because they cannot export chips that they produce, yet the pulpmills will not, or cannot use the chips.

Proposal

There are two partially conflicting factors: (1) the Government's commitment to supply the pulpmills which were required to be built under the long-term contract, and (2) the need to allow a fair share of timber sales to be bought by small businesses.

We propose to handle the issues in the following manner, by setting up two components of the timber program.

A. The annual needs of the pulpmills will be met first from the long-term contracts, which do not permit whole-log chip exports. Any additional needs for the pulpmills will come from the pulpwood component of short-term sales.

B. Short-term timber sales in excess of those needed to supply pulpwood to the long-term sales will permit export of chips from either whole logs or sawmill byproducts.

Set-aside sales will come from the B component.

Appraisals or reappraisals of A component sales will be the standard method for timber used for pulp and other products manufactured currently in use in Alaska.

Appraisals or reappraisals of B component sales will be based on chip sales values (including chip export sales, if appropriate) and other product manufacture currently in use in Alaska, if said B component sales are surplus to the needs of the pulpmills.

Question.--Pending before Congress this year, there are a number of bills which would have a dramatic effect on the Forest Service and the Timber Industry in Alaska. A number of these bills would effect existing contracts which the Industry depends on.

1. Has your office studied these proposals?

2. If so, what impact do you see on your activities if these proposals passed Congress as they are written currently?

3. Do you have the forest in Alaska to "trade off" for those areas currently under contract which would be limited by some of these bills?

4. What would be the long-term impact of the proposals on the Forest Service and timber product supplies should they pass Congress?

Answer.--The following bills have been introduced in the 95th Congress which would impact Forest Service activities and the timber industry in Alaska:

H.R. 39 (Udall); S. 500 (Jackson)--This bill would designate 147 million acres of Federal land in Alaska as wilderness. This would include 5.04 million acres of existing National Forest land.

H.R. 5605 (Seiberling)--This bill would designate Admiralty Island, which is now a part of the Tongass National Forest, as a National Preserve under National Park Service administration.

On April 25, 1977, Assistant Secretary M. Rupert Cutler testified for the Department of Agriculture on both these bills before the House Subcommittee on General Oversight and Alaska Lands. In his statement (copy enclosed), Dr. Cutler indicated that the Administration will be reviewing these bills in more depth over the course of the summer and will arrive at a position by early fall.

A copy of Dr. Cutler's testimony is enclosed. It responds, as best we can for the time being, to the impact of these bills on Forest Service activities. The testimony does not specifically address the short- or long-term impact of these bills on the timber industry or identify areas under contract for harvest. We are developing this information now for inclusion in the hearing record on H.R. 39 and will provide a copy to the Subcommittee when it is completed.

STATEMENT OF M. RUPERT CUTLER, ASSISTANT SECRETARY FOR CONSERVATION, RESEARCH AND EDUCATION, U.S. DEPARTMENT OF AGRICULTURE, BEFORE THE SUBCOMMITTEE ON GENERAL OVERSIGHT AND ALASKA LANDS, COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, HOUSE OF REPRESENTATIVES, ON H.R. 39, THE ALASKA NATIONAL INTEREST LANDS CONSERVATION ACT, ON MONDAY, APRIL 25, 1977.

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

The Department of Agriculture appreciates this opportunity to present its views on H.R. 39. This bill would result in expansion and/or establishment of new National Forests, Parks, Refuges, Wild and Scenic Rivers and Wildernesses on Federal lands in Alaska.

The bill would impact the responsibilities of the Department of Agriculture in several ways. I will speak first to those provisions of H.R. 39 which relate to designation of new units and expansion of existing units of Federal lands in Alaska. Then I will address the impact of H.R. 39 on the management of the existing National Forests in Alaska, particularly those provisions relating to wilderness designation.

NEW NATIONAL FORESTS, PARKS, REFUGES, AND WILD AND SCENIC RIVERS

Section 17 (d) (2) of the Alaska Native Claims Settlement Act directed the Secretary of the Interior to recommend to Congress the suitability of public lands in Alaska "for addition to or creation as units of the National Park, Forest, Wildlife Refuge, and Wild and Scemic River Systems."

With passage of the Act in 1971, the Forest Service established an Alaska Planning Team to study these public lands for potential new National Forests. From the outset, the Forest Service Planning Team recognized that many areas were best suited for National Parks or Wildlife Refuges status and it excluded these areas from its studies. In 1973, based on the Team's study, the Department of Agriculture recommended to the Secretary of the Interior that some 42 million acres of land identified as suitable for multiple use-sustained yield management, including wilderness, be added to the National Forest System.

The Secretary of the Interior reviewed the Forest Service studies along with studies by Interior Department agencies, the Alaska Federal-State Land Use Planning Commission and others. He subsequently recommended that 83.5 million acres of National Forests, Parks, Wildlife Refuges, and

Wild and Scenic Rivers be designated by Congress, including three new National Forests, totaling 18.3 million acres, and addition of 500,000 acres to the existing Chugach National Forest.

Since that proposal was made, the Forest Service has been preparing a series of preliminary Area Guides setting forth agency program direction for broad areas of Alaska which would include the lands in the proposed new National Forests. The Forest Service has recently completed such a guide for the Copper River-Wrangells area which would serve as the basis for subsequent land management planning for the area. This area guide includes consideration of wilderness and other multiple use values. I would be pleased to make this available to the Subcommittee as an example of our comprehensive land management planning process.

While there may be need for modification of the earlier proposal, we continue to believe that it provides a firm base upon which to begin congressional deliberations on designating additional units of Federal lands in Alaska. We will be prepared to make detailed recommendations on specific areas later this summer. However, we believe that the option for a broad combination of resource values should be provided where appropriate.

H.R. 39 would add 64 million acres to the National Park System, 46.4 million acres to the National Wildlife Refuge System, and 4 million acres to the National Wild and Scenic Rivers System. All of these systems, of course, are managed for very specific, limited resource uses. Only 1.6 million acres would be added to the National Forest System for multiple use management as expansions of the Tongass and Chugach National Forests. We would hope that the Subcommittee would adopt a balanced program providing a mix of land and resource uses in Alaska, rather than the more limited use embodied in H.R. 39.

In addition to designating most of the Federal lands in Alaska as Parks, Refuges, and Wild and Scenic Rivers, H.R. 39 would further designate all of these lands as wilderness.

Through Forest Service administrative policy and practice since 1924 and later through congressional action, wilderness has been recognized

as an important resource within the National Forest System. Wilderness is fully compatible with--is an integral element of--multiple use management. This concept was specifically recognized in the Multiple Use-Sustained Yield Act of 1960, one of the basic acts governing the administration of the National Forest System.

Today, the majority of areas in the National Wilderness Preservation System are located in the continental United States, and within the National Forest System. Although to date wilderness has been designated in Alaska only in units of the Wildlife Refuge System, the Department of Agriculture recognizes that wilderness is a major resource in the existing National Forests in southeast Alaska and soon plans to propose several major new wilderness designations within Alaskan National Forests. We would also envision that wilderness would be a major resource in any new National Forests in Alaska.

However, the advisability of establishing wilderness of the scope proposed in H.R. 39 must be weighed carefully.

As the Subcommittee is aware, Section 17 (d)(2) of the Alaska Native Claims Settlement Act did not include the National Wilderness Preservation System as one of the systems the Secretary of the Interior was to recommend to Congress. Therefore, wilderness classification was not specifically included in the agency study efforts. As has been the rule with wilderness designation in existing units of the National Forests, Parks, and Wildlife Refuges, we would have expected classification of wilderness in new units in Alaska to follow (1) Congressional designation of the four systems, (2) a subsequent deliberate land planning process by each agency, and (3) future congressional consideration of the agencies' wilderness-designation recommendations. We continue to believe that this is a reasonable approach.

A preliminary review indicates that designation of as much wilderness as proposed in H.R. 39 may have serious impacts on access and transportation opportunities throughout Alaska. In addition, subsistence use, and agricultural, community, and economic development by Native Villages, Regional Corporations, and other residents and communities could be

significantly affected. Because of this Department's commitment to achieving equal economic opportunity for rural citizens, these possible State and local impacts of H.R. 39 and any other d-2 proposals are of major interest to us. In addition, we are concerned with the "costs" of constraints on management of wildlife habitat, on provision of certain kinds of recreation opportunities, and on mineral and energy resource development which could accrue to citizens if all the areas proposed in H.R. 39 were immediately designated as wilderness.

IMPACTS ON NATIONAL FOREST MANAGEMENT

In addition to d-2 proposals, H.R. 39 has some provisions that would impact the administration of the existing National Forests in Alaska, which we need to bring to the Subcommittee's attention.

First, H.R. 39 would transfer almost one million acres of National Forest land to other Federal land systems. Some 105,000 acres would be transferred to the Glacier Bay National Park; 700,000 acres would be transferred to the Copper River Delta Wildlife Refuge, and another 70,000 acres would be transferred to the jurisdiction of the National Park Service for administration as wild rivers. We are unaware of any studies which indicate a need to transfer these lands out of the National Forest System to achieve scenic value-preservation purposes.

Secondly, H.R. 39 would result in concurrent jurisdiction of National Forest lands and resources. Section 301 of the bill would give administration of all wild and scenic rivers designated by Title III to the National Park Service regardless of where those rivers are located. Two of the proposed wild rivers--Situk and Stikine--lie principally within the Tongass National Forest.

Title VI of H.R. 39 would give the Secretary of the Interior responsibility for management of the wilderness areas designated within the existing National Forests, an awkward and unnecessary arrangement. Section 701 attributes responsibility for the additions to the Tongass and Chugach National Forests to the Secretary of the Interior. And sections 706 and 708 give the Secretary of the Interior the authority to establish on Federal and other lands administrative sites and visitor

facilities of up to 1,000 acres each and areas of ecological concern of undetermined acreage adjacent to each unit established under the Act. In addition, the Secretary could establish archeological protection sites of up to 75,000 acres each adjacent to each unit.

These provisions could lead to several million acres of National Forest land being administered by both the Secretary of Agriculture and the Secretary of the Interior. Traditionally and by statute, wilderness and wild and scenic rivers are administered by the Secretary and agency which administers the system where these designations occur. To change this procedure and to grant concurrent jurisdiction of Federal land systems would create fractured land and resource management, inefficiency, and duplication. It would unnecessarily increase the complexity of the land manager's job. Whatever legislation the Subcommittee eventually approves for designation of new public land units in Alaska, we would strongly urge the Subcommittee not to adopt provisions which would create duplicative, overlapping jurisdictions for any unit.

Before I get into a discussion of wilderness in Southeast Alaska, I do want the Subcommittee to know that I will be visiting Alaska this summer for a first-hand look at the existing and proposed National Forests. At the conclusion of my trip, we will be better prepared to speak to specific sites and areas being proposed for designation as new units of the Federal Lands Systems, as well as to designation of wilderness in the existing National Forests.

WILDERNESS IN EXISTING NATIONAL FORESTS IN ALASKA

H.R. 39 would designate as wilderness six areas, totaling 5.04 million acres of existing National Forest lands in Alaska. The areas are all within the Tongass National Forest except one, Nellie Juan, which is within the Chugach National Forest.

As you are aware, the Department of Agriculture, through Forest Service administration of the National Forest System, currently has the responsibility for management of 92 wildernesses, totaling 12.6 million acres throughout the United States. The Department of Agriculture supports expansion of the National Wilderness Preservation System. Proposals for

designating 17 additional National Forest wildernesses, totaling 3.2 million acres, which have resulted from a review of primitive areas, are now before Congress.

In addition, 245 areas, involving 11.0 million acres in the National Forest System, have been designated administratively for wilderness study. Seven of these wilderness study areas set aside for wilderness review through Forest Service initiative are in Alaska (Nellie Juan-530,000 acres, Granite Fiords-590,000 acres, Tracy Arm-780,000 acres, Russell Fiord-227,000 acres, King Salmon Capes-120,000 acres, Petersburg Creek-24,000 acres, and Khaz Bay-33,000 acres). The Department of Agriculture is aware of substantial public concern that there are no designated wildernesses on Alaskan National Forests today.

We plan to proceed with wilderness study of the Nellie Juan, Granite Fiords, Tracy Arm, Russell Fiord, King Salmon Capes, Petersburg Creek, and Khaz Bay areas. We would have no objection to a congressionally designated study of these areas, with the exception of Khaz Bay. The Forest Service land management plan for Khaz Bay has been appealed and is now undergoing administrative review. There has been contention that wilderness study area status may constitute breach of the long-term timber sale contract which includes the area.

The land management plan for the Chugach National Forest was completed in the Fall of 1974. On three areas--Red Peak (35,000 acres), Harriman Fiord (87,600 acres), and Columbia Glacier-Glacier Island (62,900 acres)--the land management plan proposed management in a near natural condition, and study for possible scenic or geological area designation. Wilderness study of these areas would also be appropriate. With the exception of the study areas, we defer further recommendations on proposed wilderness until completion of our report on H.R. 39 later this summer.

Land management planning is in progress for the Tongass National Forest. As part of the land management planning process, we expect to identify additional areas which should be studied for possible wilderness designation. We still are completing resource inventories and analysis, and will be seeking State, Federal, and public involvement and comment

on all aspects of the Tongass plan. In the meantime, we have, through our land management planning and related public involvement processes, tentatively identified 16 areas as having substantial wilderness value.

1.	Barrier Islands	- (3,000 Acres)
2.	Tebenkof	- (66,000 Acres)
3.	Eudor Mountain	- (62,000 Acres)
4.	Mt. Edgecumbe	- (63,000 Acres)
5.	Stikine LeConte	- (215,000 Acres)
6.	South Baranof	- (406,000 Acres)
7.	East Admiralty	- (508,000 Acres)
8.	Taku River	- (375,000 Acres)
9.	Naha River	- (36,000 Acres)
10.	Skagway River	- (53,000 Acres)
11.	Swanson River	- (25,000 Acres)
12.	Beecher Pass	- (8,000 Acres)
13.	Berners Bay	- (160,000 Acres)
14.	Russell Fiord Expansion	- (90,000 Acres)
15.	East Behm Canal	- (200,000 Acres)
16.	Granite Fiord Expansion	- (1,500,000 Acres)
	Total	(3,770,000 Acres)

We believe that designation of these and/or other areas for wilderness study probably should await completion of the land management plan. The land management plan will provide better definition of the areas and assist in establishing appropriate study boundaries.

On the areas mentioned in my statement as having substantial wilderness values, I can assure you that their wilderness potential, subject to valid existing rights, will be protected until such time as the Congress has had an opportunity to review our specific recommendations resulting from the land management planning on the Tongass National Forest.

H.R. 5605 - ADMIRALTY ISLAND PRESERVE

In the Chairman's letter to Secretary Bergland requesting our testimony on H.R. 39, we also were asked to present our views on H.R. 5605, a bill to establish Admiralty Island as a "national preserve" under the jurisdiction of the Secretary of the Interior. This same area is proposed as wilderness in H.R. 39.

Admiralty Island is one of the larger islands in Southeast Alaska. It is approximately 100 miles long and slightly over 30 miles wide, and contains approximately 1,147,600 acres. All but 2,400 acres of Admiralty Island are National Forest lands.

As part of the Tongass National Forest, Admiralty Island is included in the land management planning process now underway. The Tongass Land Management Plan will allocate land areas on the Tongass National Forest to various uses or combinations such as wilderness, dispersed recreation, and wildlife management. The development of the Plan is an interdisciplinary effort involving the Forest Service, the State of Alaska, National Marine Fisheries Service, Fish and Wildlife Service, Native groups, community leaders, and other citizen groups. The Tongass Land Management Plan seeks to resolve land use issues through land allocation and extensive public involvement. The Draft Environmental Statement for the Plan is scheduled for release in December 1978.

In the interim, there are no timber sales or harvesting on Admiralty Island, and protection of the Bald Eagle and Alaska brown bear continue through specially designated management areas.

This is the current situation with regard to Admiralty Island. The management options open to the Forest Service through the land-management planning process include wilderness protection and endangered species management, and the Department will respond affirmatively to Congressional direction which has been set forth in this regard.

We have not had sufficient time to analyze H.R. 5605 in contrast to H.R. 39, or to discuss within the Administration possible positions with regard to Admiralty Island. We will submit a formal legislative report on H.R. 5605, as well as H.R. 39.

As I mentioned earlier, I plan to visit the area myself this summer, and I would hope that during its July field trip, the Subcommittee would see the area at first-hand to observe Forest Service management of the area.

Mr. Chairman, this concludes my prepared statement. I would be happy to answer any questions you might have at this time.

Questions Submitted by Senator Hatfield

Question. How does this budget compare to the RPA recommended research budget on a national level, and for the State of Oregon?

Answer. The President's FY 1978 budget for the national research program is $95,650,000 as compared to $119,331,000 in the recommended RPA program. The total for Oregon in the President's budget for FY 1978 is $8,231,000 compared to $10,431,000 at the full RPA level.

Question. What is the current status of the Oregon Range Validation program? I have been contacted about the need for additional economics research in this area. Can you explain how much is needed for this additional work and how it would be used?

Answer. This program is a new kind of effort for us. It involves extremely close cooperation of several Federal and State agencies plus local landowners in a carefully planned and monitored large scale evaluation of a variety of range management practices. During the first year the procedures, such as for coordinating planning on public and private lands, have been developed and tested, the monitoring system has been designed and baseline data are being obtained, and test range management practices are now being carried out on the ground.

To bring this program into better focus with regard to economic realities, we need to expand the effort to include development of multiple use economic decisionmaking guidelines. The guidelines will help determine the consequences of resource decisions on jobs, growth and stability of communities and effects on regional and national economics. Such guidelines would be useful well beyond the Blue Mountains of Oregon. This research could be done with an additional $100,000 annually.

Question. As you know, I have been greatly concerned over the use of certain herbicides for brush control in forest management. There has been considerable controversy over the use of 2,4,5,-T. Can additional research help to clarify the situation? Do you have any funding in this budget to carry out such research? How much money is needed?

Answer. Yes, very definitely, additional research is needed to evaluate the long term effects of 2,4,5,-T on organisms, and we do have plans for such research in our RPA planning. The President's budget does not contain any increase for this needed research. At the RPA recommended level for FY 1978 there would be an increase over the President's budget of $100,000 for research on 2,4,5,-T through research units at Corvallis.

Question. It has come to my attention that there may be curtailment in genetic improvement research at the Pacific Northwest Lab. I am concerned because of the importance of this work to future timber supply. Please provide me with current funding figures and the level necessary to maintain the program at its present level.

Answer. Yes, there is considerable interest in the genetics research program at Corvallis, which provides a scientific foundation to the cooperative private-public tree improvement program in the Northwest. The effective funding for this research has not kept pace with rising costs. The current level of research is $316,000. Under the RPA we estimate that an additional $150,000 is required to maintain the research at its 1971 level.

Question. How is your program to study the effects of forestry practices on anadromous fish habitat progressing? Is additional funding needed this year?

Answer. The anadromous fish habitat research program got off to a good start at all locations--Corvallis, Oregon; Juneau, Alaska; Boise, Idaho; and Arcata, California. Studies are underway to determine the effects of alternative logging and grazing practices on anadromous fish habitat. The program is ready to begin Phase II which would require an additional $800,000 annually.

Question.--Cascade Head Scenic Research Area. How is management of this area progressing? What funds are now available for acquisition and other purposes, and is there need for increased funding?

Answer.--We approved the management plan for the Cascade Head Scenic Research Area on March 29, 1977. Implementation is underway, with emphasis on acquisition activities.

For fiscal years 1977, 1978, and 1979 we have planned $1,636,000, $2,000,000, and $1,505,000, respectively, for acquisition. These funds should accomplish the needed acquisition. Other funding for the Area is adequate.

Question.--Oregon Dunes National Recreation Area. Can additional funding be used for this area and for what specific purposes?

Answer.--Yes, additional funding can be used at Oregon Dunes National Recreation Area. $358,000 is needed to rehabilitate water and sanitation facilities at the Eel Creek and Siltcoos Campgrounds. This amount is included within a project listing for rehabilitation and construction at the 85 percent level of the Resources Planning Act Recommended Program.

Question.--Hell's Canyon National Recreation Area.

1. Can additional funding be used for planning and other purposes?

Answer.--Additional planning funds are not needed for Hells Canyon National Recreation Area for fiscal year 1978. The amount included in the President's budget is adequate.

Important unfunded operation and maintenance needs are: (1) boater access safety at the Hells Canyon Dam; (2) wilderness permit administration; and (3) a River Ranger.

Question.-- Historic Timberline Lodge is being subjected to increased uses for activities it was not meant to serve. Is additional money needed in FY 1978 for the new day lodge or any other purpose?

Answer.-- We could use $3,148,000 at Timberline Lodge in fiscal year 1978 to construct a day lodge, install a tertiary treatment sewer system, pave a strip for parking, and landscape around the C. S. Price wing. The planning for these facilities is being done this fiscal year.

Question.--One of the worst droughts in history aggravates a serious fire control problem in the West. How much funding was requested by the Forest Service for the Clarke-McNary cooperative fire program in FY 1978? How much additional money is needed to simply maintain the program at the previous year level?

Answer.--The proposed funding level for Cooperative Fire Protection for fiscal year 1978 is $11.8 million. This level of funding is $8.8 million less than fiscal year 1977. To maintain the program at the 1977 level, funds for fiscal year 1978 should be increased over the funding level of 1977; but even with this increased funding, the level of protection that is recommended in the RPA program for 1980 will not be achieved. The recommended program for fiscal year 1980 is $35 million in Federal funds to assist States to achieve the level of forest fire prevention and protection determined in 1974 Fire Protection Analysis. The gap between the 1980 RPA recommended program and the fiscal year 1978 proposed budget is about $23 million in Federal funds. Although the implications of this gap are not entirely clear, the impact on the forest fire prevention and protection program on non-Federal land would result in greater dollar losses in natural resources. There would be reduced effectiveness and efficiencies in prevention, training, implementation of improved equipment for firefighting and forest fuel modification. This would increase the number of fires and acres burned over the current levels.

Question.--As you know, a 1973 amendment to the Sikes Act stimulated cooperative fish and wildlife habitat development plans within many States. How are these plans progressing and what level of funding is needed nationwide and in Oregon?

Answer.--Statewide plans for fish and wildlife on the National Forests have been completed in 35 States; 7 State plans are not completed. Funding needs are $26.17 million for the first year to implement the 35 State programs. For Oregon, $756,750 is needed for the first year. A listing of the States with completed plans and the first year funding needs is enclosed.

TABLE 1

Inventory of Fish and Wildlife Work
(Comprehensive Cooperative Plans)
To Be Done on National Forest Lands

Region	State	Cost to Implement Plan
1	Montana	$1,935,500
	Idaho	2,537,900
	North Dakota (grasslands)	350,000
2	Wyoming	753,000
	South Dakota	789,000
	Nebraska	323,000
	Colorado	365,565
	Kansas	145,000
3	New Mexico	1,500,000
4	Nevada	417,500
	Utah	450,000
5	California	2,000,000
6	Oregon	756,750
	Washington	186,200
8	Alabama	252,430
	Arkansas	880,100
	Florida	334,069
	Georgia	227,100
	Kentucky	252,000
	Louisiana	373,812
	Mississippi	378,079
	North Carolina	350,000
8, 3	Oklahoma	143,406
	South Carolina	149,380
	Tennessee	80,000
8, 3	Texas	404,460
	Virginia	1,013,000
9	Indiana	300,000
	Michigan	1,543,000
	Minnesota	1,734,000
	Missouri	375,000 1/
	Ohio	300,000
	West Virginia	800,000
	Wisconsin	413,000
10	Alaska	3,356,000
		26,168,251 2/

All of the above listed comprehensive plans have been completed.

1/ Fourth year increment of five-year program for Missouri National Forests.
2/ Total first year costs for implementing the 35 programs. State plans yet to be completed include Illinois, Pennsylvania, New Hampshire, Vermont, Maine, Arizona, and New York.

Question.--There appears to be an overall reduction in roads programs for the current year--FY 1978. Why is there a reduction, particularly in appropriated funds? At this level will there be any possible impact on the timber sales program? What was the amount requested from Agriculture and OMB?

Answer.--The reason for the reduction is twofold: (1) this is an effort to reduce direct Federal spending; and (2) most of our road construction has been in support of the timber sales program and as our sales program in fiscal year 1978 is down 500 million board feet from the fiscal year 1977 program our road needs are less.

In fiscal year 1977 we were able to emphasize a highly desirable program--road construction in advance of timber sales--due to the $72 million program increase directed by Congress. By reducing the fiscal year 1979 program the advance roading will not receive emphasis.

The impact of not preroading is on the timber harvesting program rather than on the sales program. Timber harvesting may begin immediately after a sale is awarded where the roads are already in place. However, if roads are built after sales are awarded there is a significant delay in the harvesting operations.

The amount initially requested from the Department and OMB was consistent with the Resource Planning Act recommended program, $293,000,000.

Question.--What is the RPA level of funding for roads in FY 1978?

Answer.--The total Forest Roads and Trails program as shown in the recommended RPA program is $293 million.

Question.--What will the National Forest Management Act provision for the small business option do to change road funding needs for the coming year?

Answer.--We have been, as you know, working on regulations and new procedures to implement the small business election provisions. This means possible new appraisal methods as related to road cost estimates and revision of specifications to meet contract requirements under both Timber Sale contract and under Public Works contract requirements.

We are also attempting to determine the potential of the industry's actual use of this provision to have Forest Service build the road. These unknowns made it difficult to predict cost increases. Our best guess at this time is that FR&T and Purchaser Credit will increase $24,000,000 and $26,000,000 respectively over our normal program.

Question.--In light of past experience, won't these roads (purchaser opts for Forest Service to construct) be more costly if the Forest Service has to build them rather than the timber purchasers? Will there be any change in policy related to road standards?

Answer.--We are confident that if the government constructs specified roads, it will be more costly than if the purchasers constructed these same roads. The following are reasons why this occurs:

Overhead

Current fiscal policy requires that all funded programs be assessed for a pro rata share of overhead costs.

Under the timber sale contract there is no purchaser credit allowance for overhead related to road construction. It is allowed as a cost in appraising the total sales operations cost. When we relieve purchasers of road building responsibilities, we incur the overhead costs associated with getting the road built.

Administration

When the purchaser opts for the government to construct the road the government must prepare a public works contract, advertise for bids, award the contract, administer the contract, and if the road contractor is unable to complete the job on schedule, through no fault of his own, we may have to modify the timber sales contract or be liable for damages.

The option requires the government to process and administer two complete contracts in lieu of one contract for the same job. This leads to less than effective use of our limited manpower resource.

Other Costs

Under procurement regulations for formal contracts, there are requirements that are different than under a government sales agreement. These requirements tend to increase the costs to the government.

Appraisal Procedures

When estimating the value of timber on the stump we begin by determining what the timber is worth at the mill. We then determine the cost of getting the timber from the forest to the mill. This cost includes such costs as: move-in move-out felling, bucking, yarding, hauling, slash disposal, erosion control, profit and risk allowances, etc. We then reduce the mill price accordingly and arrive at a minimum acceptable price.

If the purchaser builds the road his equipment moving-in moving-out expenses are allowed for in the sale operating costs. This is also true for the cost of road right-of-way slash disposal. His profit and risk is calculated on the sale as a whole rather than by individual components of the sale.

If the government builds the road these costs are direct costs that a contractor incurs in building the road. The purchaser incurs these costs in moving timber from the forest to the mill.

We are currently studying our appraisal procedures to determine a way of eliminating this particular problem.

Bonding Costs

Timber purchaser must post a bond equal to 10 percent of their bid up to a maximum of $200,000 regardless of size of sale or road costs. If built by the government, the road contractor must post a bond equal to 100 percent of his total bid.

The National Forest Management Act will not affect road standards. We will continue to design roads to standards appropriate for the intended uses, considering safety, cost of transportation, and impacts on National Forest resources.

Question.--I understand that you are now rewriting forest road construction specifications. What effect will these have on road construction costs?

Answer.--The revised specifications will not have a measurable effect on the cost of road construction. They are being revised so that the language is compatible for both methods of contract road construction. By doing this we will combine two sets of specifications that are currently in use to one set.

There is no intent to change the standard of roads. The road standards which determine road cost are set in the process of land use planning, environmental impact studies, and tiimber sale planning. Specifications are only a means of describing in mutually understandable terms what is intended to be built.

We are most cognizant of the "overbuilding" issue. We have a Service-wide effort underway to assure complete understanding at every organizational level, of the necessity to keep to a minimum both the cost and the adverse environmental effects of roads.

QUESTION SUBMITTED BY SENATOR MORGAN

Question. What priority has been assigned to the proposed Forest Service facility at the University of North Carolina campus at Asheville?

Answer. The Forest Service considers construction of the proposed Southeastern Station Headquarters-Laboratory among its highest priorities. Present space in the Federal Post Office Building in Asheville is fully occupied with no space at all for laboratory research and no room for housing the increased program recommended thru RPA.

SUBCOMMITTEE RECESS

Senator HATFIELD. It is great to work with you and I want to thank you, Dr. Cutler and Chief, and all of your associates for being here this morning. We will recess now until 9:30 a.m. tomorrow when we will hear the 1978 budget request of the Federal Energy Administration.

[Whereupon, at 11:15 a.m., Monday, April 25, the subcommittee was recessed, to reconvene at 9:30 a.m., Tuesday, April 26.]

DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1978

TUESDAY, APRIL 26, 1977

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 9:50 a.m., in room 1114, Everett McKinley Dirksen Office Building, Hon. Ted Stevens presiding.

Present: Senators Huddleston and Stevens.

FEDERAL ENERGY ADMINISTRATION

STATEMENT OF JOHN F. O'LEARY, ADMINISTRATOR

ACCOMPANIED BY:

PETER LUEDTKE, ACTING DEPUTY GENERAL COUNSEL
THOMAS E. NOEL, ASSISTANT ADMINISTRATOR, STRATEGIC PETROLEUM RESERVE
JOHN D. CHRISTIE, ASSISTANT ADMINISTRATOR, ENERGY INFORMATION AND ANALYSIS
MARTIN SENECA, JR., ACTING ASSISTANT ADMINISTRATOR, ENERGY CONSERVATION AND ENVIRONMENT
ROBERT I. HANFLING, ACTING ASSISTANT ADMINISTRATOR, ENERGY RESOURCE DEVELOPMENT
BARTON R. HOUSE, ACTING DEPUTY ASSISTANT ADMINISTRATOR, REGULATORY PROGRAMS
MARTIN D. HOWELL, ASSOCIATE ADMINISTRATOR, MANAGEMENT
GORDON W. HARVEY, ACTING ASSISTANT, DEPUTY ASSISTANT ADMINISTRATOR, COMPLIANCE, REGULATORY PROGRAMS

REVISED BUDGET ESTIMATES

Senator STEVENS. Good morning.

This is the time scheduled to hear the budget estimates of the Federal Energy Administration for fiscal 1978. They total $3.3 billion, which is up some $2.7 billion from appropriations to date for 1977. Most of the increase, $2.5 billion, is in the Strategic Petroleum Reserve account and a large part of that, in turn, came in budget revisions submitted by President Carter.

JUSTIFICATIONS AND PREPARED STATEMENT

The justifications for the January budget submitted by President Ford have been printed in part 2 of the hearing record. Because of substantial revisions requested by President Carter, FEA submitted an entire new set of justifications. We will ask FEA to include in the record at this point the new general statement and summary tables and only those sections which were revised.

It should be noted that the Carter revisions added some $85.8 million to the FEA's salaries and expenses account and $1.3 billion to the strategic petroleum reserve account.

Mr. O'Leary, we will also be happy to print your complete, prepared statement in the record. If you identify those with you at the witness table you may proceed to highlight your statement.

[The justification and prepared statement follow:]

FEDERAL ENERGY ADMINISTRATION

FY 1978 Amended Congressional Budget Submission

General Statement

Since the creation of the Federal Energy Administration in May 1974, the role of the Agency has evolved to keep pace with changing national priorities for energy needs. The Agency has moved from concern with short-term reactions to an emergency situation to concern with development of a long-term (through the mid-1980's) national energy policy aimed at balancing energy needs while maintaining a strong and healthy economy.

This evolving role can be traced through the enactment of major authorizing energy legislation since 1973. The Emergency Petroleum Allocation Act of 1973 (EPAA) authorized price and allocation controls to be administered by the Department of the Interior. The Federal Energy Administration Act of 1974 created the Agency as a separate administration within the Executive Branch and transferred to the Agency energy-related functions authorized by law and previously vested in other government agencies. The Congressional concern as expressed in the Act was to "meet the energy needs of the Nation." The immediacy of this concern can be seen in the emphasis on conserving scarce supplies, insuring fair and efficient distribution of supplies, maintaining fair and reasonable consumer prices for such supplies, and promoting the expansion of readily usable energy sources. The groundwork for long-term planning was laid to develop policies and plans to meet the future energy needs of the Nation. The Energy Supply and Environmental Coordination Act of 1974 (ESECA) authorized Federal intervention in utility activities, to require, where practical, conversion of existing facilities to coal usage and construction of new facilities with the capability for coal usage.

The Energy Policy and Conservation Act of 1975 (EPCA), while providing additional authority to manage the continuing energy crisis (providing standby authority for conservation and rationing contingency plans and to exempt regulated products not in short supply) concentrated on longer-term plans for avoiding the impacts of such crisis through establishment of a strategic petroleum reserve and through conservation and resource development efforts. This Act addresses the use of price incentives, energy efficiency improvement targets, coal conversion, and conservation regulations as a means of achieving energy independence. The need for reliable energy data was recognized as a key element to any national energy effort. The Energy Conservation and Production Act of 1976 (ECPA) reiterated this emphasis on data requirements and authorized the creation of a National Energy Information System to act as a clearinghouse for energy information for the entire Federal Government. Implementation of energy conservation policies developed by the Agency and by the Congress included the expansion of the State Energy Conservation Program, the Weatherization Program, and various programs to provide financial assistance to States, businesses, institutions, and individual citizens in developing and implementing conservation measures.

The FY 1978 budget submission reflects the continuation of efforts to develop long-term policy and the initiation of efforts to implement policies thus developed. The latter involves a shift to greater State and industry involvement in implementation efforts, especially in the area of conservation. The major increases from FY 1977 to FY 1978 reflect this shift, primarily through expanded State grant programs - the Weatherization Program (+$65 million), the State Energy Conservation Program (+$25 million) and the Supplemental State Grant Program (+$24 million)- and through implementation of the Conservation Obligation Guarantee Program (+$20 million). The Weatherization Program provides for weatherization of the homes of elderly, handicapped, and low-income persons with funding channeled through States, community action agencies or minority organizations. The State Energy Conservation Program provides for grants to States for implementation of comprehensive energy conservation plans designed to reduce energy consumption by 5% by the year 1980. The Supplemental State Grant Program provides for energy audits of owner-occupied homes, expanded public education activities, and promotion of State, local and Federal coordination of conservation efforts. The Conservation Obligation Guarantees Program provides for federal guarantees of loans for installation of energy conservation devices in industrial and commercial buildings.

Pursuant to the ECPA, an internal reorganization to separate policy and data analysis functions previously performed by the Office of Policy and Analysis was initiated by the statutory requirement to establish an office of Energy Information and Analysis (EI&A). As required by the Act, a National Energy Information System (NEIS) was created to assure the availability of adequate, comparable, accurate, and credible energy information to the Federal Energy Administration, to other Government agencies responsible for energy-related policy decisions, to the Congress,

and to the public. An increase of approximately $8.5 million in FY 1978 for EI&A is to support development of the NEIS, an oil and gas reserve study, consumption data base improvement, and other designated EI&A functions. The NEIS will permit the analysis of U. S. energy supply and demand with emphasis on consumption and the sensitivity of the supply system. The NEIS will provide access to energy information and analysis by the Congress and the public.

Plans to implement the Early Storage Reserve (ESR) program and the Strategic Petroleum Reserve (SPR) program were submitted to Congress during calendar 1976. These plans proposed an ESR of 150 million barrels of centrally stored crude oil to be in place by December 1978, and an SPR of 500 million barrels of centrally stored crude (including the 150 million barrel ESR) to be in place by December 1982. Subsequent analysis has showed that this schedule could, and should, be accelerated to have 250 million barrels in place by December 1978 and about 500 million barrels in place by 1980. This budget reflects funds required to develop the reserve at the accelerated rate. It includes those amounts necessary for the purchase of 211 million barrels of crude, the amount necessary to bring the total FY 1977 and FY 1978 purchases to 250 million barrels, at the national average composite price, taking into account the January 1977 OPEC price increase. Also included are funds required for the construction of storage facilities for both the expansion and acceleration of the ESR, and for the development, under the accelerated schedule, of the full SPR capacity.

Program by Activities

The Federal Energy Administration budget submission is presented in seven major budget activities. A brief description of each of these activities follows:

1. Executive Direction and Administration. This activity provides for the immediate Offices of the Administrator and the Regional Administrators and for those support services necessary for proper execution of Agency responsibilities. These support services include Advisory Committee management; administrative support; personnel management; budget, payroll and accounting support; internal review and management sciences; communications and public affairs; legal services; Congressional and intergovernmental relations; private grievances and redress activities; and policy and program evaluation. This activity also provides for centralized funding for General Services Administration building leases, Federal Telecommunications System billings, and U.S. Postal Service Billings.

   The FY 1978 request of 1,015 positions and $37,288,000 reflects an increase of 33 positions and $2,385,000 above the FY 1977 appropriated levels. This increase relates to a requirement to cover increased billings for the Temporary Court of Appeals, General Services Administration leases, and Federal Telecommunications System support; for audit coverage of the Strategic Petroleum Reserve Program; and for legal, management and appeals activities in support of the regulatory and conservation programs. These increases have been partially offset by regional intergovernmental activities relating to a shift of responsibility for liaison with State and local governments to the program offices.

2. Energy Information and Analysis. This activity provides for analytical functions in support of FEA policy-making and programming, to include competition analysis, socio-economic analysis, macroeconomic analysis, and regional analysis; for all statistical and forecasting analysis functions in support of energy policy and program development; and for design, development and operation of all data collection and data processing systems of the Agency. The above responsibility includes the operation of the Project Independence Evaluation System (PIES) and of the National Energy Information Center (NEIC), the single Federal clearinghouse for energy data.

   The FY 1978 request of 459 positions and $39,585,000 reflects an increase of 92 positions and $10,652,000 above the FY 1977 appropriated levels. This increase relates to requirements for expansion of the PIES system, as well as increased access to the system for the Congress and the public; development of a comprehensive energy consumption data base; validation of energy data in Government data systems; and increased data systems support for new and expanded programs in the program offices supported.

3. Regulatory Programs. This activity provides for enforcement of Agency pricing, allocation, and import rules and regulations applicable to the petroleum industry; for planning, direction, and execution of the Mandatory Petroleum Allocation Program to insure the equitable and

efficient distribution of available crude oil and petroleum products remaining under control; for planning and direction of the Oil Imports Program; for contingency planning activities; and for data coordination in support of the regulatory programs.

The FY 1978 request of 1,623 positions and $47,098,000 reflects an increase of 140 positions and $1,866,000 above the FY 1977 appropriated levels. The current compliance program is based on revised audit times and an expanded universe. The operation program increase allows for the continuation of the crude oil allocation and pricing programs beyond the end of FY 1978 (mandatory controls are required through April 1979) and provides for administration of allocation and pricing controls for propane. Offsetting decreases relate to reduced contractual support in the area of contingency planning and to reduced data development in the data coordination function.

4. Energy Conservation and Environment. This activity provides for policy and program development and evaluation relating to conservation and environment issues and activities; for financial assistance to the States for energy conservation programs and for weatherization assistance for low income persons; for workshops and seminars for industry and the private sector; for conservation initiatives undertaken at the national level: the Federal Energy Management Program, voluntary programs, programs directed toward regulatory institutions; the obligation guarantee program; and for the Appliance Labeling and the Industrial Reporting Programs mandated by the Energy Policy and Conservation Act.

   The FY 1978 request of 389 positions and $204,509,000 reflects an increase of 139 positions and $169,457,000 above the FY 1977 appropriated levels (including $114 million in grant funds). This increase relates to expansion of the State Energy Conservation Program, implementation of the Weatherization Program, the Supplemental State Grant Program and the Obligation Guarantee Program; expansion of the utility rate demonstration programs; and increased formal agency intervention in regulatory rate proceedings.

5. Energy Resource Development. This activity provides for development and implementation of programs to increase the supply of domestic oil, gas, petroleum products, coal, synthetic fuels and the use of geothermal and solar energy; for implementation of the coal conversion provisions of the Energy Supply and Environmental Coordination Act of 1974; for management of the Electric Power Program aimed at insuring an adequate supply of electrical power by minimizing regulatory and procedural impediments to powerplant construction and maximizing the use of fuels in electricity generation; for development and analysis of Federal financing programs designed to encourage increases in the rate of growth of domestic energy production; for assessing specific sites for potential use as major energy supply facility locations; and for analysis of related environmental data in support of energy facility planning, siting programs and environmental legislation.

   The FY 1978 request of 282 positions and $14,152,000 reflects an increase of four positions and $3,847,000 above the FY 1977 appropriated levels. This increase relates to expanded enforcement activities for prohibition and construction orders issued pursuant to the coal conversion provisions of the Energy Supply and Environmental Coordination Act of 1974. Order issuing authorities expire June 30, 1977, with enforcement authorities extending to December 31, 1984. Enforcement activities will consist of preparation of Environmental Impact Statements, issuance of Notices of Effectiveness, and monitoring of compliance schedules.

6. International Energy Affairs. This activity provides for development, evaluation and implementation of policies, plans and programs dealing with the future price level, stability and adequacy of world energy resources as well as the sources, supply security and emergency supply alternatives related to U.S. energy imports and exports; and for proposing, negotiating, and implementing U.S. international energy agreements. This latter responsibility involves liaison with multinational organizations, such as the Organization for Economic Cooperation and Development, the International Energy Agency, the Conference on International Economic Cooperation, and the North Atlantic Treaty Organization Petroleum Planning Committee.

   The FY 1978 request of 45 positions and $1,678,000 reflects an increase of $163,000 above the FY 19/7 appropriated levels. This increase relates to the transfer of responsibility for an interagency agreement with the Department of State for foreign transcription services previously funded by the Office of the General Counsel. The increase also includes support for expanding bilateral and multilateral energy activities of the international organizations identified above.

7. Strategic Petroleum Reserve. This activity provides for the establishment of a national strategic petroleum reserve to diminish the vulnerability of the United States to a severe energy supply interruption and to provide limited protection from the short-term consequences

of interruptions in the supply of petroleum products. Activities include acquisition and construction of storage facilities, acquisition and transportation of petroleum, operation of the storage facilities, and the overall program management.

The FY 1978 request of 218 positions and $3,018,933,000 reflects an increase of 68 positions and $2,262,944,000 above the FY 1977 appropriated levels. This increase relates to acceleration of the Early Storage Reserve to 250 MMB in storage by December 1978, and the acquisition and development of storage facilities with a total capacity of 500 MMB by 1980.

Budget Justification by Activity

The detailed budget justification for each activity includes a comparison of positions, manyears, and obligations; identification of Headquarters and Regional resource levels; identification of FY 1977 Supplemental Request resource levels and the extension of these requirements into FY 1978 analysis of requested contract authority for each program area; and obligations by object classification for each fiscal period. October 1976 pay raise amounts are included in all FY 1977 and FY 1978 estimates. Major functions within each program area are addressed separately, with resource displays, program description, and justification.

Resource Summary

A resource summary by budget activity follows.

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
A. Summary By Activity
(dollars in thousands)

Program:	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	M/Y	Amount	Amount	Pos.	M/Y	Amount	Pos.	M/Y	Amount	Pos.	M/Y	Amount
Salaries and Expenses:													
Executive Direction & Administration	1,039	1,070	$ 35,783	$12,575	982	972	$ 34,903	1,015	1,032	$ 37,288	+ 33	+ 60	$+ 2,385
Energy Information Analysis	387	349	22,463	6,540	367	369	28,933	459	459	39,585	+ 92	+ 90	+ 10,652
Regulatory Programs	1,766	1,396	35,979	11,398	1,483	1,615	45,232	1,623	1,709	47,098	+140	+ 94	+ 1,866
Conservation & Environment	316	256	23,849	18,473	250	276	35,052	389	405	204,509	+139	+129	+ 169,457
Energy Resource Development	285	261	10,793	4,196	278	275	10,305	282	280	14,152	+ 4	+ 5	+ 3,847
International Energy Affairs	42	39	1,162	619	45	41	1,515	45	43	1,678	...	+ 2	+ 163
Total - S & E	3,835	3,371	$130,028	$53,801	3,405	3,548	$155,940	3,813	3,928	$ 344,310	+408	+380	$+ 188,370
Strategic Petroleum Reserve	100	15	321	5,497	150	137	755,989	218	175	3,018,933	+ 68	+ 38	+2,262,944
Total - FEA	3,935	3,386	$130,349	$59,298	3,555	3,685	$911,929	4,031	4,103	$3,363,243	+476	+418	$+2,451,314

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
B. Summary By Program
(dollars in thousands)

ACTIVITY: General Counsel

APPROPRIATION: Salaries and Expenses

Program	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Regulatory (Compliance)	62	54	1360	361	49	42	1055	52	52	1292	+3	+10	+237
Regulatory (Except Compliance)	38	29	826	256	46	37	989	34	39	1023	-12	+2	+34
Energy Resource Development	11	10	261	72	22	19	483	22	22	585	...	+3	+102
International Energy Affairs	3	2	71	22	3	3	135	3	3	90	...	...	-45
Strategic Petroleum Reserve	...	...	...	...	3	3	80	...	...	...	-3	-3	-80
Conservation and Environment	16	14	363	106	20	19	487	35	36	921	+15	+17	+434
General Law, Litigation and Legislation	30	24	643	182	30	26	672	30	32	820	...	+6	+148
Executive Direction and Support	17	14	398	118	17	15	400	17	17	444	...	+2	+44
Total	177	147	3922	1117	190	164	4301	193	201	5175	+3	+37	+874
(Headquarters)	(109)	(84)	(2407)	(736)	(131)	(108)	(2938)	(131)	(139)	(3661)	(0)	(+31)	(+723)
(Regions)	(68)	(63)	(1515)	(381)	(59)	(56)	(1363)	(62)	(62)	(1514)	(+3)	(+6)	(+151)
FY 1977 Supplemental Pending; FY 1978 ECFA Amounts Included Above					21	9	230	15	18	461			

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: General Counsel	PROGRAM: Conservation and Environment												
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	16	14	363	106	20	19	487	35	36	921	+15	+17	+434
Headquarters	8	6	170	57	10	9	241	25	26	675	+15	+17	+434
Regions	8	8	193	49	10	10	246	10	10	246	...	...	...
(Contracts/Grants)	XX	XX	...	...	XX	XX	...	XX	XX	...	XX	XX	...
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					13	4	112	15	16	408			
Headquarters					13	4	112	15	16	408			
Regions					...	...	...	...	...	...			
(Contracts/Grants)					XX	XX	...	XX	XX	...			

PROGRAM DESCRIPTION

This staff provides legal support for FEA's conservation programs, including the State Grant program authorized by Section 361-366 of the EPCA; the supplemental State Grant program authorized by Title IV, Part B, of the ECPA; the Appliance program authorized by Sections 321-339 of the EPCA; the Electric Utility Rate Design program authorized by Title II of the ECPA; the Weatherization program authorized by Part A, Title IV of the ECPA; the Obligation Guarantee program authorized by Title IV, Part D, of the ECPA; and general miscellaneous conservation projects authorized by the FEA Act, the EPCA and the ECPA (such as exchanges of information with state agencies pursuant to ECPA, Title IV, Part E).

This unit also is responsible for legal work in connection with FEA's compliance with environmental requirements pursuant to National Environmental Policy Act including review of environmental impact statements with respect to all major FEA programs.

JUSTIFICATION

There will be a substantial increase in workload during FY 1978 in several areas for which this program is responsible. The number of types of appliances for which conservation standards may be required will increase during FY 1978. The program to improve electric utility rate design will involve increased legal responsibility as specific intervention activities proceed to more sophisticated and complex stages. The Weatherization program will also involve substantial legal work in connection with approval of grants and coordination with various other agencies as provided in Title IV of the ECPA. The State Programs authorized by Section 361-366 of the EPCA and Title IV, Part B, of the ECPA will also require substantial legal service during FY 1978 to process state grants and conduct the monitoring requirements of the statutes. Strong regional counsel support will be needed to maintain the effectiveness of this state grant program to insure that state conservation plans conform to statutory requirements and that funds are actually expended in accordance with the terms of individual grants. The Obligation Guarantee program will require a high degree of legal involvement since the full faith and credit of the United States government is pledged to the payment of all loans guaranteed under the program. The Obligation Guarantee program will require increased legal support in FY 1978 to assure that the extensive requirements of law applicable to the program are complied with in the processing of individual Federal obligation guarantees and that information gathering and recordkeeping procedures insure the Government has sufficient data adequately to protect its interest with respect to every commitment made; and to provide the range of detailed legal services needed in every case of default, which potentially may involve the Government's possession, management and sale of property.

The amended request includes $275,000, 11 positions and 11 manyears more than the initial FY 1978 request for this program.

COST FACTORS ($000)

Personnel Compensation and Benefits	835
Other	86
Total	921

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
B. Summary By Program
(dollars in thousands)

ACTIVITY: Management

APPROPRIATION: Salaries and Expenses

Program	FY 1976 Actual Pos.	MY	Amount	TQ Amount	FY 1977 Estimate Pos.	MY	Amount	FY 1978 Estimate Pos.	MY	Amount	Change FY 1977 to FY 1978 Pos.	MY	Amount
Resource Management	119	117	2,871	970	118	111	2,704	121	121	2,952	+ 3	+ 10	+ 248
Personnel Management	109	108	2,796	951	99	102	2,564	99	99	2,598	...	- 3	+ 34
Administrative Management	152	171	4,372	1,689	162	164	4,515	181	177	5,296	+ 19	+ 13	+ 781
FTS, GSA, Postal Services	...	...	4,689	1,256	...	...	7,427	...	...	8,539	...	...	+ 1,112
Special Support Functions	27	26	645	217	46	45	1,102	50	50	1,230	+ 4	+ 5	+ 128
Executive Direction	29	33	1,310	210	27	27	650	27	27	655	...	...	+ 5
Total	436	455	16,683	5,293	452	449	18,962	478	474	21,270	+ 26	+ 25	+ 2,308
(Headquarters)	(300)	(323)	(13,917)	(4,502)	(322)	(319)	(13,112)	(343)	(339)	(14,784)	(+ 21)	(+ 20)	(+ 1,672)
(Regions)	(136)	(132)	(2,766)	(791)	(130)	(130)	(5,850)	(135)	(135)	(6,486)	(+ 5)	(+ 5)	(+ 636)
FY 1977 Supplemental Pending; FY 1978 ECPA Amounts Included Above					11	6	886	11	11	267			

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: Management	PROGRAM: Administrative Management												
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	152	171	4,372	1,689	162	164	4,515	181	177	5,296	+ 19	+ 13	+ 781
Headquarters	103	123	3,369	1,404	110	112	3,354	126	122	4,048	+ 16	+ 10	+ 694
Regions	49	48	1,003	285	52	52	1,161	55	55	1,248	+ 3	+ 3	+ 87
(Contracts/Grants)	XX	XX	(175)	(270)	XX	XX	(820)	XX	XX	(1,125)	XX	XX	(+ 305)
FY 1977 Supplemental Pending; FY 1978 ECPA Amounts Included Above					5	3	282	19	15	368			
Headquarters					5	3	282	19	15	368			
Regions					...	...	...	...	...	...			
(Contracts/Grants)					XX	XX	(210)	XX	XX	...			

PROGRAM DESCRIPTION

Provides for security and safety, procurement activities, logistics support, directives and publications management, and administrative programs.

JUSTIFICATION

The increase of 19 positions will provide additional support in the area of contracting for both the Headquarters (+2) and the Regions (+3), especially in the area of conservation and environment (Weatherization, state grants, etc.). The largest portion of the increase, 14 positions, will provide support for the obligation guarantee program to be initiated in FY 1978. The increase in contracts includes increased billings in support of the Temporary Emergy Court of Appeals (TECA).

Cost Factors

Personnel Compensation and Benefits	3,767
Other Costs	404
Contracts	1,125
Total	5,296

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
B. Summary By Program
(dollars in thousands)

ACTIVITY: Private Grievances and Redress

APPROPRIATION: Salaries and Expenses

Program	FY 1976 Actual Pos.	MY	Amount	TQ Amount	FY 1977 Estimate Pos.	MY	Amount	FY 1978 Estimate Pos.	MY	Amount	Change FY 1977 to FY 1978 Pos.	MY	Amount
Executive Direction and Support	10	10	286	80	11	16	403	11	11	308	...	- 5	- 95
Analytical and Decisional Activity	44	68	1389	366	59	64	1588	69	76	1872	+10	+12	+284
Total	54	78	1675	446	70	80	1991	80	87	2180	+10	+ 7	+189
(Headquarters)	(41)	(47)	(1055)	(279)	(60)	(60)	(1546)	(70)	(67)	(1704)	(+10)	(+ 7)	(+158)
(Regions)	(13)	(31)	(620)	(167)	(10)	(20)	(445)	(10)	(20)	(476)	(...)	(...)	(+ 31)
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					15	4	100	...	...	...			

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: Private Grievances and Redress	PROGRAM: Analytical and Decisional Activities												
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	44	68	1389	366	59	64	1588	69	76	1872	+10	+12	+284
Headquarters	31	37	769	199	49	49	1213	59	56	1396	+10	+ 7	+183
Regions	13	31	620	167	10	15	375	10	20	476	...	+ 5	+101
(Contracts/Grants)	XX	XX	...	...	XX	XX	...	XX	XX	...	XX	XX	...
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					15	4	100	...	10	251			
Headquarters					...	...	...	...	...	...			
Regions					...	...	...	...	...	...			
(Contracts/Grants)					XX	XX		XX	XX				

PROGRAM DESCRIPTION

This program includes all of the substantive activities conducted by the Office of Exceptions and Appeals. For purposes of workload analysis they are considered as falling into the following categories: Pricing authorities, allocation authorities, Compliance related activity, Coal Conversion Cases, and other appeals including Special Redress Relief cases and Freedom of Information Act Appeals.

Allocation Cases (Emergency Petroleum Allocation Act, PL 93-159 as amended, Section 4)-(#10 CFR, Part 212)

During FY 1978, we anticipate that a major portion of the Applications for Exceptions, Appeals, and Applications for Stay which are submitted with respect to the FEA allocation program will pertain to the Old Oil Entitlements Program. These submissions will be considerably more complex than the typical filing which we are now receiving. The experience of the Cost of Living Council clearly indicates that as a control program continues beyond a very brief period of time the economic problems which firms encounter become increasingly complex. In addition, the firms regulated by an allocation and price controls program become increasingly sophisticated as to the remedies which they might seek. While a firm might choose to continue to incur the burdens which it encounters under a brief temporary allocation program rather than assemble the complex data necessary to obtain exception relief, it will not do so if the regulatory program persists for several years. As a result we have found that the present filings involve increasingly complex economic problems and require a detailed analysis of a firm's financial and operating posture. These tendencies will continue in FY 1978.

Other Appeals

This program decides Petitions for Special Redress Relief filed under Section 21 of the FEAA; appeals from interpretations issued by the Regions or the General Counsel's Office, Freedom of Information Appeals and all other types of submissions which are not specifically described in other parts of this budget narrative.

JUSTIFICATION

The number of appeals from interpretations and Freedom of Information appeals may increase slightly in FY 1978. The number of petitions for Special Relief and other appeals is expected to remain the same as projected for FY 1977.

Anticipated decreases in caseload arising from decontrol of products will be more than offset by the significant increase in compliance related activity. For example, fifteen positions related to allocation and pricing cases in the regions are being eliminated along with 12 positions relating to pricing cases in the Headquarters' office. At the same time 22 positions are being added to the Headquarters' office to handle the expected surge in appeals from Remedial Orders. No significant change is anticipated in Coal Conversion Cases or in Other Appeals. Overall there is an increase of 8 man years and $184,000 as compared to the FY 1977 supplemental level.

The amended request includes $251,000 and 10 man years more than the initial FY 1978 request for this program.

COST FACTORS ($000)

Personnel Compensation and Benefits	1,677
Other	195
Total	1,872

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
B. Summary By Program
(dollars in thousands)

ACTIVITY: REGULATORY PROGRAMS

APPROPRIATION: Salaries and Expenses

Program	FY 1976 Actual Pos.	FY 1976 Actual MY	FY 1976 Actual Amount	TQ Amount	FY 1977 Estimate Pos.	FY 1977 Estimate MY	FY 1977 Estimate Amount	FY 1978 Estimate Pos.	FY 1978 Estimate MY	FY 1978 Estimate Amount	Change FY 1977 to FY 1978 Pos.	Change FY 1977 to FY 1978 MY	Change FY 1977 to FY 1978 Amount
Compliance	1326	1004	24,782	7,111	1326	1324	35,443	1384	1384	37,148	+ 58	+ 60	+1,705
Headquarters	(162)	(80)	(2,442)	(926)	(162)	(160)	(4,946)	(155)	(160)	(5,060)	(- 7)	(0)	(+ 114)
Regions	(1164)	(924)	(22,340)	(6,185)	(1164)	(1164)	(30,497)	(1229)	(1224)	(32,088)	(+ 65)	(+ 60)	(+1,591)
Operations	349	322	8,701	3,126	75	208	6,099	164	234	7,356	+ 89	+ 26	+1,257
Headquarters	(186)	(148)	(4,626)	(1,726)	(75)	(136)	(4,341)	(124)	(131)	(4,863)	(+ 49)	(- 5)	(+ 522)
Regions	(163)	(174)	(4,075)	(1,400)	(...)	(72)	(1,758)	(40)	(103)	(2,493)	(+ 40)	(+ 31)	(+ 735)
Contingency Planning	24	17	837	836	24	24	1,922	22	22	969	- 2	- 2	- 953
Data Coordination	30	16	788	140	27	26	887	18	20	691	- 9	- 6	- 196
Executive Direction and Administration	37	37	871	185	31	33	881	35	35	934	+ 4	+ 2	+ 53
Total	1766	1396	35,979	11,398	1483	1615	45,232	1623	1695	47,098	+ 140	+ 80	+1,866
(Headquarters)	(439)	(298)	(9,564)	(3,813)	(319)	(379)	(12,977)	(354)	(368)	(12,517)	(+ 35)	(- 11)	(- 460)
(Regions)	(1327)	(1098)	(26,415)	(7,585)	(1164)	(1236)	(32,255)	(1269)	(1327)	(34,581)	(+ 105)	(+ 91)	(+2,326)
FY 1977 Supplemental Pending: FY 1978 ECPA Amounts Included Above					290	61	2,795	...	...	...			

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: REGULATORY PROGRAMS	PROGRAM: COMPLIANCE												
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	1326	1004	24,782	7,111	1326	1324	35,443	1384	1384	37,148	+ 58	+ 60	+ 1,705
Headquarters	162	80	2,442	926	162	160	4,946	155	160	5,060	- 7	0	+ 114
Regions	1164	924	22,340	6,185	1164	1164	30,497	1229	1224	32,088	+ 65	+ 60	+ 1,591
(Contracts/Grants)	XX	XX	(410)	(...)	XX	XX	(530)	XX	XX	(625)	XX	XX	(+95)
FY 1977 Supplemental Pending; FY 1978 ECPA Amounts Included Above					70	19	504	---	---	---			
Headquarters					5	1	28	---	---	---			
Regions					65	18	476	---	---	---			
(Contracts/Grants)					XX	XX	(...)	XX	XX	(...)			

PROGRAM DESCRIPTION The Compliance Program enforces the Federal Energy Administration's pricing, allocation, and import rules and regulations that are applicable to the petroleum industry. The authority to enforce such regulations as promulgated under Section 4(a) of the EPAA is contained in Section 5. The EPAA has been extended and amended by Title IV of the Energy Policy and Conservation Act (EPCA). The National Office develops, executes, monitors and evaluates national policies, strategies and programs for obtaining uniform application of the regulations and for insuring compliance. It is also responsible for verifying energy data pursuant to Section 13 of the FEA Act. The ten regional offices are responsible for the actual implementation of the Compliance Program, including conducting investigations and audits to determine whether companies have complied with FEA's regulations. The regional offices also undertake the institution of formal enforcement actions such as the issuance of Notices of Probable Violation, Remedial Orders, Consent Orders, and compromises of civil penalties.

The regional Compliance Program is subdivided into nine program areas aligned with the marketing levels of the petroleum industry. The Headquarters staff provides both program support to these nine programs and provides staff support not directly related to the nine programs. Staff support involves the performance of "fixed" Headquarters requirements that are needed to adequately support regional Compliance efforts. This "fixed" requirement does not fluctuate based on regional size. Fixed requirements include performing field reviews, working National Office cases, processing freedom of information requests, operating and maintaining the Compliance Management Information System, developing and updating policy and procedural guidance, scheduling regional workload, performing staffing functions, managing Compliance training, and developing requirements for managing the targeting system.

The compliance program is designed so that Federal resources are concentrated on auditing those sectors of the petroleum industry with the greatest economic impact on consumers and those firms within each sector with the largest amount of probable violations.

Importers

A staffing level of 18 will permit importers to be audited on a five year cycle, 20% per year.

An importer is defined as any firm that owns at the first place of storage a regulated petroleum product brought into the United States. These firms perform as resellers and importers. In the latter capacity, the import regulations must be applied as well as entitlement transfers. In addition, the importers become involved in domestic/international exchanges. Audits are required for each of these areas. Price increases must be reviewed to assure proper license and supplemental fees. Compliance with pricing regulations must be determined.

PROGRAM: COMPLIANCE

PROGRAM DESCRIPTION: (Continued)

Resellers - Other

A staffing level of 172 will permit continuation of this program in which audits are initiated to uncover significant embargo period violations.

This program covers firms (other than a refiner or retailer) primarily involved with the trade or business of purchasing, receiving through transfer, or otherwise obtaining covered products (excluding crude oil and propane) and reselling or otherwise transferring them without substantially changing their form. Reseller customers generally exclude those purchasers which are ultimate consumers. The exceptions are those products in large quantities. Audits measure compliance with pricing regulations. Of primary concern are maximum selling prices and proper determination of class of purchaser between industrial, state and local government, and residential customers.

COST FACTORS ($000)

Personnel and benefits....	31,133
Travel.....	3,903
Other.....	1,487
Contracts.....	625
Total request.....	37,148

The amended request includes $1,200, 163 positions and 32 manyears more than the initial FY 1978 request for this program

PROGRAM: COMPLIANCE

JUSTIFICATION

The staffing required for any market level is based upon a simple formula which is the number of audits to be performed multiplied by the number of hours per audit with the result divided by the number of productive hours per staff year. The number of audits performed is based upon a percentage of the universe to be audited each year. These percentages, program by program, were established in March 1976 by the President as the necessary coverage level to assure adequate compliance.

In the Headquarters, a ratio of approximately .065 Headquarters personnel to regional personnel is used to calculate support for the 9 programs. These activities include technical guidance, on-site visits for fact gathering, monitoring activities, resolution of formal actions, special analyses, data collection, coordination of multiregional projects, etc.

Following are workload analyses for both the regional programs and the Headquarters.

Workload Analysis

PROGRAM	%Coverage	X UNIVERSE =	NO. OF AUDITS	X AVERAGE CASE TIME ÷	PRODUCTIVE MANHOURS =	ANNUAL POSITIONS
Importers	20	579	116	279	1760	18
Crude Oil Resellers	20	470	94	792	1760	42
Independent Crude Producers	18	15,261	2,747	165	1760	258
Major Refiners	100	35	35	19,771	1760	393
Small Refiners	31	107	33	3,705	1760	69
NGL	29	825	239	1,151	1760	156
Resellers Prop	20	2,500	500	131	1760	37
Retailers Prop	14	10,000	1,400	106	1760	84
Reseller Other	Level of effort to continue initiation of audits to uncover significant embargo period violations.					172
Executive Dir	Responsible for supervising four large Headquarters program offices and 5 policy direction for ten regional offices					
Program Support	.065 ratio to regions					80
Staff Support						70
			Total			1384

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: REGULATORY PROGRAMS	PROGRAM: OPERATIONS											
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	349	322	8,701	3,126	75	208	6,099	164	234	7,356	+ 89	+ 26	+1,257
Headquarters	186	148	4,626	1,726	75	136	4,341	124	131	4,863	+ 49	- 5	+ 522
Regions	163	174	4,075	1,400	...	72	1,758	40	103	2,493	+ 40	+ 31	+ 735
(Contracts/Grants)	XX	XX	(1,170)	(688)	XX	XX	(520)	XX	XX	(1,500)	XX	XX	(+ 980)
FY 1977 Supplemental Pending; ECPA FY 1978 Amounts Included Above					216	39	2,213	...	...	...			
Headquarters					80	4	1,366	...	...	...			
Regions					136	35	847	...	...	...			
(Contracts/Grants)					XX	XX	(1,260)	XX	XX	(...)			

PROGRAM DESCRIPTION This program is authorized by Section 4 of the EPAA as amended by EPCA Sections 8(a), 8(c)(1), 8(d), (f), (g), 11 and 18 of the EPAA and Sections 102, 104, 203(a)(1), 402(a), 410, 454, 455 of EPCA and Part B of Title I, of the ECPA.

The Operations Program is responsible for: the planning, direction, execution, and operations of the Mandatory Petroleum Allocation Program to ensure the equitable and efficient distribution of available crude oil and petroleum products remaining under controls; the maintenance of the viability of the independent sector of the petroleum industry; the planning and direction of the Oil Imports Program as mandated by Presidential Proclamation; insuring that allocation and price programs conform to legislative allocation and policy guidelines; the development of regulations to implement mandatory or standby petroleum allocation and price programs; the conduct of public hearings as part of the administrative rulemaking process; the management of the FEA rulemaking process and liaison with the petroleum industry and the public. Operations is composed of five major offices: the Office of Crude Oil Operations, the Office of Price Regulation, the Office of Program Management and Analysis, the Office of Product Allocations and the Office of Allocation Regulations.

The Office of Crude Oil Operations is responsible for the various crude oil allocation missions mandated by the Emergency Petroleum Allocation Act as amended and for administration of the Mandatory Oil Import Program (MOIP). The Office has four elements which include: Mandatory Oil Imports: Directs and manages the overall MOIP and interfaces with industry and government agencies on all matters relating to the MOIP. Crude Oil Allocation: Directs and manages the Crude Buy/Sell Program and the Canadian Allocation Program. Refinery Operations: Performs refinery inspections and certifications necessary for participation in various FEA programs. Also manages FEA's refinery yield model and the refinery fuel control programs. Entitlements and Transfer Pricing: Implements and administers all programs relating to crude cost equalization (entitlements), transfer pricing of crude oil imported into the U.S., and the first purchaser crude oil price program to regulate well head crude oil prices.

The Office of Price Regulations is responsible for administering the regulatory pricing program. It involves developing criteria for determining pricing levels for regulated products; assessing the need for regulatory changes in the pricing of crude oil and petroleum products; evaluating pricing trends of decontrolled products, and developing regulations in the event that reimposition of controls for specific products becomes necessary. In addition, the EPCA permits adjustment every six months of the aggregate crude oil price. This includes determining appropriate incentives to encourage production, particularly with respect to high-risk, high-cost properties, and recommending regulatory changes to assure viability of each component of the petroleum industry.

PROGRAM: OPERATIONS
PROGRAM DESCRIPTION: (Continued)

The Office of Program Management and Analysis serves as a conduit between FEA and the various segments of the petroleum industry, trade associations, and consumer groups. The Office evaluates the effect of proposed regulations on the petroleum industry, performs special marketing studies, and provides early warning to FEA senior staff on adverse market trends. This Office also conducts all public hearings for FEA; conducts operations program reviews of FEA regional offices; and provides operational assistance to budget, personnel, contract, advisory committee and correspondence functions for the Office of Operations.

The Office of Product Allocations is responsible for the implementation of the Mandatory Allocation Program for propane, propane allocations and all other petroleum products not exempted from controls. Functions include (1) administering the propane allocation program; (2) issuing SNG feedstock allocations for propane; (3) processing and issuing allocation decisions and orders for propane and Defense Production Act orders, where required, for other petroleum products to meet requirement of the Department of Defense; and (4) maintaining standby capability for residual fuel oil, SNG feedstocks, butane, natural gasoline, naphtha, gas, aviation fuels, motor gasoline, middle distillates, and "other products" should reimposition of controls become necessary.

The Office of Allocation Regulations monitors the effectiveness and integrity of petroleum allocation and import regulations and evaluates their impact specifically with respect to crude oil, crude oil entitlements, oil imports and refined products allocation. The Office identifies improved regulatory concepts; assesses alternative regulatory approaches; designs programs and regulations to implement national energy policy; responds to outside regulatory initiatives of a complex nature; develops and amends regulations for the Standby Allocation Program; acts on requests for rulemaking from sources outside and within FEA; prepares, coordinates and finalizes allocation, oil imports, entitlements and buy/sell regulations.

JUSTIFICATION: Changes to the FY 1977 budget have been proposed separately to maintain Presidential flexibility regarding product decontrol. No change for FY 1978 is proposed at this time pending development of the Administration's energy policy to be issued in late April, 1977.

Within the Office of Crude Oil Operations, program activity is expected to continue at the same or slightly higher level as in FY 1977. The resources required for the Mandatory Oil Import Program will continue to be required until the phase out of fee free license system in 1980. However, in FY 1978, there will be a slight increase in fee paid licenses with an offsetting decrease in the workload to handle fee free allocation. Refinery Operations will continue to be responsible for periodic refinery inspections as required for the Buy/Sell Program and oil import regulations. Eighty inspections are planned for FY 1978. Also continuous maintenance and redevelopment of the Refinery Yield models will be required in order to keep the system current for potential usage during a severe supply interruption or shortage. The Crude Oil Allocation program, which includes the Canadian Allocation Program and the Buy/Sell program, will require the same staffing levels as in FY 77. However, as the incremental reduction in Canadian crude oil exports occurs, additional requests for adjustments and exchanges and other non-routine requests will be received for processing. In FY 1978, the Entitlement and Transfer Pricing Division within Crude Oil Operations, will continue to implement the program relating to crude cost equalization (entitlements); transfer pricing of foreign crude oil imported into the U.S.; and, the first purchaser crude oil price program. These programs are designed to control prices of domestic crude oil and to foster competition in the production, refining and marketing sectors of the industry. The entitlements program promotes cost equalization and fosters competition by requiring refiners and eligible importers to purchase or sell entitlements valued at approximately $170 million each month. The EPCA extended price controls on crude oil for 40 months. As a result, crude oil supplier/purchaser relationships continue to be frozen. The first purchaser price program insures that actual well head crude oil prices meet the composite price requirement of the Energy Policy and Conservation Act. This program will require the same level of resources in FY 78 as in FY 77.

Within the Office of Price Regulation, the FY 78 activity will decrease slightly, resulting in a reduction of two positions from the FY 77 request. The Price Regulations Office will continue in FY 78 to formulate necessary amendments including rulings, rulemakings, and guidelines for price regulations for crude oil, propane and other petroleum products remaining under controls. A major responsibility will be to evaluate the impact of price deregulation on different products and marketing sectors.

Program: OPERATIONS
JUSTIFICATION: (Continued)

The EPCA requires that certain production incentives be provided for the discovery of development of high cost and high risk properties. To make the findings necessary to determine what prices will accomplish the above purposes over time will require substantial utilization of available resources in FY 1978. In addition, environmental impact studies are required for all major regulatory changes.

In the area of crude oil pricing and compliance liaison, the EPCA requires FEA to establish the aggregate price of crude oil at $7.66 per barrel and to adjust this price every six months for the duration of the crude oil price program (April 1979). This office must monitor crude oil prices to assure that the formula utilized produces aggregate prices for domestic crude oil which are consonant with the intent of the law. The office will be responsible for determining what price increases are necessary and justify to the Congress any price adjustments to the weighted average price.

Within the Office of Program Management and Analysis, there is a slight decrease from the FY 1977 supplemental level. The office will continue in FY 1978 to provide liaison between FEA and the various segments of the petroleum industry, including trade associations, advisory committees and consumer groups. Also, it will continue to do special studies to assess the impact of regulatory changes on the petroleum industry and the economy. It will assimilate marketing information, perform analyses and coordinate with other offices, within FEA as appropriate. The office will also continue in FY 1978 to conduct all public hearings on proposed regulations and regulatory changes as required by the EPAA.

Within the Office of Product Allocations, regional assistance, program analysis processing of inquiries and correspondence workloads will remian constant. Assignments and adjustments will decline but there will be an increased need for special studies because of the propane allocation program. This office will supervise and direct the allocation program for propane and any other products still under control. The office will act on petitions filed by suppliers and users of controlled products. It will also develop and recommend program changes.

Within the Office of Allocation Regulation, there is expected to be a slight decrease from the FY 1977 supplemental in FY 1978. Activities in FY 1978 will include the continuing development of amendments to existing allocation regulations (i.e., propane, buy/sell, entitlements, crude oil) and the preparation of rulings and guidelines necessary to clarify any allocation regulations in force. Also, it will be responsible for monitoring the decontrolled market to evaluate and make recommendations on the basis of complaints and/or for the reimposition of controls. Finally, it is the responsibility of this office to insure that standby regulations are developed and readily available for implementation.

COST FACTORS ($000)

Personnel and benefits	$ 5,424
Other	432
Contracts	1,500
Total	$ 7,356

The amended request includes $1,749 and 70 manyears more than the initial FY 1978 request for this program.

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: REGULATORY PROGRAMS	PROGRAM: CONTINGENCY PLANNING												
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	24	17	837	836	24	24	1,922	22	22	969	-2	-2	-953
Headquarters	24	17	837	836	24	24	1,922	22	22	969	-2	-2	-953
Regions	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX	(400)	(729)	XX	XX	(1,300)	XX	XX	(400)	XX	XX	-(900)
FY 1977 Supplemental Pending; EPCA FY 1978 Amounts Included Above					...	...	...	...	...	...			
Headquarters					...	...	...	...	...	...			
Regions					...	...	...	...	...	...			
(Contracts/Grants)					XX	XX	...	XX	XX	...			

PROGRAM DESCRIPTION This program is authorized by Sections 201-203 of the Energy Policy and Conservation Act of 1975 which provides for the development of conservation, rationing and other contingency plans. The plans will be part of the Nation's first line of defense against the threat of an energy supply interruption. If initial plans are not approved by Congresss, FEA has an obligation to redraft and resubmit alternative proposals so that a set of approved plans is ultimately developed. Included in this program is the evaluation of the capabilities and performance of Headquarters elements and other Federal agencies assigned to accomplish responsibilities contained in contingency plans, performance of periodic tests of contingency plans to insure that the plans are workable and up-to-date, and that the underlying rationale and data bases used in preparing the plans are valid. In addition, reviews and evaluations will be made to determine if State Contingency Plans satisfy the EPCA requirements; insure that FEA's contingency plans are compatible with the plans of the states; and insure that FEA carries out its obligations in the Federal Emergency Preparedness Program.

JUSTIFICATION The FY 1978 workload will be somewhat reduced from FY 1977 levels. Consequently, staffing will be reduced by two positions and the contracting requirement by $900,000. However, there is a greater need for coordination of energy planning and development activities within and among Federal, State and local governments. This requirement will place an added burden on the Plans Review Program which will be handled by shifting manpower within contingency planning.

In FY 1978, contingency plans will be reviewed, revised and new plans developed as necessary. Also, greater emphasis will be placed on blending various energy contingency plans (allocation, storage, rationing, demand curtailments) into the context of an overall emergency preparedness energy plan.

COST FACTORS ($000)

Personnel and benefits	507
Other	62
Contracts	400
Total	969

ANALYSIS OF CONTRACTS FY 1978 - CONTINGENCY PLANNING

	($000) Costs
- Review and revise contingency plans and as necessary develop new plans. (Includes Environmental Impact Assessments and Economic Impact Analyses, as required by EPCA.)	$ 250
- Support the review of up to 50 state contingency plans to determine acceptability of each plan on a case by case basis for fulfilling the requirements for exemption from Federal contingency plans.	150
Total Contingency Planning	$ 400

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: REGULATORY PROGRAMS	PROGRAM: DATA COORDINATION													
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978			
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount	
Estimate	30	16	788	140	27	26	887	18	20	691	-9	-6	-196	
Headquarters	30	16	788	140	27	26	887	18	20	691	-9	-6	-196	
Regions	...	...	...	...	...	...	...	...	...	...	...	...	...	
(Contracts/Grants)	XX	XX	(350)	(25)	XX	XX	(150)	XX	XX	(200)	XX	XX	(+50)	
FY 1977 Supplemental Pending; EPCA FY 1978 Amounts Included Above					...	...	...	...	...	...				
Headquarters					...	...	...	...	...	...				
Regions					...	...	...	...	...	...				
(Contracts/Grants)					XX	XX	(...)	XX	XX	(...)				

PROGRAM DESCRIPTION This program is authorized by Sections 8a, 7, 14 of the EPAA, and Sections 201, 202, 203, 401, 402, 403, 457 of the EPCA. The Data Coordination Division uses knowledge of ORP programs and data processing/data collection techniques to develop detailed requirements for data support systems which allow ORP to implement Congressional mandates in the price and allocation regulation of the petroleum industry. The centralization of ORP data processing support avoids the development of duplicative or unnecessary systems and ensures that those systems which are developed by the FEA Office of Data Coordination will accurately reflect the regulatory data needs of ORP, and will be implemented and placed in operation in a manner which causes minimum disruption to regulatory functions. In order to do this, Data Coordination performs the following functions: (1) Analysis of legislative/program requirements to determine data collection required to support Congressional mandates; (2) Integration of all ORP needs for similar data; (3) Monitoring of system acquisition to ensure adherence to requirements; (4) Systems test and user training; (5) Evaluation of operating ORP data systems.

JUSTIFICATION A decrease in staffing is possible because of a shift from data program development to data program maintenance as systems become operational. There will be a slight increase in overall workload but the nature of the workload, the distribution of the workload and projected increases in efficiency will mitigate the effect of the personnel reduction. In systems development, there will be an additional requirement to support contingency plans which will be offset by a reduction in effort to support other programs and reductions in system testing and user training for newly acquired systems and a decrease in forms design and revision.

There will be an increase in effort to review the requirement for and effectiveness of operational systems, with concomitant effort to enhance data system efficiency with the consequent need for testing and training for modified systems.

COST FACTORS ($000)

Personnel and benefits	432
Other	59
Contracts	200
Total	691

ANALYSIS OF CONTRACTS FY 1978 - DATA

	($000) Cost
o Preparation of development plans and requirements for data systems to support FEA contingency plans. Nationwide implementation of contingency plans, when approved, will require computer data systems to determine effectiveness of the mandatory conservation measures and to identify potential violations for compliance follow-up.	$ 120
o Develop detailed forms designs, respondent instructions and GAO justification packages to reduce burden on industry. Analyze the effectiveness of the Programmed Job Performance Guide approach to simplify the instructions, reduce respondent costs and improve effectiveness of the submissions.	80
Total Data	$ 200

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
B. Summary By Program
(dollars in thousands)

ACTIVITY: ENERGY CONSERVATION AND ENVIRONMENT

APPROPRIATION: Salaries and Expenses

Program	FY 1976 Actual Pos.	MY	Amount	TQ Amount	FY 1977 Estimate Pos.	MY	Amount	FY 1978 Estimate Pos.	MY	Amount	Change FY 1977 to FY 1978 Pos.	MY	Amount
ASSISTANT ADMINISTRATOR	8	8	259	60	8	8	243	7	7	215	-1	-1	-28
ADMINISTRATIVE OFFICE	18	13	416	108	13	16	464	12	13	578	-1	-3	114
MARKETING	7	7	1,108	389	7	6	174	4	5	146	-3	-1	-28
POLICY AND PROGRAM DEVELOPMENT AND ENVIRONMENT	73	43	5,305	1,366	43	61	1,844	75	82	26,851	32	21	25,007
STATE PROGRAMS	113	100	7,301	11,132	94	100	26,030	139	142	140,621	45	42	114,591
NATIONAL PROGRAMS	66	60	6,091	4,096	60	57	3,785	128	131	32,571	68	74	28,786
MANDATORY PROGRAMS	31	25	3,367	1,322	25	28	2,512	24	25	3,527	-1	-3	1,015
Total	316	256	23,847	18,473	250	276	35,052	389	405	204,509	139	129	169,457
(Headquarters)	(243)	(190)	(21,849)	(13,017)	(190)	(212)	(10,696)	(249)	(269)	(65,989)	(59)	(57)	(55,293)
(Regions)	(73)	(66)	(1,998)	(5,456)	(60)	(64)	(24,356)	(140)	(136)	(138,520)	(80)	(72)	(114,164)
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					67	36	75,728	127	121	116,110			

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: ENERGY CONSERVATION AND ENVIRONMENT	PROGRAM: ASSISTANT ADMINISTRATOR												
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	8	8	259	60	8	8	243	7	7	215	-1	-1	-28
Headquarters	8	8	259	60	8	8	243	7	7	215	-1	-1	-28
Regions	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX	...	...	XX	XX	...	XX	XX	...	XX	XX	...
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					...	...	...	...	...	...			
Headquarters					...	...	...	...	...	...			
Regions					...	...	...	...	...	...			
(Contracts/Grants)					XX	XX	...	XX	XX	...			

PROGRAM DESCRIPTION

The Office of the Assistant Administrator for Energy Conservation and Environment is responsible for developing FEA and Administration policy in the areas of energy conservation and environment and for executing national energy policy through development and implementation of appropriate conservation programs and energy-related environmental policies.

The Assistant Administrator for Energy Conservation and Environment has the primary responsibility for reducing the rate of growth of energy demand in the United States. In carrying out this charge, the Assistant Administrator is responsible for developing FEA and Administration policy in the areas of energy conservation and environment and for executing national energy policy through development and implementation of appropriate conservation programs and energy-related environmental policies.

Cost Factors:

Personnel compensation and benefits (7 positions, including one Executive Level IV)	$175,000
Other	40,000
Total	$215,000

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: ENERGY CONSERVATION AND ENVIRONMENT	PROGRAM: ADMINISTRATIVE OFFICE												
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	18	13	416	108	13	16	464	12	13	578	-1	-3	114
Headquarters	18	13	416	108	13	16	464	12	13	578	-1	-3	114
Regions	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX	...	...	XX	XX	...	XX	XX	(200)	XX	XX	(200)
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					...	...	...	...	...	...			
Headquarters					...	...	...	...	...	...			
Regions					...	...	...	...	...	...			
(Contracts/Grants)					XX	XX		XX	XX	...			

PROGRAM DESCRIPTION

The Administrative Office provides the following internal liaison and support services: (1) contracts/grants management - planning and review of all funding actions, guidance for project monitors, tracking and reporting, and liaison with FEA's Project Review Board and Procurement Office; (2) General services - personnel, travel, space, equipment and correspondence control; (3) Publications - planning, budgeting, management and tracking of all printing requirements, as well as providing graphics support and staff assistance for editing and design; and (4) Support of the Office of Policy and Program Development and Environment - budget preparation and execution, including assistance related to OMB and Congressional consideration of budget requests, and direction, review, and monitoring of funds following appropriations.

JUSTIFICATION

The Administrative Office develops and implements management support policies, programs, and activities for Conservation and Environment. Specifically:

a. Advises the Assistant Administrator on and carries out Conservation and Environment management activities in the areas of mission and functions, management analysis and organizational matters, and staffing and personnel requirements. Effects coordination with appropriate FEA support staffs.

b. Effects certain financial management activities such as designing, controlling, and coordinating an integrated budgeting, accounting, and fiscal reporting system; developing budget support data documents and working with the Office of Policy and Program Development and Environment to formulate budget requests, controlling C&E requests, printing requisitions, contracts and contract proposals, and purchase orders; and serving as C&E payroll timekeeper liaison.

c. Provides other management and logistics support in such areas as receiving, monitoring, and reviewing all controlled and uncontrolled correspondence to include preparing responses to public and private inquiries into general C&E activities; coordinating C&E's space (facilities) needs with appropriate FEA support staffs; coordinating publications activities, involving the planning, budgeting, management and tracking of all printing requirements; and providing graphic and staff assistance support for editing and design of C&E publications.

$200,000 in contract funds is required in FY 1978 to provide support in the area of publications. These funds would be used to accomplish those design and layout requirements which could not be provided within FEA.

Cost Factors:

Personnel compensation and benefits (12 positions, 13 staff years)	$307,000
Other	71,000
Contracts	200,000
Total	$578,000

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: ENERGY CONSERVATION AND ENVIRONMENT	PROGRAM: MARKETING												
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	7	7	1,108	389	7	6	174	4	5	146	-3	-1	-28
Headquarters	7	7	1,108	389	7	6	174	4	5	146	-3	-1	-28
Regions	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX	(884)	(331)	XX	XX	...	XX	XX	...	XX	XX	...
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					...	...	...	...	...	...			
Headquarters					...	...	...	...	...	...			
Regions					...	...	...	...	...	...			
(Contracts/Grants)					XX	XX	...	XX	XX	...			

PROGRAM DESCRIPTION

The Marketing Office provides staff support and technical assistance for C&E programs in both the development and implementation stages of programs established under the authority of the FEA Act and the Energy Conservation and Production Act, and specifically mandated by Sec. 381(b)(1) of the Energy Policy and Conservation Act. This function maximizes the impact of such programs by identifying appropriate target audiences and the most effective methods of reaching them.

The Marketing Office is responsible for performing the following functions:

a. To develop C&E-wide conservation marketing plans and programs.
b. To recommend marketing strategies for the various conservation programs developed within C&E.
c. To provide technical expertise on marketing strategies for conservation products, including timing, scope of marketing effort required, extent of resources needed (contracts and personnel), etc.
d. To develop and monitor energy conservation marketing and advertising campaigns.

The purpose of C&E-wide marketing plans is to aid in developing a framework of specific energy conservation programs and a rationale for such a framework. The feasibility and marketing strategies for the specific programs must be examined to ensure that cost effective measures are used to promote the programs.

Energy conservation programs which depend on the voluntary activities of their respective target audiences can succeed only if supported by an effective marketing effort. Since such voluntary programs do not mandate audience participation, compelling marketing campaigns must be undertaken to elicit the desired conserving awareness attitudes and behavior. Marketing expertise is used to aid program personnel in the implementation of their programs.

Cost Factors:

Personnel compensation and benefits (4 positions, 5 staff years)	$118,000
Other	28,000
Total	$146,000

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: ENERGY CONSERVATION AND ENVIRONMENT	PROGRAM: POLICY AND PROGRAM DEVELOPMENT AND ENVIRONMENT											
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	73	43	5,305	1,366	43	61	1,844	75	82	26,851	32	21	25,007
Headquarters	73	43	5,305	1,366	43	61	1,844	75	82	26,851	32	21	25,007
Regions	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX	(3,929)	(1,009)	XX	XX	(75)	XX	XX	(24,470)	XX	XX	(24,395)
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					...	...	500	...	...	500			
Headquarters					...	...	500	...	...	500			
Regions					...	...	...	...	...	...			
(Contracts/Grants)					XX	XX	(500)	XX	XX	(500)			

PROGRAM DESCRIPTION

Four centralized Office of Energy Conservation and Environment activities are grouped in this organization: Policy Development, Program Development, Program Evaluation and Environment.

Principal Policy Development responsibilities are: (1) assistance in the formulation of FEA positions on proposed legislation related to energy conservation; (2) identification and analysis of unresolved policy issues, particularly those arising from the authorities and direction provided by the Energy Policy and Conservation Act (P.L. 94-163) and the Energy Conservation and Production Act (P.L. 94-385); and, (3) formulation of energy conservation policy concepts. These support activities encompass the annual budgeting process, long-term or strategic planning, formulation of policy issue papers, drafting Congressional testimony and reports (specifically those mandated by Section 109, 162, 203, and 206 of the Energy Conservation and Production Act and the Congress), interaction with other FEA offices on non-programmatic issues and conservation policy coordination with other Federal agencies.

Principal Program Development functions are: (1) the effective formulation and development of new conservation programs consistent with policy promulgated by the Administration, FEA and legislative mandates; and (2) data and analysis activities undertaken with specific regard to energy use and conservation. This activity also includes the continued analysis of energy consumption patterns and behavior necessary for program formulation.

The principal responsibilities of the Office of Program Evaluation are to ensure that the energy conservation programs implemented by FEA under EPCA, ECPA and the general authorities provided by the FEA Act are fulfilling their established objectives and that the allocation of resources accurately reflects the benefits actually being derived.

The Office of Environment performs three major activities: (1) assessing the energy impacts of environmental requirements and developing alternative environmental policy proposals to minimize adverse energy impacts; (2) assessing the environmental implications of alternative energy policies and projects (for example, as mandated by Section 109 of ECPA) and recommending approaches for minimizing environmental impacts; and (3) managing FEA's efforts to assure compliance with the National Environmental Policy Act with respect to programs initiated administratively or established by EPCA and ECPA. In addition, the office provides environmental technical assistance and staff support to all other FEA offices on major agency initiatives.

83-107 O - 77 - pt. 6 - 10

JUSTIFICATION

Executive Direction

This function provides executive guidance and leadership to the Office of Policy and Program Development and Environment.

Cost Factors:

Personnel compensation and benefits (2 positions, 2 staff years)	$47,000
Other	11,000
Total	$58,000

Policy Development

It is this Office's responsibility to develop, collect, and assess policy and program ideas and to refine the decisions of the Assistant Administrator's Office so that they constitute the basis for program development. It is also responsible for the maintenance of a cohesively articulated energy conservation policy. Specifically:

a. Assist in the formulation of FEA positions on proposed legislation relating to energy conservation.
b. Identify and analyze unresolved conservation policy issues.
c. Formulate energy conservation policy concepts.
d. Provide support activities including preparation of policy issue papers, drafting of Congressional testimony and reports.
e. Consult with HUD to develop new performance standards for commercial and residential buildings in accordance with Title III of ECPA.
f. Provide assistance on activities relating to international aspects of energy conservation policy, in particular those relating to the International Energy Agency.

Cost Factors:

Personnel compensation and benefits (4 positions, 6 staff years)	$142,000
Other	33,000
Contracts	100,000
Total	$275,000

Program Development

The primary responsibility of the Program Development Office is the scoping, design and detailed definition of programs intended to implement the policies of the Office of Conservation and Environment. Programs designed by the office are to have a defined life, purpose and product. Specific functions within the purview of the office, and which will therefore be undertaken by its staff, include:

- Formulation, evaluation and development of new energy conservation programs, including those mandated or authorized by statute. This includes generation of draft regulations.

- Preparation of program justification documents for use in formulation of budget requests and submissions, and to provide support for recommended legislative initiatives.

- Utilization of economic, energy savings projections, and other pertinent information to support C&E initiatives.
- Liaison with other offices, both within and outside C&E, to assure that data and information needed for the development and refinement of programs are generated on a systematic basis.
- Analysis of program alternatives, with emphasis on economic analyses and determination of the energy conservation potential of selected alternatives.
- Maintenance and continuing development of the energy conservation and renewable-resources measures list mandated by Title IV of ECPA.

The initial measures list will be developed and published during Fiscal Year 1977. Much work must be done in FY'78 to assimilate information provided by the public regarding energy measures which should be evaluated.

With contractual assistance, the responses to FEA's request for information on conservation measures, as well as existing lists of measures, will be screened in a systematic way. Screening will be accomplished using criteria which test potential measures for their relevance to the provisions of ECPA, for the analytical effort required to develop a full evaluation, and for their applicability to various types of buildings and industrial plants. The results will be the basis for a detailed work plan to evaluate selected energy measures and their potential applications. The anticipated output includes a listing of measures and their applications, ranked on the basis of priority for further development, as well as a brief summary and preliminary evaluation of high priority measures. With some available lists containing 200 measures, many of which may be applicable to five or more types of buildings, the potential number of combinations to be ranked could easily exceed 1,000.

The initial energy measures list will include only the most obvious energy measures, as applied to relatively simple building types. This first list will begin with single family dwellings and will encompass as many simple building types as possible using available staff resources. Additional contract assistance in this area would have the objective of considering additional applications of measures included on the initial measures list. Examples of the building types which would be addressed (to the extent they are not covered in the initial list) are multi-family dwellings, retail stores, office buildings, schools, and industrial plants. Included in this contract effort is the development of methodologies to determine eligibility for energy measures applied to the additional building types.

The majority of resources in this area ($25 million dollars and 39 positions) are requested for developing and implementing innovative programs to accelerate energy conservation. Specific conservation program initiatives involving the use of the fund will be announced in the comprehensive energy policy scheduled for April 20, 1977. The funding of $25 million is needed to provide flexibility to develop innovative programs and have them funded in FY 1978. Specific proposals will be made following an evaluation of current post-embargo energy consumption trends, and identification of the individual subsectors of the economy where Federal programs should be most appropriately directed, and development and analysis of the workability of program details.

The amended request includes $25,000,000, 39 positions and 39 manyears more than the initial FY 1978 request for this program.

Cost Factors:

Personnel compensation and benefits (48 positions, 53 staff years)	$ 1,251,000
Other	286,000
Contracts	24,020,000
Total	$25,557,000

Program Evaluation

This Office is responsible for the "learning" process within the staff element. The elements of ongoing programs evaluated will be the quality and adequacy of:

a. Resources committed.
b. Program definition.
c. Program scheduling.
d. Program product delivery.
e. Program management.

The purpose of such evaluations will be to determine whether or not individual program elements achieved their stated objectives, to assess the effectiveness of such program activities in accomplishing the purposes for which funding was intended, and to evaluate the adequacy of program administration.

Receiving special attention in FY'78 will be the evaluations of the Weatherization Program (ECPA, Section 416), the Supplemental State Grant Program (ECPA, Title IV, Part B), and utility demonstrations and initiatives.

The amended request includes $100,000 more than the initial FY 1978 request for this program.

Cost Factors:

Personnel compensation and benefits (4 positions, 4 staff years)	$ 95,000
Other	21,000
Contracts	200,000
Total	$316,000

Environment

The Environment Office's major responsibilities are:

- Coordinating and assuring, through technical assistance and document review and comment, the adequacy of Agency documents prepared pursuant to the National Environmental Policy Act (NEPA). This includes environmental assessments (EA's) and environmental impact statements (EIS's) under preparation for FEA programs arising from the Energy Policy and Conservation Act and the Energy Conservation and Production Act, as well as other legislatively authorized programs. In addition, resources are required to perform and coordinate the review of other agency EIS's.

- Evaluating the energy effects of environmental initiatives within the Federal Government and keeping the Agency current with regard to environmental aspects of energy policy and actions. Specifically, the office will address the following: the Clean Air Act which may be revised (particularly the automobile emission standards); the Federal Water Pollution Control Act which may be amended and new strip mining legislation which is anticipated.

- Performing environmental/energy tasks as assigned by the Assistant Administrator.

Finally, the reports mandated by Sections 109 and 162(a) of ECPA will require assessment of the environmental impacts of existing conservation initiatives and various alternative methods for achieving national energy needs.

Contractual assistance is most needed in the following areas:

- Assessments of energy/economic impacts of the non-attainment Clean Air Act issues.
- Technical contractual support in review of Agency-prepared NEPA documents.
- Assessments of the environmental implications of energy taxing or pricing alternatives, including a Btu tax.

Cost Factors:

Personnel compensation and benefits (17 positions, 17 staff years)	$401,000
Other	94,000
Contracts	150,000
Total	$645,000

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: ENERGY CONSERVATION AND ENVIRONMENT	PROGRAM: STATE PROGRAMS											
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
* Estimate	113	100	7,301	11,132	94	100	26,030	139	142	140,621	45	42	114,591
Headquarters	52	44	5,606	5,752	44	46	1,964	49	55	3,523	5	9	1,559
Regions	61	56	1,695	5,380	50	54	24,066	90	87	137,098	40	33	113,032
(Contracts/Grants)	XX	XX	(4,198)	(10,387)	XX	XX	(23,000)	XX	XX	(136,200)	XX	XX	(113,200)
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					32	16	67,174	42	42	88,748			
Headquarters					12	6	475	12	12	349			
Regions					20	10	66,699	30	30	88,399			
(Contracts/Grants)					XX	XX	(66,722)	XX	XX	(87,566)			

PROGRAM DESCRIPTION

The activities of this office include the State Energy Conservation Program (EPCA and ECPA), the State & Local Voluntary Program, the Conservation Workshops Program, and Weatherization Assistance for Low-Income Persons (ECPA).

The State Financial Assistance Office administers the State Energy Conservation Program (SECP) authorized by Section 363 of the EPCA, and the Supplemental State Energy Conservation Program authorized by Title IV, Part B of ECPA. The SECP is a grant-in-aid program, for qualified States, whose goal is a 5% savings in the total consumption of energy from the consumption projected for 1980. To qualify States must submit an acceptable energy conservation plan which saves at least 5% in energy consumption and includes the five program measures required by EPCA. Under the Supplemental program, FEA is to provide technical assistance and financial support for State initiatives particularly as they apply to continuing public education efforts, coordination among local, State and Federal conservation programs, and encouraging energy audits for households, buildings and industrial plants.

The State and Local Voluntary Assistance function brings together a variety of activities developed or implemented on a limited basis which can most efficiently and effectively be applied and implemented by localities and institutions. These activities are distinct from the mandated portions of the State grant programs in that they offer a range of mechanisms which may be chosen and adapted to meet unique needs, or institutional constraints. Examples of areas in which technical assistance is provided are; health care facilities; elementary and secondary schools; colleges and universities; commercial buildings; industrial processes; transportation; draft standards or model legislation; and residential buildings.

The Conservation Workshops Program offers a series of seminars and workshops for executive and management representatives in the areas of commercial buildings conservation, industrial energy conservation and vanpooling.

Title IV, Part A of the Energy Conservation and Production Act (ECPA) provides that the FEA shall make available grant funds over the next three years not to exceed $200 million. The purpose of the grant money is to fund State Weatherization Programs to insulate the homes of low-income persons, with particular emphasis on the low-income elderly and handicapped. FEA is also charged with the responsibility for developing program regulations, insuring the fair and equitable treatment of Native Americans, providing technical assistance to the States and local organizations, and carrying out program monitoring and evaluation.

JUSTIFICATION

Executive Direction

This function provides headquarters and regional executive guidance and leadership for the Office of State Programs.

Cost Factors:

Personnel compensation and benefits (22 positions, 22 staff years)	$519,000
Other	121,000
Total	$640,000

State Financial Assistance

The State Financial Assistance Office administers both the State Energy Conservation Program authorized by Section 363 of the Energy Policy and Conservation Act (EPCA) and the Supplemental State Energy Conservation Program authorized by Title IV, Part B of the Energy Conservation and Production Act (ECPA).

Under the basic program, FEA, as required by EPCA: (a) provides grants to qualified States for implementation of energy conservation plans designed to reduce energy consumption by 5% in 1980; (b) provides assistance to States in the development of plans and in grants-in-aid administration; (c) assesses the impact of State plans; and (d) reports to the President, Congress and the States. The resources requested in FY 1978 will ensure that States participating in the EPCA authorized program will be able to fully implement their approved plans, thus providing every opportunity for achievement of their goal. Headquarters staffing will remain relatively stable. The increase in Regional positions is to support the management of the State Energy Conservation Program. During FY'78, the five required program measures must be on-line in each State. The program emphasis will be on closer State program assistance and coordination, program achievement, monitoring (against quarterly milestones), and assessment of program effectiveness. These activities necessitate increased Regional staff capability. An estimated 2.5 personnel per Region are essential for effective goal achievement under the basic program.

Due to the nature of the program, extraordinary requests for printed material germane to the State Energy Conservation Program are expected. Requests for information are anticipated from all 55 entities participating in the program as well as their political subdivisions. Requests are also expected from contractors and universities working with States on the development and implementation of their plans, as well as from interest groups affected by the plan.

Under the Supplemental State Energy Conservation Program authorized by ECPA, FEA will: (a) prepare and publish guidelines for the preparation and funding of supplemental plans; (b) prepare model supplemental energy conservation plans; (c) provide financial assistance to qualified States for the development and implementation of supplemental plans; (d) provide assistance to States in the administration of their supplemental plans; (e) assess the impact of the implemented plans; and (f) report to the President, the Congress and the States.

In order for a State to be eligible to receive financial assistance for its supplemental plan, FEA would require that a State's Governor submit a plan, within three months of the effective date of the guidelines, to the appropriate FEA Regional Administrator. The plan submitted by the State would include detailed information regarding the nature, implementation schedule, estimated energy savings and costs of implementation of all measures which the States wishes to be considered for Federal implementation funding.

To be eligible for funds, a State must include three measures in its plan: energy audits, public education and intergovernmental coordination. Additional measures may also be included provided all minimum criteria for the required measures are met. FEA would mandate that all required measures would be in place and ready for implementation within six months after grant award.

Minimum criteria for the required measures would emphasize the importance of energy audits in relation to the overall supplemental plan. Energy audits for homeowners, in whose interest it is to retrofit their dwelling units in order to cut both energy cost and consumption, would be specifically emphasized. The purpose of the energy audit is to inform homeowners of the possible ways of retrofitting their homes, the costs involved, and the ultimate savings and pay-back period.

The 1970 census (Bureau of the Census, "Census of Housing") indicates that there were approximately 63.5 million dwelling units in the United States (current estimates are over 70 million). Of these dwelling units approximately 46.3 million are single-family detached units and of the total number of dwelling units 62.9% are owner-occupied. The target audience for this measure would thus be those 29.2 million single-family, detached dwelling unit owners and those other homeowners who reside in duplexes, townhouses, etc., that also have the interest to retrofit their dwelling units. FEA is interested in funding audits for these households using audit procedures similar to those developed by FEA--the "Project Conserve" questionnaire and the "Home Energy Savers' Workbook." Project Conserve is a computer processed questionnaire designed to elicit input from the dweller on the characteristics of his dwelling unit and provide as output suggestions for retrofit and information on costs and cost savings. The "Home Energy Savers' Workbook" will produce approximately the same product as Project Conserve but computations are left to the homeowner.

FEA assumes that, with funding of the total FY 1978 request for the supplemental program, from 12.5 million to 15.7 million dwelling units could be audited using the noted methods. This assumes that $15.7 million of the grant funds would be used for home energy audits and that those audits would cost the State from $1.00 - $1.25 per unit. The figures are based on calculations from the Project Conserve Program and those programs using the "Home Energy Savers' Workbook." It also assumes that $7.8 million of the grant funds would be used for State administrative costs as well as other phases of the supplemental program. Assuming that 25% of these homeowners acted on the results of the audit by taking the necessary retrofit actions and by adjusting their thermostats to suggested levels, estimated savings as a result of the program would be between 2.7 and 3.45 million barrels per year oil equivalent, or an estimated 31 to 39 million dollars per year. States will also be required to develop audit programs for non-residential buildings and industrial plants and insure their availability at minimal cost.

To satisfy the mandatory public education measure, a State will be required primarily to provide information to the public relating to energy audits and will also be allowed to expand its efforts into other areas.

Finally, in satisfaction of its third required measure, States will include in their plans procedures for ensuring that effective coordination exists among the various local, State and Federal energy conservation programs within and affecting the State, including any energy extension service program administered by the Energy Research and Development Administration.

Funds for the supplemental program will be made available on the following basis: twenty-five percent divided equally among participating States and seventy-five percent divided among the participating States on the basis of their resident population.

The staff requested for the supplemental program (2 Headquarters and 10 Regional positions) represents no increase over the FY 1977 level.

This program will be evaluated by Conservation and Environment's Program Evaluation Office in FY 1978 ($100,000 in contract support).

The amended request includes $23,848,000, 12 positions and 12 manyears more than the initial FY 1978 request for this program.

Cost Factors:

Personnel compensation and benefits (52 positions, 49 staff years)	$ 1,157,000
Extraordinary printing assistance for States	289,000
Other	268,000
State Conservation Grant Awards (EPCA)	47,000,000
State Supplemental Grant Awards (ECPA)	23,500,000
Cpntracts	1,634,000
Total	$73,848,000

State and Local Voluntary Program

This Office provides non-financial support, primarily on request, to any State entity, institution or local subdivision. Assistance is provided on any aspect of energy conservation. More specifically, it encompasses a variety of activities developed or implemented on a limited basis which can most efficiently and effectively be applied and implemented by localities. Assistance will be provided for innovation where there has been no previous FEA activity. Examples of areas in which technical materials and programs will be developed are:

- local home-builders' handbook for energy efficiency;
- model school and fleet transportation systems;
- pamphlets on energy conservation for distribution by welfare workers to recipients;
- local government contingency planning; and
- encourage energy efficiency as a consideration in long-range planning by local governments and institutions.

Support currently available includes:

a. Residential retofit program designed primarily for single-family homeowners.

b. Tools to support energy conservation in institutional buildings, such as in elementary schools, secondary schools, colleges and universities and in health care facilities (e.g. hospitals, nursing homes).

c. Model legislation and implementation procedures in the area of used oil recycling.

d. Assistance to government entities below the State level to establish and implement local energy management programs.

e. Information on energy conservation curricula and teaching aids for kindergarten, elementary, and secondary schools. Additional information will be added as it becomes available.

The provision of assistance deals largely with establishing pilot programs for institutions and local governments. This Office will serve as a catalyst in the technology transfer process at the Federal and State level as well as the community to community level.

During FY'76 and FY'77 the State and Local Voluntary Assistance Office further developed Project Conserve, a residential energy conservation program, and monitored its implementation in a total of 14 States. As part of this program, the Office developed and printed the Home Energy Savers' Workbook, a 30-page guide to home retofitting. In the institutional buildings area, the Public School Energy Conservation Service (PSECS), a computerized energy analysis program, was expanded during FY'77 to include secondary as well as elementary schools. The Office sponsored a series of energy management workshops for school administrators and business officers from schools (K-12), colleges and universities across the country. Similar workshops were also held for health care facilities engineers and administrators. In the area of used oil recycling, a Model Used Oil Recycling Act was developed for use by State and local governments interested in developing a similar piece of legislation for their areas. To assist local governments in the establishment and implementation of energy management programs, the staff prepared workshop materials to be used and evaluated by State and local government officials.

During FY'76, this Office surveyed existing curricula and materials that could be incorporated into energy conservation curricula and conducted regional seminars for educators to determine energy education needs; an energy conservation awareness training program was developed for teachers and student leaders. The Office sponsored a guide to currently available energy/environment teaching aids and produced a booklet on energy suitable for the junior high school level. In addition, the Office sponsored a program of energy awareness through the Nation's parks. During FY'76 and FY'77 the Office investigated institutional barriers to adopting vanpooling and carpooling programs. The staff also tested and developed various vanpool and carpool marketing strategies. In the area of building standards, the Office sponsored a variety of activities during FY'76 and FY'77. During FY'76 building code workshops were held in each of the 10 FEA Regional Offices and followed up on a State-specific basis in 30 States. Studies were held to evaluate the economic impact of building energy conservation standards such as ASHRAE 90-75 and the HUD Minimum Property Standards. Under the Building Standards Program, cooperative agreements were funded with 10 States to determine the most effective means of implementing energy efficient building codes. Follow up analysis work is being conducted in FY'77 with the League of Cities, Conference of Mayors and National Association of Counties to determine specific options in implementing energy efficient building standards.

During FY 1977, a great number of new programs are being developed by individual States. Many, if not all, of these programs have some applicability in a large number of States. Staff will be needed to review these programs, identify "universal" elements in them, properly organize and package this information, make the information available, and provide any assistance requested to further develop and implement such programs.

No increase in Headquarters staff is requested in FY 1978. An increase of five regional positions is requested. Specifically, the provisions of assistance across the board to institutions and communities is expected to increase. The increase in Regional positions from FY'77 to FY'78 is caused by the fact that Regional personnel must provide the link between the target group and Headquarters staff to assure efficient implementation of individual conservation programs. As this assistance service becomes established and recognized, local entities are expected to take increasing advantage of the conservation expertise offered through the Regional staff.

Cost Factors:

Personnel compensation and benefits (35 positions, 35 staff years)	$ 826,000
Other	193,000
Total	$1,019,000

Conservation Workshops

Conservation Workshops is a program of energy conservation seminars and workshops designed to stimulate and facilitate conservation in large and medium-sized commercial and industrial businesses and facilities. Included are conferences for top management and technical workshops for physical plant personnel. These workshops promote energy-saving opportunities and provide techniques for capturing these opportunities with regard to industrial processes, improved conservation practices for buildings and vanpooling programs.

The man-year staffing level requested for FY 1978 is required to phase out the FEA role in this program. As a result of conducting a successful effort during FY 1977, it is anticipated that a significant demand will develop for additional materials and follow-up information from States, trade associations and others.

Cost Factors:

Personnel compensation and benefits (no positions, 8 staff years)	$176,000
Other	38,000
Total	$214,000

Weatherization Program

The Weatherization Program was proposed in January 1975. This proposal was based on a successful Office of Economic Opportunity program of insulating the homes of low-income persons in Maine. Currently, the eligible universe is estimated at six million low-income homes. FEA anticipates that approximately 880,000 of those homes will be weatherized if the requested funds are appropriated. In addition to the funds requested in this budget, $55 million in supplemental funding is also requested in FY'77.

The program is mandated by P.L. 94-385, Section 413, for three fiscal years beginning October 1, 1976 and ending September 30, 1979. Some program development work has been done in FY'76. Currently, regulations, program manual, technical assistance packages, a monitoring contract and requirements for a management information system are being prepared.

Pending supplemental appropriations for FY'77 and final publication of the regulations, the program will be ready for full implementation in the spring of 1977. Contact with the States and local delivery agencies is still minimal, but will require greater expenditure of man-hours as we move closer to actual program implementation. Headquarters coordination will be of paramount importance during FY'77 to ensure that grant administration is consistent and equitable. During FY'78 administration of the program will be regionalized to provide for effective management of the numerous and diverse applications which are expected. Already there are indications that not every State plans to apply for grant funds. Community Action Agencies (900), Indian tribal councils (500) and units of local government (3,000) will be eligible to apply for funding in the event their State elects not to do so. The implementation burden is likely to be multiplied many times in this way, thereby increasing the workload not only in Headquarters but in the Regional Offices as well. We estimate that 45 State, 100-150 local government/CAA, and 100 Indian applications will have to be processed in FY'78.

As the program becomes fully operational in FY'78, management emphasis will shift to the regions, the principal source for technical assistance, program monitoring and application processing. The budget estimates reflect the regional shift and provide the resources necessary for a more decentralized operation of this program. Current plans call for 10 new regional positions to be filled at the beginning of FY'78.

This program will be evaluated by C&E's Program Evaluation Office in FY'78 ($100,000 in contract support).

The amended request includes $10,000,000 more than the initial FY 1978 request for this program.

Cost Factors:

Personnel compensation and benefits (30 positions, 28 staff years)	$ 675,000
Other	159,000
Grants	64,066,000
Total	$64,900,000

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: ENERGY CONSERVATION AND ENVIRONMENT	PROGRAM: NATIONAL PROGRAMS											
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	66	60	6,091	4,096	60	57	3,785	128	131	32,571	68	74	28,786
Headquarters	54	50	5,788	4,020	50	47	3,495	78	82	31,149	28	35	27,654
Regions	12	10	303	76	10	10	290	50	49	1,422	40	39	1,132
(Contracts/Grants)	XX	XX	(4,188)	(3,199)	XX	XX	(1,880)	XX	XX	(27,890)	XX	XX	(26,010)
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					35	20	8,054	85	79	26,862			
Headquarters					35	20	8,054	35	35	25,587			
Regions					...	...	...	50	44	1,275			
(Contracts/Grants)					XX	XX	(7,472)	XX	XX	(24,572)			

PROGRAM DESCRIPTION

The Office of National Programs is responsible for four energy conservation initiatives undertaken at the national level: the Federal Energy Management Program (FEMP), the Obligation Guarantee Program, programs directed towards regulatory institutions, and voluntary programs.

The Federal Energy Management Program was established in 1973 to set policy for and monitor the progress of energy conservation efforts in the Federal Government. Under the Energy Policy and Conservation Act (Section 381), the President has been directed to develop and implement a 10-year plan for energy conservation in all Federal Government buildings. The responsibility for this plan has been delegated to FEA by Executive Order 11912.

The Obligation Guarantee Program Office is responsible for administering the implementation of the Obligation Guarantee Program, authorized in Part D of ECPA as a means of installing energy conservation or renewable-resource energy measures in buildings and industrial plants.

The Regulatory Institutions Program Office is responsible for: (1) the continuation of the utility demonstration program authorized in part by Section 204(1)(A) of the Energy Conservation and Production Act; (2) the implementation of programs authorized by Title II of ECPA to encourage the institution of energy conservation, rate reform and load management activities by gas and electric utility regulators; (3) intervention in utility rate hearings to advocate the adoption of policies and programs in accordance with policy as authorized in part by Section 204 of ECPA; and (4) to provide for the operation of offices of consumer services to assist consumers in their presentations before utility regulatory commissions as authorized by Section 205 of ECPA.

The Voluntary Conservation Programs Office is responsible for encouraging and obtaining the participation of Federal agencies, business associations and professional societies in programs to conserve energy. Specifically, such programs include: (1) encouraging manufacturers and operators of transportation equipment to improve the energy efficiency of trucks, buses, and automobiles; (2) implementing a voluntary goal-setting and reporting program in conjunction with the Department of Commerce and national trade associations to improve energy efficiency in the industrial sector, including administration of the exemption provision in EPCA; and (3) working with engineering and architectural professional societies to urge adoption of energy conserving design techniques.

JUSTIFICATION

Executive Direction

This function provides executive guidance and leadership to the Office of National Programs.

Cost Factors:

Personnel compensation and benefits (2 positions, 7 staff years)	$165,000
Other	39,000
Total	$204,000

Federal Energy Management Program

The Federal Energy Management Program Office is responsible for:

a. Developing and managing the Federal Energy Management Program and reporting to the President and Congress on Federal agency performance;

b. Working with Federal agencies to develop and implement consistent energy conservation programs; and,

c. Developing and implementing a 10-year plan for energy conservation with respect to buildings owned or leased by an agency of the United States, as well as with respect to other areas of Federal agency operations affecting energy use.

The 10-year plan for Federal Energy Management will be developed during FY 1977 and some limited implementation activities will begin. Increased funding levels will be required to fulfill the President's EPCA mandate (delegated to FEA) in the following areas:

a. Continued refinement of the original plan based on initial implementaiton experience, as well as new developments (technological or otherwise) which would improve the plan;

b. Increased demand for interagency liaison, monitoring and reporting as the plan begins to be implemented; and,

c. Provision of technical assistance to other Federal agencies.

Contract assistance is needed to develop end-use efficiency measures, programs to convert Federal boilers from petroleum or natural gas, new construction energy standards and for improvements to data collection and reporting systems.

Cost Factors:

Personnel compensation and benefits (12 positions, 12 staff years)	$283,000
Other	66,000
Contracts	630,000
Total	$979,000

Obligation Guarantee Program

Part D of the Energy Conservation and Production Act (ECPA) authorized the Administrator to issue or commit to issue obligation guarantees. Total guarantees are not to exceed a total of $2 billion dollars by September 30, 1979. This section authorizes FEA to guarantee qualified loans made to States and local governments, institutions, businesses, and owners of residences which comprise 3 or more dwelling units. Specific qualifications for eligibility are: (1) that the loan must be for installing an approved material or device which either saves energy or generates energy from a renewable source; (2) the applicant must not be able to obtain financing for his plan on "reasonable terms and conditions"; and (3) there must be a reasonable prospect for repayment of the loan.

Applications for loan guarantees are limited by legislated criteria such as:

a. 5 million dollar maximum for any single borrower;

b. only 90% of any conservation plan's cost may be guaranteed;

c. a loan must be repaid within 25 years;

d. the purpose of the loan must be in accordance with the list of eligible measures published by the FEA Administrator or approved by an energy audit (ECPA, Section 432 and 451(b)).

The staff and contract resources are requested to implement the program and to monitor the progress and impact of the program authority contained in ECPA. As there is a significant lack of information about economically attractive opportunities for investment in energy conservation, resources will be needed to create public awareness. Background studies already accomplished have shown this effort to be vital to this program's success.

Implementation of a management program to be designed in FY 1977 is required to perform the tasks and resolve the issues identified which must be accomplished in order to issue obligation guarantees early in FY 1978. Implementation, installation and operation of a management information system is required to insure the proper handling of the data and timely processing of the applications. Regulations and administrative procedures must be developed and technical support requirements undertaken. The technical support activities include manuals for conducting and reviewing audits, continuing analysis of measures and their applications for potential inclusion on the energy measures list and assistance in the review of applications to systematize, standardize and streamline guarantee procedures.

The staffing requested will be needed to maintain the energy measures list, to review energy audits, to process applications, to issue commitments and guarantees, to disseminate information concerning the program and to develop and implement analytical criteria for program evaluation. The Regional offices will need 50 positions and will be primarily responsible for disseminating information, processing applications, reviewing energy audits and issuing commitments and guarantees. Headquarters will require the remaining 25 positions. These personnel will be responsible for maintaining the energy measures list, insuring consistency in processing applications, reviewing problem cases referred from the regional offices, reviewing applicants' appeals, operating and maintaining the management information system and developing and implementating program evaluations.

The amended request includes $19,500,000, 75 positions and 69 manyears. There was no initial FY 1978 request for this program.

Cost Factors:

Personnel compensation and benefits (75 positions, 69 staff years)	$ 1,628,000
Other	372,000
Contracts	2,500,000
Default fund (no-year money)	15,000,000
Total	$19,500,000

Regulatory Institutions Program

Under Titles I and II of the Energy Conservation and Production Act, the Office of Conservation and Environment undertook in Fiscal Year 1977 four distinctly different efforts to advocate utility rate reform and related conservation measures. During Fiscal Year 1978, these efforts will be continued and in some instances completed.

This request provides for the continuation and completion of the electric utility demonstration program authorized by ECPA, Section 204(1). The program provides financial assistance to utility regulatory bodies. The initial phase was designed to produce a comprehensive experimental data base on the impacts of specific rate reform and load management practices so that local regulatory authorities, utilities, and consumer representatives can assess their potential. The second phase of this program (to be initiated in Fiscal Year 1977 and continued in Fiscal Year 1978) will demonstrate actual system-wide implementation of these reforms (as contrasted with experimentation). The requested resources provide $1,325,000 for the initiation of 2 new fully funded demonstrations and $2,480,000 for completion of 9 projects initiated in earlier years. With this funding, there will be a total of 23 fully funded demonstrations since the inception of the program in FY 1975. In addition, this request will allow initiation of 2 new fully funded natural gas utility demonstrations, at a cost of $780,000, and completion funding of $620,000 for 5 projects initiated in FY 1977. These gas demonstrations will focus on pricing and conservation techniques uniquely applicable to gas distribution utilities, including utility financing of heating system modifications.

Gas and electric regulatory rate reform initiatives are nationally-directed technical assistance activities designed to modify regulatory policies and processes. These rate reform tools include case studies, jurisdiction-specific needs assessment, improved supply/demand forecasting techniques, utility simulation models, customer response analyses, information collection/dissemination systems and technical assistance teams to help regulatory institutions. These must cover not only rate structures, but also the ancillary conservation measures that allow customers to adapt to new rates. Examples of such measures are conservation financing, elimination of master metering and averaged billing, energy efficiency advertising, energy audits, and mandatory efficiency criteria for continuation of service. Rate reform initiatives covering these areas will be used to provide technical assistance to regulatory institutions and, through them, to gas and electric utilities and their customers. They will provide detailed "how to" assistance that will not only communicate generic rate reform/conservation principles, but will also allow regulators to translate these general approaches into specific actions appropriate for the local regulatory context. These initiatives will be complementary to FEA's formal intervention in regulatory proceedings. With expanded funding and concentration of effort on regulatory institutions in FY 1977-1978, coverage could be expanded to all 50 State regulatory commissions and the 15 largest municipal commissions. Through the leverage of these institutions, about 93 percent of gas and electricity sales will be covered. This request will use the jurisdiction-specific profiles of regulatory problems and the results of the field testing of improved gas and electric load forecasting techniques funded in FY 1977 for increased direct technical assistance to regulatory institutions. This will be done principally through technical assistance teams.

FEA utility conservation programs will also feature intervention in gas and electric regulatory rate proceedings, complementing the informal (less legalistic) advocacy efforts undertaken as Regulatory Rate Reform Initiatives. Intervention may be at the request of any State, utility regulatory commission, or participant in a utility regulatory proceeding, and is intended to encourage energy conservation by providing expert testimony and technical assistance at rate hearings. The program's objectives will continue to be: (1) recommend rate structure revisions to reflect utility costs, including those that vary with time-of-use; (2) advocate the adoption of cost-effective conservation measures, including electric utility load management; and (3) provide technical information, obtained through the FEA demonstration projects or other methods, on the effectiveness of various conservation techniques. The program activities include development of testimony, preparation briefs and reply briefs, preparation and appearances of FEA witnesses, analysis of utility system characteristics, examination of other parties' submissions, and resolution of technical rate-making policy issues. In Fiscal Year 1976, FEA participated with full intervenor status in seven rate cases, at an average cost of $32,000. The agency also participated in five additional cases, but not as full intervenor. The requested funds for Fiscal Year 1977 will cover 25 full intervenor cases at an average cost of about $30,000. Prior to Fiscal Year 1977, FEA honored only invitations directly from the regulatory commissions. In Fiscal Year 1978, the requested funds would cover 30 full intervenor cases, again at an average cost of about $30,000. The substantial increase in case load over pre-FY 1977 levels is expected because of the new policy (consistent with ECPA, Section 205) to honor invitations from any participant in any rate case, of which there are about 250 annually for investor-owned retailers alone, and several times this number for municipals, co-ops and wholesalers.

Section 205 of ECPA authorizes FEA to provide grants to States for the establishment and operation of offices of consumer services to assist consumers in their presentations before utility regulatory commissions.

The consumer services office program will enable consumers to become more informed about and active in influencing public decisions concerning the price, and thus the amount, of utility-supplied power which they use. Such an FEA grant program is important for several reasons: (1) to help consumers respond knowledgeably in an environment in which energy prices are rising steadily and proposals for utility rate reforms are proliferating; (2) to encourage State utility regulatory commissions to give full consideration to the concerns of the various utility consumer classes; (3) to alleviate the present situation wherein the consumers' ability to retain legal assistance is limited by their lack of resources; and, (4) to advance FEA goals, since consumer interest in furthering utility load management and rate reform can improve utilities' load factors and thus result in a shift from gas and oil to coal and reduce overall energy consumption.

The full Congressional authorization of $2 million is necessary to establish, where necessary, and operate State utility consumer services offices. Two FEA staff persons are needed to implement and monitor this grant program.

The amended request includes $2,925,000, 5 positions and 4 manyears more than the initial FY 1978 request for this program.

Cost Factors:

Personnel compensation and benefits (31 positions, 32 staff years)	$ 753,000
Other	175,000
Contracts	7,680,000
Grants	1,942,000
Total	$10,550,000

Voluntary Programs

The Voluntary Conservation Programs Office is responsible for encouraging and obtaining the participation of Federal agencies, business associations, professional societies, and others in the private sector.

Existing programs in this area include:

a. A program to encourage manufacturers and operators of transportation equipment to improve the energy efficiency of trucks, buses, and automobiles.

b. A program to implement a voluntary goal setting and reporting program in conjunction with the Department of Commerce and national trade associations to improve energy efficiency in the industrial sector, including administration of the exemption provision contained in EPCA.

c. A program to educate and work with engineering and architectural professional societies to urge the adoption and implementation of energy conserving design techniques.

d. In conjunction with EPA, produce and distribute New Car Mileage Guides as required by EPCA.

These programs are expected to continue through 1978. Since they are voluntary programs attempting to institutionalize conservation procedures, at least 2-3 years will be required before impacts can be expected. Program implementation is also expected to occur in FY 1978 in the following areas: (1) a program for home builders in new residential construction; (2) a program to encourage the development of a residential retrofit business, expected to be implemented with the assistance of national remodeling associations; and (3) a program to encourage the use of dual purpose power plants by industry.

Cost Factors:

Personnel compensation and benefits (8 positions, 11 staff years)	$260,000
Printing of New Car Mileage Guides (20,000,000 copies at 4.4 cents each)	880,000
Other	60,000
Contracts	138,000
Total	$1,338,000

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: ENERGY CONSERVATION AND ENVIRONMENT	PROGRAM: MANDATORY PROGRAMS										Change FY 1977 to FY 1978		
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate					
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	31	25	3,367	1,322	25	28	2,512	24	25	3,527	-1	-3	1,015
Headquarters	31	25	3,367	1,322	25	28	2,512	24	25	3,527	-1	-3	1,015
Regions	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX	(2,567)	(1,114)	XX	XX	(1,400)	XX	XX	(2,800)	XX	XX	(1,400)
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					...	...	...	...	...	...			
Headquarters					...	...	...	...	...	...			
Regions					...	...	...	...	...	...			
(Contracts/Grants)					XX	XX	...	XX	XX	...			

PROGRAM DESCRIPTION

The Office of Mandatory Programs provides support for two activities mandated by the Energy Policy and Conservation Act (ECPA).

The Appliance Program, Part B, Title V of the Energy Policy and Conservation Act includes: (1) developing procedures to test energy efficiency of appliances; (2) measuring and monitoring of the energy efficiency improvement activities conducted by appliance manufacturers; and (3) disseminating to consumers information that will enable them to ascertain the life cycle cost of owning and operating different products.

The Industrial Reporting Program provides for the continuing implementation of the mandatory industrial energy conservation provisions of the Energy Policy and Conservation Act (Section 375).

Executive Direction

This function provides executive guidance and leadership for the Office of Mandatory Programs.

Cost Factors:

Personnel compensation and benefits (2 positions, 2 staff years)	$47,000
Other	11,000
Total	$58,000

Appliance Program Office

The Appliance Program as mandated under Part B, Title III of the Energy Policy and Conservation Act (EPCA) must:

a. Develop and publish test procedures to measure the annual operating costs and energy efficiency of major home appliances;

b. Advise FTC on publishing labeling rules for covered products;

c. Identify other types of consumer products and make recommendations to include these as "covered" products under EPCA;

d. Develop and publish energy efficiency improvement targets for each type of covered product and monitor progress against these targets;

e. Conduct a program to educate consumers and others with respect to the appliance efficiency and labeling programs; and,

f. Prepare an annual report to the Congress on the progress of the program and its energy impact.

The FY'78 funds and personnel requested will provide for continued technical support that the National Bureau of Standards (NBS) performs for the program, continued study of consumer usage of appliances, a substantially increased consumer education program, and the initiation of a program to evaluate the potential benefits and problems from retrofitting furnaces, hot-water heaters and other major energy consuming appliances with energy savings devices such as the automatic flue gas damper. Specifically, such additional resources will be applied to the following activities:

NBS must continue to provide general technical support for the Appliance Program. Targets and test procedures for covered products (11-13) must be finalized and modification of existing test procedures will be necessitated by future innovative design changes. Modification of test procedures is very important because it is the mechanism that will allow manufacturers to receive credit for design changes, and thereby, reduce the estimated annual operating cost figure which will appear on the labels. If test procedures are not able to measure and give credit for innovative design changes, there will be no incentive for increasing the efficiency of appliances. NBS must also continue laboratory testing to insure that energy efficiency is maintained over the life of the product.

Consumer usage patterns must be monitored on a continuing basis so that accurate data is available to calculate the "estimated annual operating cost" of covered products.

The most critical aspect of the appliance program is consumer education. Without it, there will not be an adequate awareness of the existence of energy efficient appliances nor an understanding of the information contained on the appliance labels, which will enable the consumer to make the crucial decision to buy the most energy efficient appliance. In addition to the individual consumer, groups such as homebuilders, contractors, and retail salespersons must be made aware of the program and must be convinced that the effort to increase appliance efficiency is important. FY 1978 will be the first year that labels will be on all 13 product types, and thus, it is the appropriate time for the maximum effort in the consumer education area.

Significant, immediate energy savings can be realized by the retrofit of certain appliances, particularly furnaces and hot water heaters, with energy saving devices such as the automatic flue gas damper and electronic ignition. There currently is no formal Federal program to investigate the energy-saving advantages of retrofit devices and to determine the extent (and appropriateness) of the impediments to the installation of certain devices that now exist. FEA will initiate such a program and establish a coordinated Federal effort to address the retrofit concept by including agencies such as the Energy Research and Development Administration and the Consumer Product Safety Commission.

The amended request includes $1,649,000, 3 positions and 1 manyear more than the initial FY 1978 request for this program.

Cost Factors:

Personnel compensation and benefits (15 positions, 15 staff years)	$ 354,000
Other	82,000
Contracts	2,800,000
Total	$3,236,000

Industrial Reporting

The Industrial Reporting Program Office is responsible for:

a. Identification and ranking of the major energy-consuming industries as required by EPCA;

b. Identifying the 50 most energy-consumptive corporations in at least the 10 most energy-consumptive industries;

c. Establishing energy efficiency improvement targets for at least the 10 most energy-consumptive industries;

d. Preparing standard mandatory reporting form for use by the identified corporations to report energy use and conservation data to FEA; coordinating with the Voluntary Programs Office regarding implementation of the provision for the corporations exempt from this requirement for full participation in adequate voluntary programs;

e. Receiving reports and making an annual report to the Congress and the President on the progress of energy conservation in industry, the need for further legislation, etc.

In FY 1978 this office will:

. Review the industrial energy efficiency targets in light of available energy management reports to determine whether such targets should be modified. Any modifications will be published in the Federal Register.

. Receive energy progress reports from the 50 identified companies in each of the 10 most energy intensive industries.

. Prepare the annual report for the Congress and the President, including a summary of the progress made by industry toward achieving the improvement targets set by FEA.

Cost Factors:

Personnel compensation and benefits (7 positions, 8 staff years)	$189,000
Other	44,000
Total	$233,000

FEDERAL ENERGY ADMINISTRATION

Congressional Budget Submission
Fiscal Year 1978

OFFICE OF ENERGY CONSERVATION AND ENVIRONMENT

Analysis of FY 1978 Contracts/Grants

	($000) Cost
Administrative Office:	
o Technical support for writing and editorial services, graphic services, film and videotape duplicating and photographic services	200
Subtotal	200
Policy and Program Development and Environment:	
--Policy Development--	
o Contractual support for Congressional Reports mandated by ECPA	100
--Program Development--	
o Contractual assistance for innovative conservation programs	23,870
o Screen potential energy conservation and renewable-resources measures list (Title IV, ECPA) and extend initial list	150
--Program Evaluation--	
o Evaluation of the Weatherization Assistance Program required by ECPA, Section 416	100
o Evaluation of the Supplemental State Grant Program (ECPA, Title IV, Part B)	100
--Environment--	
o An analysis of the non-attainment Clean Air Act issue to identify Air Quality Control Region industries and pollutants involved, and to develop economic and energy impact estimates	75
o Technical contractual support in review of Agency-prepared NEPA documents	25
o Assessment of environmental implications of energy taxing or pricing alternatives including a Btu tax. (ECPA, s109 and 162(a))	50
Subtotal	24,470

2676

State Programs:

--State Financial Assistance--

o Grants to States for implementation of energy conservation programs (EPCA)	47,000
o Grants to States for supplemental energy conservation programs (ECPA)	23,500
o Update the State Energy Conservation Program Sourcebook	50
o Study to identify the relative effectiveness of different implementation options for particular program measures	100
o Contract to revise and improve the energy savings estimation methodologies and data tables	20
o Contract to evaluate the "results" data collection portion of the established management information system	50
o Conduct conferences, develop publications, disseminate materials and technical support to States	350
o In the area of building standards analyze savings potential from retrofit; conduct regional workshops to disseminate results of retrofit savings analysis; develop and disseminate utility-specific fuel cost projections; develop requirements for computer graphics capability to accommodate building performance standards	275
o Conduct State demonstrations of building performance standards for new and renovated buildings	200
o Demonstrate transportation control alternatives	200
o Develop and disseminate information pertaining to the relative energy efficiency of items most commonly purchased through State procurement procedures	134
o Survey and evaluate existing energy conservation education programs, including in-school programs, and develop supplemental information for State assistance	255

--Weatherization--

o Weatherization Grant Awards	64,066
Subtotal	136,200

National Programs:

--Federal Energy Management Program--

o Development of additional end-use energy efficiency measures (Federal Energy Management Program)	200

o Development of programs to convert Federal boilers to fuels other than petroleum or natural gas	200
o Technical assistance to Federal agencies, e.g., retrofit handbook revision, additional energy standards for new construction, technical information materials, and improved data collection and reporting techniques	230
--Obligation Guarantee Program--	
o "No year" money to cover loss on guarantees issued during FY 1978 (estimated to be $500,000,000) at the anticipated loss rate of 3 percent.	15,000
o Implement management information system in FEA headquarters and regions including training appropriate personnel in system operation and maintenance	300
o Develop analytical techniques/tools to monitor the progress and evaluate the impact of the program.	350
o Develop program support activities for the 10 regional offices including technical assistance in reviewing the feasibility of energy measures identified by an energy audit.	500
o Technical assessment of measures for possible inclusion on the energy measures list.	150
o Develop and publish audit manuals, workbooks, brochures etc., for sectors offering greatest promise in terms of energy savings	100
o Develop energy consumption and financial profiles of various classes of borrowers	150
o Provide technical assistance to borrowers and lenders concerning energy audits and applications for obligation guarantees	500
o Develop conservation investment awareness programs describing energy audits and energy measures suitable for the various classes of borrowers.	325
o Develop and disseminate data on the performance and effectiveness of various energy conservation measures to various public/private sectors	125
--Regulatory Institutions--	
o Gas Utility Demonstrations	1,400
o Electric Utility Demonstrations.	3,805
o 10 Gas Utility Interventions at $30,000 each	300
o 20 Electric Utility Interventions at $30,000 each.	600
o Support of technical assistance teams of nationally recognized experts to aid gas and electric utility regulators in planning and implementing rate design and conservation activities that meet their specific needs	800

o	7 case studies which analyze how gas and electric utility reforms could be approached, from initial problem identification to actual implementation.	175
o	Application of computer simulation models to predict the impacts on gas and electric utilities of rate reform and conservation options. This is a preliminary step to initiating regional and State specific rate reform and conservation programs.	500
o	Operation of information transfer systems to keep regulators advised of developments pertinent to gas and electric utility rate design and conservation.	100
o	Consumer Office Grant Awards	1,942
	--Voluntary Programs--	
o	Transportation Energy Conservation: Technology Transfer	38
o	Auto Fuel Economy: Consumer Education	50
o	Industrial Voluntary Conservation Program Support.	25
o	Energy Conservation Design Techniques for Buildings.	25
Mandatory Programs:	Subtotal	27,890
	--Appliance Programs--	
o	Transfer of funds to National Bureau of Standards (NBS) for: completion of test procedures and targets for covered products in categories 11-13; modify existing test procedures to account for innovative design changes; technical analysis of energy consumption and trends; research to determine revised minimum energy efficiency levels; review and analysis of industry energy efficiency improvement data; and, analysis and evaluation of technical support information	1,800
o	Contract to study potential changes in appliance usage patterns in households. Changes in usage must be reflected on appliance labels	100
o	General consumer education program to promote awareness of the Appliance program and to educate consumers on the use of labels on appliances; specific program to educate consumers and other groups on the proper sizing of heating and cooling systems; consumer research analysis survey to determine, for example, if the program has influenced consumer willingness to buy more energy efficient appliances even though these may have a higher first cost	600
o	Collect background data and materials on appliance retrofit devices (both domestic and foreign); determine magnitude of energy savings and economic feasibility; assess safety of current retrofit devices; identify institutional and technical barriers that must be resolved to make retrofit devices acceptable for consumer use; develop implementation strategy.	100
o	Accomplish monitoring and evaluation of the appliance industry's energy improvement activities.	200
	Subtotal	2,800
	TOTAL CONTRACTS AND GRANTS	$191,560

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
B. Summary By Program
(dollars in thousands)

ACTIVITY: ENERGY RESOURCE DEVELOPMENT

APPROPRIATION: Salaries and Expenses

Program	FY 1976 Actual Pos.	MY	Amount	TQ Amount	FY 1977 Estimate Pos.	MY	Amount	FY 1978 Estimate Pos.	MY	Amount	Change FY 1977 to FY 1978 Pos.	MY	Amount
ENERGY SOURCES	89	101	4,504	693	84	83	3,132	82	82	3,199	- 2	- 1	+ 67
ESECA-COAL UTILIZATION	60	30	1,519	1,765	58	57	2,071	70	68	5,807	+12	+11	+3,736
ELECTRIC POWER	55	53	2,374	754	54	54	1,894	51	51	1,981	- 3	- 3	+ 87
* FINANCIAL PLAN & INCENT	22	21	754	204	22	22	1,028	22	22	1,011	-	-	- 17
SITING	21	19	569	285	23	22	814	20	20	894	- 3	- 2	+ 80
ENVIRONMENT	12	11	354	221	12	12	610	12	12	571	-	-	- 39
EXEC. DIRECTION & ADMIN.	26	26	719	274	25	25	756	25	25	689	-	-	- 67
Total	285	261	10,793	4,196	278	275	10,305	282	280	14,152	+ 4	+ 5	3,847
(Headquarters)	(230)	(212)	(9,680)	(3,897)	(225)	(222)	(9,039)	(227)	(225)	(12,770)	(+ 2)	(+ 3)	(+3,731)
(Regions)	(55)	(49)	(1,113)	(299)	(53)	(53)	(1,266)	(55)	(55)	(1,382)	(+ 2)	(+ 2)	(+ 116)
FY 1977 Supplemental Pending; FY 1978 ECPA Amounts Included Above					...	...	3,150	...	...	...			

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: ENERGY RESOURCE DEVELOPMENT	PROGRAM: ENERGY SOURCES												
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	89	101	4,504	693	84	83	3,132	82	82	3,199	-2	-1	+67
Headquarters	64	76	3,936	574	64	63	2,654	57	57	2,571	-7	-6	-83
Regions	25	25	568	119	20	20	478	25	25	628	+5	+5	+150
(Contracts/Grants)	XX	XX	(1,933)	(154)	XX	XX	(1,000)	XX	XX	(1,000)	XX	XX	(---)
FY 1977 Supplemental Pending; FY 1978 ECPA Amounts Included Above					---	---	1,900	---	---	---			
Headquarters					---	---	1,900						
Regions					---	---	---						
(Contracts/Grants)					XX	XX	(1,900)	XX	XX				

PROGRAM DESCRIPTION

The goal of the Energy Sources function is to develop and implement project and programs that aim to increase the supply of domestic oil, gas, petroleum products, coal, synthetic fuels and the use of geothermal and solar energy. Four divisions in conjunction with strong support or lead by regional personnel have responsibility for achieving the goals and objectives of the Energy Sources Program. Increased supply and use of domestic energy sources is achieved through many approaches. Staff in the program offices for Coal and Oil& Gas identify potential constraints, problems, or issues that may impede achievement of national energy production goals. The Program offices develop programs and efforts to resolve the impediments or facilitate resolution of the issues. Program offices identify site specific projects that are transferred to Project Operations staff for tracking and implementation. Project Operations personnel facilitate and expedite preparation of major project-related studies such as an EIS, obtain required approvals, licenses, or permits from Federal, State or local agencies or governments. Project Operations personnel conduct near term energy development studies to identify key actions to be taken for a region of the country, identify obstacles impeding a project's progress, and identify and implement corrective measures. The objectives for each of the offices comprising Energy Sources follows:

The Office of Coal is responsible for promoting the expansion of coal and developing plans and programs to meet coal demands. Six major programs have been identified as necessary to achieve the goal of additional coal production.

The Office of Oil and Gas is responsible for promoting increased domestic exploration for crude oil, production of refined products and petrolchemicals, transportation and distribution of oil, and the production and distribution of natural gas. The Office administers 4 programs to achieve these objectives.

Solar, Synthetic Fuels, and Geothermal Energy is responsible for encouraging the commercialization and widespread use of altermative energy sources. The office is implementing 4 programs to achieve its objectives.

Project Operations is responsible for monitoring and expediting implementation of site specific projects important for achieving national energy supply objectives. The site specific projects involve development of coal, oil and natural gas and the distribution or transportation of these resources. Projects are choosen on the basis of their energy supply impact, according to criteria derived from Agency authorizations and often represent concrete examples, or prototypes of the issues represented.

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: ENERGY RESOURCE DEVELOPMENT	PROGRAM: ESECA/COAL UTILIZATION												
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	60	30	1,519	1,765	58	57	2,071	70	68	5,807	+12	+11	3,736
Headquarters	45	21	1,315	1,676	43	42	1,713	55	53	5,430	+12	+11	3,717
Regions	15	9	204	89	15	15	358	15	15	377	...	...	+ 19
(Contracts/Grants)	XX	XX	(777)	(1,500)	XX	XX	(610)	XX	XX	(2,431)	XX	XX	(+1,821)
ECPA: FY 77 Supplemental Pending; FY 78 Amounts Included Above					...	...	900		...	...			
Headquarters					...	...	900						
Regions					...	...	...						
(Contracts/Grants)					XX	XX	(900)	XX	XX				

PROGRAM DESCRIPTION

The Office of Coal Utilization implements the coal conversion provisions of the Energy Supply and Environmental Coordination Act of 1974 (ESECA), as amended by the Energy Policy and Conservation Act of 1975 (EPCA). FEA, pursuant to the authorities granted it under the law, issues Prohibition Orders to existing utility powerplants and Major Fuel Burning Installations (MFBI's) requiring that they switch from burning oil and natural gas to coal. FEA issues Construction Orders to utilities and MFBI's in the early design stage requiring them to be constructed with the capacity for 100% coal burning.

In both instances, certain findings must be made before FEA can make its final binding order: a Notice of Effectiveness. These include (1) an available supply of coal, (2) compliance with environmental standards, (3) practicability (which involves financial capability and reasonableness), and (4) the order's effect on reliability (for utilities only).

Order issuing authorities expire June 30, 1977 with enforcement authorities extending to December 31, 1984. Absent any extension or modification of the program, work in FY 78 will consist of actions leading to issuance of Notices of Effectiveness and compliance monitoring.

JUSTIFICATION

The Energy Supply and Environmental Coordination Act of 1974 (ESECA) created the coal conversion program. Order-issuing authorities under this Act expired June 30, 1975. These authorities were extended in December, 1975, by the Energy Policy and Conservation Act (EPCA) with order-issuing authorities extended to June 30, 1977. Authority to enforce these orders does not expire until December 31, 1984.

The coal utilization program authorizes FEA to issue two types of orders to utilities and major fuel burning installations (MFBI's):

1. Prohibition Orders: issued to existing facilities that have coal-burning capability and also the capability to burn oil or gas. These orders would prohibit the burning of oil or natural gas.
2. Construction Orders: issued to new facilities in the "early planning process" requiring that these facilities be constructed with 100% coal-burning capability. They would also be eligible for a Prohibition Order. However, once a plant is designed to burn coal, it is unlikely that oil, at a higher cost, would be used.

both ordering authorities are done on a case-by-case basis in compliance with applicable environmental requirements.

In order to issue Prohibition Orders for existing plants FEA must make a series of positive findings:

-- that the capability to burn coal exists.
-- that coal of the proper quality is available.
-- that coal transportation is available.
-- that the order is "practicable" (meaning financial capability and cost impact be considered).
-- that reliability of service will not be impaired (only for utilities).

Construction Orders can only be issued if FEA cannot find that coal is unavailable and FEA considers financial and reliability (for utilities) aspects.

The coal utilization regulatory process carefully considers environmental requirements, public comment, and due process. The sequence of events requires the following actions:

1. The gathering of data and a preliminary determination by FEA that an order fulfills the necessary requirements.
2. The issuance of a Notice of Intent (NOI) (published in the Federal Register) to issue a Construction Order or Prohibition Order.
3. Public hearings are held for all Prohibition Orders and Construction Orders if current plans are not for coal.
4. If still appropriate, Construction or Prohibition Orders (P.O.) are issued.
5. An Environmental Impact Statement (EIS) or a negative determination is prepared for each order, and a public hearing is held, as required by the National Environmental Policy Act (NEPA).
6. In the case of P.O.'s, EPA provides certification of the earliest complying coal burning date and a possible compliance date extension.
7. A Notice of Effectiveness (NOE) setting forth the required compliance schedule is issued.
8. Compliance schedules are monitored and the NOE enforced.

The total process time from boiler analysis to NOE is 1½ to 2 years.

To date, FEA has issued utility Prohibition Orders to 74 powerplants at 32 generating sites and Construction Orders or NOI's for Construction Orders to 143 powerplants at 97 generating sites.

JUSTIFICATION (cont'd)

By June 30, 1977, we anticipate issuing the following additional orders:

	Utilities	MFBI's
Construction Orders	0	35
Prohibition Orders	40	60

By FY 1978, the required steps will have been completed for many, but not all order recipients. The table below indicates the anticipated number of orders by type issued between June 30, 1975, and June 30, 1977, for which implementation (NEPA process, NOE's) and/or subsequent compliance monitoring work must be performed:

	Orders Issued
Utility Prohibition	72
Utility Construction	97
MFBI Prohibition	60
MFBI Construction	35
	264

For FY 78, FEA assumes that EPA will certify coal burning dates for all Prohibition Orders issued through FY 77. EPA certification is not required for Construction Orders since order recipients must be capable of burning coal in compliance with applicable new performance standards. Thus, FY 78 work will concentrate on producing NEPA-related documents (Environmental Assessment, EIS's) and NOE's performance and non-degradation air quality standards.

JUSTIFICATION (cont'd)

Cost Factors

Staffing: 70 positions	$(000)	$(000)
68 man-years @ 24K personnel compensation and benefits		= $1632
Notices of Effectiveness (NOE): technical analysis		
100 Utility/MFBI Prohibition Orders (P.O.) @ 3K	= $ 300	
1 Utility Construction Order (C.O.) @ 5K	= 5	
35 MFBI C.O.'s @ 5K	= 175	
Total NOE technical analysis		= 480
Environmental Assessments (EA's) and Impact Statements (EIS's) technical analysis		
72[1] MFBI/Utility P.O. EIS's @ 20K	= 1440	
28[1] MFBI/Utility P.O. EA's @ 7.5K	= 210	
1 Utility C.O. EIS's @ 20K	= 20	
5 MFBI C.O. EIS's[2] @ 30K	= 150	
Total EA/EIS technical analysis		= 1820
EA/EIS Printing and Hearings Costs		
108 EIS hearings @ 7K	= 756	
108 EIS printings @ 6K	= 648	
28 EA printings @ 2.5K	= 70	
Total printing & hearing		= 1474
Pre-NOE Conference, Compliance Inspection Admin Costs		
Administrative costs	= 270	
Contractual Assistance	= 131	
Total other costs		= 401
TOTAL ESECA PROGRAM COST		= $5807

(1) Total P.O.'s will be 100 of which an estimated 28 will not require a full EIS

(2) MFBI C.O. EIS'sare more costly than utilities for the following reasons:
- MFBI's in industrialized, urban centers where more detailed analysis is needed to determine impact.
- data collection for MFBI's more difficult than for utilities; additional, and costly, air modeling required.
- Total requirement is estimated as 35 EIS's of which approximately 30 are requested for funding in FY 77

Analysis of FY 1978 Contracts (Cont'd)

	($000) Cost
. Municipal Solid Waste and Synfuels Commercialization -- Assist in the development of incentive programs for the accelerated development of these energy programs and for the identification and elimination of institutional barriers blocking program development	25
Subtotal, Energy Sources	$1000
ESECA-COAL UTILIZATION	
. Site specific analysis of environmental impact of implementing FY 1977 Orders	1820
. Site-specific technical analysis for the following:	
. practicability of conversion . coal availability . capability of conversion . reasonableness of cost	480
. Pre-NOE Conference and Compliance	131
Subtotal, ESECA-Coal Utilization	$2431
ELECTRIC POWER	
. State/Regional Planning. Develop initial component of Phase II of the comprehensive electricity forecasting system which will complement the demand for forecast with a supply forecast. Overall requirements will continue into FY 1979	110
. Energy Manpower Requirements. Development of system for forecast energy related construction activity and skilled labor needs	40
. Hydropower Development. To analyze the desirability of the construction of new mini-hydroelectric powerplants (less than 5MW). This study will determine where the potential is the most promising	50
. Powerplant Productivity. To undertake studies, analyses and demonstrations to encourage improvement programs, promote cooperative efforts, publicize specific examples of improvements, highlight cost effectiveness and benefit and encourage increased applied technology and testing	150
. Comparative Electric Generating Costs. In conjunction with ERDA, NRC, and others, develop improved cost estimating methods and up-date data requirements. Focus on improving operating cost and maintenance price estimates for the coal fuel cycle. Disseminate methodology, cost data and analysis to State energy agencies	150
. Co-generation Projects. Two or more cooperative projects undertaken jointly with ERDA and other Federal and State agencies to demonstrate how institutional inhibitions on specific problems can be resolved, and how equitable financial and cost sharing arrangements can be estimated. Projects undertaken are expected to involve cooperative participation of utilities energy-consuming industries, and state agencies	100
Subtotal, Electric Power	$600

Analysis of FY 1978 Contracts (Cont'd)

	($000) Cost
Colorado - Legislative Analysis Using the findings of the Western Governors in Regional Energy Policy Office and the Western Socio-economic Impacts Finance Workshop, FEA will conduct a study of the various constraints and implications of alternative state legislative reforms designed to induce public and private financial investment in impacted areas.	
Subtotal, Cooperative Agreements	140
Subtotal, Siting	355
ENVIRONMENT	
. Analysis of non-attainment of the National Ambient Air Quality Standards (NAAQS) on a site specific basis for the purpose of identifying relevant issues and proposing solutions at a local level	50
. Analysis of industrial plants in Regions 4 and 5 to determine the feasibility of retrofitting scrubbers	50
. Analysis of State Implementation Plans (SIP's) in Regions 4 and 5 to determine areas where emission requirements are more stringent than necessary to meet National Ambient Air Quality Standards	50
. Technical analysis of proposed environmental legislation and related Federal regulatory actions in order to determine the energy and economic impacts involved	50
. Analysis and appraisal of the "State-of-the-art" concerning sulfates to include reviews of sulfates criteria, preparation of related energy/economic impact analyses, and determination of enforcement alternatives	40
Subtotal, Environment	$240
TOTAL, ENERGY RESOURCE DEVELOPMENT	$5,031

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
B. Summary By Program
(dollars in thousands)

ACTIVITY: Strategic Petroleum Reserve

APPROPRIATION: Strategic Petroleum Reserve

Program	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Storage Facilities	41	3	122	4,011	75	64	306,617	110	110	470,758	+35	+46	+ 164,141
Petroleum Acquisition & Transportation	4	...	...	...	6	6	440,216	12	12	2,538,595	+ 6	+ 6	+2,098,379
Planning & Analysis	30	10	184	1,224	39	37	4,495	39	39	4,586	...	+ 2	+ 91
Program Management & Review	17	1	7	236	21	21	1,166	21	21	1,567	...	...	+ 401
Executive Direction	7	1	8	26	7	7	252	7	7	232	...	...	- 20
Data & Procurement Support	1	...	...	...	2	2	3,243	17	17	2,799	+15	+15	- 444
General Counsel Support	...	...	...	...	...	...	...	12	12	396	+12	+12	+ 396
TOTAL	100	15	321	5,497	150	137	755,989	218	218	3,018,933	+68	+81	+2,262,944
(Headquarters)	94	15	321	5,497	136	125	755,557	186	186	3,017,878	+50	+61	+2,262,321
(Field)	6	...	...	...	14	12	432	32	32	1,055	+18	+20	+ 623

GENERAL STATEMENT

Background

The interruption of petroleum supplies during the winter of 1973-74 demonstrated the need for an emergency storage program. The resulting petroleum shortage caused severe economic impacts on the U.S. economy and emphasized our vulnerability to interruptions in imports from the major oil exporting nations. The repercussions of supply denial and simultaneous price increases of the 1973-1974 oil embargo is estimated to have caused a loss of $35-45 billion in gross national product (GNP) and 500,000 jobs. A GNP loss of $10-20 billion is directly ascribed to the embargo. A future petroleum cutoff could be more severe because many energy users have already restricted their use of energy while the level of imports has continued to increase. Many relatively easy steps to conserve energy have been taken, and further improvements in energy efficiency may be more difficult.

Public concern, in addition to the formal commitment of the United States to the International Energy Program (IEP) agreement entered into with other energy-importing countries, provided a strong impetus for an emergency storage program. A number of bills providing for a Strategic Petroleum Reserve were introduced into the 93rd Congress. Thereafter, the Senate and the House of Representatives passed separate bills (S. 622 and H.R. 7014) requiring or authorizing creation of a Strategic Storage Reserve, which ultimately was enacted as Title I, Part B, sections 151 through 166, of the Energy Policy and Conservation Act (P.L. 94-163).

Energy Policy and Conservation Act (EPCA)

The Energy Policy and Conservation Act (EPCA) provides for the creation of a Strategic Petroleum Reserve (SPR). The objective of the Strategic Petroleum Reserve program is to provide for the storage of substantial quantities of petroleum in order to diminish the vulnerability of the United States from the effects of a severe energy supply interruption and to provide limited protection from the short-term consequences of interruptions in the supply of petroleum products.

A Strategic Petroleum Reserve will help stablize the national and international petroleum situation by:

- Providing credible evidence that the United States has the will to insulate its energy economy from major supply disruptions.
- Avoiding undue pressures on either our domestic or foreign policy, as well as contributing to international stability through the International Energy Agency (IEA).
- Reducing the economic impact of an interruption if one occurs.

The Federal Energy Administration, as required by the EPCA, has developed national plans for crude oil storage that provide, to the maximum extent practicable, and except to the extent that any change is justified pursuant to the EPCA, for the storage by December 22, 1982, of crude oil equal to the volume of crude oil imports into the United States during the three consecutive highest import months in the 24 months preceding December 22, 1975 (subsequently determined to be approximately 500 million barrels, which were imported during August-October 1975). An Early Storage Reserve Plan was submitted to the Congress on April 22, 1976, which outlined plans for accomplishing storage of 150 MMB by December 1978; the Strategic Petroleum Reserve Plan submitted to Congress on December 15, 1976, proposed a fill schedule to meet the EPCA goals of 65% (325 MMB) by December 1980 and 100% (500 MMB) by December 1982.

Accelerated Program

This amended budget for Fiscal Year 1978 is directed to exceeding the goals of the Early Storage Reserve and Strategic Petroleum Reserve Plans. It requests funding for 211 million barrels (MMB) of crude oil which, together with the 39 MMB funded in FY 1977, will provide for a total of 250 MMB of petroleum in storage by the end of 1978 instead of the earlier planned 150 MMB.

This budget also provides funding for the acquisition, development, and expansion of storage facilities to provide the storage capacity necessary to store about 500 MMB by the end of 1980 rather than 1982.

This accelerated program is recommended because it is desirable and appears to be feasible. The result will provide the United States the benefits of a 500 MMB reserve two years earlier than originally proposed. Accelerated development of the Reserve would reduce our foreign policy vulunerability to threatened or actual embargoes. The potential economic benefits would be substantial and the national security benefits would be significant.

In summary, this budget request provides for a two year acceleration of the current ESR and SPR Plans as follows:

	Current Plan	Accelerated Program	Increase
1978	150	250	+100
1980	325	500	+175
1982	500	500	---

The SPR Plan will be amended to reflect these changes.

Site Acquisition

The proposed costs for land acquisition are based on the best information available at the time of submission. Site appraisals currently underway by the Corps of Engineers and negotiations with the owners of the sites are essential before precise costs can be determined for each site. Should the appraisals and negotiations with owners indicate a lower cost, the savings would be applied to the purchase of oil required for the total storage program.

Facility Design and Construction

Facility design and construction cost estimates are based on detailed analyses and feasibility studies for each candidate storage site. Following the guidance of OMB Circular A-11, Sec. 13.5(a), the estimates shown in this submission include an escalation factor.

Oil Acquisition

The estimated cost of purchasing the oil is based on a projected national average composite price of crude in FY 77 and FY 78 which includes the price of new and old domestic oil and imported crude prices with the January 1977 OPEC price increase. Both domestic and imported crude costs are delivered prices to the storage site. FEA intends to use the authorities granted in the Energy Petroleum Allocation Act (EPAA) to allow the Government to obtain the benefit of domestic price controls for the SPR to the same extent that those benefits accrue to domestic refiners that process imported crude oil under FEA's domestic crude oil allocation (entitlements) program. The Government will engage in competitive procurement but expects to receive the benefits of cost equalization through amendments to be proposed to the entitlements program.

Management

Every effort has been made to keep the number of full-time Federal employees to the minimum necessary for the timely and efficient operation of the program. The nature of this program itself is ideal for a high level of contract-funded activities as the program moves through the phases of site acquisition, construction, fill and maintenance of the reserve. Half of the requested position increase is for additional legal and data support and half is for the increased scope of the construction activity and oil purchase taking place in FY 78. The increase of positions requested in this submission reflects the minimum number of Federal employees required to effectively administer the high level of contract activities.

Funding

It is imperative that "no year" funds be appropriated since justified delays, beyond the control of the Administrator, may occur during program implementation.

Regional Petroleum Reserves

FEA has determined that at this time sufficient transportation and refining capacity will be available to distribute and refine centrally stored crude oil with no inequitable effect on either import dependent regions or non-contiguous areas. Therefore, reserves for these regions of the country will be maintained in the large, central crude storage facilities.

The amended request includes $1,329,400,000, 43 positions, and 43 manyears more than the initial FY 1978 request for this program.

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: Strategic Petroleum Reserve

PROGRAM: Storage Facilities

	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	41	3	122	4,011	75	64	306,617	110	110	470,758	+35	+46	+164,141
Headquarters	35	3	122	4,011	61	52	306,185	78	78	469,703	+17	+26	+163,518
Field	6	...	...	...	14	12	432	32	32	1,055	+18	+20	+ 623
(Contracts/Grants)	XX	XX	(100)	(3,899)	XX	XX	(304,314)	XX	XX	(467,133)	XX	XX	(+162,819)

PROGRAM DESCRIPTION

In determining where storage sites should be located so that the reserve oil can function as an efficient replacement for lost imports, careful consideration was given to the existing petroleum refining and transportation network. The philosophy underlying the design of the reserve system is that the Government should not expend funds nor commit labor resources to the construction of distribution facilities that the private sector is willing and able to undertake. In effect, the Government should not duplicate components of an oil distribution system that already exists.

In essence, the storage sites will be located where they are most accessible to existing tanker or major crude oil pipeline terminals, or both, to provide for rapid withdrawal during an interruption, and to permit the reserve to be used for a wide range of interruptions. The locations that provide the greatest flexibility are in the Gulf Coast because that area already receives the majority of imports and provides ready access to the primary imported crude oil distribution system of the country. Storage in this area can feed the major crude oil requirements of the interior, the Gulf Coast refineries, and East Coast, West Coast, and noncontiguous area refineries by pipelines or tankers, or by combinations of the two.

In order to determine the most efficient and cost-effective mode of storage for the reserve, a number of alternative types of storage facilities were examined. Among those considered were solution-mined caverns, conventionally-mined caverns, surface tanks, mothballed tankers, depleted oil wells, shut-in oil production, and others. Analysis has shown that salt dome caverns, mines, or rock caverns are the lowest cost form of storage. Underground storage also minimizes environmental problems and at the same time provides maximum security.

Trade-offs between conversion or expansion of existing capacity and development of new capacity at undeveloped sites are being considered. The most feasible and cost beneficial methods will be selected.

Seven candidate sites--three salt domes, with existing leached caverns, and four existing mine sites--are being considered for development for the early reserve. The sites are grouped by proximity to major crude oil distribution centers, as follows: at Freeport, Bryan Mound would serve the Texas/Seaway pipeline; West Hackberry would serve the Texas/Texoma pipeline at Nederland; and Bayou Choctaw, Weeks Island, and Cote Blanche would serve Louisiana/Capline at Saint James. Each of these sites could also serve local refineries and other areas of the country by tanker as well. The Central Rock and Ironton Mines would serve the Ashland or Mid-Valley pipelines. In this manner, crude oil stored in selected sites would be used to replenish petroleum supplies lost during an import interruption.

Because the environmental assessment process is not complete, the sites proposed for acquisition and development in the submission are offered as typical sties for budget purposes only and represent no De Facto decision to acquire, develop and store oil at any specifically determined site.

This program includes the actions required to perform environmental assessments, acquire the sites, secure necessary permits, design, manage, construct and operate the storage sites. It provides for the acquisition of the real estate on which storage facilities will be built, the personnel staffing and support functions necessary to effectively administer the extensive design and construction programs, and the action required to administer, operate, maintain and fill the storage sites during a filling operation, and to monitor all activities to assure conformance with environmental requirements.

This accelerated budget request proposes expansion of two of the salt domes to be acquired in FY 1977 and proposes the development of additional sites in FY 1978 for a total of seven sites. As noted above, this request implies no De Facto selection of sites or the number of storage complexes to be developed. Final decisions of these issues will be made on the basis of environmental considerations, feasibility and cost effectiveness.

The Environmental Projects and Permits function is responsible for assuring that design, construction, and operation of storage facilities are accomplished in an environmentally acceptable manner. This function is also responsible for complying with the requirements of all Federal permits and for full compliance with the National Environmental Policy Act. In addition, this function coordinates all SPR activities with State, county, and local authorities for licenses, permits, and regulations. Specific actions required are:

- Prepare environmental impact statements; prepare and implement environmental mitigation plans and specifications, including permits.
- Prepare and submit all permit applications.
- Develop, maintain and update environmental protection plans for each storage site.
- Conduct environmental assessments of all proposed design configuration or construction modifications; prepare and publish modifications, if required, to the environmental impact statements.

The initial acquisition of real estate in FY 77 represents the largest manageable tracts that can efficiently be programmed to implement the Early Storage Reserve Plan consistent with realistic construction schedules. The FY 78 expansion provides the additional capacity as required to accomplish the total storage objective of about 500 MMB by 1980.

Real estate will consist of dock sites, pipeline rights-of-way, pump station sites, ancillary sites as required as well as the storage sites themselves. Property will be bought, leased, rented or possibly condemned for purchase. Easements across properties will have to be secured from waterfront to the sites in order to construct the connecting pipelines and pump stations.

The Design and Construction effort covers development, modification, or expansion of facilities at selected sites. The funds provide for materials and contracted services to construct oil injection systems, pipelines, docks, terminals, tank farms, brine disposal systems, raw water supplies, electrical power systems, instrumentation, control, and other associated systems required for each project. The final total system will be capable of providing about 3 million barrels of crude oil a day to the nation's oil distribution systems in the event of an energy supply interruption.

The Operations function includes fill, maintenance, test, inspection, and drawdown in the event use of the stored oil is required. All of these activities will be under contracts which cover personnel staffing and supportive functions necessary to receive, ship, store, account for and maintain the crude oil in storage.

During filling operations the facilities will operate seven days a week, three shifts each day. Dozens of valves and manifolds must be set, product must be sampled and gauged, environmental checks must be accomplished, pump stations must be manned, and meters must be operated; at the caverns and mine sites brine pumps must be operated and approximately 50 miles of pipeline must be in operation as up to 10,000 barrels of crude (420,000 gallons) an hour will be pumped into the storage cavity. A similar quantity of brine must be pumped out and disposed of in a manner consistent with the environmental impact statements filed for each site.

Shift work will not be required until the fill operation is begun, but all facilities and procedures must be fully operational at that time. To accomplish this, the staff must be in place 30 days before the start of fill so that they may be trained in equipment operation, operational techniques, acceptance procedures and inventory control, fire prevention and firefighting methods, and preventive maintenance and repair. The staff must also be thoroughly familiar with environmental requirements and procedures applicable during both fill and standby operations.

During the construction period these operations costs are funded as part of the design and construction activity. Once construction is completed and the site is filled to capacity, additional standby operations funds will be required.

JUSTIFICATION

Workload analyses are presented below which highlight significant elements within the Storage Facilities Program:

o Environmental Projects and Permits Contracted Support

DESCRIPTION	COST ($000)
- Preparation of amendments in EIS's as program proceeds into implementation stages and design alternatives are firmed up	200
- Preparation of environmental operating plan for each site	400
- Preparation of additional EIS's for alternative storage sites	400
- Performance of baseline study work in support of plans/EIS updates	500
TOTAL	1,500

o Storage Facilities (site acquisition, design, construction and fill)

--SITE--	PRIOR YEARS		FY 1978		TOTAL	
	CAPACITY MMB	FUNDING ($000)	CAPACITY MMB	FUNDING ($000)	CAPACITY MMB	FUNDING ($000)
Site 1 & Expansion	63	69,700	66	86,600	129	156,300
Site 2 & Expansion	61	102,300	76	188,500	137	290,800
Site 3	94	89,165	---	14,100	94	103,265
Site 4	---	---	27	34,400	27	34,400
Site 5	---	35,900	89	88,333	89	124,233
Site 6	---	3,300	14	26,900	14	30,200
Site 7	---	1,000	21	26,800	21	27,800
TOTAL	218	$301,365	293	$465,633	511	$766,998

NOTE: Development of storage facilities at various sites range from $1.10 per bbl to $2.16 per bbl with the total 500 MMB system averaging $1.50 per bbl for site acquisition, construction and fill.

The amended request includes $68,624,000, 24 positions, and 24 manyears more than the initial FY 1978 request for this program. Differences between these figures and the original request results from a realignment of programs.

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: Strategic Petroleum Reserve

PROGRAM: Petroleum Acquisition and Transportation

	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	4	...	...	...	6	6	440,216	12	12	2,538,595	+6	+6	+2,098,379
Headquarters	4	...	...	...	6	6	440,216	12	12	2,538,595	+6	+6	+2,098,379
Field	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX	...	...	XX	XX	(440,000)	XX	XX	(2,538,200)	XX	XX	(+2,098,200)

PROGRAM DESCRIPTION

After examining several options for acquiring oil to fill the reserve, it has been determined that the crude oil to be stored should be obtained through the normal Federal procurement procedures. FEA will request offers from interested sellers. A revision of the crude oil Entitlements Program to permit a class of suppliers of oil to FEA to earn "entitlements" to price-controlled domestic oil as a result of delivering oil for storage will result in prices for the reserve oil near the national average composite price (imports included). It provies an equitable way for the petroleum industry and petroleum consumers to pay a proportionate share of the costs of the reserve, which would directly benefit both the industry and petroleum consumers during an interruption.

This activity provides for acquisition of a total of 250 million barrels (MMB) of crude oil for storage by December 1978; this represents an acceleration of the goal of 150 MMB presented in the Early Storage Reserve Plan, as noted above. The Early Storage Reserve and the additional 100 MMB will become part of the total reserve after the Strategic Petroleum Reserve Plan and its amendments are approved by Congress.

Appropriation authority currently exists for the first 150 MMB of oil. Further legislative action is required for authorization to appropriate funds for the additional 100 MMB.

JUSTIFICATION

The $11.40 a barrel price for FY 77 and $11.98 a barrel price for FY 78 are estimates of the national average price for the respective years. These estimated prices include the cost of delivery to the storage sites in the United States and take into account both new and old domestic crude prices and the cost of imported crude with no further OPEC price increases. The January 1977 OPEC increase has been considered in these prices.

Should the price of oil be higher at the time of purchase, FEA will request supplemental appropriations to assure delivery of the necessary quantities. Should the price of oil be lower than the estimates, any excess appropriation will be carried over the next fiscal year in order to fund subsequent oil purchases.

	FY 77	FY 78
National Composite Average Price	$ 11.40/BBL	$ 11.98/BBL
Purchase of Crude	38.60 MMB	211.87
Cost ($000)	$440,000	$2,538,200

A lead time of five months is required for SPR petroleum purchases. This allows for 45 day procurement notice, 30 day negotiation, 45 day transportation and delivery arrangement, and 30 day sailing time. Since filling will commence in the last quarter of FY 77, procurement action for the initial 38 MMB must be started in March of 1977. Procurement of 212 MMB must be initiated in the first quarter of FY 78 to provide continuous filling of the sites throughout the year so that the 250 MMB goal will be met.

Oil will be delivered to the storage sites by ocean tanker, barge, or pipeline depending upon its source. Tanker, barge and pipeline movements must be forecasted monthly, scheduled weekly and dispatched daily. FEA will be using ICC determined rates for barge/pipeline movements into storage pending final construction of SPR pipelines. Considering port congestion, tanker delays, barge and pipeline movements, the administrative workload, including reporting, monitoring and operational control, will be considerable and will require close coordination with other aspects of the storage program.

It should be noted that the Cargo Preference Act requires that 50 percent of all cargo purchased overseas by the Federal Government be shipped on American flag vessels if such vessels are available. This may result in an increase in the cost of transportation. It has been impossible to estimate with accuracy what additional costs may result from compliance with the Cargo Preference Act, particularly because of uncertainty as to how much oil for the Reserve may be supplied from domestic sources obviating the necessity for oceanic transportation of oil. Cargo Preference costs, to the extent necessary, will have to be accommodated in future budget submissions on the basis of actual cost experience.

The amended request includes $1,259,331,000, 4 positions, and 4 manyears more than the initial FY 1978 request for the program.

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: Strategic Petroleum Reserve	PROGRAM: Planning and Analysis

	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	30	10	184	1,224	39	37	4,495	39	39	4,586	...	+2	+ 91
Headquarters	30	10	184	1,224	39	37	4,495	39	39	4,586	...	+2	+ 91
Field	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX	(108)	(950)	XX	XX	(3,164)	XX	XX	(3,300)	XX	XX	(+136)

PROGRAM DESCRIPTION

The basic functional responsibilities of this program are to specify and analyze the major issues pertinent to creation and use of the Strategic Petroleum Reserve; specifically, to determine: how the facilities will be designed and updated to optimize their value; what method will be used to monitor, control and use the reserve; what foreseeable impacts the creation, maintenance and use of the SPR will have on the economy; the size and availability of reserved industrial inventories and how to develop and (if authority is exercised) implement measures to manage a minimum level industrial inventory program or some other industrial reserve program. Other functions include the presentation of storage alternatives and plans for the use of the SPR in conjunction with all other contingency actions during emergency supply interruptions.

JUSTIFICATION

Planned activities for FY 78 include:

- o Analyze and plan use of all emergency energy shortfall management options, including the reserve, under alternative scenarios including integration with regulatory and conservation activities.
- o Analyze petroleum distribution system including transportation, refinery, storage and demand factors, to provide improved basis for future distribution decisions and determination of product storage in regions and non-contiguous areas.
- o Analyze and plan continuing petroleum acquisition efforts, including consideration of alternative sources, prices, crude types, timing, and transportation.
- o Analyze alternative development schedules, including costs, resource needs, benefits, and national security consideration.
- o Evaluate initial experiences in petroleum acquisition, site acquisition, and design and construction to identify opportunities for improvements.

- o Update the comprehensive plan for the SPR; develop reports to Congress, the President and others regarding revisions in policies and plans, and on progress in developing the reserve.
- o Respond to requests for information regarding the policies and plans for the SPR and their analytical basis.
- o Manage and integrate emergency energy supply.
- o Perform and continually update the analyses for IPR, including the minimum inventory levels program and implementation strategy.
- o Provide implementation procedures/guidance on program activities, such as Defense Production Act (DPA), reserve oil allocation and pricing authorities, real property acquisition.
- o Prepare and coordinate reserve program regulations on use, allocation, and oil acquisition.
- o Study and propose, as appropriate, alternate methods of paying for the reserve.

Staffing will have been completed by the end of FY 77, resulting in full funding for personnel support in FY 78. The total workload will not change between FY 77 and FY 78, but the emphasis will shift somewhat from a focus on initial planning decisions to a greater effort on use plans, more detailed operating plans, final plans for the full reserve, and evaluation of initial experience of operating a reserve program. The continuing contract effort is indicative that initial workload has leveled out as the program proceeds from planning stages into full implementation.

The amended request includes $1,928,000, 13 positions, and 13 manyears less than the original FY 1978 request for this program. This reduction results from organizational transfer of the Environmental Projects and Permits function from Planning and Analysis to Storage Facilities. This change was made to reflect the increasing involvement of Environmental Projects and Permits with the on-going Storage Facilities design and construction effort.

STRATEGIC PETROLEUM RESERVE OFFICE
Congressional Budget Submission
Fiscal Year 1978

Analysis of
Policy, Planning and Analysis Contracts

DESCRIPTION	COST ($000)
Petroleum Analysis:	
o Crude: analytical and experimental	250
o Refined Products: analytical and experimental	200
o Embargo level refinery yield slate	200
Subtotal	650
Distribution Analysis:	
o Regional pilot study	350
o Product distribution data file generating maintenance and retrival system, including monitoring	300
o Drawdown rates versus economic impacts	150
o Distribution planning support	350
o Model allocation schemes	150
o Refinery survey and analysis	300
Subtotal	1,600

DESCRIPTION	COST ($000)
Economic Analysis:	
o Embargo effects	155
o Impacts of establishing a reserve	165
o Regional impacts	230
o Simultaneous embargoes: oil and LNG	200
o Cost factor analysis	200
o Analysis of alternative SPR pricing policies	100
Subtotal	1,050
TOTAL, Policy, Planning and Analysis	3,300

2700

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: Strategic Petroleum Reserve

PROGRAM: Program Management and Review

	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	17	1	7	236	21	21	1,166	21	21	1,567	...	...	+ 401
Headquarters	17	1	7	236	21	21	1,166	21	21	1,567	...	...	+ 401
Field	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX		(151)	XX	XX	(410)	XX	XX	(875)	XX	XX	(+465)

PROGRAM DESCRIPTION

This activity includes program coordination and review, resource management, and administrative services.

The program coordination and review function is responsible for integrating program planning, coordinating project execution of all SPR programs and maintaining the program's operating plan. It serves as "third party" evaluator of projects conducted within the program, identifies issues to be examined, oversees those plans which affect SPR program schedules, objectives, and resources, and maintains a decision documentation process for issue resolution and documentation.

The resource management function is responsible for budget planning, formulation, and execution, for financial management and contract administration, and for audit activities.

The administrative service function is responsible for manpower planning and personnel management, space and property management, travel and transportation planning and control, and correspondence and classified material control.

JUSTIFICATION

o Workload Analysis

FY 77	FY 78
SPR Plan	Annual Congressional Report
Oil Procurement	Oil Procurement (3 times greater than FY 77)
9 EIS's	10 EIS's
4 site acquisitions	3 site acquisitions
4 site designs	7 site designs (4 in progress)
4 site construction projects	7 site construction projects (4 in process)
Material Procurement	Material Procurement
150 Total Positions	218 Total Positions
$751 Million Contracts	$3,012 Million Contracts

- This effort continues at its current level of 21 positions; workload will shift in FY 78 for the following reasons: 1) increased project evaluation workload and an increase in inquiries from the public, State officials and the Congress regarding the SPR as it proceeds into full implementation; 2) increase in SPRO staffing level causes a slight increase of the support services workload; and 3) increased number of storage projects in progress from four to seven results in a proportional increase in financial management, audit, and information requirements.

- Contract funding for audit services is increased to cover added effort required as fill operations begin. Current planning calls for these services to be procured from DCAA or a private contractor.

The amendment request includes $350,000, 0 positions, and 0 manyears more than the initial FY 1978 request for this program. This increase covers increased audit effort required as a result of program acceleration.

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: Strategic Petroleum Reserve

PROGRAM: Executive Direction

	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	7	1	8	26	7	7	252	7	7	232	...	...	-20
Headquarters	7	1	8	26	7	7	252	7	7	232	...	...	-20
Field	XX	XX	...	...	XX	XX	...	XX	XX	...	XX	XX	...
(Contracts/Grants)			...	...			...			...			...

PROGRAM DESCRIPTION

This activity represents the Office of the Assistant Administrator, who is responsible for the overall direction and management of the Strategic Petroleum Reserve (SPR) program. The AA is responsible to the Administrator of FEA for ensuring that the missions of the SPR program are accomplished within the time frames and funding limits established by the President or by the Congress.

JUSTIFICATION

Full staffing was accomplished during the Transition Quarter, and it is planned to maintain this level through FY 78. Although the SPR program will increase significantly in size and scope of work, no additional positions are requested.

The amended request calls for $32,000, one position, and one manyear less than the initial FY 1978 request.

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: Strategic Petroleum Reserve

PROGRAM: Data and Procurement Support

	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	1	...	...	...	2	2	3,243	17	17	2,799	+15	+15	-444
Headquarters	1	...	...	...	2	2	3,243	17	17	2,799	+15	+15	-444
Field	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX	...	...	XX	XX	(3,171)	XX	XX	(2,240)	XX	XX	(-931)

PROGRAM DESCRIPTION

This program provides Management Information System (MIS) for the identification, scheduling, coordination and control of all essential program activities required for the implementation of the Strategic Petroleum Reserve and for the highly specialized procurement of storage design, construction and related construction sub-contracts, as well as petroleum acquisition and transportation procurements.

JUSTIFICATION

o Data Support

Manyears shown in FY 77 are only those directly charged to the Strategic Petroleum Reserve appropriation although support is provided under the FEA Salaries and Expenses appropriation. Total charges are shown against the SPR appropriation in FY 78.

Data support includes the design and development of 13 major ADP systems. These systems will provide information required for management of site acquisition, design and construction, financial management and accounting, transportation, operation and policy analysis.

Major ADP system design will be completed in FY 77; however, significant funding is required in FY 78 to assure continued development, implementation, and operation. Full operation of the ADP systems in FY 78 is anticipated with a subsequent increase in data input and an emphasis on data validation and quality control.

o Procurement Support

During most of FY 77 procurement support is provided under the FEA Salaries and Expenses appropriation because the kinds of procurement are general planning and analysis contracts which the FEA staff is capable of absorbing. However, two contract specialists, experienced in architect and engineer and construction procurement are required and because these skills have applicability only to the SPR program a direct charge is shown in the FY 78 submission.

Specialized procurement will begin in late FY 77 and continue throughout FY 78.

The amended request includes $896,000, 9 positions, and 9 manyears more than the initial FY 1978 request for this program.

STRATEGIC PETROLEUM RESERVE OFFICE
Congressional Budget Submission
Fiscal Year 1978

Analysis of Contracts
Data Support

DESCRIPTION	COST ($000)
o ADP Facility Operation and Management Contracts	1,000
- This element represents a prorated portion of total usage costs. SPRO requires massive volumetric, demographic transportation, cost accounting, and other similar tracking systems. Maintenance of these systems requires significant computer utilization.	
o Data Reduction Support Contracts	400
- This element represents data entry and data reduction efforts required to provide continual update to maintain timeliness of the operational systems and data bases developed during FY 77.	
o ADP System Support	840
- This element provides contracted ADP support for specific SPRO activities, studies and analyses. Full operation of the ADP system in FY 78 will result in increased data input and the need for quality control and data validation. Specialized procurement, begun in late FY 77, will continue through FY 78. Included are:	
- Financial planning, purchasing, disbursement and control (120).	
- Program-Wide Tracking MIS with charting capability (80).	
- Implementation of the Comprehensive MIS for SPRO operational support (640).	
TOTAL DATA SUPPORT	2,240

83-107 O - 77 - pt. 6 - 13

FEDERAL ENERGY ADMINISTRATION
FY 1978 CONGRESSIONAL BUDGET ESTIMATES
C. Resource Summary
(dollars in thousands)

ACTIVITY: Strategic Petroleum Reserve				PROGRAM: General Counsel Support									
	FY 1976 Actual			TQ	FY 1977 Estimate			FY 1978 Estimate			Change FY 1977 to FY 1978		
	Pos.	MY	Amount	Amount	Pos.	MY	Amount	Pos.	MY	Amount	Pos.	MY	Amount
Estimate	...	...	...	...	...	...	...	12	12	396	+12	+12	+396
Headquarters	...	...	...	...	...	...	...	12	12	396	+12	+12	+396
Field	...	...	...	...	...	...	...	...	...	...	...	...	...
(Contracts/Grants)	XX	XX	...	...	XX	XX	...	XX	XX	...	XX	XX	...

PROGRAM DESCRIPTION

This program element provides legal support for the entire Strategic Petroleum Reserve program, including, as necessary, (1) legal review of contracts and other documents, negotiation, real estate acquisition, environmental analysis, statutes, regulations and permits and (2) other legal activities as required to support the effective administration of the SPR program and to ensure compliance with the multitude of legal requirements applicable to the program.

JUSTIFICATION

Legal support for the SPR involves legal review of the following: (a) Real estate acquisition, including evaluation of the various legal interests in land, and the comparative advantages of acquisition of alternative interests, such as leases, fees, easements, rights-of-way, etc.; the real estate work will involve working with the Corps of Engineers in all aspects of property acquisition, including negotiations with property owners; (b) the legal sufficiency of environmental analysis with respect to acquisition, construction, and filling of sites; and (c) contracts and other procurement documents, negotiations with parties with respect to such documents and legal actions required to ensure fulfillment of their terms.

Legal support will also ensure that acquisition and construction efforts meet the legal requirements of applicable statutes including Federal requirements relating to environmental protection, pipeline safety and all other applicable legal requirements. General legal support to the SPR program includes review of reports and other documents for legal sufficiency, drafting of legislative proposals, and drafting of proposed and final regulations to implement the program.

Support provided in FY 1977 is funded under the FEA Salaries and Expenses appropriation, and in FY 1978 is now shown as a direct charge to the Strategic Petroleum Reserve appropriation.

The amended request includes $198,000, 6 positions, and 6 manyears more than the initial FY 1978 request for this program.

STATEMENT OF JOHN F. O'LEARY

Mr. Chairman and Members of the Committee, I appreciate the opportunity to appear before you today in support of the Federal Energy Administration's Fiscal Year 1978 Budget Request.

The primary authorizations for the Federal Energy Administration (FEA) are the Energy Policy and Conservation Act (EPCA) and the Energy Conservation and Production Act (ECPA). These laws specifically assign to FEA responsibilities for establishing and operating near-term programs which promote energy conservation, provide for emergency petroleum requirements, maintain a national energy data base, encourage optimal development and use of energy resources, and regulate certain petroleum products.

To carry out our responsibilities in the area of energy conservation and efficiency FEA has requested funds in the FY 1978 budget for five major activities. First, the Weatherization Program as mandated by the ECPA is designed to provide assistance to low income persons, especially the elderly and handicapped, in weatherproofing their homes. The emphasis of this program is on actions that would conserve energy, and at the same time reduce the fuel costs of those most in need. Without this program it is likely that many low income people who experienced costly heating bills this past winter will be faced with the same problem the next winter and each winter thereafter. The FEA program is designed to solve the weatherization problem in a relatively permanent fashion primarily by providing materials for the weatherproofing of homes. This is a very cost effective approach since the value of the energy conserved offsets the cost of the materials in less than two years. Our budget request of $65 million will provide for the permanent weatherization of approximately 475,000 homes. Funds have been requested by FEA rather than the Community Services Administration in order to maintain a coordinated energy policy and to simplify administration of the program. FEA is ready to proceed with the program; and we feel we should start to resolve the problems addressed by the Weatherization Program, especially when the benefits are so great and long lasting.

Second, our budget includes two State Grant programs, each focusing on a different aspect of energy conservation. The initial program, which is currently in operation under the EPCA, provides that participating States must implement five energy conservation actions; and if funds are still available, they may develop other innovative approaches aimed at achieving a five percent reduction of projected energy consumption in the State by 1980. Grant funding of $47 million would be provided in FY 1978 to assist the States in this endeavor. The other State conservation grant program is for supplemental State plans and is designed to provide the States with increased financial and technical assistance in developing and promoting additional energy conservation plans. These actions are expected to include provisions for energy audits of single family homes, public education efforts, and development of procedures within each State for effective coordination of conservation programs administered by all levels of government. The supplemental grant funding will provide $23.5 million to the States in FY 1978. While the bulk of the funding requested for these programs is for grants, FEA support is needed for preparation of model plans and for administration of the grant programs.

A third activity, the Obligation Guarantee Program, is authorized by Congress to foster energy efficiency in existing buildings owned by States or local governments, institutions, businesses or individuals by guaranteeing, for up to 25 years, loans for the installation of approved materials or devices which either conserve energy or utilize energy from a renewable source. Supplemental funding for determining the most cost-effective design and program development was requested in FY 1977. The FY 1978 portion of this program provides $15 million in no-year funds for possible default payments and $5 million for implementation, application processing, development and implementation of a management information system, monitoring, and program evaluation.

Fourth, conservation is being promoted through a Utility Demonstration Program. This program provides co-funding of projects with State Public Utility Commissions and electric or natural gas utilities to test the impact of various techniques such as load management, time-of-day metering and rate reform on energy consumption, the need for new generating capacity, and consumer costs. The $5.2 million requested in FY 1978 will provide for the completion of all projects presently in progress as well as four new ones in this budget.

The fifth major conservation request is $25 million for the development of innovative conservation programs. This funding is designed to accelerate energy conservation. Specific proposals will be based upon identification of those sectors of the economy which would benefit most from Federal programs and to allow for rapid advancement into areas where energy conservation can have the greatest pay-off. The rapid changes that have occurred in the energy field and the need to respond to a crisis situation make it imperative that we maintain some flexibility. We are requesting these funds now to provide for the lead time necessary to act on these new proposals.

Other conservation efforts reflected in the FY 1978 budget include the Appliance Efficiency Program which is designed to inform consumers of the relative energy efficiency of similar appliances; the Industrial Reporting Program which promotes energy conservation in major industries; grants for State Offices of Consumer Services which will permit utility customers to have a greater input to State utilities regulatory proceedings; and the Federal Energy Management Program which promotes conservation and efficiency in Federal Government energy utilization.

The EPCA provides for the creation of a Strategic Petroleum Reserve (SPR) in order to diminish the vulnerability of the United States from the effects of an energy supply interruption. Plans to accomplish an Early Storage Reserve (ESR) of 150 MMB by December 1978 have been submitted to Congress. This amended budget provides for acceleration of these plans to attempt to have 250 MMB in storage by December 1978 and 500 MMB by December 1980. This accelerated program is recommended because it appears feasible and because it is desirable to move quickly to reduce our vulnerability to threatened or actual embargoes. The national security and potential economic benefits of this accelerated program are significant. The SPR Plan which became effective on April 18, 1977, will shortly be amended to reflect these changes. The total budget request for FY 1978 is $3 billion of which $2.5 billion is for oil acquisition with the remainder for storage facilities and program management. The recently announced expansion of the ultimate program size to one billion barrels will have no effect on the FY 1978 request.

In concert with the conservation and oil storage programs this budget also requests funds to more adequately develop and utilize our national reserves of coal and other energy sources which will in turn reduce our dependence on foreign energy supplies. The major funding increase in this area is for expansion of the Coal Conversion Program to accelerate the conversion of utilities and industrial firms from oil and gas to coal.

In 1974, the Energy Supply and Environmental Coordination Act (ESECA) provided the Federal Energy Administration with authority to prohibit existing utility and major fuel burning installations from burning petroleum or natural gas. It granted authority to order new utility power plants to be constructed with coal burning capability. The ordering authority under ESECA expired on June 30, 1975, with enforcement authority extending to December 31, 1979. In December 1975, the ESECA authorities were extended by the Energy Policy and Conservation Act (EPCA). Ordering authorities were extended to June 30, 1977, and enforcement authorities were extended to December 31, 1984. In addition, overall program authority was expanded to new major fuel burning installations, whereby they, too, could be required to be constructed with coal burning capability.

Both Acts require FEA to select candidates on a case-by-case basis. The burden of proof rests on the Federal Energy Administration to make a series of statutory findings for each case. These include: coal supply and coal practicability, the existence of coal burning capability in existing facilities, and the impact on reliability of service for utility power plants. In addition, both the Environmental Protection Agency (EPA) and FEA must insure full compliance with all environmental requirements.

Activities in FY 1978 will consist of performing environmental and other analyses required to make the orders issued in FY 1977 and prior years effective. This is a complex and controversial activity, but one which can contribute significantly to our national energy security. It should be noted that Congress is presently considering several modifications and extensions to the present FEA order issuing authority under this program.

Other energy sources for which FEA is seeking funds to facilitate the development or commercialization of include solar, synfuels, and geothermal as well as the conventional generating technologies.

With respect to our energy data gathering activities, the ECPA contained a statutory requirement to establish an Office of Energy Information and Analysis and this resulted in an internal reorganization to separate policy and data analysis functions previously performed by the Office of Policy and Analysis. Also, as required by the ECPA, a National Energy Information System (NEIS) is being created to insure that comparable, accurate, and credible energy information is available to the Federal Energy Administration, to other Government agencies responsible for energy-related policy decisions, to the Congress and to the public. The NEIS will permit the analysis of U.S. energy supply and demand with emphasis on consumption and the sensitivity of the supply system.

The Office of Energy Information and Analysis also performs analytical functions in support of FEA policy-making and programming, to include competition analysis, socio-economic analysis, macroeconomic analysis, and regional analysis; all statistical and forecasting analysis functions in support of energy policy and program development; and design, development and operation of all data collection and data processing systems of the Agency. The above responsibility includes the operation of the Project Independence Evaluation System (PIES) and of the National Energy Information Center (NEIC), the single Federal clearinghouse for energy data. The $39.6 million in FY 1978 for EI&A is requested to support development of the NEIS, conduct of an oil and gas reserve study, improvement of the consumption data base, and other designated EI&A functions.

FEA currently has broad information gathering authority and has been utilizing its resources to meet many regulatory and statistical information requirements. Certain data areas that have been specified in legislation such as expanded energy reserves data collection, and financial reporting from petroleum companies are an essential part of the President's April 20th energy proposals. We plan to take additional steps to insure that these types of information are collected.

The FY 1978 request for the Regulatory Programs reflects a continuation of auditing activities to identify those petroleum industry firms which have not complied with FEA's pricing, allocation, and import rules and regulations. This request reflects the additional resources identified in the supplemental request associated with recent audit times and revised industry universe information. The Compliance program has been an area of great interest and concern to me since joining FEA. Compliance has made substantial progress in the last two years in terms of its development. Its management systems and structure are in place. Many outstanding regulatory issues have been or are being resolved. Program results for the period July 1, 1974, to December 31, 1976, include completion of about 22,000 audits and investigations with over 8,500 violations resolved. In addition, over 1,000 additional violations have been identified and are undergoing final resolution at the present time. The total dollar viola-

tions detected and corrected amount to about $500 million. Additionally, over $3 million in penalties have been collected. (The estimated potential violations pertaining to open audits are estimated at about $2 billion.) Although these accomplishments have been substantial and much progress has been made in Compliance, I have formed a Task Force headed by a highly respected individual from outside FEA and augmented by knowledgeable representatives from within FEA. This Task Force will report back to me with recommendations on regulatory issues including Compliance audit strategy, need for greater legal support for the audit functions, organizational weaknesses and special investigations. Based on the recommendations of the Task Force, I will take any actions necessary to ensure the adequate enforcement of FEA's regulations.

The request assumes continuation of crude oil pricing and allocation controls through May 1979, as required by law. The Administration has not yet made a decision on the decontrol of petroleum products. However, additional positions and funds will be necessary if controls are continued on these products through the end of FY 1978.

Thank you, Mr. Chairman. This concludes my opening remarks. I will be happy to respond to any questions which you or members of the Committee may have.

SUPPLEMENTAL ACTION

Senator STEVENS. It should also be observed for the record that Congress has just completed action on the 1977 supplemental appropriation bill. This bill carries $58.3 million for the FEA, most of it, $50.6 million, for conservation activities. We will include a table in the record of the funding by activity and program for that bill, also.

[The statement follows:]

FEDERAL ENERGY ADMINISTRATION
(dollars in thousands)
Salaries and Expenses

	1976		1977 Approp.		Supplemental Request		H. R. 4877	
	Pos.	Amount	Pos.	Amount	Pos.	Amount	Pos.	Amount
Executive Direction & Administration:								
Administrator	72	2,417	71	1,554	...	...		
General Counsel	177	3,922	190	4,088	21	230	—	—
Management	436	16,683	452	18,472	11	886	—	739
Communications & Public Affairs.	124	3,628	60	2,036	...	...		
Congressional Affairs	57	1,202	24	600	...	...		
Intergovernmental Relations & Special Programs	71	4,937	60	2,204	...	...		
Private Grievances & Redress	54	1,675	70	1,894	15	100	(15)	100
Policy & Program Evaluation	48	1,319	55	1,659	2	76	—	25
Sub-Total, Exec. Dir. & Admin.	1,039	35,783	982	32,507	49	1,292	(15)	864
Energy Information & Analysis:								
Executive Direction	13	582	13	327	...	...		
Economic Impact Analysis	62	2,186	55	2,691	5	250		
Data & Analysis	150	4,459	144	6,712	42	3,442		
Data Services	162	15,236	155	18,716	26	1,805		
Sub-Total, Energy Infor. & Analysis	387	22,463	367	28,446	73	5,497	(73)	2,433
Regulatory Programs:								
Compliance	1,326	24,782	1,326	34,200	70	504		
Operations	349	8,701	75	5,904	216	2,213		
Contingency Planning	24	837	24	1,875	...	...		
Data Coordination	30	788	27	661	...	...		
Executive Direction	37	871	31	697	4	78		
Sub-Total, Reg. Prog.	1,766	35,979	1,483	43,337	290	2,795	(227)	2,000
Conservation & Environment:								
Executive Direction	26	675	21	677	...	...		
Policy & Program Development,								
Policy Development	19	1,188	8	519	...	150	—	106
Program Development	24	2,249	15	582	...	...		
Evaluation	4	496	3	83	...	...		
Environment	26	1,372	17	582	...	...		
Innovative Conservation Programs	...	...	...	...	33	5,000	—	—
EPCA State Grants	49	1,657	44	24,248	...	...	—	—
ECPA Supplemental State Grants.	...	...	...	...	12	12,174	12	12,174
Weatherization Grants	...	...	...	...	20	55,000	15	27,500
Office of Consumer Services Grants	...	...	...	...	2	2,000	2	2,000
Conservation Loan Guarantees	...	...	...	...	25	1,800	5	1,512
Appliances	16	1,883	13	1,860	2	1,479	2	623
Industry	42	3,893	39	1,485	...	...		
Buildings	47	3,266	37	1,071	...	...		
Transportation	25	1,894	17	758	...	...		
Federal Energy Management Programs	12	1,659	12	597	...	...		
Utilities	19	2,507	17	2,071	12	6,775	12	6,685
Marketing	7	1,108	7	167	...	...		
Sub-Total, Cons. & Envir.	316	23,847	250	34,700	106	84,378	(48)	50,604
Energy Resource Development:								
Energy Sources	89	4,504	84	3,024	...	1,900		1,150
Coal Conversion	60	1,519	58	1,997	...	900		900
Electric Power	55	2,374	54	1,823	...	350		350
Financial Planning & Incentives.	22	754	22	999	...	...		
Siting	21	569	23	785	...	...		
Environment	12	354	12	594	...	...		
Executive Direction	26	719	25	723	...	...		
Sub-Total, Energy Resource Development	285	10,793	278	9,945	...	3,150		2,400
Total, Federal Energy Administration	3,835	130,027	3,405	150,385 2/	518	97,112	363	58,301

STRATEGIC PETROLEUM RESERVE

Mr. O'LEARY. Mr. Chairman, I would like to make a very, very brief summary of the budget before you.

The budget is featured primarily by the Strategic Petroleum Reserve program. Tom Noel, to my right, will be here to discuss that with you. And to my left is Martin Howell, who will be prepared to provide any other backup.

There are other officers of FEA here if it is necessary to get into their spheres of expertise.

Now, I will briefly summarize our budget request, Mr. Chairman.

We are asking you for $3.3 billion. Most of this money would go into the Strategic Petroleum Reserve. I can't overemphasize the importance of that reserve to the well-being of this country. We are sitting at a point now where if there were interruption, it would be a much more serious supply interruption than we were, in fact, exposed to in 1973, 1974.

Our dependency overall on imports is much greater than it was then and our dependence, particularly on the interrupting countries is substantially higher than it was at that period of time. Despite the fact that 3 or more years have passed, we do not have the first drop of oil in the strategic reserve in the event that we are once more interrupted.

On entering office one of the first things that the new administration did was to take a look at this program and we asked the people who were in charge of it, What is the greatest level of fill that could be expected with a 75-percent confidence level? The answer came back 250 million barrels by the end of 1978. Again, I want to emphasize that is for a 75-percent confidence level.

We then costed that out, and the result is the appropriation request that you see before you. I think that it is extremely important, Mr. Chairman, that we proceed to that fill just as rapidly as we can.

I think that just a casual perusal of any paper will tell you that we are, in effect, living by severance in the world today in petroleum supply. There is the possibility of interruption at almost any moment of time. We ought to be prepared to meet that interruption sensibly with a substantial reserve.

Now, I understand that there have been suggestions, both on the House side and the Senate side, that our budget request be reduced and reduced substantially by as much as $1 billion on the grounds that it was possible that we would not be able to attain that fill rate.

I have sent a letter to a number of Members of Congress including the chairman suggesting that that would probably be viewed by people outside of the United States as lacking resolution on the part of this country to, in fact, go ahead and fill at a very rapid rate. So I would like to discuss that with you, Mr. Chairman, as we proceed this morning.

Further, it should be noted that the President has asked that the overall target be increased to 1 billion barrels in his energy plan that was submitted to Congress a week ago tomorrow. Mr. Chairman, that is the most important element of the program that I will discuss with you today.

CONSERVATION PROGRAMS

The second most important task has to do with the conservation programs that are conducted by the FEA under EPCA and ECPA. As you see, they will require a substantial level of funding during the coming year.

We are going essentially for the full funding for this legislation. We think that the conservation path is one that we have to travel. We will begin to move down that as rapidly as possible.

Again, in the short run we have very little in the way of choices. Those two are the important elements of the program, Mr. Chairman.

With that introductory statement, I will be pleased to answer any questions you may have.

CARTER ENERGY PROGRAM

Senator STEVENS. How much is the request going to go up as a result of the April 20 energy message?

Mr. O'LEARY. Mr. Chairman, we haven't costed that entirely. We will have a good handle on that, hopefully, by the end of the week. I will be pleased to submit that for the record at that time.

[The information follows:]

The Federal Energy Administration is currently assessing the impact of President Carter's April 20, 1977 energy message. When the effect of this proposal on the budget presentation has been determined, the information will be provided to the committee.

Senator STEVENS. When do you think that we will get the budget amendments necessary to meet that message?

Mr. O'LEARY. I think that we will have the estimates by the end of the week. The budget amendments will be coming up just as rapidly thereafter as we can, Mr. Chairman.

Senator STEVENS. Did you analyze that message to determine what portion of that budget request before us will be affected by it, by the message?

Mr. O'LEARY. It really doesn't heavily impact the budget that is before you. Most of the charges are administrative, as you know. It seems to me that it would not have a massive effect for 1978.

FEDERAL ENERGY ADMINISTRATION ROLE

Senator STEVENS. We know your involvement in a lot of things, the utility rate reform, the weatherization program and the like, but what role will FEA play in the President's new proposals?

Mr. O'LEARY. I am sorry; would you repeat your question, please.

Senator STEVENS. What are you going to do between now and the creation of the Department of Energy and what is your role after that?

Mr. O'LEARY. To begin with, Mr. Chairman, we will be doing the support work that will lead to the changes in oil and gas pricing on behalf of the President.

We are now, for example, in the process of staffing out the legislated requirements that are involved in the gas and oil pricing initiatives. We hope to have those in hand again by the end of the week.

The FEA role, of course, will be substantial in the oil pricing initiatives as it has been in the past, and we will be required to

administer the program that will evolve from the President's recommendations in that context.

With regard to the conservation programs, FEA will take most of the initiatives in that area as well. There will be some that will be taken, as you know, by HUD and by DOT; but primarily, the conservation work, which is to say the development of working relationships with the States to put the installation programs into place, will be the responsibility of FEA.

We hope to get down that line just as rapidly as we can.

WEATHERIZATION PROGRAM CONTROL

Senator STEVENS. Has that fight been won as far as CSA and FEA in the weatherization program? You are now going to handle the relationships with the States and their program and CSA will handle community-oriented public-assistance-type weatherization?

Mr. O'LEARY. Yes. There was never any fight there, Mr. Chairman, except to the extent that there was a jurisdictional debate over who should handle the low-income weatherization program.

Senator STEVENS. There was a fight on the Appropriations Committee about that.

Mr. O'LEARY. However, there was never any argument about the overall weatherization program. That is not properly a function of CSA. It is generally recognized as a requirement that was placed properly on FEA.

FEDERAL ENERGY ADMINISTRATION AUTHORIZATION

Senator STEVENS. It is our understanding that your authorization expires this year; is that right?

Mr. O'LEARY. Our authorization does, in fact, expire this year, Mr. Chairman. That seems to be a constant position of the FEA.

Senator STEVENS. It is also my personal understanding that the Department of Energy bill does not change any substantive legislation. If that is the case, when are we going to get reauthorization for the FEA activities of DOE?

Mr. O'LEARY. Mr. Luedtke is here to answer that. I didn't realize that there was a problem there, Mr. Chairman. I thought that the creation of the DOE and the appropriation therein and the continuing functions of FEA would take care of it.

We do, as you know, have a number of program requirements in the statute that extend well beyond the end of the current calendar year. For example, our responsibilities under EPCA depending upon which of those responsibilities you want to single out, go well into 1979.

Senator STEVENS. That requires reauthorization in 1979, but where is the authorization for the appropriations requested as far as fiscal 1978 is concerned?

Mr. O'LEARY. Let me ask Mr. Luedtke to answer that question.

Mr. LUEDTKE. I am sorry. I am simply not aware of any problem in that regard.

Mr. O'LEARY. I am not either, Mr. Chairman.

I think that the organization under the existing statute ceases to exist at the end of the year.

Senator STEVENS. I am informed that if FEA expires, some of your programs continue, some don't. Some are in your own authorization. Here are some of them: the date of expiration of the authority of the petroleum reserve is December 31, 1977; and the voluntary international energy program, December 1977; the authority to transfer information to International Energy Agency, December 30, 1977; and so on. All of those are this year.

We would like to have an analysis of the authorities that you administer, when the authority expires and where it is in the authorization for DOE, if it is substantive legislation. The Government Operations Committee has informed the committee that it has no intent to modify substantive legislation.

Mr. O'LEARY. Mr. Chairman, I will supply that for the record.

Senator STEVENS. All right.

[The information follows:]

FEDERAL ENERGY ADMINISTRATION

AUTHORIZATIONS AND APPROPRIATIONS REQUEST

FY 1978

(dollars in thousands)

Legislative Reference	Title	Authorized	Requested	Expiration Date
Federal Energy Administration Act (FEAA) of 1974, as amended	Executive Direction and Administration	$ ...	$ 37,288	Dec. 31, 1977
ECPA, Title I, Part C	Energy Information and Analysis	...	39,585	Dec. 31, 1977
Federal Energy Administration Act of 1974, as amended	Regulatory Programs	...	47,098	Dec. 31, 1977[1/]
ECPA, Sections 205 and 207	Grants for Offices of Consumer Affairs	...	2,000	Sept. 30, 1977
ECPA, Section 451	Obligation Guarantee (defaults)	60,000[2/]	15,000	Sept. 30, 1979
ECPA, Section 422	Weatherization	65,000	65,000	Sept. 30, 1979
EPCA, Section 365	State Grants	50,000	50,000	Sept. 30, 1978
ECPA, Section 432	Supplemental State Grants	40,000	23,948	Sept. 30, 1979
EPCA, Section 339	Appliance Efficiency Labeling	2,200	3,236	Sept. 30, 1978
FEAA	Conservation and Environment (Other)	...	45,325	Dec. 31, 1977
FEAA and Energy Supply and Environmental Coordination Act of 1974	Energy Resource Development	...	14,152	Dec. 31, 1979[3/]
FEAA	International Energy Affairs	...	1,678	Dec. 31, 1977
	Total, Salaries and Expenses		$ 344,310	
EPCA, Title I, Part B	Strategic Petroleum Reserve[4/]	1,100,000	3,018,933	
	Total, Federal Energy Administration		$3,363,243	

1/ The President's authority, delegated to FEA, expires for some functions in May 1979, and completely expires September 30, 1981.

2/ The $60 million in default money is authorized from FY 1977 through FY 1979.

3/ Authority to issue orders to prohibit the burning of natural gas or petroleum products by a powerplant or major fuel burning installation, require construction with coal burning capability, and allocate coal under the Energy Supply and Environmental Coordination Act of 1974, expires June 30, 1977; modification and enforcement authority continue through December 31, 1984.

4/ The $1.1 billion is authorized to develop the Strategic Petroleum Reserve Plan with the exception of the purchase of oil. Such funds as are necessary are authorized for the Early Storage Reserve Plan of 150 million barrels, including oil purchase. Additional authorization is required for the purchase of oil beyond the 150 million barrels already authorized. The FY 1978 appropriation request brings the total oil requested to 250 million barrels.

2716

26644

FEDERAL ENERGY ADMINISTRATION EXTENSION

Senator STEVENS. This proposal before us presumes that the Department of Energy will be created before the commencement of the fiscal year; is that correct?

Mr. O'LEARY. I would assume that, Mr. Chairman. But this appropriation does not assume that. This assumes, in fact, that the DOE is not effected at all. It goes to the continuing functions of FEA.

Senator STEVENS. Then it assumes that you either have reauthorization for FEA before December 31 or DOE.

Mr. O'LEARY. Yes. One or the other, Mr. Chairman.

Senator STEVENS. Have you considered requesting language in this appropriation that this would authorize transfer of FEA funds to another department or agency?

Mr. O'LEARY. No, we have not, Mr. Chairman.

Again, this bill simply assumes that FEA will continue in existence. As you point out, this would require in the event that the DOE does not come in to existence a continuation of our organic life through the extension of the authorization act for FEA.

Senator STEVENS. That would be your alternative? Are you going to call it DOE or DE. Is this going to be DOE?

Mr. O'LEARY. I understand that DOE is a little deer.

Senator STEVENS. I hope that DOE is not DOA before it gets there.

Mr. O'LEARY. I hope so, too, Mr. Chairman.

Senator STEVENS. Well, we will just have to wait for action on that other Department. But we may well be finished with our bill before that bill passes.

I want to warn you about that. We are supposed to be finished before August. There may be nothing in either bill that would authorize you to continue in the event that DOE is somehow or other sidetracked.

LEGAL STATUS ON CONTINUED OPERATIONS

Mr. O'LEARY. Mr. Chairman, we will act upon your suggestion and look at that very carefully and have a response to the committee within a few days on what the legal status of our continued operations is.

[The information follows:]

The Energy Conservation and Production Act extended the termination date of FEA as an Agency to December 31, 1977. After that date all authorities residing in the FEA would revert to the President or his designee.

At the present time, Congressman Dingell's Subcommittee on Energy and Power has reported out a bill (H.R. 6794) which recommends an extension of FEA's termination date to September 30, 1978. It is anticipated that this bill will be considered soon by the full House Interstate and Foreign Commerce Committee and that Senator Jackson's committee will review similar legislative proposals.

EXECUTIVE LEVEL POSITIONS

Senator STEVENS. Can we expect when this merger takes place there is going to be any savings in overhead when FEA and ERDA and others are merged with DOE?

Mr. O'LEARY. Yes. There will be some savings in overhead, Mr. Chairman.

Senator STEVENS. You are requesting more than 4,000 positions for 1978, 18 executive levels and 100 supergrades. Are they to continue through into the DOE?

Mr. O'LEARY. The 100 supergrades would continue into the DOE. The 18 executive levels would be merged with, I think, a total of 36 in the various agencies that are going to be brought together in the DOE. There will be a significant saving there in the number of Presidential appointees.

Senator STEVENS. We are wondering if we are losing control over this first year of DOE by virtue of what is happening here because of your 18 executive levels. I think it is the intention to transfer all of these from the various agencies that are consolidating into DOE and do with them what they want to do.

It is probably not Mr. O'Leary's problem.

Mr. O'LEARY. Mr. Chairman, with regard to the supergrade aspects of the problem, right now in the agencies that are anticipated as forming the new Department of Energy, there are about 700 supergrades. The act creating the new Department of Energy asks for an authorization ceiling of 750, so there will be an additional 50 supergrade slots.

I am not sure that they will be all utilized there. There will, at the same time, because of the consolidation be a substantial reduction in the number of Presidential appointees. My recollection is that at the moment, there are 36 Presidential appointees associated with the agencies that will go into the DOE. That will be reduced to something like 18.

Senator STEVENS. The committee still wonders why FEA needs so many executive level positions—as many as all of ERDA with its nearly 9,000 positions, more than twice as many as EPA with its 9,000 positions, more, in fact, than almost all comparable agencies. We will need solid justifications for this high-level employment.

Mr. O'LEARY. We will provide that, Mr. Chairman.

[The information follows:]

AUTHORIZATION FOR EXECUTIVE POSITIONS

The basic authorization for the 18 executive level positions requested in the fiscal year 1978 Budget is the Federal Energy Administration Act of 1974, which actually designates 19 such positions for FEA. When Congress passed the FEA Act, it recognized that while FEA would be a relatively modest sized agency, it was being charged with numerous important energy related responsibilities such as regulating petroleum product prices, developing and managing scarce energy supplies, enhancing and promoting energy efficiency, gathering, analysing and assimilating vast quantities of energy data, and developing and analyzing both national and international energy policy. And, more recently, FEA has assumed the added responsibility of establishing a strategic petroleum reserve. These tasks and their associated support functions require executive level appointments for two primary reasons, one, GS salaries, which are at least $10,000 less per year, are not sufficient to attract the quality of administrator who is capable of accomplishing these tasks; and two, to provide a level of status for these qualified managers so they will be able to deal on an equal footing during their routine meetings with the presidents of major corporations, heads of consumer groups, media reporters, congressmen, and other high level government officials from our country and abroad.

FEA has been charged with developing and implementing a National Energy Plan. This task would be even harder than it has proven to be if the country and the World perceived FEA's leadership as less than qualified or of lesser status.

CONTRACT EXPENSES

Senator STEVENS. What are you going to do about contracting under salaries and expenses? Your salaries and expenses request indicates $78.5 million for contracting.

That is 22 percent of your budget and 64 percent over 1977, including the supplemental we just passed. Why do you need so much money for contracting out?

Mr. O'Leary. We will have a substantial amount in contracts. Some of that is associated with Mr. Noel's program. That provides for some of the increase. Some of it is associated with statistical programs conducted by the Agency. Maybe you would like to hear from Mr. Noel as to the rationale for his increase in contract services.

Senator STEVENS. We are not talking about the strategic reserve, as I understand it. The bulk of that is not in the strategic reserve. Why don't you tell us what it is? What is that $78.5 million for contracting under salaries and expenses?

Mr. HOWELL. I have a list of it here, Mr. Chairman, which I will be glad to submit for the record. Or, I can go over it with you in detail now.

[The information follows:]

2669A

FEDERAL ENERGY ADMINISTRATION

FY 1978 CONTRACT REQUEST

CONTRACTS
($000)

	FY 1977 base	FY 1978 Request	Increase or Decrease	Reason for Increase
Administrator	$ ...	$ ...	$ ...	
Office of General Counsel	55	...	- 55	
Management	1,220	1,497	+ 277	
Communications and Public Affairs	270	170	- 100	
Congressional Affairs	...	15	+ 15	
Private Grievances and Redress	...	...	...	
Intergovernmental Relations and Special Programs	1,767	738	- 1,029	
Policy and Program Evaluation	400	500	+ 100	
Energy Information and Analysis	19,266	27,407	+ 8,141	Proposed increases are for an Oil and Gas Reserve Study; Development of the Consumption Data Base, and Expansion of the Data Validation Program.
Office of Regulatory Programs	2,500	2,725	+ 225	
Energy Conservation and Environment	3,855	40,052	+36,197	$23.9M is for innovative conservation activities which are new and there is also $9M more in Rate Demos, etc. than was in 1977 base.
Energy Resource Development	3,210	5,031	+ 1,821	Total increase is related to ESECA orders.
International Energy Affairs	313	408	+ 95	
Total Salaries and Expenses	$32,856*	$78,543	$+45,687	

* Does not include FY 1977 Supplemental of $15 million for contracts.

ADMINISTRATIVE COSTS OF CONTRACTS PROGRAM

Senator STEVENS. Is it correct that it is administrative costs to administer the contract program?

Mr. HOWELL. In part that would be correct.

The biggest increase, though is for the Office of Conservation and Environment, which has many new responsibilities associated with the Energy Conservation and Production Act which was passed last August.

Senator STEVENS. Wait a minute. Is it money to be paid out? It is listed under salaries and expenses which, to me, implies that we are going to hire people to administer money that is going to be paid to contracts.

Mr. HOWELL. No. These are contracts, Mr. Chairman, and there is an increase of some $45 million in contracts over 1977.

Senator STEVENS. What is the money that you are going to pay out to contractors doing under expenses?

Mr. HOWELL. This is the way that we have listed it in all previous budgets, Mr. Chairman. If you would prefer us to break it out further, we will be happy to do that.

Senator STEVENS. It just confuses me. The $45 million increase, what is that for?

Mr. HOWELL. The majority of it, $36,197,000 in fact, is in conservation and environment. Of this, $23.9 million is for innovative conservation activities which are new. Another $9 million of the increase is for rate demonstrations and related technical assistance to State public utility commissions. And, in ERD you have an increase of $1,821,000. All of this is related to the ESECA activities, environmental impact statements, et cetera.

Senator STEVENS. Some of these contracts described in the justification seem superfluous. Some are to evaluate or help implement your own programs, for instance. Why can't more of this work be done in-house if it's needed?

Mr. HOWELL. The basic philosophy of the administration, as directed by the Office of Management and Budget and as reflected in our budget request, is that short-term requirements should be fulfilled as much as possible through contract assistance so as not to add a lot of talent that is specialized and might be needed only on a temporary basis.

The primary reason for weighting our resource request in favor of contracts over personnel was our desire to bring as lean a staff as possible into the forthcoming Department of Energy so that the new Secretary of Energy might be able to make personnel growth decisions independent of his inheritance.

Of course, the largest single contract increase is $23.9 million for the innovative conservation programs which I mentioned earlier. These funds are required to meet the immediate energy proposals of the new administration.

INNOVATIVE CONSERVATION PROGRAM

Senator STEVENS. One last question, then Senator Huddleston will ask some questions.

What is this innovative conservation program? What does that cover?

Mr. HOWELL. We can identify specifically this morning about $14 million.

Senator STEVENS. Is that a contingency item for this new program?

Mr. HOWELL. No. This is for solar commercialization and coordination activities, Mr. Chairman.

Mr. O'LEARY. This runs, Mr. Chairman, to the President's initiatives in connection with ECPA, and under the Presidential program that was put before you last week there will be $2 million for the development of commercialization options for solar technologies. There will be $1.5 million for support for residential and business tax credits. There will be $6.5 million in program administration for solar energy for the government building program and about $4 million for State support, especially to establish building codes and revise local property tax laws on the treatment of solar improvements to homes and buildings. We have identified $14 million of that.

Senator STEVENS. Since it's almost all contracting, why does the innovative program need 39 positions? The committee will need specific justification of this $25 million fund including an explanation of why so much of it is contracting. Please supply that for the record.

Mr. O'LEARY. I will be happy to do that.

[The information follows:]

INNOVATIVE PROGRAMS

The "innovative programs" expenditures, as indicated in the budget document, will be directed toward development activities associated with energy initiatives undertaken as a result of legislative and executive decisions. Details cannot be provided until such time as major energy legislation is enacted, hopefully during FY 1977. However, the following general categories are cited to reflect preliminary views on effective utilization of the requested resources:

Support for Residential Energy Conservation Initiatives - $4,000,000.

- Engineering evaluation of devices which can be added to existing residential furnaces, heating boilers and water heaters to improve energy efficiency. Among the retrofit devices to be evaluated are automatic flue gas dampers, reduced fuel orifice size, flue restricters and flue gas heat exchangers. Devices found in the studies to be most promising for oil and gas fired equipment would then be evaluated further in a field test and demonstration program involving a number of homes located in different climate regions.

Support for Industrial/Commercial Energy Conservation Initiatives - $4,000,000.

- Developmental and consultation responsibilities associated with the industrial investment tax credit will be placed in FEA. Required work would include: descriptions of specific boundaries on eligible investments; development of technical and training manuals for use by the Internal Revenue Service in assessing the eligibility of specific investments; installation and implementation of a joint FEA/IRS management information system; development of a program evaluation system; and assessment of additional measures for possible inclusion on the list of items eligible for the tax credit.

- Publications on the technology and economics of industrial co-generation of electricity will be important to support the co-generation initiatives of the Administration's plan.

Support for Conservation Initiatives in Transportation - $3,000,000.

- Management information system, evaluation and other support for the Federal Vanpooling Program.

- Management and implementation of programs to reduce energy consumption by automobiles.

Solar Energy Initiatives - $14,000,000.

- Development of commercialization options for solar technologies not covered by FY 1977 effort.

- Support for residential and business investment tax credits, including standards, regulations and monitoring.

- Program administration for the solar energy in government buildings program, including survey and assessment.

- State support, especially funds for States to establish builders code, property tax and sun right laws, plus funds to deal with utility/solar interface.

Some of the expertise required during the formulative stages of new programs are unlikely to be needed for implementation later on. This makes it more efficient to draw, for these purposes, on specialized contractor support rather than to hire staff temporarily with the needed specialized skills. The resources requested reflect what is felt would be an effective combination of in-house and contractual resources to accomplish both the short-term and long-term requirements of program implementation. Some of the "in-house" personnel will be required to properly manage the large contract expenditures.

PROGRAM DUPLICATION

Senator STEVENS. The innovative fund is part of conservation's policy and program development activity, which itself seems to duplicate the policy and program evaluation work budgeted under executive direction and administration. Why do you need two policy shops?

Mr. O'LEARY. The basic difference between the two policy development offices is that the Policy and Program Evaluation Office with executive direction and administration reviews overall policy and plans while the similarly titled office within conservation and environment has been responsible for examining micro policy related to environment and conservation matters including a review of energy impacting environmental impact statements filed by other agencies and for assisting the Assistant Administrator in evaluating his programs.

Senator STEVENS. Environment is also listed under the conservation policy activity. What's the difference between that and the environment program under the energy resource development program?

Mr. O'LEARY. The environment function listed under the conservation policy activity is the agency's centralized, environmental policy function that is responsible for the initiation, review, analysis, and coordination of FEA environmental policy as it relates to national energy policy—it should be noted that this function has been recently transferred to the Office of Policy and Program Evaluation. Moreover, that environmental function assures FEA compliance with the requirements of the National Environmental Policy Act—NEPA—by analyzing the energy programs of FEA line organizations and assuring the program offices undertake appropriate environmental analyses and prepare necessary environmental impact statements.

The environmental program under the Office of Energy Resource Development—ERD—is a line function which provides environmental technical and policy support for the specific energy resource development activities of ERD. Other FEA program offices, such as the Strategic Petroleum Reserve Office and the Office of Regulatory Programs, likewise have environmental impact statements and assess other environmental technical and policy issues as they relate to their specific program activities.

Senator STEVENS. Again, why do you need two environmental shops?

Mr. O'LEARY. There are more than two environmental shops within FEA. Line organizations need to have some environmental resources to assure that adequate environmental considerations are factored into energy program implementation. Moreover, the centralized environmental policy function is necessary to assure that environmental elements of energy policies and the energy impacts of environmental policies are fully considered. This division of environmental resources is nonduplicative and reflects a distinction between environmental analysis that is needed in the implementation of FEA's energy programs.

COAL CONVERSION PROGRAM

Senator HUDDLESTON [presiding]. We are switching chairmen.

Let's go to your coal conversion program and the big increase, about $3 million. This is the program to switch petroleum-burning plants to coal. Your justification notes that FEA's authority to issue

prohibition orders expires in June, only 2 months away. What is the status of legislation to renew that authority?

Mr. O'LEARY. Both the House and Senate have under consideration an extension of FEA's authority to issue prohibition and construction orders. At the moment the Senate is considering a 6-month extension; the House an extension of 15 months.

Senator HUDDLESTON. Is your $5.8 million budget for coal conversion based on renewal of the order issuing authority or only on compliance?

Mr. O'LEARY. The budget request is based on efforts leading to issuance of notices of effectiveness and compliance monitoring. Should ESECA order issuing authorities be extended a supplemental budget request would be prepared and submitted.

Senator HUDDLESTON. Your justification states that budgeted coal conversion work will concentrate on environmental work but fails to explain why the increased funding and 12 additional positions are needed. Why are they?

Mr. O'LEARY. The vast majority of the funding and personnel increase requested for fiscal year 1978 is directly associated with timely implementation of orders to be issued before June 30 of this year.

The issuance of orders, however, does not complete the ESECA process, and does not lead to immediate coal burning. In fact, the largest percentage of case specific money and staff time is required after the order is actually on the street. At this time an environmental impact statement—EIS—or a negative determination is prepared for each order, and a public hearing is held, as required by the National Environmental Policy Act—NEPA.

We have learned that NEPA compliance is not easy for coal conversion, even for the easier round 1 utility cases. To date, we have had 2 to 4 analysts to implement round 1 orders, and as a result have not been as timely in causing actual coal burning as we have wanted to be. In fiscal year 1978 we will be dealing with entirely new aspects of the program and will be pursuing a much larger volume of cases. If we are to make progress on these new, more difficult, and more complex cases, the resources simply must be made available.

Senator HUDDLESTON. The justification states that more than 100 prohibition orders have been issued to date and another 100 are anticipated by June 30. Do you have any estimates on the oil or gas savings these involve?

Mr. O'LEARY. It's significant. I'll supply the figures for the record.

[The information follows:]

The potential oil and gas savings of plant issued prohibition orders from the inception of the program to June 30, 1977, are estimated to be:
Oil: Utility, 84.8 Mil. Bbl/Yr.; MFBI, 13.7 Mil. Bbl/Yr.
Gas: Utility, 59.1 Bcf/Yr.; MFBI, 32.2 Bcf/Yr.

Senator HUDDLESTON. I was pleased to note the increase in your appropriation request for the vitally important coal conversion program. What funds were appropriated over the last 2 fiscal years for this program?

Mr. O'LEARY. I will check that. Just a moment, Mr. Chairman.

Mr. Chairman, while you are waiting, you may have noticed that we issued 19 notices of intent yesterday on the coal conversion program.

Senator HUDDLESTON. I understand. These were not final orders, however; were they?

Mr. O'LEARY. No, Mr. Chairman. You may be interested in the order and sequence of that program. Yesterday as a result of about 2 years work, we issued 19 orders of intent. Sometime between now and June 30th we will have hearings on each of those 19 plants. They will culminate in the order prior to June 30. After that there will be a period, a very prolonged period, in which we anticipate work done by the companies and perhaps some litigation.

At the end of that period which might last 1 year to 2 years, we might then issue what we call NOE's or notices of effectiveness. At that point, the order will really go into effect. The whole program will have taken at that point, almost 4 years, Mr. Chairman. It is a very, very long, drawn out process.

We hope that through the Jackson bill, which is now pending before Jackson's committee, that we will be able to speed up that process eventually.

Senator HUDDLESTON. During this hearing process, what do you expect to develop? Are you looking for the feasibility of a particular plan to convert?

Mr. O'LEARY. Yes. I think that what we will hear is probably a good deal of information from the State and local air quality regulatory people. The utility will come in and make its point with regard to the availability of coal and the capacity of a plant to accept coal. Although you understand that we have to make findings with regard to the technical feasibility of conversion and the economic feasibility of the conversion prior to issuance of the NOI.

Senator HUDDLESTON. Did EPA play a significant part?

Mr. O'LEARY. Yes, we worked like Hansel and Gretel. Hand in hand down this path together.

Senator HUDDLESTON. That is not an easy alliance, especially on the same path.

Mr. O'LEARY. I think the reason that we are holding each other's hands is because we don't want them in each other's pockets, Mr. Chairman.

Senator HUDDLESTON. Do you have those figures now? I would assume that in a long-term program such as this your expenditures for coal conversion have not been very substantial.

Mr. O'LEARY. They have not been substantial in terms of the overall program, but there is a certain amount of expense associated with the economic and environmental checks that are necessary in advance of the issuance of the NOI's and, of course, in the litigating process. From here on out, there will be additional expense, Mr. Chairman.

Mr. Howell now has those numbers that you were asking for.

COAL CONVERSION FUNDING

Mr. HOWELL. Yes. We are going up from $2,071,000 in 1977 to $5,807,000 in 1978.

Senator HUDDLESTON. What about prior to 1977?

Mr. HOWELL. We had $1,519,000 in 1976.

Senator HUDDLESTON. That was an accelerated program?

Mr. HOWELL. It is an accelerated program and one from which we hope to derive great benefits.

Senator HUDDLESTON. Have any of these appropriations from previous years been diverted to other uses in past years?

Mr. HOWELL. To the best of my knowledge, no; although the program has not proceeded with the alacrity which I think everyone had hoped it would.

Senator HUDDLESTON. Could you provide for the record a specific breakdown of how these funds have been expended?

Mr. HOWELL. We would be happy to, Mr. Chairman.

[The information follows:]

J. 83-107—F. 12028—Klock 51498—2-4-0-3 6/7/77—C107BB.v01
J. 83-107—FOLIO 13038—B107BB.V01
J. R. Barton 04975—6-7-'77

J. 83-107—FOLIO 13038—A107BB.V01
MAN NO. 17262—COLIHAN—6-4-77

Coal conversion costs by type and by year

[In thousands of dollars]

	Fiscal year			
	1975	1976 and transition quarter	First half 1977	Total
Personnel and related support	348	1,291	720	2,359
Contracts:				
Environmental	488	469	71	1,028
Policy and program development	231	142	0	373
Technical evaluations	293	1,382	450	2,125
Total costs	1,360	3,284	1,241	5,885

CONVERSION ORDERS

Senator HUDDLESTON. Now, you mentioned your intent orders. How many plants have received final orders?

Mr. O'LEARY. Mr. Chairman, we have issued one final order throughout the life of the program, and my understanding is that was issued to a willing converter. I have to report to you that thus far under the ESECA legislation, which is pretty difficult legislation for us to administer, and, of course, a pioneer attempt, we would have not had what I would regard as a successful heads-up program.

That is why I hope that we can obtain the revised program that has been proposed in the Jackson measure that I mentioned earlier.

Senator HUDDLESTON. You don't have any plans to convert——

Mr. O'LEARY. There are a number of plants that have converted voluntarily in the industrial sector, but so far as our ordering authority goes, it has been very ineffective.

Senator HUDDLESTON. Have you found a way to expedite this?

Mr. O'LEARY. Yes. I think that I do, Mr. Chairman. The Jackson bill will make a substantial change in the burden of proof.

Right now, the entire burden rests upon us. One of the things the Jackson bill will permit us to do is to issue show cause orders and put the burden on the utility or the industrial converter. I think that that will be a much more orderly process.

Senator HUDDLESTON. President Carter's energy message to Congress on April 20 emphasized an increased effort in coal conversion, as you know. How do you plan to fund that expanded effort in 1978?

Mr. O'LEARY. Plans for funding an expanded fiscal year 1978 effort in coal conversion are not yet complete. An analysis of the President's national energy plan to assess its impact on the workload of the Office of Coal Utilization is underway. This analysis is not yet complete.

UNDERGROUND COAL MINE LOAN GUARANTEES

Senator HUDDLESTON. Under the Energy Policy and Conservation Act, FEA can guarantee loans for the development of new, small underground coal mines. Has this program been implemented?

Mr. O'LEARY. No. We are not requesting funds for that purpose, to implement that authority at this time, Mr. Chairman.

Senator HUDDLESTON. What is the reason for that?

Mr. O'LEARY. So far, we have not been able to bring together a sensible program in this area. We are working on that and it may be we will be asking for a supplemental as the year goes forward.

It seems to me that there are really two problems that ought to be addressed with that kind of a program. As you know, it runs to small mines producing low-sulfur coal. It seems to me that there may be a comparable problem in the anthracite region and we might want to take that authority and extend it not only to the conventional low-sulfur, bituminous coal, but to anthracite coal as well.

Senator HUDDLESTON. Doesn't the objective of increasing the production of coal by two-thirds put more urgency into that program?

Mr. O'LEARY. It does, indeed, Mr. Chairman. That is why I would suggest we would probably be coming up for a supplemental before very long to implement that authorization.

ERD COAL PROGRAMS

Senator HUDDLESTON. You have $948,000 allocated to coal programs, but most of the work cited in your justification seems to duplicate the work now being conducted by Interior agencies. Tell us why you need 28 people to conduct this program and explain what you have achieved to date and plan to achieve in 1978.

Mr. O'LEARY. The coal programs we are involved with do not duplicate the work being done in the Department of the Interior. Thus far FEA through its coal programs has assured that supplies of coal were adequate to meet demand and that transportation was available to move the coal from mine to market. Studies were conducted of the coal operator's mine expansion program through 1985 that detailed future production capacity. A coal mine monitoring system was initiated that identifies specific mine openings, problems encountered by the operators and provides a means for FEA to assist in overcoming these problems. An analysis was conducted of the coal rail transportation system servicing the East to insure that lines in need of repairs were considered for rehabilitation. Legislation relevant to coal was analyzed for its impact on coal production with recommendations made where warranted.

From these activities, it is apparent that supply is demand driven, but constant surveillance of the coal and transportation industries is necessary to overcome obstacles if production and utilization goals are to be achieved.

With regard to 1978, I think it would be best to briefly describe the various programs and the allocation of the 28 people to specific programs.

A major effort will involve the transportation and distribution of coal. Through this program we hope to insure that there will be adequate transportation to move the projected 400-million-ton increase in coal production by 1985 called for in President Carter's energy message. Nine people will be assigned to this program. Our metallurgical coal program is an assessment of the metallurgical coal supply/demand outlook through 1985 that will assist in establishing the basis for responsible use of production of this valuable resource. It will also enable us to maintain a reasonable coal export policy. We have four people working on this program. A continuing program is the coal mine expansion program. This involves the evaluation of the industry's production plans through the next decade to determine shortfalls and resolve any identified constraints that may inhibit target production goals from being achieved. Three people will be assigned here. We have initiated a program to determine the capacity of the coke industry. Coke is made from metallurgical coal and is essential to the production of steel. A preliminary study has revealed that within the next decade coke capacity may not be sufficient to meet steel demands. An early assessment will enable us to take actions in sufficient time to overcome any potential deficits. One person is assigned to this program. Another program is Pennsylvania anthracite. The primary objective of this program is to increase the production and consumption of Pennsylvania anthracite. One person will be assigned to this program. We are also working on a program that provides technical assistance to native Americans in developing coal resources located on their lands. Areas of assistance will include reclamation techniques, surface mining, socioeconomic impacts and state-of-the-art technology. Three people have been assigned to this program. The last program is a broad program that involves various aspects of western coal development. Primarily, it involves the identification and tracking of new mines and problems associated with bringing the mines into operation. This program will provide an early warning system of any problems as they may occur to achieving western coal production goals. Seven people are assigned to this program.

SELECTION OF SPR SALT DOME SITES

Senator HUDDLESTON. Let's turn to the Strategic Petroleum Reserve. I understand the FEA has made initial selections for salt dome sites for a capacity of 301 million barrels for the Strategic Petroleum Reserve program. Is that correct?

Mr. O'LEARY. That is correct. Mr. Noel, who administers that program, is here with me. He can provide any detail that you want, Mr. Chairman.

Senator HUDDLESTON. What is the status of the other potential sites such as Central Rock?

Mr. NOEL. Central Rock, Ky., and the original Ohio sites, which are both limestone sites, as you know, Mr. Chairman, are under active consideration. The Central Rock site and the Ironton site would serve

the same need and probably one of those two will be selected. The refinery whose needs would be served is the Ashland Refinery.

You are aware that I am visiting the people at that refinery tomorrow. The problem we have at the moment, as you are aware, is a national line from Potoca Parkway out to some kind of junction. There is a 24-inch line from there on out to the Ashland Refinery. The problem now is that refinery is full.

The problem is not in discharge. The problem is could either of those two sites be filled using the existing supply and distribution center. I will know the answer to that after I meet with the company officials tomorrow.

Senator HUDDLESTON. It is under active consideration?

Mr. NOEL. Yes. I think, as you understand, as your personal staff has been briefed, there is considerably less flexibility with respect to those sites than there is with respect to the gulf coast sites. There is a need there, and one way or another, we must meet that need.

It is under active consideration.

SPR STORAGE FACILITIES

Senator HUDDLESTON. You are requesting more than $470 million for storage facilities. How much of the early storage capacity of 250 million barrels is already online and how much needs to be acquired?

Mr. NOEL. Of the total 511 million barrels of storage capacity shown in the amended budget submission for the 500-million-barrel reserve, 369 is available as capacity in existing salt dome, salt mine, or limestone mine cavities which are candidate storage sites. The additional 142-million-barrel capacity will be developed by leaching new caverns at two of the salt dome sites.

Four sites with 307 million barrels of storage capacity—Bryan Mound, West Hackberry, Bayou Choctaw, and Weeks Island—have actually been selected and a declaration of taking has been filed for each. The remaining sites listed are representative candidates for selection and are shown for budgetary planning purposes.

None of these sites may be considered as being online at the present time. Access to existing capacity by means of injection wells and pipelines must be provided and brine disposal facilities must be installed. However, much of the preliminary work required has been done and we expect the first three storage facilities—Bryan Mound, West Hackberry, and Bayou Choctaw—to come online during the third quarter of calendar year 1977.

I will submit a table setting out the figures I've been discussing.

[The information follows:]

- 500 MMB STORAGE RESERVE SITE CAPACITIES -

Site	Existing Capacity of Sites Selected 1/	Existing Capacity of Candidate Sites 2/	Additional Capacity to be Developed 3/	TOTAL
Bryan Mound	63	---	---	63
Bryan Mound Expansion	---	---	66	66
West Hackberry	61	---	---	61
West Hackberry Expansion	---	---	76	76
Bayou Choctaw	94	---	---	94
Weeks Island	89	---	---	89
Cote Blanche	---	27	---	27
Central Rock	---	14	---	14
Ironton	---	21	---	21
TOTAL	307	62	142	511

WEATHERIZATION PROGRAM

Senator HUDDLESTON. The request for your weatherization program is $65 million, the full authorization. Tell us first what you plan to do with the $27.5 million appropriated to start this program in the supplemental.

Mr. O'LEARY. The $27.5 million fiscal year 1977 supplemental appropriation will be used to make initial grants to the States. We anticipate that all grants to States will be made by September 30, 1977, with the funds apportioned in accordance with the proposed formula published in the *Federal Register* on April 1, 1977.

Senator HUDDLESTON. There has been some discussion as to which agency or agencies would be responsible for the weatherization program. Is it now settled how this program will function?

Mr. O'LEARY. Yes, Mr. Chairman. There was some confusion as to the proper role for CSA and that of FEA in this area. That arose in the course of a request that FEA made for a $55 million supplemental for the current fiscal year.

The result of that was to cut in half that appropriation giving half to FEA and half to CSA. My interest in that, Mr. Chairman, was that FEA have some hands-on experience with the organization prior to becoming responsible for the very much larger weatherization program that the President has described before the Congress in the recently announced energy plan.

I think that the $27.5 million provides ample scope for our obtaining the necessary hands-on experience in that region. So I am quite content with that break.

Senator HUDDLESTON. CSA has been doing this longer and has the organization for it. Why shouldn't we just let that agency carry on this program?

Mr. O'LEARY. The FEA weatherization program has been specifically designed to achieve energy conservation goals through a highly concentrated effort for the improvement of thermal efficiency of targeted dwellings. The program is narrow in focus and designed to meet long-term goals through the installation of insulation and other weatherization materials. It is one major aspect of the President's

stated goal that 90 percent of all American homes be properly weatherized. Of course, the complement to the low-income weatherization approach is the insulation tax credit which is aimed at moderate or high-income homes which require weatherization. Consequently, the low-income weatherization program is an integral part of the larger weatherization effort. CSA's program, on the other hand, is predicated on social objectives and is typified by a combination of both long-term and short-term emergency efforts, including weatherization, input to utility ratemaking proceedings, and crisis intervention activities. It is also important to note that somewhat more than one-third of the Nation's counties are uncovered by community action agencies, who are the delivery agencies for CSA's weatherization program, while the FEA program is aimed at all of the Nation's low-income population.

Senator HUDDLESTON. Your weatherization request includes more than $800,000 for administrative costs. Couldn't that be saved if we let CSA run the program?

Mr. O'LEARY. No. If CSA were to receive additional funding, it would be necessary to expand their program—currently it covers somewhat less than two-thirds of the Nation's counties—to effect consistency with the new administration's energy conservation goals. Program expansion of this nature would necessitate additional administrative funds because a larger staff would be required to administer and monitor the program.

Senator HUDDLESTON. Right or wrong, considerable funding also went to the Community Services Administration in HEW to conduct the same kind of weatherization program. How will you coordinate this work?

Mr. O'LEARY. While both FEA and CSA are authorized to operate a weatherization program, there are some important differences. The FEA weatherization program is both narrow and concentrated, aiming at maximum energy conservation through increased thermal efficiency of low-income dwellings. The CSA program is a broad base, socially oriented program of which weatherization is only a part.

FEA and CSA have been coordinating on their respective weatherization programs even before FEA received its statutory authority with the passage of ECPA in August 1976. On September 23, 1976, representatives of Mr. Zarb and Mr. Martinez met to determine the direction and pace of the coordination which is mandated by the legislation. Since that meeting coordination at the staff level has been both continuous and extensive, taking the form of meetings, telephone conversations and written communications. Every effort is being made to insure that FEA's weatherization program supplements but does not supplant existing weatherization programs.

Senator HUDDLESTON. Is the administration advancing any recommendations to consolidate the weatherization effort?

Mr. O'LEARY. No, each program has its role—FEA's thrust being the conservation of energy and CSA's thrust the achievement of social objectives. Coordination between FEA and CSA has been such that the two programs will complement each other rather than operate at cross purposes.

Senator HUDDLESTON. There are some weatherization projects financed under title X, which probably won't be renewed, but which

probably won't be completed before title X is phased out. Will an effort be made through the weatherization program to complete these projects that are already underway with funding from other programs?

Mr. O.Leary. I am not aware of the point that you are making here, Mr. Chairman, but we will note it. It seems to me that it is totally inappropriate for us to have a half-completed job and, if that is the case, we will discuss with CETA and CSA and see if there is a way to——

Senator HUDDLESTON. Clean up those projects?

Mr. O'LEARY. Yes.

WEATHERIZATION ACCOMPLISHMENTS

Senator HUDDLESTON. The weatherization program is currently authorized through fiscal 1979. If your appropriations requests are provided, what do you expect as an accomplishment by the end of that period?

Mr. O'LEARY. Under the initial request, we are looking to weatherization of about $1.4 million low-income housing units. That will be reduced, of course, because of the reduction to $27½ million from our initial request of $55 million for this fiscal year.

Mr. Chairman, I am advised that the reduction in funding in the supplemental weatherization program reduces the overall target from 1.4 million that I referenced, to 1.2 million units.

Senator HUDDLESTON. How does that relate to whatever figures you have on projected need?

Mr. O'LEARY. Mr. Chairman, that is not a large chunk of the need. The fact is——

Senator HUDDLESTON. You are just beginning?

Mr. O'LEARY. We are just beginning this program. This is the sort of thing we are going to have to do over the next 7 to 8 years in order to meet the President's objectives.

Senator HUDDLESTON. Does this take into account the efforts that will be made, for instance, by TVA?

Mr. O.Leary. There are a number of programs that are complementary. Some State programs, for example my own State of New Mexico, have weatherization programs that they administer and help.

Senator HUDDLESTON. That is in the supplemental?

Mr. O'LEARY. There are quite a number of pieces to this puzzle to put together.

ADMINISTRATIVE EXPENSES OF STATE GRANT PROGRAM

Senator HUDDLESTON. Under the State grant program, in which participants develop five energy conservation activities, what portions of the $47 million will go for administrative expenses?

Mr. O'LEARY. Mr. Howell will help us with that, Mr. Chairman.

Mr. HOWELL. As far as the actual administrative costs on that, Mr. Chairman, I would like to supply it for the record.

Senator HUDDLESTON. I think that that would be helpful. Also, what portion of the supplemental grant fund would be devoted to administrative expenses.

[The information follows:]

ADMINISTRATIVE EXPENSES

It is important to note that FEA's administrative expenses for managing both the Base and Supplemental State Energy Conservation Programs are not included in the grant awards requested for those programs. The $47 million and the $23.5 million referred to are the amounts that will be given to States for the implementation of their programs. (The budget includes $3,348,000 for the FEA's administrative expenses.)

For the Base Program, States must include in their energy conservation plans five required program measures and any number of additional program measures deemed appropriate for reaching the State percentage reduction goal. Three additional required program measures are specified for the Supplemental Program. It is left up to each State's best judgment as to how the grant funds should be spent in order to meet the legislated requirements most effectively and achieve their 5 percent goal. There is no restriction stated in the legislation or either program's guidelines on administrative versus operational expenditures.

GOALS OF STATE CONSERVATION GRANTS

Senator HUDDLESTON. You are budgeting nearly $74 million for State grants. What can we expect to get in terms of real energy conservation for that investment?

Mr. O'LEARY. Of the $74 million requested, $50 million is for the original State energy conservation program and $24 million is for the supplemental program. Of the $50 million for the original program, $47 million would be made available in direct grants to States for implementation of energy conservation program measures. Based on the 23 State plans we have reviewed to date, 1,952 trillion Btu's of energy savings are projected for the amount of funding allotted for those States. This figure assumes a continued level of financial support for the program from various sources through 1980. Projecting the same average Btu/dollar ratio for the remaining States, total U.S. savings would be 4,496 trillion Btu's, which represents 5.47 percent of forecasted 1980 consumption.

Of the $24 million for the supplemental program, $23.5 million is proposed for direct grants to the States. Because of the different programmatic content of the supplemental program, the same Btu/dollar ratio cannot be assumed for the calculation of savings. FEA assumes that, with funding of the total fiscal year 1978 request for the supplemental program, from 12.5 million to 15.7 million dwelling units could be audited. This assumes that $15.7 million of the grant funds would be used for home energy audits and that those audits would cost the State from $1.00 to $1.25 per unit. The figures are based on calculations from the project conserve program and those programs using the "Home Energy Savers' Workbook." It also assumes that $7.8 million of the grant funds would be used for other phases of the supplemental program. Assuming that 25 percent of these homeowners acted on the results of the audit by taking the necessary retrofit actions and by adjusting their thermostats to suggested levels, estimated savings as a result of the program would be between 14.9 and 19.0 trillion Btu's.

Therefore, the total amount of real energy conservation that can be projected for 1980 with a $74 million investment in 1978 and continuation of the State programs through 1980 is over 4,500 trillion Btu's.

STATUS OF 1977 GRANTS

Senator HUDDLESTON. What has been achieved to date with the $25 million appropriated last year for basic State grants and how much of it has been obligated?

Mr. SENECA. The final guidelines for the basic State energy conservation program, which were issued on October 28, 1976, established that the State plans would be due on March 28, 1977, after a 5-month planning period. FEA adopted internally a 45-day period in which to review and approve the plans, so the first grant awards for the implementation phase of the original program were not expected to occur until mid-May 1977. A few States were able to submit their plans prior to March 28—a few grants will therefore be awarded sooner than originally expected. For example, on April 18, 1977, a grant to implement the first phase of its plan was awarded to the State of Massachusetts in the amount of $563,000, making Massachusetts the first State to receive funding for the first year's implementation of its plan.

The granting of all available funds may not be completed until September 30, 1977, for several reasons. First, because of their attention to the severe winter and other administrative reasons, nearly half the States have asked for and received extensions for plan submission. The FEA review period for the last of those plans will expire mid-August. Second, should any States fail to submit an approvable plan, FEA intends to reapportion the funds originally allocated for those States to the other States with an approved plan. In this case, States with an approved plan would submit a modification to their basic plan which would be reviewed and approved prior to grant award of the reapportioned funds. Although it appears now that all the States will probably submit an approvable plan, the reapportionment process could continue through September 30, 1977.

In summary, no implementation grants were awarded during either the first or second quarter of fiscal year 1977. We anticipate that the majority of States will have their plans approved and grants awarded during the third quarter. It is estimated that nearly $14 million will be obligated by June 30, 1977, based on present plan deadlines and an assumed 45-day turnaround period.

Senator HUDDLESTON. How many States are participating in the basic grant program to date?

Mr. O'LEARY. In fiscal year 1976, FEA granted nearly $5 million to 55 "States" to be used in developing their energy conservation plans. A 56th eligible "State", the Trust Territory of the Pacific, chose not to participate in the program and did not apply for planning funds.

As of April 25, 1977, 25 "States" had submitted energy conservation plans to FEA for review and funding according to the provisions of the Energy Policy and Conservation Act. The remaining 30 participating "States" have filed for and received extensions of time to submit their plans. Extensions of time will run no longer than July 1, 1977. It appears at this time that all 55 "States" will have submitted approvable plans by June 30, 1977.

ADMINISTRATIVE AND CONTRACTING COSTS

Senator HUDDLESTON. The administrative costs for the State grant program seem high—$3.3 million, including $1.6 million in contracts. Why so high, and who so much contracting for grant administration?

Mr. O'LEARY. In the budget requests for the original and the supplemental program, FEA has requested a total of $3.3 million for support, including approximately $1.6 million in contract funds, the remainder being for personnel costs to support 52 positions and some extraordinary printing requirements. Of the 52 positions, 17 will remain in the national office and 35 are designated for regional offices. The regional offices are responsible for direct contact with States, the review and approval of plans and the granting of funds. The national office is primarily responsible for policy determination, development of program guidelines, provision of grants management assistance, consumption forecasts and data acquisition, program evaluation and development of technical assistance materials.

This program entails considerably more than the usual mechanics of grant administration. Because of the newness and technical complexitities of energy conservation strategies, an extraordinary amount of technical assistance must be provided. The need for technical assistance encompasses considerable staff activity for plan analysis and coordination of ideas and policies, as well as the development of technical materials, for which contracting with specialists is essential.

Of the funds requested for contracts, approximately $1.4 million would be designated for use in developing materials which would be useful to States in the implementation of their plans. Examples of the work to be completed include the updating of information on conducting energy audits, transportation control alternatives, and information pertaining to the relative energy efficiency of items most commonly purchased through State procurement procedures.

The remaining $200,000 of the contract request would be used in the evaluation of the relative effectiveness of the program management and energy savings. Finally, a total of $289,000 has been requested for extraordinary printing made necessary by the volume of printed material anticipated for distribution to State governments.

Senator HUDDLESTON. With 52 people running the grant program, we will need strong justification for the contracting.

Mr. O'LEARY. A primary focus of the State program has been the viability of the State as a mechanism for the promotion of energy conservation. Not only is the State familiar with its own needs, but it also has several legislative, taxing, outreach, and political capabilities not available to the Federal Government. Therefore, States have been considered a primary facilitator of energy savings.

However, the area of energy conservation is relatively new. The development of technology and/or information has not caught up with the need for energy conservation. As an example, one program measure to be included in each State plan requires States to adopt standards and policies relating to energy efficiency in State and local procurement practices. Although the issue had been under consideration by several groups in and out of Government, no concrete system is available to States who desire continuing information regarding such things as life-cycle costing and product efficiency.

The substantial request for contract funds is to assemble and develop information for use by States in the implementation of energy conservation plans. Few States have the technical capacity to conduct their own energy conservation program; most are, therefore, reliant on the greater resources of the Federal Government in this area.

The vastness and diversity of the amount of information that might be relevant to various energy conservation efforts, and particularly the level of technical expertise necessary to analyze and synthesize it, require FEA to obtain short-term technical support through contracting with knowledgeable firms. The requested staff positions are needed for the purposes described in the answer to the previous question, but must be augmented with contractor services for specialized technical purposes.

FOREIGN INVESTMENTS

Senator HUDDLESTON. According to the budget justification FEA has responsibility for monitoring foreign direct investments in U.S. energy sources and supplies. I believe there is $70,000 in the fiscal year 1978 budget for this.

Under what authority does FEA do this monitoring?

Mr. O'LEARY. My understanding, Mr. Chairman, is this is done under the organic charter of the FEA itself.

Senator HUDDLESTON. How do you proceed to monitor this?

Mr. O'LEARY. We monitor trade journals. We have a number of State Department sources of information on this. We are in constant touch with the financial community to find out what is happening in this area. It is not a large program, as you can see, but in conjunction with the Treasury Department, which has a comparable program, we manage to piece together a fairly good view of how investments are going in this area.

Senator HUDDLESTON. Can you require from industry or business information on their outside investments?

Mr. O'LEARY. Yes, we can. We do not do this as a matter of mandatory reporting, but we do have that authority, Mr. Chairman.

ENERGY RESERVES DATA BASE

Senator HUDDLESTON. There is widespread concern over the data currently available on energy reserves, production, consumption, and the like. What is the FEA doing to improve our data base?

Mr. O'LEARY. We have an extensive program. As a matter of fact, the request this year is close to $40 million all told for the data base.

Senator HUDDLESTON. What was that figure again?

Mr. O'LEARY. Very close to $40 million, Mr. Chairman, which is a significant step up from the level of 1977. Included in that increase will be $2 million directed at the very point that you have just made and an updated reserve study.

If you would like, I will tell you how we go about that.

Senator HUDDLESTON. Very good. I would like to hear that.

Mr. O'LEARY. Mr. Chairman, what we do is obtain access to the reserve estimating procedures of the industry by participating with them in their regional geologic groups that together provide the Amer-

ican Gas Association and the American Petroleum Institute reserve data.

When we have done that, we will finally get to the point where we have isolated reserve data with regard to a reservoir or a number of reservoirs on a disaggregated basis.

We will then hire contractors, very competent firms in this field, to go in and review this same reservoir. We will then find out whether or not we track the esimates that are being done by the industry committees.

In fact, in the past we have found that there is a significant variation between the numbers that the industry groups have come up with and those that our contractors have come up with.

This variation would run from 10 percent as kind of a minimum figure to better than 50 percent in some instances. In looking at the aggregate of the data, however, thus far we have found that we have come up about the way that the industry does.

We want to take another much more careful look to see if we can explain the wide individual variations. Is this a matter of methodology? Is it a matter of subjective judgment? That is why we want to go forward with this $2 million program.

Mr. Chairman, that won't end this matter by any means. It seems to me that in the next few years, particularly in light of the President's own program, we are going to have to put an enormously increased emphasis on obtaining good data in these areas.

My own view is that when we finish this process we are not going to find that the existing data are bad. The existing data have convinced us that they are not believed. What we would like to do is get to the point where we have sufficient confidence in the data so that the executive branch and the legislature can operate with confidence on the basis of these numbers.

That is going to take some doing and some little time.

Senator HUDDLESTON. It is. That has certainly been one of the major stumbling blocks since I have been here to having a comprehensive energy program. No one has ever been really sure what the situation was.

Mr. O'LEARY. Maybe they have, Mr. Chairman.

FIRMS USED IN DATA GATHERING

Senator HUDDLESTON. What kind of organization do you contract with?

Mr. O'LEARY. We contract in this area with competent geologic firms that have a well demonstrated track record that are used by industry.

Senator HUDDLESTON. They are independent firms?

Mr. O'LEARY. Yes. They have a very, very high level of professional competence.

TRAVEL INCREASE

Senator HUDDLESTON. Let's go back to some of the more specific questions on the budget request.

Overall, for salaries and expenses, you show $6.9 million for travel. This is an increase of $1 million from your original 1977 appropriation. How do you justify this increase?

Mr. O'LEARY. Mr. Howell.

Mr. HOWELL. The majority of this increase will be the increased activity and the compliance program. As you know, in the past we have had some problems concerning this program. We think that we have finally gotten a good program now. Quarterly work plans have been projected and, as a result of this, a good part of these moneys will go into travel of auditors in the field to make sure that crude producers are properly audited, and we have the proper funds to make sure that the entire compliance program is brought up to a peak of efficiency.

We think that our returns will be at least 10 to 1. For every $1 spent, we will recoup for the Federal Government at least $10.

PRINTING AND REPRODUCTION INCREASE

Senator HUDDLESTON. You show a sharp increase for printing and reproduction from $1.4 million to $2.9 million. What is this needed for?

Mr. HOWELL. In reproduction some of the things that will be needed are a result of EPCA, such as the mileage guides I will be glad to give you a detailed breakout of this add-on of $1.5 million, Mr. Chairman.

Senator HUDDLESTON. I think that that would be helpful.

Mr. O'LEARY. Mr. Chairman, along that line, for the mileage guide alone, we have produced 20 million copies of the small brochure that is available at every car dealer around the country, which shows comparative mileage for all of the brands of cars.

Senator HUDDLESTON. That is a function of your office?

Mr. O'LEARY. Yes, sir.

Mr. HOWELL. This was some $600,000 last year.

STRATEGIC PETROLEUM RESERVE REQUEST

Senator HUDDLESTON. We are now into the program with the big money, the Strategic Petroleum Reserve for which FEA is now requesting some $3 billion.

The Strategic Petroleum Reserve request involves rapid acceleration which even exceeds FEA's own approved plan, as I understand it. How much of this request is authorized and what is the congressional status of new authorizing legislation?

Mr. O'LEARY. Mr. Chairman, it was my understanding that this is entirely authorized, although the initial target will be about 150 million barrels, there is authorization for 500 million barrels in our statute. The problem here is really one of funding. We are requesting this acceleration of the program because of Dr. Schlesinger's, the President's and my conclusion that the public interest demands that we fill the Strategic Petroleum Reserve as rapidly as possible to avoid the severe dislocations that would be associated with a cutoff of petroleum imports.

Senator HUDDLESTON. This will require amended legislation for the acceleration, won't it?

Mr. O'LEARY. I don't think so, Mr. Chairman. Mr. Noel will address that.

Mr. NOEL. We do not believe that amendments will be required up to the level of 500 million barrels, sir. As you are probably aware, the Strategic Petroleum Reserve plan which was approved a week ago last Monday contemplated 500 million barrels.

Senator HUDDLESTON. You have language, though, in your request that provides that $1,016,300 of this appropriation shall be available only upon enactment into law of authorizing legislation.

Mr. NOEL. That is correct, Mr. Chairman. It was correct at the time that it was submitted. However, the SPR plan has now been approved up to 500 million barrels. It is my understanding that the appropriate information——

Senator HUDDLESTON. You do not believe so at this time?

Mr. NOEL. I do not believe so at this time. That caveat was correct when the packet was sent to the Hill. However, I believe that has been amended and, therefore, the authorization of the SPR plan as submitted would change that.

Mr. O'LEARY. Mr. Chairman, the President last Wednesday announced that the objective would be raised to 1 billion barrels and that, in all likelihood would require a new authorization.

Senator HUDDLESTON. Yes. Well, if we keep our appropriation schedule, we will complete action on this appropriation in June or July at the latest. Is it likely in your judgment that the accelerated plan will have been cleared by Congress before we act on this appropriation?

Mr. O'LEARY. I think, as Mr. Noel indicated, we already have the authorization and the plan went before the Congress in late March—was it, Mr. Luedtke? The strategic stockpiling?

Mr. LUEDTKE. I think so.

Mr. O'LEARY. And, if necessary, the statutory 45-day period was cleared last week. So this is an approved plan as we interpret it now.

CAPACITY TO MEET STRATEGIC PETROLEUM RESERVE GOAL

Senator HUDDLESTON. Assuming that you have the authority and the appropriation, are you confident the FEA has the capability to meet that goal?

Mr. O'LEARY. No. I am not confident, Mr. Chairman. The ground rules for this estimate were a 75-percent probability of being able to fill. It may be that we will be 1 month to 3 months, perhaps, into the next calendar year, prior to completion of the fill objective. In this case, Mr. Chairman, I strongly urge that it is worthwhile in erring on the side of prudence in getting that stockpile up.

I have in that context, as I said to Senator Stevens a little earlier, directed a letter to a number of Members of Congress, including the chairman of the full committee and Mr. Stevens, relative to the absolute urgency of honoring the full budgetary request for this program, primarily because of the interpretation abroad that would be placed on the failure to authorize the full program.

I think that it is absolutely essential that we show a national will to achieve the stockpile objective, Mr. Chairman.

STRATEGIC PETROLEUM RESERVE CONSTRAINTS

Senator HUDDLESTON. You refer on occasion in your language relating to this acceleration that it "appears feasible." What constraints are you concerned about when you talk about feasibility?

Mr. O'LEARY. Let me just take you through the first part of the exercise. We own at the moment, only one of these storage facilities. We are going to have to go ino a testing program. We can't get access to these facilities to test them until we actually have title.

It may be that as we go down the line, although we think that they are going to be all right, we will find that one, or maybe all, are simply not competent to accept fill. That is one possibility.

Senator HUDDLESTON. You can't test them until you use them?

Mr. O'LEARY. We can't get on the structure until we have the title.

Senator HUDDLESTON. That could be a very expensive thing, a very expensive proposition.

Mr. O'LEARY. That could be an expensive proposition, Mr. Chairman. Of course, that is discounted in the purchase price that we provided. Mr. Chairman, I think you should know we have a very high confidence level that we are going to be all right on these.

STORAGE SITES

Senator HUDDLESTON. The engineering science is available on this?

Mr. O'LEARY. Yes. They have been used for storage purposes in the past. Mr. Noel will give you further information on that.

Mr. NOEL. I might just add a little bit. Some of the ones we propose using are presently in use for storing the product now. Others have been used for hydrocarbon storage, primarily the five gases.

Some of the caverns we are talking about have gasoline in them; some ethane; some No. 2 heating oil. In addition to that, we have had over the last year or so some very detailed technical feasibility work done.

It is also true that each of the sites that we presently contemplate have been operating under very reputable firms such as Dow Chemical and Allied Chemical. They have onsite engineers who have grown up with these caverns over a period of time.

As a matter of fact, the overall executive engineer who is responsible for conducting the testing program was formerly an employee of one of these firms. He was responsible for the engineering portion of the firm, so perhaps it would be best to describe these tests as confirmatory tests. I should point out that even if some of the caverns turned out not to be suitable for our purposes, the rest of the salt mass and the location with its access to existing distribution systems and all the rest make it a desirable purchase even for that reason.

As Mr. O'Leary pointed out, the appraised cost or the appraised value of these sites presumes nothing about the reliability of the caverns, even though we expect that they will prove to be reliable.

STRATEGIC PETROLEUM RESERVE OBLIGATIONS

Senator HUDDLESTON. To date, a total of more than $760 million has been appropriated for the reserve and most of that was not obligated at the beginning of 1977. You are estimating all of that will be obligated by September 30. Is that still an accurate estimate?

Mr. O'LEARY. That is, Mr. Chairman.

Senator HUDDLESTON. What is the current unobligated balance of reserve funding?

Mr. NOEL. There was appropriated for fiscal year 1976, the TQ and fiscal year 1977 a total of $761.8 million. Estimated obligations to April 30, 1977, were $238.9 with another $85.7 committed. This leaves us with an available balance of $437.1 million; $324.6 million of the balance available is for the purchase of crude oil; $97.3 million is for construction activities, with the balance for planning contracts and salaries and expenses for personnel.

Mr. HOWELL. It might be pointed out, Mr. Chairman, that this is no-year money.

Senator HUDDLESTON. I beg your pardon?

Mr. HOWELL. These are no-year moneys.

Senator HUDDLESTON. The budget projects no unobligated balance at the end of fiscal 1978. Are you realistically saying that you will fully obligate $3 billion in 1978 on top of any 1977 carryover?

Mr. O'LEARY. With the caveat that I gave you earlier, Mr. Chairman. That is that we have asked the staff not to figure 100-percent confidence. That is a very conservative number. But one with 75 percent confidence; that maybe there will be a carryover of another 2 or 3 months.

Mr. NOEL. The figure, Mr. Chairman, by the end of this fiscal year will be $447.8 million we expect to have obligated.

Senator HUDDLESTON. This is over half.

Mr. NOEL. Yes, sir. But there is the tremendous increase, as you can understand. Roughly 90 percent of the cost of the program is in inventory. And, it is simply when you begin buying the oil that that occurs.

For example, during this fiscal year we will purchase a relatively small portion of the oil. However, over the next 12 fiscal months we purchase the bulk of that oil.

Senator HUDDLESTON. Once your sites are set and approved you can expend it pretty fast when you start actually buying oil.

Mr. NOEL. Absolutely. And there is a very long leadtime involved in preparing for the beginning of fill which will occur in July of this year. We intend to have two sites starting fill in July, this summer; a third one in October. Our estimates, I think, are very sound. Our expectations are very sound based on this.

As I am sure you realize, we are talking about between a 3- to 5- month environmental process. State permits that—not State permits but State compliance with regulation with respect to air and water quality. All of these things. Some of this has been spent, if you will.

We really see no impediments to our beginning this July. Four sites have been selected, and as Mr. O'Leary pointed out, we have access to one site already. We will have in the next 10 days access to at least two more.

REASSESSMENT OF OBLIGATIONS

Senator HUDDLESTON. The committee is always a little concerned about the ability to meet these large obligations as quickly as some-

times we think we can. Will you give us an update, say within 30 days, and reassess your ability to obligate these funds?

Mr. O'LEARY. Mr. Chairman, we will have all of the information for that sort of update within the next 2 weeks. We will have access to the other sites that are contemplated to hold our intermediate fill level. And, we will be able to give you, I think with precision, a fill schedule then with a much higher degree of reliability than we could even 1 month ago.

Senator HUDDLESTON. Please do that for the record.

Mr. O'LEARY. We shall.

[The information follows:]

The fill and outlay chart which follows is the same one submitted earlier with our FY 1978 budget request. The schedule for filling the Reserve has remained essentially unchanged. This schedule was based on the assumption that of the four sites selected for initial storage three would be acquired by the end of May.

The FEA has succeeded in acquiring these three sites and has begun cavern testing at one (West Hackberry in Cameron Parish, Louisiana). The FEA has just been granted possession of the other two sites, Bryan Mound in Brazoria County, Texas and Bayou Choctaw in Iberville Parish, Louisiana; mobilization is now getting underway. The achievement of these milestones as planned serves to reconfirm the schedule of oil acquisition outlays as shown below:

OIL BUDGET AUTHORITY AND OUTLAYS FOR ACCLERATED 500 MMB PROGRAM
250 MMB by 12/78 and 500 MMB by 12/80

			OIL PURCHASES						OIL DELIVERIES					CUMULATIVE	
			QUANTITY OIL PURCHASED		OBLIGATIONS		BUDGET AUTHORITY	UNOBLIGATED BALANCE	QUANTITY OIL DELIVERED		OUTLAYS REQUIRED		OUTLAYS		
FY	QTR	OIL PRICE	By QTR (MB)	By Yr (MB)	By QTR ($000)	By Yr ($000,000)	By Yr ($000,000)	By Yr ($000,000)	By QTR (MB)	By Yr (MB)	By QTR ($000)	By Yr ($000,000)	PLANNED ($000,000)	OIL PURCHASED (MB)	OIL DELIVERED (MB)
	1	---	---		---				---		---		---	---	---
	2	11.40	---		---				---		---		---	---	---
77	3	11.40	2,760		31,464				---		---		---	2,760	---
	4	11.40	14,960		170,544				2,760		31,464			17,720	2,760
				17,720		202.0	440.0	238.0		2,760		31.5	44.0		
	1	11.40	20,700		235,980				14,960		170,544			38,420	17,720
	2	11.98	59,530		713,169				20,700		235,980			97,950	38,420
78	3	11.98	82,350		986,553				59,530		713,169			180,300	97,950
	4	11.98	70,160		840,517				82,350		986,553			250,460	180,300
				232,740		2,776.2	2,538.2	---		177,540		2,106.2	2,093.7		
	1	11.98	28,750		344,425				70,160		940,517			279,210	250,460
	2	13.10	36,560		478,936				28,750		344,425			315,770	279,210
79	3	13.10	40,280		527,668				36,560		478,936			356,050	315,770
	4	13.10	23,280		304,968				40,280		527,668			379,330	356,050
				128,870		1,656.0	1,656.0	---		175,750		2,191.5			
	1	13.10	43,900		575,090				23,280		304,968			423,230	379,330
	2	13.84	32,100		444,264				43,900		575,090			455,330	423,230
80	3	13.84	28,140		389,458				32,100		444,264			483,470	455,330
	4	13.84	16,530		228,775				28,140		389,458			500,000	483,470
				120,670		1,637.6	1,637.6	---		127,420		1,713.8			
	1	13.84							16,530		228,775			---	500,000
	2	13.84							---		---			---	---
81	3	13.84							---		---			---	---
	4	13.84							---		---			---	---
				---		---	---	---		16,530		228.8			
	1	13.84													
	2	13.84													
82	3	13.84													
	4	13.84													
TOTAL		---		500,000		6,271.8	6,271.8			500,000		6,271.8		500,000	500,000

NOTE: 500 MMB program derived from SPRO accelerated fill schedule for a 500 MMB and 750 MMB system; undeveloped dome site is dropped.
Obligation authority required three months before delivery; outlays occur at time of delivery.

IMPORTS VERSUS DOMESTIC PRODUCTION

Senator HUDDLESTON. Building up this reserve, do you have any objective as to what proportion of that you would buy from domestic production and what you would buy from imports?

Mr. O'LEARY. No, Mr. Chairman. The way the world is situated today if you do buy from domestic production, it simply implies a requirement for an additional import. So, what we are trying to do is get the lowest private price and the most versatile oil that we can into storage. Versatile in the sense that we need something that will fit the maximum number of requirements.

Senator HUDDLESTON. So economically or from the standpoint of supply it doesn't make a whole lot of difference whether you get it domestically——

Mr. O'LEARY. It really doesn't. We are limited by the requirement to stay at the U.S. composite, which is to say, to use the entitlements program. The consequences that either a direct import or an import once removed is indifferent so far as the overall cost to the economy is concerned.

ACQUISITION OF STORAGE FACILITIES

Senator HUDDLESTON. You are requesting more than $470 million for storage facilities. I think you already indicated how much of the early storage capacity is online and how much you need to acquire.

Do you anticipate the acquisition of storage facilities can become a problem in reaching these goals?

Mr. NOEL. No, sir. We do not simply because of the information I mentioned previously. We have completed very significant, very detailed environmental and technical feasibility work on the eight candidate sites, which included the two you addressed previously.

Senator HUDDLESTON. Does that cause any major problems in the environmental aspects of it?

Mr. NOEL. No, sir. As a matter of fact, the Environmental Protection Agency has concluded that the way we are proceeding is environmentally much more sound than alternatives, if you will. In other words, above-ground storage would generate significant air pollution, in the form of hydrocarbon emissions into the air that are a much greater problem.

We are able in any of these storage sites we are describing to minimize to, I think, an irreducible minimum the impact. Not only—but also economically and from an engineering point of view.

COSTS ASSOCIATED WITH STORAGE FACILITIES

Senator HUDDLESTON. At these facilities is there considerable expense on structuring or adapting the site to this use, or is most of the cost for site acquisition?

Mr. NOEL. No, sir, the reverse is true. The site acquisition is roughly 20 percent of the total cost of the facility. A typical site would cost between $10 and $20 million for acquisition of the salt mass itself and the associated rights-of-way and those materials acquired. On top of that you have a site expansion, a site development cost, not only underground but on top. I am talking about the pumps, the pipelines, the metering devices and all the rest. That amounts to another, let's say, $50 million.

Our facilities cost for the entire program——

Senator HUDDLESTON. This estimate is based on experience factors or guess?

Mr. NOEL. No. They are actual hard estimates, Mr. Chairman. And the reason is these types of facilities have been established not only in this country but also in the world. They are in South Africa, France, Germany. Japan is also building some facilities. I visited some of those sites as well as our own. We have shared information with them. There are, as I pointed out previously, facilities similar to these in operation in the private sector in this country today.

We know what pumps will cost. We have our designs in hand. It is largely a matter of costing out what a 750-horsepower pump is going to be.

IMPACT OF ACCELERATION OF STRATEGIC PETROLEUM RESERVE

Senator HUDDLESTON. There has been some concern over the impact of the reserve program on petroleum supplies. If this program is accelerated, what would be the impact? Is this a problem?

Mr. O'LEARY. Mr. Chairman, it would not be severe.

Senator HUDDLESTON. Have you studied this problem?

Mr. O'LEARY. We sure have. We have looked carefully at this. Although this is a large volume of oil in terms of our requirements it is quite a small volume in terms of the overall world demand for oil, and we will be on the world market. We don't anticipate that this will have any perturbing effect at all.

Senator HUDDLESTON. The prices of oil or gasoline will not rise?

Mr. O'LEARY. No.

Senator HUDDLESTON. Are there some specific advantages to the accelerated plan aside from just getting oil into storage?

Mr. O'LEARY. There are two advantages, Mr. Chairman, and we will probably save money in the long run; but I discount that. I don't regard that as enormously important. The real advantage of this is that it will get us as rapidly as possible to a point where we can stand the consequences of a cutoff. This is a strategic reserve, but we are entirely exposed at the moment.

I really think that the position of the United States given the kind of warning we have had in this area, is rather tragic.

COSTS OF MAINTAINING RESERVE

Senator HUDDLESTON. What kind of costs are you anticipating in maintaining this reserve once it is established?

Mr. NOEL. If we were to establish the program, the 500 million barrel program which we have the hardest data on now and we are presently working up the data to support the President's announcement of last week. But essentially if we were to complete the 500-billion-barrel program by 1980, which is our present plan, in subsequent years it would cost less than $10 million per year to maintain the system beyond the fill years. We have not been able with precision to predict beyond 5 years, but we expect on the order of $20 million would be required to maintain the system beyond 1980 once it is loaded.

POSSIBILITY OF STORAGE LOSS

Senator HUDDLESTON. Is there a loss in these storages?

Mr. NOEL. Inventory loss, sir?

Senator HUDDLESTON. Seepage; could you lose inventory that way?

Mr. NOEL. There is virtually no loss.

Mr. O'LEARY. We sure hope not.

Senator HUDDLESTON. Do you think somebody might drill into it from the other side?

Mr. NOEL. The slant well problem is a relatively minor one. I think it is fair to say that that is a relatively easy problem to solve.

The salt structures, first of all, are plastic under pressure. They are self-sealing. Therefore, there is very low likelihood that there will be any leakage in that way.

The experience in industry is with storing liquified gases. It is unlikely that they lose more than one-tenth of 1 percent in their ins and outs. In other words, it is a very low loss rate and a very high recovery rate.

Perhaps we can anticipate due to the high viscosity of oil as compared—that there might be more sticking to the sides of the cavern than ethylene. But still we expect it to be a very low number. Nothing like, for example, a depleted oil reservoir which has been recommended to us.

MONITORING OF STORAGE FACILITIES

Senator HUDDLESTON. The monitoring and metering devices are developed to the point that you can keep it constant?

Mr. NOEL. Absolutely, sir. Of course, we will meter on the way in and meter on the way out. There is a chain of custody established from the point of purchase of the oil. We will be using the Military Sealift Command for a portion of the journey. They are the folks responsible for the quality control of the oil itself.

As you understand, during shipment a fair amount of base sediment and water can be introduced.

May I say, after you visit one of these terminal facilities operated in the commercial sector, you develop a great confidence. A lot of money can be lost if that metering is not very well done.

OIL PURCHASE PRICES

Senator HUDDLESTON. Your budget request for the purchase and transportation of this petroleum is based on $11.40 a barrel for 1977 and $11.98 for 1978. Can you justify these prices?

Mr. O'LEARY. Yes. Those are FEA figures and so far as we are aware, they are good. If there is any significant change in that, we will come back. But they are the best estimate that we can derive as of the moment.

Mr. Chairman, if you would like the derivation of these figures, I have a table that will show you the world price anticipated.

Senator HUDDLESTON. But you are taking a composite price approach?

Mr. O'LEARY. Yes.

Senator HUDDLESTON. Will you offer this on bids?

Mr. O'LEARY. Yes, we will go out on bids.

Senator HUDDLESTON. What about the entitlements program that you propose to use in oil purchases? It is somewhat complicated for most of us.

Mr. O'LEARY. It is somewhat complicated for me.

Mr. NOEL. For virtually all of us, Mr. Chairman. Essentially in concept, what we intend to do is be in the same posture as a refinery who uses a barrel of oil. That is to say, those who have access to domestic oil and those who do not are treated exactly the same way. We will be treated then as a refiner will be treated. That is to say a barrel of oil that goes into the storage program will be treated exactly as if it had gone through a refinery and been turned into product at that time.

The result of this, of course, is that we get the national composite average which is the combination of the average domestic price together with the average world price where the price is actually paid.

Now the impact of that is that, as Mr. O'Leary mentioned to you before, we are in effect buying a barrel of oil for every barrel that goes into the storage program. So what is happening is the increment between the national composite average and the actual world price at that point is distributed through all the barrels that are purchased on a given day which has the effect then of treating the barrels going underground as if they were in a refinery.

Senator HUDDLESTON. Does it also have the effect of increasing the cost of what you might be able to buy?

Mr. NOEL. It does slightly. Between now and 1979 it has the effect of passing through approximately $500 to $700 million. That does, however, have less impact than something like two-tenths of a cent per gallon on products across the board.

Senator HUDDLESTON. So it is less disruptive of the market itself to do it the way you are suggesting?

Mr. O'LEARY. I don't think it makes any great deal of difference, Mr. Chairman. The concept here is, first of all, to reduce the budgetary cost by using the entitlements program. And, second, and philosophically, to force a portion of the cost of the fill on current users.

You can see that what we are doing is saying there are two sets of cost: those that are borne by the taxpayer at large, the base cost, and then the entitlements chunk which will be borne by current consumers on the basis of this two-tenths of a cent per gallon charge. That is really the other side of the coin of the entitlements program.

CHANGES IN THE ENTITLEMENTS PROGRAM

Senator HUDDLESTON. Now, your justifications speak about amendments to the entitlements program. What changes are being recommended?

Mr. NOEL. There are conforming pricing amendments that are required, as well as amendments to modify the entitlements program that are required to effect the program as we just described. We offered one public hearing on the entitlements program. We have a second public hearing on the entitlements program modifications and conforming price amendments scheduled for May 12, 1977.

Subsequent to that time we expect to be able to use the entitlements program in conjunction with SPR oil acquisition.

I will submit an additional statement for the record to clarify this.

[The information follows:]

ENTITLEMENTS PROGRAM

FEA's amendments to the entitlements program will allow the Government and thus the taxpayers, to obtain the benefits of domestic crude oil price controls for imported crude oil to the same extent that refiners now receive such benefits for processing such oil. FEA's amendment would allow any seller of imported crude oil to the SPR to earn entitlements by treating the crude oil sold to the SPR as "runs to stills".

FEA will accomplish this result by amending the entitlements and price control regulations. A final rule amending the entitlements program for the purchase of the first 10 million barrels was published in the Federal Register on April 29, 1977 (42 F.R. 21761); and FEA expects to propose additional amendments for subsequent purchases. A Notice of Proposed Rulemaking for conforming price control regulations, and a request for further comments on changes to the entitlements program, was published on the same date (42 F.R. 21789).

ORIGINAL BUDGET PROPOSAL

Senator HUDDLESTON. Looking at some possible reductions in your budgeted program, several have been recommended by Members of Congress. This accelerated reserve plan is admittedly a difficult one to achieve. What would be the impact of going back to the original budget proposal of $1.7 billion?

Mr. O'LEARY. I think, Mr. Chairman, from the standpoint of the strategic position of the United States it would be a very, very serious action if the Congress were to cut us back to the 150 million barrel limit. We sit in a world that is unstable in the extreme with regard to oil supply. And it seems to me that we are simply taking an enormous chance if we do not go ahead and fill this as rapidly as possible.

Senator HUDDLESTON. Any cutback would affect the actual oil purchases for that facility?

Mr. O'LEARY. No, Mr. Chairman. If you were to accept the fill rate, there is the possibility of a budgetary reduction, an immediate budgetary reduction along the lines of that which was proposed by the Senate, or the House Budget Committee. I think what must have been in the back of the minds of the people who were suggesting those cuts is the inability of FEA to make the fill on that time schedule.

As I have said before, we do have some doubts at the moment about our capacity to make the fill in that time schedule. However, I think it is absolutely imperative that we honor the President's request in that regard. Otherwise, I think that the people abroad will interpret the Congress failure to honor the President's request as a lack of seriousness about the strategic reserve.

It seems to me that we must make absolutely sure, first, that people understand that we are dead serious about it and, second that we do fill it as rapidly as possible. So I would urge that we go ahead and honor the full funding for the President's request in this regard.

DEFENSE DEPARTMENT AGREEMENT

Senator HUDDLESTON. Tell us about the agreement you have signed with the Defense Department for petroleum purchases.

Mr. NOEL. The decision to enter into an interagency agreement with the Department of Defense whereby the Administrator of the Federal Energy Administration delegates to the Secretary of Defense the authority to execute contracts for the acquisition of petroleum for the strategic petroleum reserve was based on the expertise available from the DOD in petroleum contracting through the defense fuel supply center.

Due to the nature of the commodity involved, the satisfactory procurement of petroleum requires specialized experience and procedures. In order to adequately enter into this specialized procurements field, the FEA would have had to build a staff of experienced specialists. In doing so, the FEA would have duplicated much of the expertise and manning already in place in DOD, and delayed the realization of a petroleum reserve. Essentially, the DOD will perform the contracting function as assisted by FEA technical advisers and the DOD will also arrange for transportation of the oil.

Control of the oil acquisition process will be maintained by FEA through the definition of requirements which are furnished to DOD. The use of DOD should insure an orderly buy and transportation program is instituted for the SPR program. FEA's first oil deliveries are scheduled to start in July 1977 at the West Hackberry, La., early storage site.

CARGO PREFERENCE ACT

Senator HUDDLESTON. Your justification states the Cargo Preference Act may have an impact on oil prices. Do you have any more definite projections now?

Mr. NOEL. SPRO has received estimates from the Maritime Administration which anticipate an added cost of about $2 per barrel for transportation of crude oil in American bottoms. Since the Cargo Preference Act requires that 50 percent of such imports be carried in American bottoms, we have estimated that the added cost will be an average of $1 per barrel

FEA Counsel has determined that the Cargo Preference Act is applicable to oil purchased for the reserve; however, the key question concerning the availability of American bottoms at the time and place, and in the size required, will be answered only when oil purchases are actually made. At present the first SPRO invitation for bid for oil acquisition is being published. We will have further projections within the next 60 days.

Senator HUDDLESTON. Your justification for oil purchase does not include any cost factors. Please supply that for the record, along with cost factors for the other SPR activities.

Mr. NOEL. Cost factors for storage facility design, construction, and fill are shown in table 1.

An estimate of the national average composite oil price was used as the basis for oil cost projections for the 500-million-barrel system, as shown in table 2. These oil prices include overseas and domestic transportation costs.

Revised oil price estimates are now being prepared to reflect such proposals as the wellhead tax. They will be made available as soon as they are firm. I will submit these tables for the record.

[The information follows:]

TABLE 1

- FY 1977 - 1978 -

STORAGE FACILITY COSTS FOR 500 MMB PROGRAM

	Bryan Mound 63 MMB	Bryan Mound (Expansion) 66 MMB	West Hackberry 61 MMB	West Hackberry (Expansion) 76 MMB	Bayou Choctaw 94 MMB	Weeks Island 89 MMB	Cote Blanche 27 MMB	Central Rock 14 MMB	Ironton 21 MMB	TOTAL
Site Acquisition	17.4	10.0	13.9	15.4	23.7	35.9	21.9	3.3	1.0	142.5
Design/Construction	39.7	25.2	76.2	98.2	60.8	84.1	11.2	15.0	8.1	418.5
New Space Devel.	---	32.0	---	40.9	---	---	---	---	---	72.9
Distribution Systems & Fill	12.6	19.4	12.2	34.0	18.8	4.2	1.3	11.9	18.7	133.1
500 MMB TOTAL COST	69.7	86.6	102.3	188.5	103.3	124.2	34.4	30.2	27.8	767.0

NOTE: These costs include operations and fill costs which occur during construction but do not include standby operations and maintenance costs after fill has taken place.

2751

TABLE 2

OIL BUDGET AUTHORITY AND OUTLAYS FOR ACCLERATED 500 MMB PROGRAM
250 MMB by 12/78 and 500 MMB by 12/80

			OIL PURCHASES					OIL DELIVERIES					CUMULATIVE	
			QUANTITY OIL PURCHASED		OBLIGATIONS	BUDGET AUTHORITY	UNOBLIGATED BALANCE	QUANTITY OIL DELIVERED		OUTLAYS REQUIRED				
FY	QTR	OIL PRICE	By QTR (MB)	By Yr (MB)	By QTR ($000)	By Yr ($000,000)	By Yr ($000,000)	By Yr ($000,000)	By QTR (MB)	By Yr (MB)	By QTR ($000)	By Yr ($000,000)	OUTLAYS PLANNED ($000,000)	OIL PURCHASED (MB)	OIL DELIVERED (MB)
	1	---	---		---				---		---		---	---	---
	2	11.40	---		---				---		---		---	---	---
77	3	11.40	2,760		31,464				---		---		---	2,760	---
	4	11.40	14,960		170,544				2,760		31,464			17,720	2,760
				17,720		202.0	440.0	238.0		2,760		31.5	44.0		
	1	11.40	20,700		235,980				14,960		170,544			38,420	17,720
	2	11.98	59,530		713,169				20,700		235,980			97,950	38,420
78	3	11.98	82,350		986,553				59,530		713,169			180,300	97,950
	4	11.98	70,160		840,517				82,350		986,553			250,460	180,300
				232,740		2,776.2	2,538.2	---		177,540		2,106.2	2,093.7		
	1	11.98	28,750		344,425				70,160		940,517			279,210	250,460
	2	13.10	36,560		478,936				28,750		344,425			315,770	279,210
79	3	13.10	40,280		527,668				36,560		478,936			356,050	315,770
	4	13.10	23,280		304,968				40,280		527,668			379,330	356,050
				128,870		1,656.0	1,656.0	---		175,750		2,191.5			
	1	13.10	43,900		575,090				23,280		304,968			423,230	379,330
	2	13.84	32,100		444,264				43,900		575,090			455,330	423,230
80	3	13.84	28,140		389,458				32,100		444,264			483,470	455,330
	4	13.84	16,530		228,775				28,140		389,458			500,000	483,470
				120,670		1,637.6	1,637.6	---		127,420		1,713.8			
	1	13.84							16,530		228,775			---	500,000
	2	13.84							---		---			---	---
81	3	13.84							---		---			---	---
	4	13.84							---		---			---	---
				---		---	---	---		16,530		228.8			
	1	13.84													
	2	13.84													
82	3	13.84													
	4	13.84													
TOTAL		---		500,000		6,271.8	6,271.8			500,000		6,271.8		500,000	500,000

NOTE: 500 MMB program derived from SPRO accelerated fill schedule for a 500 MMB and 750 MMB system; undeveloped dome site is dropped.
Obligation authority required three months before delivery; outlays occur at time of delivery.

SUBMITTED QUESTIONS

Senator HUDDLESTON. We have a few more questions on the Strategic Petroleum Reserve program which we will give to you and ask you to answer for the record at this point.

[The following questions were not asked at the hearing, but were submitted to the Department for responses subsequent to the hearing:]

STRATEGIC PETROLEUM RESERVE

Question. The justification for planning and analysis states the total workload will not change. Why, then, does that activity require two additional positions and a $91,000 increase?

Answer. The fiscal year 1978 Budget does not request any additional positions for this program area. The increase is shown as two additional man-years; man-years indicate average paid employment, not actual positions. The +$91,000 change from fiscal year 1977 to fiscal year 1978 is a net increase in funds needed caused by an increase of $136,000 for contracted studies. The man-year cost, excluding contracts, is less in fiscal year 1978.

Question. Please explain why you need a $465,000 contracting increase for program management and review.

Answer. The contract funding for this program area is for audit services, and as construction and fill operations increase, additional funds are needed to cover this effort. Audit service will probably be obtained from the Defense Contract Audit Agency.

Question. The 15-position increase requested for data and procurement support is apparently a transfer from the salaries and expenses appropriation. Where is the offsetting decrease in S&E?

Answer. Although support was provided to SPRO under the FEA S&E appropriation, man-years provided were not as many as needed, nor was the specialized expertise available for procurement of construction related services and materials. Specialized procurement began in mid to late fiscal year 1977 and will continue through fiscal year 1978. Full operation of ADP systems also did not begin until late fiscal year 1977, and these positions are needed to implement these systems.

Question. You are requesting 12 positions under general counsel support for SPR, an activity previously charged against the S&E account. However, the decrease under S&E is only three positions. Why do you need so many additional legal positions?

Answer. Neither the FEA S&E appropriation not the SPRO appropriation requested funds or positions for legal support in fiscal year 1977 although there was a need for these services. However, the FEA appropriation did ultimately fund three positions in fiscal year 1977, although more support was needed. Approval of the accelerated fill schedule further emphasized the need for additional legal support. The fiscal year 1978 workload includes litigation for acquisition of real property, increased procurement and review of service contracts for fill operations, as well as the greatly increased oil procurement which demands review of input and policy decisions for legal sufficiency.

Question. Overall, you are seeking 68 new positions for SPR, a 45 percent increase. Why do you need so many more personnel under what is essentially an increased oil-buying program?

Answer. Although funds for the oil procurement program comprise approximately 84 percent of the fiscal year 1978 budget request, construction is increasing as well as data, procurement and legal support. Employees working in the petroleum acquisition program are responsible for the purchase and shipment of the oil. The largest increase in requested positions is in the Storage Facilities program area, where responsibility lies for site acquisition, environmental programs and permits, construction of the facilities, including procurement of materials, and fill operations.

The funds needed to procure crude oil does not directly correspond with the number of positions needed to accomplish the total storage program. SPR activities peak in fiscal year 1978 where personnel are needed for construction, operations and support functions.

FEDERAL ENERGY MANAGEMENT PROGRAM

Senator HUDDLESTON. Getting off on another subject, nearly $1 million is budgeted for a Federal energy management program. As I recall, GAO didn't rate this program very highly. What has it accomplished in the past year?

Mr. O'LEARY. Martin Seneca is with us, Mr. Chairman. He is our energy man and can tell us all about that.

Mr. SENECA. Mr. Chairman, the Federal energy management program has accomplished several things. In fiscal year 1974, there was a goal of a 7-percent below projected use based on fiscal year 1973 figures. We achieved in fiscal year 1974 a 24-percent reduction in energy use in Federal buildings.

Senator HUDDLESTON. Was this nationwide?

Mr. SENECA. Nationwide. In fiscal year 1975 we set a goal of 15-percent below the projected use based on fiscal year 1973 figures again. And we achieved a reduction of 24.3 percent.

In fiscal year 1976 we decided that what we needed to have was a goal of no growth over the actual fiscal year 1975 activity. We achieved in fiscal year 1976 a 5.7-percent reduction in energy use.

Mr. Chairman, one of the things that we are actually involved in in dealing with the Federal energy management program is the reduction of travel by Government employees on official business. We provide for some savings in automobile mileage through elimination or consolidation of trips. Substituting compact cars for standard sedans in Government inventory, emphasizing proper maintenance with regard to this fleet, imposing speed limits on vehicles and establishing optimum fuel conserving speeds for both ships and aircraft, reducing the flying hours of aircraft and the steaming hours of ships, encouraging the use of carpools and vanpools and having the employees commute to work, reducing lighting levels of Government-owned or leased buildings, lowering thermostat settings in the heating seasons and raising them in the cooling seasons, encouraging the increased use of simulators for flight training, increasing maintenance of heating equipment, changing operating hours of buildings and reducing the use of heating and ventilating air conditioning systems as well as elevators in normal hours, insulating pipes and recycling waste heat, rescheduling janitorial services to daylight hours, tighter schedules and use of simulation to reduce test equipment in laboratories, are some of the ways we reduce energy use.

What we have done recently is to determine a fairly comprehensive energy management plan and manual that has been tested out and proven effective in assisting building managers to create more thermally efficient buildings from the standpoint of housekeeping activities.

WASTE IN FEDERAL BUILDINGS

Senator HUDDLESTON. With all of this improvement, do you still feel that there is a considerable amount of waste in our Federal buildings? I think I see it here in our congressional buildings, and I am sure it is true throughout the whole Federal area.

Mr. SENECA. What we have talked about and what we have done thus far are those easy kinds of things to do. In other words, they are not capital intensive kinds of improvements. In order to deal with the larger issues of conservation for buildings such as this, we would have to make relatively large capital investments to get the kind of conservation that we would like to achieve.

Senator HUDDLESTON. It seems to me there are still a lot of lights burning that could be turned off at much less expense.

Mr. O'LEARY. Mr. Huddleston, I take a great interest in this, because my own office, I believe, tends to be one of the least efficient from the standpoint of energy use in the entire Federal establishment. We find that the thermostat seems to be totally unrelated to the heating unit. That is an example of a requirement for a fairly substantial capital cost that will go much beyond where we are now.

I think we are going to have to look upon energy management in the Federal establishment as a long, continuing exercise.

We are going to have to introduce life cycle concepts into investments in this area. It is going to cost a lot of money and take a lot of continuous pressure on the system in order to make it respond.

Senator HUDDLESTON. We should develop a light bulb that turns itself off every 3 hours. You would be surprised how many would not be turned back on.

IMPROVING FEDERAL ENERGY MANAGEMENT PROGRAM

Does the President's plan call for beefing up this Federal energy management program?

Mr. SENECA. In our fiscal year 1977 budget we have $610,000. We are moving into a 1978 request of $979,000. What we are looking toward is an increased emphasis on this program, with regard to the new initiatives that the President announced.

So I feel we do not have what we think is a substantial increase over the fiscal year 1977 budget in our 1978 program, though there may be in the future a much expanded Federal energy management activity.

Senator HUDDLESTON. You have budgeted some $630,000 for contracting. Could this be done in-house?

Mr. SENECA. The basic philosophy that we considered as directed by the Office of Management and Budget and reflected in our budget request, is that short-term requirements should be fulfilled as much as possible by contract assistance, so as not to add to the growing bureaucracy talent that is specialized and is needed only on a temporary basis.

So the basic concept here with regard to that $630,000 is that much of this requirement is for a specialized, one-time effort. The direct answer to your question is no, we do not have in-house capability to deal with this contract activity.

Senator HUDDLESTON. Is this mostly an effort to evaluate the buildings and find out what needs to be done? Is this what you are contracting out for?

Mr. SENECA. No. Let me just go through those contracts you are referring to. The development of additional end use efficiency measures—what we need here is better data to be able to determine how we are using the energy, how efficiently we are using it.

Then, there would be contracts for the development of programs to convert Federal boilers to fuels other than petroleum or natural gas. The idea here is that we need some assistance to understand what the barriers are to converting some large buildings to the use of coal. Then we need some additional technical assistance for other Federal Agencies and some revisions in some existing materials which require the talents of engineering and architectural personnel that we do not have on staff, nor require on staff in the long term.

CONSERVATION LOAN GUARANTEE PROGRAM

Senator HUDDLESTON. You are requesting $19.5 million to get the new conservation loan guarantee program going. What particular sector of the economy do you anticipate this program will cover?

Mr. O'LEARY. Mr. Chairman, this will hit particularly these people who have difficulty in going into the commercial market and getting loans. We expect hospitals and other comparable institutions to participate in this. We think homes of one sort or another will participate. Probably there be something to do with schools. Multiple family dwellings to some degree. Altogether, we think this will hit a sector that generally speaking would not be able to obtain the substantial amount of financial resources required to bring these structures up to reasonable standards.

Senator HUDDLESTON. How does this program tie in with President Carter's energy program?

Mr. O'LEARY. This runs hand in hand with it, Mr. Chairman, in that it permits us to bring up the quality of the existing stock of structures. Now, this does not run the single-family structures, but it does get into that intermediate position which is the straight industrial side of the business and the single family dwelling.

LOAN GUARANTEE SUPPLEMENTAL REQUEST

Senator HUDDLESTON. What do you anticipate accomplishing in the current year with the $1 million supplemental for conservation?

Mr. SENECA. You asked the question with regard to the supplemental request?

Senator HUDDLESTON. Yes; $1 million was requested for the supplemental.

Mr. SENECA. What we need to do now in terms of being able to put the program together is to assess those groups that might utilize the program, so that we can understand what the client profile is. There are small and large businesses, there are public buildings and institutional buildings. We have to understand just what it is we are going to be able to do for each client group.

If the program is successful, we anticipate that we may receive 40,000 to 50,000 applications covering a wide variety of energy conservation and renewable resources. Now a part of what we are going to do with that $1.5 million in supplemental money is to begin to develop the methodology, the processes, the technical assistance, and so on and so forth that will be necessary for the full implementation of the program.

Mr. Chairman, let me bring one other thing to mind. A lot of people don't understand what they can do to conserve energy. People understand, I guess, that we want to save energy, but then how do they do that? In this program we are talking a lot about small business establishments, public buildings, hospitals—and we need to have the capability to assist these people to understand what kinds of conservation activities they need to become engaged in. So that $1.5 million is to get us into the position to help them do the things they will have to do to conserve energy.

Senator HUDDLESTON. Will you administer this program mainly from regional offices?

Mr. SENECA. A mix of headquarters—regional staffing was considered to be the most efficient implementation mechanism. Involvement of regional offices in the program is expected to improve program awareness and thereby program participation by the potential borrowers and lenders throughout the United States. However, overall planning, direction, coordination, and evaluation of program effectiveness would still best be performed at headquarters.

The regional offices will receive, review, and perform initial processing on all applications for loan guarantees. All applications dealing with energy measures which are either on the energy measures list or cost less than $250,000 will be received and finally processed by the appropriate regional office. All other applications will be received initially by the regions, checked for completeness and forwarded to the headquarters office for final processing. In addition, all complex cases involving special handling and interpretation will be processed by the headquarters office.

LOAN GUARANTEE CONTRACTS

Senator HUDDLESTON. With 75 positions to administer the program, why do you need $2.5 million in contracts?

Mr. SENECA. The personnel will be needed to maintain the energy measures list, review energy audits, process applications, issue commitments and guarantees, disseminate information concerning the program, and evaluate the program. They would also be responsible for maintaining records and processing default cases, including acquisition and disposal of properties in cases of liquidation.

The contract funds are needed to provide short-term support to properly implement, administer and monitor the progress and impact of the program. In order to perform this work in-house, considerably more personnel would be required. Tasks expected to require contract support would include: One, implementation of the management information system in the regional and national offices, and the training of personnel in its operation; two, provision of technical support for evaluating energy measures; three, development of profiles for various classes of borrowers; four, development of program publicity and marketing materials, and five, preparation of energy audit manuals for various classes of borrowers to increase program utilization.

In general, the tasks requiring contract support are more specialized and are for a limited period. These tasks are best accomplished on a contract basis to avoid hiring personnel who would no longer be required once the program is running smoothly. Often the specialized services required are easier to acquire on a consulting or a contract basis.

Senator HUDDLESTON. Many of those contracts listed on pages 129 and 130 would seem to be the kinds of activities that could be performed in-house. Why can't you reduce the contracting?

Mr. SENECA. Much of the work preparatory to putting a complex loan guarantee program in place would peak during fiscal year 1978 and cease thereafter, a situation that necessitates immediate contract support instead of the hiring of long-term employees. Moreover, some of the skills needed in preparing audit manuals, et cetera, are unlikely to be needed for implementing the system/program once it is on

line. This makes it more efficient to draw, for these purposes, on specialized contractor support rather than temporarily hire staff with the needed specialized skills. The resources requested reflect what is felt would be an effective combination of in-house and contractural resources to accomplish both the short-term and long-term requirements of program implementation.

UTILITY RATE REFORM

Senator HUDDLESTON. Let's move to utility rate reform for a few minutes. You have $8.5 million budgeted this year for utility rate reform. This will fund 30 electric and gas rate demonstration projects in all. What do you expect to accomplish with this program and how is it going to save energy?

Mr. SENECA. Mr. Chairman, one of the things we are trying to do in regard to utility rate reform is to take a look at the way that electricity is priced at the present time. A utility's pricing structure should be based upon load. There is usually a baseload in most instances that is either nuclear or coal fired and that runs all the time. That is where the utility is just functioning day in and day out.

The utility cannot store electricity. Every time a light switch is switched on there has got to be some capacity generating that electricity.

The next level is the intermediate level, which is usually generated by petroleum or in some instances natural gas, and which runs a considerable period of time.

On top of that the third level is what has been termed the peakload. Mr. Chairman, that is the period of time during the day, for example, when people are up and about in the morning say from 8 o'clock to 10 in the morning, and there is a lot of demand for electricity. In order to meet that demand, utilities go to this third level in what we call the peaking activity.

Our demonstration programs are essentially in rate reform to try to flatten out that demand, reduce those peaks. And by reducing those peaks we place the demand then primarily upon the baseload and perhaps the intermediate load.

If we could price electricity or create a rate structure that would at least partially create a situation wherein electricity that was used during those peak demand areas would be priced at a higher rate than offpeak activity——

Senator HUDDLESTON. That is, the idea is to get away from the volume.

Mr. SENECA. That is right, to create a set of circumstances where people would use that electricity during the offpeak activities to a greater extent than they presently do.

Senator HUDDLESTON. You would just redistribute the load?

Mr. SENECA. That is right.

UTILITY RATE REFORM PROGRESS

Senator HUDDLESTON. The question is, What success are you having? What are you accomplishing with this?

Mr. SENECA. Our independent analysis has indicated that improving load factors could reduce the capital requirement for new capacity.

The whole utility industry, as you may well know, is a capital-intensive industry. The industry is having a tough time raising the capital to build the additional requirements in order to meet the demand.

If we could flatten out that load or those peak requirements, it could reduce the capital requirement. It could reduce oil consumption for peaking and cycling generation. It could reduce electricity costs and it would allow the substitution of coal-fired electricity at acceptable energy and economy efficiencies for direct burning of domestically scarce oil and natural gas.

These demonstrations are showing that peak-period-kilowatt-hour usage and kilowatt demand are sufficiently price-elastic to render time-of-use rates cost effective, that total kilowatt hour usage is somewhat lower under time-of-use rates and that customers can reduce their bills by eliminating some consumption and moving some consumption to offpeak periods.

So, Mr. Chairman, what we find with our present activity in utilities and our demonstration activity that we have—and we are in the process of concluding this, it will go up through 1978 and we don't anticipate coming back and asking for any more funds after fiscal year 1978. But what we are finding and our sense is that the completion of this program we will have demonstrated the concepts that we have been talking about.

UTILITY RATE REFORM PRICING POLICY

Senator HUDDLESTON. All right. And after you have done that you have the data. How do you implement the pricing policy?

Mr. SENECA. We have two different activities that we get into, keeping in mind that most of the utilities are regulated by the public utility commissions of States.

The first is our intervention program. We use our data to move into rate hearings going on in the States and assist them by putting forth this information in those hearings.

Senator HUDDLESTON. Does the company have to be willing to do this?

Mr. O'LEARY. Mr. Chairman, the President's program calls for voluntary action on the part of the public service commissions to eliminate reclining block rates and provide that utilities offer a peak demand responsibility rate so that that will encourage a spreading of the load throughout the day and avoiding the peaks. I think it is fair to say, Mr. Chairman, that there will be some conservation effects. But the most important impact of these programs does not run to the conservation of energy per se but the conservation of capital.

As Mr. Seneca pointed out earlier, that is an extremely important result.

Senator HUDDLESTON. It would be a better distribution in use. We would use the same amount of energy but at different times. It could eliminate the peakloads.

Mr. O'LEARY. Yes. And it will permit you to provide more of the energy requirements of this country with a smaller set of generating capacities. I think that as we look down the pike over the next

5 to 10 years we are going to enter an era where the capital requirements of the system to meet our energy needs are going to be really enormous.

ADMINISTRATIVE COSTS

Senator HUDDLESTON. This seems to be little more than a contract management program. Why do you need 29 positions to run it?

Mr. SENECA. This program is much broader than one which is solely contract management. In fact, only about 11 positions are required to manage the various elements of the demonstration program, rather than the 29 cited. The remainder of the positions are allocated to providing direct substantive expertise and support services to State public utility commissions; 7 will perform the intervention activities cited in our budget request, including the actual FEA representation at rate cases, and 11 will deal with commissions to assist them in understanding and implementing conservation measures such as energy efficiency advertising, energy audits, and mandatory efficiency criteria for continuation of service.

It should also be noted that the 11 positions required to manage the financial assistance program are not allocated exclusively to contract management per se, but will also analyze the data resulting from the demonstration projects.

Senator HUDDLESTON. Why don't you simply award grants to utility regulatory agencies and let them contract for all this technical assistance?

Mr. SENECA. A decision to award direct grants to regulatory agencies for their use in funding contracts for technical assistance would ignore the fact that the technical assistance effort has been conceived as an instrument, in itself, of national energy policy. The technical assistance program has been developed as a flexible policy implementation tool, which will enable FEA to apply its unique experience and data base, in the areas of utility rate reform and conservation, to the specific needs of regulatory jurisdictions. To simply award grants to support contract assistance would waste the expertise and information FEA has developed in these areas.

Senator HUDDLESTON. I think it is a good approach. I am just concerned that we be able to implement it once you have developed the plan. I assume that the public service commissions, or whatever they are called in the various States, will be agreeable to this.

Mr. O'LEARY. I think they will, Mr. Chairman. The basis for the President's recommendation grew out of these demonstrations that Mr. Seneca was describing to you.

VOLUME RATE REDUCTION

Senator STEVENS. Could I ask one question there?

Senator HUDDLESTON. Yes.

Senator STEVENS. In areas of my State if you have electric hot-water heaters you will get a little reduction. If you have electric ranges, refrigerators on a consumer basis, you get different rates because of the volume increases if you go that way rather than going to propane or some other alternative source for those particular appliances.

Does your proposal, the President's proposal, go to consumer rates that are reduced by volume? If you go to an all-electric house for instance, do you have a lower rate than if you just have a service solely for a refrigerator for instance?

It goes to the concept that the cost of running that line to an individual home is going to be amortized over a period with more intensive use of the service than would be the case if you had a sole appliance or a very limited use of electricity.

Are you trying to change that?

Mr. O'LEARY. Mr. Chairman, we are trying to change the industrial composition of demand primarily by eliminating the so-called promotional rates.

PROMOTIONAL RATES

Senator STEVENS. These are promotional rates when an REA tells a rural customer we will put the line to you but the cost is going to be *x* dollars per month if you just have a refrigerator than if you electrify that house and get rid of that gas furnace, et cetera, and go all electric. They will reduce it and you actually have the whole service for just a little bit more.

But the per unit rate is sufficiently less than the promotional rate from all-electric homes. Is that going to be impacted at all? Are we just talking about industrial customers? If we are, how do you do it on the basis of total volume of service? Do you determine what is industrial by volume or do you determine what is industrial just by classification of use?

Mr. O'LEARY. Mr. Chairman, as I understand the proposal it will not run to the rates charged to householders. It will run to the industrial users, not to the general service customers. And it will run against the provision of defining block rates and promotional rates.

Senator STEVENS. Do you have any objection to the small business exception to that?

Mr. O'LEARY. I think probably, Mr. Chairman, you will find that the general service customer is a small volume customer. You don't really differentiate between a household and a small business.

Senator STEVENS. The promotional rates are there for a small business——

Mr. O'LEARY. Mr. Chairman, the term "promotional," in this sense, may be subject to some qualification. Generally speaking, you have a fixed capital cost in order to supply service to a facility, let's say a household, and whether that is running to heat it or to simply light an occasional light bulb those fixed steps are there.

So the essence of a two-part rate, and for industry, generally speaking, you would have a two-part rate, one running to commodity and the other running to amortizing of the capital. For a householder or a small business, you would not have that.

It is probably fair in that case to have a rate for a large volume, or I should say an intermediate volume customer that is somewhat lower than the rate for the fellow who just switches on a light bulb occasionally.

Senator STEVENS. I just wanted to make sure you are not going to affect small business and consumers in terms of promotional competition.

Out our way when the gas came in, the gas people said, if you convert to gas we will give you a gas furnace, provided you use it for 15 years. You have to pay for it, if you don't use it, for 15 years. Now we are in an area of gas surplus. I understand that. But it brought about competition between the utility people providing electricity as opposed to the utility people providing gas. When you actually have a very beneficial effect for the whole small business concern of the community, I want to make certain that is not lost.

Senator HUDDLESTON. Of course, you do run the possibility here of running a conflict of interest down the road someplace. If we are successful in coal conversion and we have a breakthrough in eliminating pollutants from coal and generating the electricity becomes the best energy supply, it might well replace gas heating, oil heating, and every other type of energy we can with electricity.

Senator STEVENS. Even in industry.

Mr. O'LEARY. That is altogether possible.

Senator HUDDLESTON. Is there a conflict with that kind of plan?

Mr. O'LEARY. Mr. Huddleston, at this point I don't see the economics at all. Right now, if you take a look at, let's say, the coal-to-gas plan using the Morgan process versus a coal-to-electricity plan, you would find that, let's say, for new plant versus new plant, the electricity cost is about twice that of the coal-to-gas cost. So unless there is something fairly revolutionary in the cost of one or the other, I don't think the situation that you present will come to pass, at least in the short run.

DUAL BURNING CAPACITY

Senator STEVENS. Four years ago I tried to get the Congress to mandate industry to have a dual burner capacity, either oil or gas and coal. Congress refused to do it. The Maritime Provinces of Canada have done that for 40 years. It would put the burden on the industrial side to maintain the stockpile of coal, whether they are going to burn oil or gas.

In the event of an embargo or an emergency, they could switch to coal. The consequence of what you are doing would be that it would just become more expensive to use the electricity, but there is no corresponding requirement to have an alternative burning capacity in every major energy user in the country. I still think that is a defect of your plan.

If you require it now, the joint burning capacity as coal becomes more plentiful and as the price does become more realistic, there will be a shift.

Senator HUDDLESTON. We have legislation in, Senator.

Senator STEVENS. It is not mandatory to convert; it is mandatory to have a dual capacity.

Mr. O'LEARY. I wish that you had had more success in that bill 4 years ago. I think we would be a lot better off. In the meantime we are pursuing both the ESECA program that runs to people who have the capacity to shift now, and the prospective program that prohibits certain classes of users to build a new plant based upon something other than coal. I should say based upon oil or gas.

And of course, we are working now with the Energy Committee on the development of new legislation. The Jackson bill which would accomplish a much greater switch from oil and gas to coal.

UTILITY CONSERVATION CONTRACTS

Senator HUDDLESTON. There is another question here on cost. You have $7.6 million designated for contract work in this area. What kind of organizations will be doing this kind of contract work?

Mr. SENECA. In terms of our utility conservation program, what we have in a large part, the reason there is such a large amount of money in that for contracts is that most of the time we are engaged in a cost-sharing situation with the States and public utility commissions. So what we are doing in these demonstrations for the most part and where that money shows up then is for the actual funding of these demonstration programs. This is what the bulk of that money will be used for.

Senator HUDDLESTON. Are utility companies cooperating and participating in this?

Mr. SENECA. Yes.

Senator HUDDLESTON. I think Senator Melcher has some questions he is interested in.

PIPELINE CONSTRUCTION PROBLEMS

Senator MELCHER. Thank you, Mr. Chairman.

Mr. O'Leary, my questions have nothing to do with this issue, increasing the rates. As you know Congress has been addressing itself to the problem of equitable distribution of Alaska crude oil once it becomes available through the trans-Alaska pipeline. I think we started sometime last fall, in September with a bill passed in October, a specific direction to the Administration to make a proposal on the pipeline or pipelines that would be necessary to accomplish this purpose for the northern tier States and into the Midwest.

Private industry is building a pipeline with their own money. The economics of the construction of a pipeline or such pipelines seems to dictate that there would be rapid consideration on the part of the committees concerned so that the pipelines could start and get underway as soon as possible.

With that in mind and the resulting effect of section 18 of the Alaska Natural Gas Act bill, the responsibility being designated, being delegated to FEA, I am somewhat concerned now that with the northern tier proposals that they have progressed to the point of attracting to that company substantial binders in the West and the Midwest.

We are concerned now that if FEA would be helping to develop with them, remembering that this is basically private industry, but nevertheless, the system does come into play, if FEA would be working it, at least as fast as they are.

I am concerned that one of these refiner's reports to me this morning, that they are in a quandry as to what FEA might be doing about this. Have you got any proposals to change the policy that has been so far gone along with in the Carter administration on encouraging the rapid construction of such pipelines?

Mr. O'LEARY. No. You may know that I have established a Federal coordinator.

Senator MELCHER. Yes. I am aware of that.

Mr. O'LEARY. Doug Robinson, who just this weekend was in the State of Washington, attended a meeting that was called by the Governor of the State of Washington and several Governors of affected States, to discuss, among other things, the northern tier route.

You are aware, Mr. Chairman, that there are three competing northern routes in addition to the California route that are currently being reviewed by the private sector. There are actions to be taken on two of those routes by the Canadian Government. One is a very good line, as you know, and this is really a matter of bringing the private sector to some resolution of where it is going.

What we want to see is a resolution of the problem. We don't have any particular concern with regard to one route over the other. We don't favor one route particularly over the other.

We simply want to see an expeditious and logistically efficient resolution of the problem so that the Alaskan crude can move just as rapidly as possible into that area of the country.

FEDERAL ENERGY ADMINISTRATION ROLE IN ALASKAN PIPELINE ROUTES

Senator MELCHER. Since this is private industry and will be competing, it does seem like the role of FEA is a very—the Federal bureaucracy—is a very complicated one since it will be to essentially assist the Federal community in whatever private pipeline company or multiples thereof wish for a Federal permit.

Mr. O'LEARY. I think that that is fair.

Also, the Government of Canada is involved in working with the Canadian authorities to see that there is a consort between what they are doing and our requirements.

Senator MELCHER. Of course, I don't quite follow that since the Canadian Government would have no interest over a pipeline built within the United States.

Mr. O'LEARY. That is true, but as we pointed out, Mr. Melcher, there are other alternative routes that are being looked at that would involve Canada.

Senator MELCHER. I understand that there are alternative routes, but the Federal Government would only be involved—the Canadian Government would only be involved to the extent that they need—it would be up to the Canadian Government whether they wanted the pipeline built through their Provinces.

Mr. O'LEARY. We would, of course, be working with the Canadian Government.

Senator MELCHER. Does this slow down anybody?

Mr. O'LEARY. Not a bit.

AMOCO MEETING

Senator MELCHER. I am wondering why Amoco reports to me this morning that the appointment with you tomorrow during which they are—the appointment was apparently cancelled.

Mr. O'LEARY. It could be. I am going out of town tomorrow, Senator Melcher.

Senator MELCHER. I am concerned that it is canceled.

Mr. O'LEARY. Mr. Melcher, I never had an appointment with them for tomorrow. I have been scheduled to be out of town tomorrow for about 3 weeks. I don't think that there could have been anything other than a mixup on this.

Senator MELCHER. Perhaps there is, but the call to me this morning by Amoco doesn't represent just passing the time of day. There was a firm understanding——

Mr. O'LEARY. My advice to Amoco is when they have a problem, call me. I always respond to those kinds of calls.

Senator MELCHER. They called me this morning that an appointment with them tomorrow to describe to you, first of all, two points and I will not go into the second because it doesn't concern pipelines, but the first point was to discuss with you their firm intention of becoming a part owner of northern tier pipelines.

Going with that, the agreement of accepting from northern tier pipeline of 150,000 barrels of crude oil over that amount per day.

This is the type of action we have been waiting for. By we, I mean the Congress has been waiting for Government to start firming up the private sector in putting together a package that will build a pipeline.

I am concerned because they called me thinking they had an appointment of some standing, of some fairly long standing with you, that they were notified late yesterday that there would be no appointment.

They are concerned as to whether or not the development of what you call a coordinate for this situation, assisting private industry going to building pipelines, whether or not that is some sort of shift in policy or delay in policy.

Mr. O'LEARY. Mr. Chairman, I can assure you that any cancellation of a meeting with me arose from someone's misunderstanding. For the last 3 weeks, I have been scheduled to address a group in San Francisco tomorrow. I am leaving tonight for that purpose. We are not perfect and we may have slipped up and made a dual appointment. Probably a secretary called up and said, unfortunately, Mr. O'Leary will not be here. Indeed, I have to tell you that for a few days, there was some uncertainty as to whether I would keep the speaking engagement or Dr. Schlesinger would.

It might have been that they set it up as a contingency during that period of uncertainty, but at any rate I can assure you that there are no policy implications with regard to the cancellation of that appointment. I would be glad to see those people just as soon as possible.

My own advice to them, Mr. Melcher, is that when they have difficulty getting an appointment with me, they call me.

Senator MELCHER. I think that they made every attempt to ascertain before they called me what this apparent—I will grant that likely it was a mistake, but to them it was an apparent cancellation.

I simply want to emphasize that we don't have much time to waste on getting the movement of these pipelines within the lower 48 States. I would hope that we could take the lead—we, meaning the Federal Government—to take the lead in establishing the prompt action and expediting the Federal permits that are necessary.

I am not asking the Congress to override the individual State's perogatives on the questions they raise on the pipeline. Congress has indicated they will set an example for the States and I hope that we can proceed on that.

I would advise Amoco to get on an airplane today and see you today before you have to depart for San Francisco. How early is your plane?

Mr. O'LEARY. I have to leave downtown at 4 o'clock. I would be more than delighted to meet with them at noon, if I could make it by then.

Senator MELCHER. I would advise them to go to San Francisco.

Senator HUDDLESTON. We are going to let you go in time to make that appointment.

Senator MELCHER. Thank you very much.

ADDITIONAL QUESTIONS

Senator HUDDLESTON. Thank you, Senator Melcher.

We have a number of other questions, Mr. O'Leary. Due to time constraints, we would like to submit those for answers for the record.

[The following questions were not asked at the hearing, but were submitted to the department for responses subsequent to the hearing:]

CONSUMER SERVICES

Question. The request for consumer services grants is $2 million, the same as provided in the supplemental. How are these grants awarded?

Answer. In FY 77, grants for offices of consumer services are to be awarded by September 30, 1977, on a competitive basis to a limited number of States, territories, and/or the Tennessee Valley Authority. States will be chosen for awards on the basis of the quality of the office of consumer services proposed in the State's application, as well as on each State's documented need for such an office. It is expected that FEA would award the $2 million in FY 1978 in a similar manner, with all interested States applying for FY'78 funds.

Question. $2 million wouldn't seem to go very far for 50 States. What will this assistance actually accomplish?

Answer. A $2 million program, of course, would not provide much money to each of the 57 jurisdictions (States, territories, D.C., and TVA) eligible for consumer services grants. It is for this reason that FEA has decided to award grants to only a limited number of eligible jurisdictions, at funding levels presently expected not to exceed $250,000 per jurisdiction.

FEA believes that effective consumer services offices can have a significant and innovative role in enabling consumers to become more informed about and active in influencing public decisions concerning the utility-supplied power which they use. Consequently, the grants may be used as seed money for provision of new services by existing State offices of consumer services, or to establish such offices where none exist. However, FEA does not envision creating a large Federal program for these purposes and plans to encourage States to supplement and eventually replace Federal funding for offices of consumer services.

Question. Have the States indicated much interest in establishing consumer services offices under this limited assistance?

Answer. FEA headquarters and regional offices have received phone calls and letters from officials in a number of States expressing interest in reviewing the draft guidelines for the program, and inquiring about the availability of grant money in Fiscal Year 1977. To date, these States include Alaska, Colorado, Georgia, Idaho, Illinois, Michigan, Minnesota, New Hampshire, Pennsylvania and Rhode Island. Many of these States have offices of consumer services which they would like to expand, and several others are interested in establishing a new office. FEA has not yet heard from any State which feels it will not apply for a grant because of the limited level of assistance available. After reviewing comments from the States, final guidelines are expected to be published by June 30, 1977.

VOLUNTARY PROGRAMS

Question. Please tell us what you have done to date under your voluntary conservation programs for which you are requesting $1.3 million?

Answer. Proposed exemption criteria for corporations required by EPCA to report directly to the Administrator on the progress made in improving their energy efficiency were developed and published in the Federal Register on November 24, 1976. Analyses were made of about 80 comments received and final criteria developed and published on March 23, 1977. Applications for exemption were received from about 80 percent of the 470 or so affected corporations, with approximately 360 exemption determinations made and transmitted this week to the Federal Register.

Two editions of the 1977 model year Gas Mileage Guide were published and distributed as required by EPCA to about 25,000 dealers, plus separate editions for California, listing vehicles specifically certified as meeting the California emission standards. Other EPCA or ECPA related activities

included the completion of a study of the impact of rising energy prices on HUD foreclosures in 1974-75, the development of a methodology to examine the direct and indirect energy price effects on household expenditure patterns and the completion of a national survey to ascertain lender influences upon energy use in buildings.

A voluntary truck/bus energy conservation program was initiated and a seminar held on dieselization of light and medium duty trucks. Work continued on various technology transfer activities, including development of reports, films, and video tapes on such subjects as Waste Heat Recovery, Economic Thickness of Industrial Insulation, Energy Efficiency and Electric Motors, Efficient Operation of Boilers, Truck Fuel Conservation for Owner/Operators and Fleet Operators. In cooperation with the Department of Commerce expansion of the Voluntary Industrial Energy Conservation Program continued and Progress Report No 4 was published in November, 1976. Data for Progress Report No. 5 is anticipated by April 30, as scheduled.

Question. The bulk of this request--$880,000--is simply to print new car mileage guides. What's the payoff from that investment?

Answer. Under Title III, Section 506 of EPCA, FEA is required to print and distribute the Gas Mileage Guides. All new car dealers are required to have copies prominently displayed and available for their customers. Therefore, FEA, in determining the size of the printing order for the Gas Mileage Guide, must anticipate the needs of the dealers for the coming model year, based on their legal responsibility for display and availability of the guide.

The benefits of having the guide available in the showroom are: (1) it is the only composite listing of all the models that allows easy comparison of the different fuel economy estimates within classes of comparable size vehicles; (2) according to an evaluation of the 1976 program, buyers who were aware of the guide obtained over 25 percent improvement in fuel economy compared to their previous vehicles. Buyers who were not aware of the guide received less than 1 percent improvement; and (3) it provides useful information on driving habits and other factors which effect fuel economy.

Question. Don't most people get the same information simply from reading newspaper reports on EPA mileage ratings?

Answer. At the beginning of each model year, joint press releases are issued by EPA/FEA, which list the fuel economy information. Many newspapers do print the information at that time. However, this type of press coverage tends to be a one time event. The guide is the only useful source of information which a prospective consumer can keep as reference material.

This year's guide contains approximately 450 vehicles with 10 pieces of information listed for each one. Most newspapers or magazines do not print this total listing due to either lack of space or to a determination that only certain vehicles will be interesting copy. Therefore, while newspapers and magazines are useful in alerting the public to the fuel economy program, the guide itself is the only form in which all the necessary information can be printed. Further, the guide is present at the point of sale and serves as a continuing mechanism for reinformcing the need for fuel conservation and for encouraging comparison shopping.

Question. The rest of your voluntary program seems to be too small to be of any effect and it seems to duplicate ERDA or State conservation activities. Why is it needed?

Answer. The determination that an industry's voluntary reporting program is adequate and the exemption process are annual requirements of EPCA. Further, EPCA requires an annual report of progress toward the achievement of the industrial energy efficiency improvement targets which cannot be accomplished without development and analyses of progress achieved under the voluntary reporting program which encompasses the major portions of the identified industries and companies. The dissemination and promotion of proven industrial and vehicular energy conservation technology is a continuing

national need that is not duplicated by ERDA which focuses on basic research and emerging technology. The program also provides staff support in the area of technical analysis, review and policy development to the Department of Transportation and the Environmental Protection Agency in the development of mandated standards and test procedures, and in the implementation of truck/bus and vehicle-in-use energy conservation programs. These efforts are national in scope and transcend State conservation activities.

APPLIANCES

Question. The request for the appliances program is $3.2 million. What has been achieved to date under this program in terms of saving energy?

Answer. No specific saving in energy can be attributed directly to the Appliance Program at this time. However, since the initiation of the program, there have been noticeable trends in industry toward adding energy efficient products to product lines and advertising these products. The EPCA requires that efficiency targets be met by products manufactured in Calendar Year 1980, and thus, the real energy saving potential of the program begins in 1980 and increases as older, less efficient appliances are replaced by new, more efficient ones.

By 1985, we estimate that savings for products (1-10) will be in the 400 to 500 (kbde) range and that the savings for products (11-13) will be in the range of 300 to 500 (kbde). (Kbde = thousands of barrels per day of oil equivalent.) These figures assume that the 1980 targets will be achieved and that 50 percent of the appliance population existing in 1985 are new energy efficient models.

The current program activities involve prescribing the test procedures required under Section 323 and the efficiency improvement targets required by Section 325. Program activities for FY'78 will shift to consumer education and monitoring the progress of industry toward meeting the targets.

Question. Aside from the technical work that the Bureau of Standards is doing for you, what will you actually be doing as far as promoting more energy-efficient appliances?

Answer. FEA currently has a relatively small contract for production and distribution of public service advertisements in the radio, television and print media, and is FEA's first step in the important area of educating consumers about the program. These advertisements will be distributed to the news media in June of this year. In addition, a joint National Bureau of Standards/FEA booklet on appliance efficiency and the sizing of appliances is being produced.

Recently, the Appliance Program Office has been working closely with voluntary industry standard setting groups to reach a consensus on a standard for flue gas dampers. Once this standard is finalized, testing and certification of dampers can begin and this energy saving device can be installed on furnaces and gas or oil-fired water heaters.

Question. You list a $600,000 contract for a consumer education program on appliances. How will that program be conducted, and why is it by contract?

Answer. FEA is developing a program for consumer education regarding the significance of estimated annual operating costs and how the consumer can save money by comparative shopping.

FEA will work in cooperation with manufacturers, distributors, retailers, consumers, plus State, local and Federal Government representatives to create and implement this program. Radio and television public service announcements, brochures, pamphlets, newspaper ads and direct mail sheets will be produced and widely distributed. Appliance manufacturers will be encouraged to include energy conservation material in all advertising.

The program can be divided into two phases: general consumer education regarding energy efficient appliance utilization and education tied to the understanding of the appliance efficiency labels that will be prescribed by FTC. The second phase cannot be initiated until FTC completes the proceedings required by EPCA before labels are prescribed. Also, there will be special programs directed to homebuilders, salespersons and contractors who often help consumers select appliances.

This program is contract-oriented because specialized personnel would have to be hired to create the materials for a development program that may have a relatively short life.

Question. The appliance program should have great energy conservation potential, but the public program laid out in your justification doesn't seem too effective. Shouldn't we be considering some mandatory industry program?

Answer. The program outlined in the FY'78 budget reflects the authority given to FEA by Title III, Part B of EPCA. This program, when fully implemented, will provide significant energy savings beyond 1980.

As you know, the President, in his April 20 energy message, stated that he intended to propose mandatory efficiency standards for certain home appliances. These mandatory standards will strengthen the program and provide additional energy savings over those expected from the current program.

The legislation required to implement the standards will be forwarded to Congress with the President's comprehensive legislative program on energy.

MARKETING

Question. You have a small $146,000 marketing program under conservation whose role seems somewhat vague. Give us some specific examples of what this program has accomplished to date.

Answer. The Marketing Office is fundamentally a staff office which consults the various program offices on the development and effective implementation of their programs.

The Office helps the program offices produce programs which have a greater acceptance by the target audiences. For example, Project Conserve was at first tested without any Marketing Office support and achieved a market participation of about 1 percent. With marketing support and the creation and use of effective promotional materials such as media announcements and posters, the participation became over 15 percent.

The Office also conducts market research to determine consumer attitudes, knowledge and behavior as it relates to energy conservation. This is vital to ensure that programs are directed to actual audience needs rather than needs as program personnel may perceive them. For example, our research shows that money spent to increase consumer awareness of an energy problem or to urge general conservation is not being put to good use since nearly all Americans now at least recognize the problem. The research helps direct our program efforts to education with specific conservation actions that consumers can take since this area is where knowledge has been found to be low.

The Marketing Office has produced public service announcements telling drivers five ways to drive more efficiently and others that urge new car purchasers to consider fuel efficency as a purchase criterion. The Office has also provided input to development of media announcements concerning appliances.

As a support staff to program offices, the Marketing Office input has strongly influenced the direction of programs such as obligation guarantees,

vanpooling, educational curriculum development, mileage guide/auto labeling, FEMP, appliances and the executive conference workshops.

Question. Why is the Marketing Program being reduced? The justification offers no explanation.

Answer. The Administration's viewpoint, as reflected in the budget request and directed by OMB, is that energy conservation marketing support can more easily be reduced as a staff function than if its function were spread through program offices.

Question. Why don't you just absorb that program elsewhere in conservation and save the overhead cost?

Answer. Decentralization of marketing functions would prove less efficient than consolidation in a small, centralized office. Spreading marketing management expertise means either a greater dependence on contracting, or the separate hiring of promotional personnel, market research personnel and market management planning personnel for each functional program area. Centralization of marketing management functions actualizes a greater and more coordinated in-house capability to develop marketing plans, conduct market research, produce public service announcements and provide marketing management experience and perspective to the implementation and administration of the diversified C&E programs.

ENERGY RESOURCE DEVELOPMENT

Question. You have $3.2 million budgeted for the energy sources program but no breakdown of how the funding is allocated. Please insert a table of the allocations in the record at this point, along with other program allocations under the ERD activity.

Answer.

	POSITIONS	MAN-YEARS	AMOUNT	(CONTRACTS)
ENERGY SOURCES	82	82	3199	1000
Coal Programs	28	28	948	200
Oil & Natural Gas	40	40	1723	650
Solar	4	4	110	0
Synfuels & Geothermal	10	10	418	150
ESECA-COAL UTILIZATION	70	68	5807	2431
ELECTRIC POWER	51	51	1981	600
Electricity Economics	4	4	209	100
Coal & Nuclear Fuel	5	5	286	150
Electricity Rate Init.	3	3	82	-
Powerplant Productivity	6	6	315	150
Cogeneration	1	1	28	-
Project Expediting	12	12	346	30
State/Regional Planning	12	12	405	80
Energy Labor Requirements	5	5	175	40
Hydroelectric Power	3	3	135	50
FINANCIAL PLANNING & INCENTIVES	22	22	1011	405
Materials Allocation	2	2	206	150
Advisory Committees	2	2	80	25
Financial Planning/Coal	6	6	286	120
Financial Planning/Elect. Power	7	7	252	60
Financial Planning/Oil & Gas	5	5	187	50
Underground Coal Loan	-	-	-	-
SITING	20	20	894	355
Water Resources	3	3	180	100
Siting Legislation	2	2	130	75
CZM	2	2	95	40
Proj. Licenses/Permits	4	4	104	-
Regulatory Mgt.	2	2	55	-
Economic Adjust. Comm.	2	2	55	-
Energy Parks	1	1	28	-
Socioeconomic Impact	4	4	247	140

	POSITIONS	MAN-YEARS	AMOUNT	(CONTRACTS)
ENVIRONMENT	12	12	571	240
Non-Attainment	2	2	105	50
Sulfates	1	1	68	40
Envir. Legislative	2	2	105	50
Coal Initiatives	4	4	110	-
SIPS	2	2	105	50
Scrubbers	1	1	78	50
EXEC. DIR. & ADMIN.	25	25	689	-
TOTAL ERD	282	280	14152	5031

SOLAR COMMERCIALIZATION

Question. The 1977 supplemental contains $1.1 million for solar commercialization, but I note your 1978 program shows only $110,000. Why the reduction?

Answer. The Administration now proposes a FY 78 budget of $14 million to carry out the President's Initiatives and to provide continuation of solar energy commercialization activities specified in ECPA. At the time the original FY 78 request was made, we stated we would request additional funds as our studies justified further expenditures. Since then, we have proceeded with our analyses of solar energy commercialization requirements and appropriate solar energy commercialization initiatives for inclusion in the President's Energy Program. Conclusion of our extensive review is that we shall require at least 14 million dollars in FY 78. The budget request will be provided for the following categories--

A. Continued development of commercialization options/plans for solar technologies (including photovoltaics, wind, bioconversion and solar thermal) and revisions reflecting the President's initiatives.

B. Support for residential and business investment tax credits (standards, regulations, and monitoring)

C. Program Administration for Solar Energy Government Building Program (survey and assessment, central program office, and support from Federal supply office)

D. State support, especially funds for states, establish builders code, property tax, and sun rights laws plus funds to assist public utility commissions in dealing with utility solar interface (rate policy, storage, etc.)

Question. We are aware that FEA has a specific solar commercialization authorization but why are you in the business instead of ERDA? Isn't ERDA doing the same thing, essentially?

Answer. FEA's role in solar energy is defined in Section 110 of Public Law 94-385. This statute contains a specific prohibition against FEA engaging in "solar energy research, development, or demonstration activities." There is no single Federal agency that encompasses all the expertise, insight, and working relationships with the private sector that are essential to solar commercialization. Even under a projected Department of Energy, there will still be a number of different Federal agencies involved in solar commercialization (e.g., the Department of Interior's Bureau of Reclamation, with its potential involvement in the use of hydroelectric systems for storage of solar-generated electricity). FEA's commercialization endeavors will coordinate the diverse efforts of the Federal agencies, including ERDA, and bring them together in a single

national plan for the accelerated commercialization of solar energy. This will carry out the intent of Congress in the statutory provision cited above. All major FEA solar commercialization projects, moreover, have been developed jointly in conjunction with the appropriate agencies, and this practice will be continued.

You may want to refer to the June 15, 1976 Congressional Record, pages S9439 to S9447 where Senator Gary Hart (sponsor of the FEA solar energy commercialization authority) discusses the need for a multi-agency approach to solar energy commercialization.

Question. When do you expect FEA will be ready to submit the required solar commercialization report to Congress?

Answer. The report you are referring to--I believe--is the "National Plan for the Accelerated Commercialization of Solar Energy". In accordance with ECPA, FEA is expected to provide Congress, in the shortest feasible time, results and recommendations, regarding

- a "national plan for the accelerated commercialization of solar energy" to include workable options for achieving on the order of 1 million barrels per day of oil equivalency in energy savings by 1985 from the combined total of all solar technologies;

- the development of commercialization plans for each major solar technology;

- conduct studies and analyses addressing mitigation of economic, legal, environmental and institutional constraints;

- assist States in developing State solar energy commercialization plans and programs; and

- develop major commercialization projects such as, but not limited to, the "Solar Energy Government Buildings Program," the Southwest Project, among others.

FEA is proceeding--in stages--to develop the "national plan". As a first step we will be developing commercialization plans and analyses for each major solar technology. We are currently developing a "Solar Heating and Cooling of Buildings (SHACOB) Commercialization Report" which should be completed in July. With FY 77 funding expected shortly, we will be continuing our development of the "preliminary wind energy commercialization plan" and also proceed with other commercialization plans and analyses. Since we did not receive--during FY 77--the full amount we felt is required for meeting the ECPA requirements, the schedule for developing the national plan and meeting other parts of the ECPA authority is currently being revised. We can provide you with that information as it becomes available.

I think it is now appropriate to emphasize that the "national plan" and the "various commercialization plans" will be continually revised throughout the duration of our efforts to accelerate the commercialization of solar technologies. A number of expected changes will necessitate continued revision of our plans and strategies for accelerating the commercialization and use of solar technologies. These include:

- rapidly evolving technologies

- improved understanding of the commercialization process

- feedback from early commercialization activities--such as the President's proposed solar energy commercialization initiatives

- opportunities for new commercialization initiatives

- a changing national and international energy supply and demand situation,

- and others

Thus, there will be no final solution--only options and strategies which reflect our best judgement of how we can fulfill a commitment to develop--as rapidly as feasible--permanent energy resources--particularly solar energy.

Question. Will that report attempt to define the bigger push on solar commercialization that President Carter is talking about?

Answer. The "national plan" will present a number of options and strategies for each solar technology. Specific recommendations--in the form of Administration solar energy initiatives--will reflect the results of these commercialization plans. In fact, our policy of accelerating the commercialization and use of solar technologies will require a continuing development of better approaches and new initiatives.

OIL AND GAS

Question. You have $1.7 million and 40 positions budgeted under energy resources for oil and natural gas programs. What are some of the more notable recent achievements of this effort?

Answer. The Office of Oil and Gas constitutes about half of the total effort or approximately $900 thousand and 17 positions. Over the past year, the Office of Oil and Gas has completed the following four Congressionally mandated reports:

- Crude Oil Supply Alternatives for the Northern Tier States. Prepared for: The Committees on Interior and Insular Affairs of the Senate and House of Representatives.

- The Exploration, Development, and Production of Naval Petroleum Reserve Number 4. (Submitted pursuant to P.L. 94-163, Sec. 164)

- Impact of Mandatory Petroleum Allocation, Price and Other Regulations on the Profitability, Competitive Viability, and Ease of Entry of Independent Refiners and Small Refiners. (Submitted pursuant to P.L. 94-385, Sec. 123)

- Equitable Sharing of North Slope Crude Oil. (A study requested by Congress in Section 18 of the Alaska Natural Gas Transportation Act)

In addition to the mandated reports, the Office of Oil and Gas publishes an annual report entitled "Trends in Refinery Capacity Utilization." This report is widely distributed in industry and Government.

Finally, the Office of Oil and Gas is completing a final draft of a study concerning the disposition of surplus crude oil on the U.S. West Coast.

The Office of Oil and Gas is composed of specialists in the various aspects of exploring, developing, producing, transporting, and processing of crude oil and natural gas. The Office is frequently called upon by members of the Congress, the Administration, the industry, and the general public to provide information, commet, analysis, and review of various issues concerning oil and natural gas.

Question. The justification speaks of oil and gas reserve and resource estimates. Isn't this work conducted by the energy data and analysis activity under FEA?

Answer. The Office of Energy Information and Analysis has the lead in conducting the reserve study. They send out forms and receive and collate responses. However, the Office of Oil and Gas in Energy Resource Development is assigned the task of conducting the field audit studies. This is done to take advantage of the FEA in-house expertise.

SYNFUELS AND GEOTHERMAL

Question. What amount of funding was allocated to synfuels and geothermal energy by FEA in 1977, and what specific accomplishments can the program claim to date?

Answer. In FY 1977, there were two full-time professionals assigned in this area (plus the overall direction and support associated with the Office of Synfuels, Solar, and Geothermal). Accomplishments in this area in FY '77 include preparations of numerous policy documents incident to development of the President's Energy Program, preparation of testimony, and the handling of a heavy volume of Congressional and other correspondence. In addition, a major study on the institutional barriers to expanded use of solid waste for energy was completed. In the geothermal area, FEA chaired an Interagency Institutional Barriers Panel with representation from twelve different Federal agencies. A variety of actions were initiated to streamline the licensing process and to facilitate more rapid commercialization of geothermal energy.

Question. Your other energy resource program is for synthetic fuels and geothermal energy, for which you requested $418,000 and 10 positions. Again, aren't we talking about ERD functions?

Answer. With regard to the manpower resources allocated to the synfuels and geothermal effort, although 10 positions are shown, it must be recognized that this total includes an allocation of 2 positions in the Deputy Assistant Administrator's Office for Executive Administrative purposes and 3 positions in FEA Regional Offices. The remaining 5 positions in the Office of Synthetic Fuels, Solar and Geothermal Energy include two positions for secretary/clerical personnel and 1 position for the Director, Office of Synfuels, Solar and Geothermal. This leaves two full time professional positions, one each for synfuels and geothermal. Of the total funds allocated to this effort ($418,000), $150,000 in contract funds is necessary to supplement the effort of the two professionals. The breakdown of contract funds is as follows: synfuels--$125 thousand; geothermal--$25 thousand. The 3 regional positions are to support the Washington Office in policy studies, assist in identifying institutional barriers (particularly with regard to geothermal) and to handle local matters. None of these activities overlap ERDA functions (see below for amplification).

Question. Basically, it seems you are talking about commercializing these energy technologies. Please tell us what you are doing that ERDA is not.

Answer. In general, FEA is concerned with the broad policy-related aspects of commercializing energy technologies and with how a given area relates to other energy areas. ERDA, on the other hand, approaches commercialization from a technology-based RD&D viewpoint. Both approaches are needed and are not duplicative. FEA's efforts to date with these technologies (synfuels and geothermal) have been modest in scale, and essentially the same level is proposed for FY 1978.

Regarding synfuels, virtually no analysis has been done to identify, evaluate and quantify the long-range constraints to synfuels production. No analysis has been done to determine what is a reasonable production level for a mature synfuels industry and what will limit that production level. Specifically, we propose to:

- Analyze the long-term constraints to a synthetic fuels industry;

- Determine the synthetic fuels potential of the United States;
- Prepare a long-term synfuels policy and recommendations to implement that policy.

FEA would continue to maintain an overview (part-time effort of one professional) of waste-to-energy matters to ensure that this area is properly considered in the context of overall energy planning.

FEA's FY 1978 program in the area of geothermal energy will focus on developing policy alternatives to mitigate legal, institutional and economic constraints impeding commercial development of geothermal resources. High priority will be given to specific problems dealing with:

- Federal and State Taxation Policy
- Utility Rate Structure and Power Transmission access
- Federal, State and Local Environmental Assessment Procedures and Standards

Policy initiatives will be developed from interagency consensus and presented as recommendations to the Interagency Geothermal Coordinating Council.

ELECTRIC POWER

Question. For the electric power subactivity you have budgeted nearly $2.0 million and 51 positions. You have nine different programs ranging in funding from $400,000 down to $28,000, all analyzing various electric generation matters. What specific accomplishments have this activity turned up to date?

Answer. Within the Office of Fuels and Facilities recent program accomplishments include the following:

Powerplant Productvity Improvement Program:

Through interagency task force analysis and subsequent meetings with utility industry, have eleveated the need to improve powerplant performance to the attention of top level utility management and State and Federal regulators.

Complete three studies identifying causes of lost productivity at 12 large coal and nuclear powerplants.

Played instrumental role in utility industry initiation under leadership of American National Standards Committee of development of system for improved and expanded collection of data on operating powerplants.

Initiated studies with industry on the costs and benefits of improving powerplant performance.

Is providing assistance to the State of California in developing methods for establishing reliability and productivity standards for California powerplants.

Provided testimony and technical papers to many institutions on benefits of improved powerplant productivity and measures to attain it.

The report was submitted to Congress on February 24, 1977. Topics which the Office of Energy Resource Development prepared were:

1. Mandatory conversion of oil and gas-fired powerplants and industrial boilers to coal.

2. Promotion of soar applications with electric backup system.

3. Measure to motivate co-generation of electricity and industrial steam.

4. Consideration of alternative utility system reliability criteria.

5. Reliability and economic benefits potentially available from expanded interconnection of utility grids and centralized economic dispatch among interconnected systems.

6. Measures to improve the performance of large coal and nuclear powerplants.

7. Fuel adjustment clauses and alternative means to adjust rates to changing fuel costs.

8. Automatic adjustment of utility rates.

9. Handling of deferral taxes on utility capital investments.

Comparative Electric General Costs

Analyzed comparative costs of coal and nuclear power electricity generation in State of New York and are submitting testimony to New York Public Service Commission hearings on this subject.

Identified need for consistent Federal cost estimating methods and data and have initiated efforts establishing interagency effort to accomplish this.

Nuclear Fuel Cycle Capabilities

Provided review input to policy deliberations on nuclear fuel cycle alternatives and non-proliferation policy decisions.

Participated in interagency analysis of required implementing measures of these policies.

Studied the domestic uranium supply capability and identified measures needed to provide adequate uranium supplies.

Managed the modification of computer programs to calculate nuclear fuel cycle requirements and related costs.

Need for Power

Conducted in cooperation with ERDA, an assessment of current regional generating capacity expansion plants to determine whether adequate new electric generation capability is in process to assure reliable electric supply for the period to 1985. Identified the prospect of potential shortfalls of adequate capacity in six of nine regions of the country unless immediate corrective measures are taken. Briefed White House energy policy advisor and other senior energy officials on these findings. Initiated plans for briefings of states in key regions.

Electric Utility Rate Design

Participated jointly with FEA Office of Conservation and Environment in preparing a report to Congress on means to improve electric utility rate design and other economic regulatory policies.

PROJECT OPERATIONS SYSTEM:

The project operations system this past year contained 35 projects resulting in an estimated savings of 360 million dollars, 30 million barrels of oil and a 36 months reduction in the delay of constructing these energy facilities. Selected projects are monitored in order to determine the impediments to successful completion and operations of energy facilities. These impediments include Federal, State and local regulations, environmental constraints, and the lack of necessary resources including capital, material, labor, and equipment. This program has developed and uses as its tracking system an inventory of online and projected powerplant projects which is a composite from other Federal agencies such as the Federal Power Commission, Nuclear Regulatory Commission, Rural Electrification Administration, Corps of Engineers, and Bureau of Reclamation.

Hydropower. This office sponsored an interagency hydroelectric workshop on November 4, 1976, which identified specific tasks to be completed in order to properly assess hydro development. These tasks include an assessment of the following:

- o R&D needs including solar and wind
- o Benefit/cost methods using "life cycle" evaluation of hydropower within the total water planning scheme
- o Small hydro inventory and potential new hydro sites
- o Institutional constraints on development and legislative needs

Study of Potential Drought Related Electricity Shortage. A report prepared jointly by FEA and FPC which examines the potential summer electricity shortages in the Western United States. The report provides the Administration with decisionmaking information vis-a-vis the drought and its relation to energy.

REGIONAL AND STATE PLANNING:

In the development of rational energy strategies, it is essential that prime consideration be given to the State and regional problem. Utility Projects Management catalyzes regional energy planning by bringing states together to collectively assess their individual and regional energy problems. It stimulates such planning by providing states with pertinent data relative to short and long term energy supply and demand issues and by the evaluation of regional energy options and decisions.

New England Governors Energy Policy Study. This office is working closely with FEA's Boston Regional Office, New England Regional Council and the states in developing the New England Governors Energy Policy Study resulting in the following objectives being enclosed by the New England Governors:

- o to reduce the growth in energy consumption, especially oil and gas;
- o to reduce the region's adverse energy price differential relative to other regions;
- o to increase the security of energy supplies to the regions;
- o to minimize adverse environmental impacts; and
- o to promote economic growth in terms of employment and income.

Massachusetts Cooperative Agreement. A cooperative agreement was executed between FEA and the Commonwealth of Massachusetts (representing the New England Governors) to determine the socio-economic impacts of the policy options considered by the New England Energy Policy Task Force.

State Energy Balances. An interagency agreement was completed with ERDA's Los Alamos laboratory for $80k in order to prepare a total State energy balance for each of the fifty (50) states. These balances indicate the State import, and export of each energy form as well as consumption by inudstrial, residential, commercial and transportation sectors. This effort represents an important first element in a comprehensive State/regional energy planning program.

Independent Analysis of State Electric Power Needs. The purpose of this effort is to establish a useful method of forecasting electricity on the State level. This will include work with the State public utility commissions and other related State bodies directed toward two primary objectives: (a) accurate State energy data and balances, and (b) defined relationships in electricity demand in a model which can be supplied to any State for forecasting their projected electricity needs.

MANPOWER PROGRAMS FOR ENERGY FACILTIY CONSTRUCTION:

This program's purpose is to determine projected deficiencies in skilled labor requirements for energy facility construction and to undertake appropriate corrective action to mitigate any anticipated problems.

Interagency Agreement. The major cornerstone of this effort is an interagency agreement entered into by the Federal Energy Administration, the Department of Labor, the Energy Research Development Administration and the Tennessee Valley Authority in December 1976. The objective is to develop manpower requirements for energy facility construction between now and 1985.

Question. Your budget provides a reduction of three positions and an increase of $100,000 for contracting but doesn't explain why. What are the reasons?

Answer. The loss of three positions to support the ESECA program next fiscal year has placed an additional burden on the program to seek contractual assistance in completing several on-going efforts. Among these efforts are the cooperative projects that are undertaken jointly with ERDA and other Federal and State agencies to demonstrate how institutional inhibitions on specific problems of co-generation units can be resolved as well as the development of improved cost estimating methods for comparative electric generating costs. Through this means FEA can utilize the expertise and manpower of other agencies to supplement its own limited resources. The increase in contract dollars is roughly equivalent to the 3 positions that are lost. The increase in average personnel support next fiscal year throughout FEA.

Question. A good portion of the electric power program is contracted out. Why then couldn't the various utilities and regulatory agencies do this work?

Answer. The FEA has a perspective of electric utility issues that is frequently quite different from that of individual utilities, their national organizations, the utility supply industry or State regulators and energy policy offices. It is this different perspective and motivation that is key in determining what private contractors do and what product they produce. Frequently, FEA identifies and examines utility policy and planning issues before they are viewed as important by States, the utilities or their suppliers. For example, FEA has been instrumental in bringing the need to improve powerplant productivity to the attention of top utility officials, State and Federal regulators and others as an important factor in the Nation's ability to meet future electric power demand. Many utilities credit FEA's programs as a critical factor in the high priority being given this matter by numerous States and their utilities.

FEA's national or regional view is essential to the proper identification and analysis of many electricity demand and supply issues. States or

individual utilities can view the issue quite differently and, without FEA or other Federal agency participation, could develop issue resolution measures which are inadequate due to a lack of regional perspective or inattention to national policy considerations.

Third, FEA frequently must identify and assess policy or planning issues from a national standpoint as a preliminary step to State or local governments, utilities, or supplier industry examination of these same issues from their individual standpoint.

Contractor assistance in the conduct of analyses is essential to carry out these FEA responsibilities. Not only do they provide technical expertise in selected areas, but also they materially expand the extent of analytic and evaluation work that can be accomplished by the fixed FEA staffing level. They also provide alternative insights to problems or means to resolve them.

FINANCIAL PLANNING AND INCENTIVES

Question. The next activity under ERD is financial planning and incentives, for which $1 million and 22 positions are requested. Aside from the unfunded coal mine loan guarantee program, what is this activity accomplishing?

Answer. The Financial Planning and Incentives responsibility in Energy Resource Development involves the development and analyses of Federal financing programs designed to ensure the availability of adequate capital to attain the necessary national growth levels for domestic energy production. Aside from the unfunded Underground Coal Loan Guarantee Program, currently on-going and proposed programs include:

1. Financial Planning and Analysis -- to monitor energy industry cash flows and capital requirements; to analyze capital and money markets for their ability to accommodate these capital requirements.

2. Financial Incentives -- to review existing economic and regulatory restraints and disincentives in the Federal and private sectors which discourage the financing of domestic energy production and to develop and implement programs for both removing financial and economic barriers and providing financial incentives to promote the expansion of domestic energy production.

3. Economic Regulation -- to review and recommend FEA policy options on economic regulatory issues such as rate of return, tax matters, financial incentives, etc.

4. Obligation Guarantees Program -- mandated by ECPA (P.L. 94-385). The program allows FEA to guarantee $2 billion of principal of debt obligations issued by any person or state to finance the installation of energy conservation of renewable-resource measures in existing buildings or industrial plants. Draft version of program regulations and technical amendments has been completed.

5. Materials Allocation Program -- mandated under EPCA (P.L. 94-163) to provide for priority performance of contract for materials and equipment supplies for energy programs and projects. This program is currently operational.

6. Construction and Energy Finance Advisory Committee -- to provide a liaison between ERD/FEA and the Construction and Energy Finance Advisory Committees which results in the provision of independent advice on the subjects.

Question. There is a series of various studies that seem to duplicate other agencies' efforts. Couldn't these resources be used better elsewhere?

Answer. Contract study No. 1 ($25,000) is, on a quick response basis, to support the Energy Finance Advisory Committee whereas no other technical assistance is provided in the budget for the committee members who are top level, senior executives with financial firms. This contractual effort will provide detailed, technical support to the members for specific projects.

Contract studies No. 2 ($70,000) and No. 3 ($160,000) are to support the Financial Planning and Incentives Program, the Economic Regulation Program and the Underground Coal Loan Guarantee Program. To the best of our knowledge, to date there exists no single comprehensive financially oriented energy information system (particularly in the areas of coal and utilities) within either FEA or other Federal agencies, including Treasury, Commerce and Interior.

Contract study No. 3 ($150,000) is to support the Materials Allocation Program. The program is mandated by EPCA (P.L. 94-163). ERD/FEA has been designated the responsibilities to implement the program. This contractual effort is to conduct analysis of potential Energy-related materials and equipment shortages. We are aware of no duplicate efforts existing within any other Federal agencies.

SITING

Question. The siting activity, budgeted at $894,000, is also a scattering of low level funding for energy siting studies that are also handled by other agencies. What are some of this activity's specific accomplishments?

Answer. The Office of Siting is the sole Federal focal point having a comprehensive overview of the energy facility planning and siting issues. This office has sought to integrate Federal and State efforts to resolve facility siting problems. A key objective of our efforts is an attempt to insure a consistent approach by the many Federal agencies having narrowly based siting related program responsibilities. We are providing policy guidance and technical support to activities such as the NRC siting efficiency study, Federal Regional Council's license and permit coordination efforts, utilization of surplus property as energy sites and the Siting Subcommittee of the National Governor's Conference.

The Office of Siting is supporting the efforts of the various states to improve their energy facility planning and regulatory capability. Using cooperative agreements and contracts with State agencies, we have been able to (1) obtain a greater degree of State government consistency and commitment and (2) share projects costs with States.

Examples of two recently completed cooperative studies are attached:

(1) Montana Coal Gasification Study using Surplus Property

(2) Utah Governor's Office, Energy Facility Siting Study

Other cooperative studies which have or are being completed pertain to Michigan, Washington, and Pennsylvania. A conference was also held at Williamsburg, Virginia in December to discuss conclusions and recommendations pertaining to State siting processes; participants included state government, industry, Federal Government, and public interest representatives.

In the water area, a unique data processing model for preparing water for energy assessments has been completed in cooperation with the State of Colorado. This methodology is now being extended to actual implementation in performing water for energy assessment studies of coal and oil shale technologies in the Upper Colorado Basin. We anticipate use of contract funds to extend this methodology in the data systems and water rights laws of other Western States. We have also completed a study of the feasibility of the use of brackish ground water resources

of the Tularosa Basin, New Mexico for energy development. The report is at the printers and will be furnished to the Committee. Further cooperative projects with states will follow up on the potential energy development of brackish ground water not suitable for agricultural and other water uses.

Coastal Zone Management (CZM) studies are required by the 1976 energy related amendments to the CZM Act. One accomplishment consist of an analysis of the State regulatory requirements which will impact siting of OCS onshore support facilities. This is a joint effort of the five mid-Atlantic States. A copy of the first phase report has been completed and the final report will be submitted when copies are available after printing.

Surveys of States have confirmed widespread use of the first phase report. Interagency cooperation has been maintained through a special committee of the Office of Coastal Zone Management, Department of the Interior, National Science Foundation, and FEA to make sure that OCS related studies are not overlapping or duplicative.

In the area of socioeconomic impacts, our accomplishments fall into three categories:

Workshops
Demonstration projects
Inter- and intra-agency coordination

We have been aware of many extensive studies of the nature of energy-related socioeconomic impacts in remote areas. To collect information on what the gaps were in existing efforts to mitigate impacts, and to encourage debate as to the relative merits of alternative financing and structural solutions to energy facility siting and related community development problems, we sponsored two series of workshops. At these workshops, which were attended by small groups of state officials and legislators, industry representatives, private developers, environmentalists, members of the financial community, and other interested groups, we discovered that most of the people whom we considered to be adversaries had never talked with each other before. We also confirm our belief that few studies had defined or developed constructive alternative financial planning and management strategies which states and communities could adapt to their own needs.

Consequently, we have sponsored several demonstration projects, many of which are cooperative efforts with states or regional governments.

These demonstration projects and their degree of completion are noted briefly below:

- Northwest Colorado Council of Governments: Project to devise a financial plan and guidelines for its implementation for the impacted community of Hayden, Colorado, with that process documented for the benefit of similar impacted communities in the intermountain West. Project complete.

- Western Governors' Regional Energy Policy Office: Cooperative agreement under which WGREPO analyzed and assessed legislative alternatives for dealing with socioeconomic impacts in each of the ten states it represents. Project complete.

- Wyoming, Department of Economic Planning and Development: Project to assess the abilities of two Wyoming communities to interface effectively with the state government agencies, especially the Community Development Authority, to solve problems generated by the large numbers of energy facilities being sited in their vicinity. Completion - Summer, 1977.

- National Governors' Conference: a) Subcontract to New Mexico Energy Resources Board. Project to 1. Analyze the relative fiscal capacities of five communities in the coal development area of New Mexico to

absorb growth under different energy development scenarios; and 2. To analyze the optimal areas of coordination desirable for the newly-legislated community assistance council and other energy facility siting agencies in the State. To be completed by July 31, 1977. b) Coalfield Housing Association. About to let subcontract to this non-profit Appalachian organization which is backed by both industry and labor to assess its approach to solving socioeconomic impact problems in Appalachia, and to determine its replicability elsewhere in that region and in other geographic areas. Complete in late 1977.

- Colorado Special Census Analysis: Cooperative agreement under which the States has agreed to analyze the results of a special census of three counties to determine how much federal assistance these counties would be eligible for if the eligibility requirements of federal programs were geared to projected population figures in the cases of areas anticipating rapid energy-related growth. Completion by October 31, 1977.

One of the greatest impediments to implementing any of these solutions has been the lack of coordination among federal agencies. Not only does the existing siting process create great uncertainties as to the number, scale, and location of energy development to expect, but federal agencies have not made the right kinds of assistance available to communities in a timely fashion. We have expended considerable effort within our own agency, and with other agencies, to begin informal coordination of efforts to minimize the uncertainities in the siting process, to eliminate duplication, to discuss contradictions in eligibility requirements, and to encourage cooperative, constructive efforts to facilitiate the process of energy development-related growth in remote areas.

Product Price and Allocation Controls

Question. You apparently have not budgeted for continuing control of gasoline prices and allocations pending a decision by the Administration. The President's message was not precise on this question. When do you expect a firm decision on the question of decontrol?

Answer. The President's Energy Program addresses gasoline decontrol under Section F4(i) as follows:

i. Gasoline Decontrol (Administrative)
Gasoline prices have never reached their allowable controlled ceilings, and marketers have contended for some time that deregulation of gasoline would increase competition by allowing them to shop among suppliers.

In order to assure the maintenance of such competition, the Administration will support legislation similar in concept to the current "Dealer Day in Court" statute that protects service station dealers from arbitrary cancellation of their leases by major oil suppliers.

In addition, the Administration currently hopes to eliminate gasoline price controls and allocation regulations at the end of the peak driving season this coming fall. Gasoline prices and market competition will be closely monitored and controls will be reimposed if prices rise above a predetermined trigger level. If this action is taken, it would permit the elimination of controls while protecting consumers.

From the foregoing, the gas decontrol issue will be resolved after the peak summer consumption period during which time the FEA will closely monitor the Nation's gasoline consumption. If the findings at the end of the summer period indicate that decontrol is desirable, such recommendations will be made to Congress. Assuming that decontrol is

recommended, a "trigger" mechanism, similar to the "trigger" on heating oil prices, will be put in place. This "trigger" mechanism will permit decontrol yet protect the consumer should decontrol result in uncontrolled price increases in gasoline.

Question. If controls are continued, what are the estimated costs to FEA?

Answer. The effect on the budget of continuing the present controls would be an increase of 127 positions over the current requested levels. This eliminates 58 positions from the FY 76 level which reflected controls on all petroleum products. The estimated cost of continuing existent controls is $3.4 million over the current request. Assorted legal support would require an additional 21 positions and $570,000. This $3.4 million figure includes $2 million contract support for revising and simplifying the regulations for those products which continue under control.

Question. The 1,623 positions you request for Regulatory Programs in 1978 does not sustain the personnel level funded under the supplemental. Is this because of the decontrol assumption in your budget?

Answer. Yes. We expect decontrol of motor gasoline and aviation gasoline to take place during FY 78. Consequently, there are fewer positions planned for FY 78 than FY 77, and all of these positions are involved with the controls function either in FEA Washington or at FEA Regional Offices.

Compliance

Question. Mr. O'Leary, in your statement you mentioned that the Regulatory Programs are of great interest and concern to you. Could you expand on that?

Answer. The Compliance Program, within Regulatory Programs, impacts on the public directly. It is through the efforts of FEA's audit and investigation functions that violations are uncovered which could result in returns to the consumer. Because of the importance and visibility of the Compliance Program, a task force has been established to improve the audit, legal, and enforcement aspects of the Compliance process. The task force has been meeting informally and it is expected that it will be formally established imminently. I have asked the task force, to the extent possible within the time limits that have been set, to:

1. Evaluate the current backlog of Compliance cases.

2. Examine FEA's present compliance and enforcement strategy.

3. Examine FEA's audit techniques.

4. Examine FEA's audit skills and other national and regional staffing needs.

5. Examine FEA's organization and management of the Compliance program with particular emphasis on better coordination between the audit and legal functions.

6. Evaluate communications and allocations of authority between national and regional offices, between General Counsel and the Office of Regulatory Programs (ORP) (both at the national and regional levels, and between different regions).

7. Evaluate FEA's present enforcement powers.

8. Evaluate FEA's Special Investigation procedures.

9. Provide a preliminary report of its findings and recommendations within 60 days after formal establishment of the task force.

Implementation of the findings of the task force should result in a compliance effort that will better focus on the problems of discovering and successfully

prosecuting price violators. Furthermore, for the first time in its history, the National Office of Compliance has been given a staffing level that will permit successful management of the Compliance effort. In the past, budgetary limitations have prevented the full staffing of the audit programs necessary for insuring compliance with FEA regulations.

Question. You apparently feel the Compliance Program is not adequate since you have formed a task force to look into improvements. What are are the main deficiencies as you see them?

Answer. A task force has been formed to analyze and develop proposed solutions in the following areas of the Compliance Program.

1. The Current Backlog of Cases

   The task force will evaluate the current backlog of compliance cases, recommend audit and litigation priorities for such cases, and recommend a strategy for the resolution of priority cases.

2. Compliance and Enforcement Strategy

   Within the previous Administration, there was much discussion concerning the level of audit coverage that should be given to the Compliance programs. The task force will review the strategies that had been proposed and recommended the most appropriate strategy. The following three strategies have been discussed most frequently:

   - 80-15-5 Strategy. This strategy calls for annual audits of firms doing 80 percent of the total business in a given petroleum program. Those firms doing 15 percent of the volume would be audited every three years. The remaining five percent would be audited on a five year cycle. All major refiners would be audited on an annual basis.

   - 80-20 Strategy. This strategy calls for audits every two years for those firms doing 80 percent of the total business in a program and every five years for those firms doing the remaining 20 percent. Again, major refiners would be audited annually.

   - Current Strategy. After extensive interagency coordination between OMB and FEA, the Administration proposed the current strategy which provides for varying audit coverages for each Compliance Program. This strategy embodies continuous audits for major refiners and specific annual levels of audit coverage for the other programs which range from a low of 14 percent per year for propane retailers to a high of 31 percent per year for small refiners.

   In addition, the task force will make recommendations respecting establishment and implementation of a more effective compliance and enforcement program, including suggestions for improving the effectiveness of the overall audit effort and for revising existing compliance and enforcement procedures.

3. The Need for Improved Audit Techniques

   The task force will make recommendations respecting suggestions for improving the effectiveness of the overall auditing effort including specific suggestions for improving audit techniques.

4. The Need for Improved Audit, Legal and Other National and Regional Staffing Needs

The task force will make recommendations for the professional disciplines necessary to improve the overall compliance, auditing, and enforcement program.

5. The Need for Establishing an Organizational Structure with Sufficient Legal Support for Audit Functions that Will Provide Timely and Uniform Interpretations of Regulations

The success of the Compliance effort greatly depends upon the adequacy of legal support. This support entails the review of formal actions and the issuance of interpretations and rulings. Due to many competing priorities for legal support, the audit function has not received the attention it deserves. The amount of time elapsed between the recognition of a problem requiring legal attention and its ultimate resolution must be reduced. The task force will look into this problem and identify ways of improving the progress by which legal support is given to the audit staff.

The task force will review the organization and management of FEA's Compliance Program to include both audit and legal functions and make recommendations to maximize the program's effectiveness. Particular attention will be given to actions which will better coordinate the audit and legal functions of the enforcement effort.

6. The Need for Improved Coordination within FEA-Inter-Office, National-Regional, Inter-Regional

The task force has been asked to evaluate communications and allocations of authority between national and regional offices, between General Counsel and Office of Regulatory Programs (ORP) (both at the regional and national levels), and between different regions, and to make recommendations respecting organizational and other changes which will improve coordination within FEA.

7. The Need for More Effective Enforcement Powers within FEA

The task force has been asked to recommend appropriate legislation that would improve the effectiveness of FEA's present enforcement powers.

8. The Need for Improved Special Investigation Procedures

The task force has been asked to make recommendations for improving FEA's Special Investigation procedures. This aspect of the review will include an assessment of the proper balance of skills necessary between personnel with audit backgrounds and those with investigative backgrounds, and those with legal backgrounds.

Question. Your statement estimates that the potential violations pertaining to open audits are estimated at $2 billion. What does that mean, exactly?

Answer. That figure is based upon violations to the point that Notices of Probable Violation, Consent Orders and Remedial Orders have been prepared on open audits as of January 1977.

Question. The $3 million in penalties have been collected to date -- what period does that span?

Answer. The amount of penalties collected for the period July 1, 1974, through February 28, 1977, is $3,540,000.

Question. FEA received congressional criticism last fall over reports that oil companies who may have raised prices improperly, were to have their penalties forgiven. Where does that situation stand now?

Answer. FEA is pursuing this matter. However, eleven oil companies have initiated legal proceedings challenging the legality of FEA's regulations regarding non-product costs. The FEA has been temporarily restrained by the Courts from taking further administrative action on this issue. It is anticipated this matter will be resolved in the near future. The FEA will then take appropriate administrative action against all refiners, both large and small, that are found in violation of the applicable regulations.

Question. Your cost factors for Compliance show nearly $4 million in travel and $1.5 million for "other" costs. Please supply a justification for those estimates, including a breakdown of other costs.

Answer. The Compliance travel request of $3.9 million for FY 78 was a projection based upon detailed input from the regions required in the Quarterly Compliance Workplans for FY 77. A sample of the Travel Funding Request, one of several schedules that make up the Workplan, follows. The Regional Compliance Workplan is a system for the allocation of regional Compliance staff resources to the audit/investigation of the various industry levels and segments that are required to comply with the FEA Regulations. The purpose of the Regional Compliance Workplan is to establish and maintain a medium that will enable the National Compliance Office to provide guidance and direction to the regions in the utilization of their staff resources, and to achieve and sustain the level of effectiveness required to maintain a viable ongoing Compliance effort. Workplans for each fiscal year quarter are prepared by each of the ten regions and submitted to the National Office for approval. In the Workplans, the regions distribute their regional staff resources to workload requirements, which are based on Compliance priority criteria established by the National Compliance Office. Each proposed regional workplan is reviewed by the National Office with approval predicated upon satisfactory implementation of Compliance priorities and other workload requirements.
This request is a decrease from the FY 77 request. The level of detail indicated on the Travel Funding Request enables FEA to accurately estimate the travel requirements necessary to accomplish the goals set forth in the Workplan.
The $1.5 million for "other" costs is listed as one of the cost factors. The following is an explanation of the costs involved:

	($000)
° Transportation of Things. This includes transportation of household goods for personnel who are being employed and transferred from a duty station to FEA. Funds requested provide for approximately 50 employees in FY 78.....	125
° Rent, Communications and Utilities. This includes commercial space rental for some field offices, rental for photocopy machines, programmable calculators, typewriters and other office machines.....	670
° Printing and Reproduction. This involves Compliance forms and instructional pamphlets for the various industry sectors.	120
° Other Services. This includes training for approximately 850 employees, court reporting services, equipment repairs, and repairs for alterations to buildings (painting, etc.)....	225
° Supplies. This includes office supplies for 1,384 employees, also includes publications and trade periodicals.....	115
° Equipment. This request provides for office furniture (e.g., desks, lamps, chairs), approximately 20 work stations.....	232
Total "other" costs.....	$1,487

Question. Some of the $625,000 in Compliance contracting seems to involve work that is also budgeted under the information and analysis activity. Why can't the data work be centralized?

Answer. The data work budgeted under Compliance contracting involves such projects as the analysis and/or development of requirements or the conducting of studies to provide recommendations for current or projected computer systems for the Office of Compliance. Based upon the results and recommendations of such analyses and studies by technically qualified contractors, the Office of Compliance decides which alternatives to pursue. The request for the actual implementation phase is submitted to the Office of Energy Information and Analysis for action. All data work is centralized in the Office of Energy Information and Analysis.

ENERGY INFORMATION AND ANALYSIS

Question. Mr. O'Leary, we recognize the need to contract out for data services, but there is a total of $27.4 million in contracts included for information and analysis. That's up about $8 million, I believe. What is the justification for that?

Answer. The following justifications cover the majority of the increases in contract funds. However, it should be noted that the increase is closer to $6 million, as the Congress has recently approved a supplemental increase of about $2 million in the FY 1977 budget for EI&A.

The proposed increases are for an oil and gas reserves study to obtain and update on a continuing basis estimates of oil and gas reserves of the Nation so that there is creditable and accurate information available for policy decisions of the Administration and Congress. Congress has been critical of the previous 1975 study as it was felt that FEA relied too heavily on industry sources for the data; the data validation program must be expanded to all Federal energy data systems per ECPA, Sections 141(b) and 142. This means that FEA must apply data validation criteria to the over 240 existing Federal energy data systems and to change, merge and eliminate systems as necessary to insure that data validation criteria are met, to reduce duplication of collection effort, to reduce the cost of the government and the public and to meet user requirements; the consumption data base must be developed by examining 2.7 million data records to determine major consuming segments, trends, and specific consumption patterns. The completion of the data base will represent the first time a detailed examination has been done on a comprehensive computerized consumption data base (required by ECPA, Section 142, Part B, Section 52a); to develop a National Energy Information System (NEIS) to serve as the single authoritative source of energy information. This will require identification of data gaps and the development of a plan to obtain the additional data required by the act. This activity is required by the ECPA, Section 142 (Section 52); provide public and Congressional access to the Project Independence Evaluation System (PIES) model on the FEA computer. The resources are necessary for developmental costs and analytical support to users and is required by ECPA, Section 31; and the necessary data service support to the above programs.

Question. Few of the sub-activities under information and analysis give any justification for specific increases or decreases. Where there is any substantial change, particularly in data and analysis, please submit such justifications for the record.

Answer. The major position increases are also associated with the justifications cited in the contract information listed in the previous question. Major contract increases also have major position increases.

Question. More information is needed on funding allocations within sub-activities under information and analysis. Please supply for the record the dollars and positions allocated to the various programs under economic impact analysis, data and analysis, and data services. Include increases or decreases from 1977 levels.

Answer. Following is the resource requirements by program:

	FY 1977*		FY 1978	
	Pos	Dollars	Pos	Dollars
Economic Impact Analysis				
Competition Anal.	16	650	16	735
Socioeconomic Anal.	6	550	7	605
Macroeconomic Anal.	22	911	23	1,150
Regional Anal.	9	585	9	800
Executive Direction	7	175	6	200
	60	2,871	61	3,490
Data & Analysis				
Executive Direction	4	300	4	310
Energy Systems Data	43	1,688	47	3,123
Oil & Gas Analysis	48	2,268	55	5,252
Coal, Nuclear & Electric Power Analysis	38	1,682	42	2,572
Energy Systems Modeling & Forecasting	53	2,503	57	3,305
	186	8,441	205	14,562
Data Services				
Support to Other FEA Offices	10	1,355	10	2,222
Support to Energy Information & Analysis	92	10,494	93	10,287
Support to Regulatory Programs	42	3,947	42	3,185
Support to Conservation & Environment	19	1,669	18	2,782
Support to Energy Resource Development	14	1,760	14	2,336
Support to International Energy Affairs	3	484	3	369
	180	19,709	180	21,181

*Includes FY 1977 Supplemental Approved by Congress.

EXECUTIVE DIRECTION AND ADMINISTRATION

MANAGEMENT

Question. The biggest single increase - $2.3 million and 26 additional positions is in Management, and much of the work there seems to duplicate program functions of other activities. Why do you need this kind of management increase?

Answer. The increase in the Office of Management is primarily to provide adequate administrative support to the program offices for the requirements and authorities which were recently assigned to them under the Energy Conservation and Production Act. Requested increases in Management positions include 14 to accomplish the administrative review, document processing and other support for the Obligation Guarantee Program and 5 for grant and contract administration to

support such programs as Low Income Weatherization and State Grants. The additional resources requested will also provide for internal review and financial management of new or expanding programs.

In addition to supporting the staff mentioned above the $2.3 million increase will provide for increased space, telephone, and court costs over which the Agency has little or no control.

Question. Why, for example, do you need a data system to track energy programs, support for the obligation guarantee program, and public education mailing. Don't these properly belong under information and analysis, conservation and communications and public affairs?

Answer. The activities which are referred to do not duplicate the function of the program offices but rather are necessary requirements to provide coordination and administrative support for certain specific and other general FEA substantive efforts. For instance, the data system to track energy programs is part of a Program, Planning, and Budgeting System (PPBS) which is designed to facilitate comprehensive and integrated management information on all FEA programs. For operational efficiency, FEA is organized partially along functional rather than program lines. Consequently, it is difficult to make knowledgeable decisions about program resources, etcetera, since these resources may reside in several different organizational units. The PPBS system, then, serves a management function and does not duplicate the substantive data systems of specific energy programs.

Question. Your management request includes some $1.5 million in contracting. Why do you need to contract out so much of your own management work?

Answer. Virtually all of the Management contracts are for services which cannot be accomplished in-house at any price. The $200,000 requested for health services, $400,000 for uniform guard service, $125,000 security investigations and clearances for certain FEA employees, $500,000 for the Temporary Emergency Court of Appeals, and the $72,000 for training all are requested for functions which FEA cannot feasibly provide for itself. The remaining $200,000 of the contract request is for services which are of short duration and therefore do not merit additional staffing of experts who are not presently on the staff.

PRIVATE GRIEVANCES AND REDRESS

Question. You are reducing employment in private grievances and redress from the level established in the supplemental. Why? Are you anticipating less workload?

Answer. The FY 1977 supplemental budget expanded the PGR staff by 15 positions. The additional 15 positions are necessary to permit the FEA Regional Offices to continue to process Applications for Exception and Appeals which are associated with the continuation of controls on certain refined petroleum products beyond April 1977. The funding for the PGR FY 1977 budget assumed that these controls would be discontinued by April 1977. The FY 1978 budget submission also assumes the discontinuation of controls on refined product. Accordingly, the 15 positions which are the subject of the FY 1977 supplemental budget submission will not be necessary for FY 1978. The FY 1978 budget submission, however, does seek an increase of 10 positions in the staff of the National PGR Office. These additional 10 positions will be required to accomodate a significant increases in Appeals and Applications for Exception which will result from substantially increased FEA compliance activity.

Intergovernmental Relations

Question. With State energy activities shifting almost entirely to conservation and ERD, why do you need to maintain the Intergovernmental Relations Office at the $1.1 million level?

Answer. The $1.1 million requested for the Intergovernmental Office includes $500,000 for contracts with Public Interest Groups and approximately $568,000 to support a staff of 11 people in our headquarters office and one IGR person in each of our 10 regional offices.

The need for the funds to support the Public Interest Groups is explained below. The level of staffing is the minimum needed to discharge our responsibilities, under Section 20 of the FEA Act, to assure proper input of State and local governments to energy policy development and implementation.

Although energy activities in the States are shifting to conservation and ERD and the program people in the regions have primary responsibility for implementing these programs, IGR people are still required to assure proper input of State and local governments to energy policy development. In addition, there are many IGR activities which are not directly program related or which cut across program lines and require the presence of IGR specialists both in headquarters and the regions.

Question. How much travel is budgeted for this office?

Answer. A total of $57,000 for FY 1978. This includes $25,000 for travel of headquarters IGR personnel and $32,000 for travel of regional IGR people.

Question. Intergovernmental Relations lists $500,000 in contracting with four national organizations of State and local governments "to collect information on energy programs . . . and to solicit their views." Why does FEA need to pay these groups for this service?

Answer. The contractual relationship between the Federal Energy Administration Intergovernmental Relations Office and the national organizations representing State and general purpose local governments is designed to facilitate development and implementation of national energy initiatives and programs.

This support provides FEA with access to State and local government energy information which would not otherwise be obtainable because the various contractors would not be able to gather it due to their limited resources.

Additionally, the contracts provide a valuable mechanism for explaining FEA policies and programs to their various constituencies in a manner that is effective and direct.

Section 20 of P.L. 93-275 mandates that FEA will consult with and directly assist State and local governments on energy matters. Through the national organization mechanism, these processes are expedited and FEA's accomplishment of mission is enhanced.

Each of the national organizations under contract to the FEA Office of Intergovernmental Relations has an energy project staff which these funds help to support. The work programs spelled out in each contract vary, but all provide a consultative mechanism to assist the Federal Energy Administration in achieving comprehensive and timely input on energy policies and programs affecting specific constituent levels of government.

This consultative device affords the Intergovernmental Relations Office an opportunity to work closely with the elected officials who comprise the energy policy making committees of these organizations. Through a close exchange of ideas with these State and local government elected officials, points of difference can be negotiated and policy convergence obtained with a minimum of delay.

This method for resolving differences of both a policy and program nature has proven invaluable to the Federal Energy Administration over the past three years.

Consumer Affairs/Special Impact

Question. With a State grant program for consumer services initiated

under the conservation activity, why do you need increases for your office of consumer affairs?

Answer. FEA's State grant program for Offices of Consumer Services is categorically limited to the utility area. These grants can supplement existing State efforts or establish State efforts to advocate on behalf of consumers before State Public Service Commissions on utility rate issues within that State.

FEA's Office of Consumer Affairs is both increased and decreased. National Staff is budgeted for a staff reduction of four positions.

In the Regional activity consumer affairs budget is increased to support a minimal increased outreach through State and local consumer forums on the entire spectrum of energy issues--not just utilities as in the State grant program. Our plan is to encourage maximum community dialogue on energy and sometimes to pay expenses to attend these forums for those citizens--such as low income, elderly, handicapped, American Natives--who are most severely impacted by energy price and distribution and who are most in need of interaction on energy with private and public State and local officials. The results of these many dialogues are expected to be multi-fold. First better understanding of the choices individual citizens can make to enhance their own household use and expenditure patterns for energy may be gained. Secondly, assistance resources available to households --such as energy supply, conservation, financial, or information sources--should be clarified for citizens and for communities. Finally, Federal, State and local government should gain information on energy policy and assistance gaps in the household sector which need to be addressed. The entire Regional consumer program, then, is intended to assure two-way communication between consumers and their governments on energy and to supplement and support State and local efforts on energy.

At the National level a small contract budget is requested. This will help the Office of Consumer Affairs to quantify and scope issues that the small staff does not have the expertise or time to analyze--primarily at the request of the National Consumer Affairs/Special Impact Advisory Committee.

Question. How much travel in total is budgeted for this office?

Answer. The total CA/SI budget for National and Regional travel is $57,000.

PROGRAM DEVELOPMENT

Question. You have established a separate office of program development and evaluation in response to recent legislation. The trouble is, various programs also appear to have the same functions embodied in their budget. How much overall is budgeted for this work in FEA?

Answer. The Office of Policy and Program Evaluation was established last year at the direction of Congress in the Energy Conservation and Production Act. Within that Office the FY 1978 Budget requests 11 positions and $380,000 for the function entitled Program Development and Evaluation. Additional resources of 63 positions and $26,167,000 have been requested for program development and evaluation primarily within the offices of Regulatory Programs, Conservation and Environment, and Energy Resource Development. However, it should be noted that 39 of these positions and $25,000,000 are associated with the Innovative Conservation Fund. Excluding the Fund, the total resources requested for FEA are 35 positions and $1,547,000 or substantially less than one percent of the total Salaries and Expenses Budget.

It should be noted that the responsibilities of these 35 people will not carelessly overlap. Twenty-four of these people work in specific programs and will accomplish development and evaluation activities which are limited to their program and which are required for effective management by their

Assistant Administrator. The remaining 11 people will work in the Office of Policy and Program Evaluation performing an independent review of the Agency.

Question. There is no justification for requested increases in personnel and contract fundings. Please supply that for the record.

Answer. It rapidly became apparent as we began our evaluation effort that additional contract funds were required in two areas:

The first is the design and distribution of survey forms to evaluate public outreach programs. Considering the number of these in relation to the number of evaluations anticipated, it would not be cost-effective to add full-time professional statistical survey persons to our staff.

The second area is in specialized technical areas where there is a need to obtain professional, high-level technical information or opinions independent of the program office being evaluated. These needs generally are short-term, one-time requirements for a specific evaluation.

Personnel increases reflect the significant changes in program priorities and direction resulting from further implementation of the provisions of the Energy Conservation and Production Act.

Question. No cost factors are included in the justification for the offices of administrator, communications and public affairs, and congressional affairs. Please supply them.

Answer. Cost factors for these offices are supplied below:

The cost factors for the Office of the Administrator are as follows:

Personnel Compensation and Benefits	$1,539,000
Other Costs	431,000
Total	$1,970,000

The cost factors for Congressional Affairs are as follows:

Personnel Compensation and Benefits	$ 564,000
Other Costs	65,000
Total	$ 629,000

The cost factors for the Office of Communications and Public Affairs are as follows:

Personnel Compensation and Benefits	$1,304,000
Other Costs	130,000
Contracts	170,000
Printing	200,000
Total	$1,804,000

INTERNATIONAL ENERGY AFFAIRS

Question. The request for $1.6 million for international energy affairs involves only slight increases. Please provide some specific accomplishments for this activity.

Answer. The specific accomplishments of the Office of International Energy Affairs are broken by budget activity.

Executive Direction

FY 1976
In addition to overall responsibility for the direction and management of IEA's other program activities, Executive Direction performed significant roles as Deputy Head of the U.S. Delegation of the Conference on International Economic Cooperation's Energy Commission, U.S. Delegate to the International Energy Program's Governing Board, and headed a technical group of the U.S.-U.S.S.R. Energy Committee of which the FEA Administrator is U.S. Chairman.

FY 1977
In addition to continuing overall responsibility for the direction and management of International Energy Affairs' other program activities, Executive Direction continued its participation in various international organizations involved with energy in leadership roles as U.S. Delegate to the International Energy Program's Governing Board, as Deputy Head of the U.S. Delegation to the Conference on International Economic Cooperation, and head of a technical group of the U.S.-U.S.S.R. Energy Committee, of which the FEA Administrator is U.S. Chairman.

International Resource and Commerce/International Policy

FY 1976
1. Designed policy options and strategies for the U.S. Government's role in the international trade of energy.

2. Provided continuing analyses of energy and cost/tradeoffs of future energy supply and demand for the 1975-1985 time period.

3. Assisted in policy and legislative evaluations regarding the future role of the United States Government vis-a-vis the international oil supply.

4. Developed data on and provided analyses of patterns of world-wide investment in energy resource development regarding the probable extent to which it will constrain or contribute to future U.S. energy supplies.

5. Analyzed the issues and policy and program options in the international implications of world-wide developments in nuclear power, including (1) adequacy of uranium reserves, (2) international trade in all aspects of the nuclear fuel cycle, and (3) uranium and plutonium reprocessing, including the potentials for regional reprocessing centers.

6. Participated in International Energy Agency negotiations to develop specific mechanisms to implement long-term cooperation on energy resource and development and conservation and resource development.

7. Provided extensive staff support for U.S. participation in the International Energy Agency and the Conference on International Economic Cooperation.

8. Evaluated for Eximbank the implications of proposed transactions for domestic and international energy supply and demand.

9. Analyzed future developments in the world petrochemical market.

10. Revised and updated the previous report published by FEA on foreign investment in U.S. energy resources and industry including an assesment of data collection difficulties on foreign investment and an assessment of the policy implications of foreign investment in the U.S. energy sector.

11. Participated in preparation of policy recommendations regarding future U.S. imports of LNG.

12. Analyzed international crude oil and petroleum pricing.

13. Evaluated the international implications (including supply, security, and price) of the Strategic Petroleum Reserve Program and the Early Storage Reserve Program, as authorized in the EPCA.

FY 1977

1. Provided policy recommendations and analyses for U.S. participation in the International Energy Agency (IEA) and Conference on International Economic Cooperation (CIEC):

- U.S. policy toward OPEC pricing
- U.S. policy toward Less Developed Countries (LDC's)
  - -- technology transfer
  - -- International Resources Bank
  - -- International Energy Institute
- IEA program in
  - -- Accelerated Development
  - -- Energy Conservation
  - -- Emergency sharing and allocations
- U.S. policy toward "indexation" of international oil prices and the potential relationship to other commodity prices

2. Provided policy recommendation for Energy Resources Council and other Executive Branch processes regarding:

- LNG import restrictions
- U.S. coal exports
- Ex-Im Bank financing of energy equipment trade
- Foreign investment in U.S. oil companies
- U.S. monitoring of oil company activities overseas
- Divestiture

3. Provided international analyses for the 1977 draft National Energy Outlook.

4. Coordinated energy policy with other foreign policy issues, particularly with respect to bilateral relationship between the United States and Great Britain, Canada, Mexico, Japan, Iran, and Saudi Arabia.

5. Provided policy recommendations based on international implications of domestic energy decisions, including:

- Disposition of Alaskan oil
- Resolution of Northern Tier crude oil deficit
- Product entitlement MOIP

International Agreements and Regional Affairs/International Aggrements

FY 1976

1. Participated in various multilateral consultations between oil consuming and producing countries and developing countries regarding all aspect of international energy policy and cooperation, e.g.:

- IEP negotiations to develop specific mechanisms to implement emergency sharing procedures;

- Law of the Sea negotiations;

- NATO Petroleum Planning Committee, which has responsibility for oil allocation in NATO emergencies;

- National Security Council issues and studies involving energy; and

- U.S.-U.S.S.R. Joint Committee.

2. Improve climate and results for energy relationship with Canada.

3. Participated in preparation of the allocation program tied to the reduction of supplies of Canadian oil to U.S. Northern Tier refiner.

4. Participated in conclusion of U.S.-Canadian Transit Pipeline Treaty Negotiations.

FY 1977

1. Promoted cooperation and ensured compatibility of U.S. international energy policy with policies of other major consuming countries through:

- Participation/membership or leadership of U.S. delegations to the IEA

  -- Governing Board

  -- Standing Group on Long-term Cooperations (SLT), including serving as the Vice-Chairman.

     --- SLT/Subgroup on Accelerated Development, including serving as the Chairman

     --- SLT/Subgroup on Conservation

  -- Standing Group on Emergency Question (SEQ)

  -- Standing Group on Oil Market (SOM)

- Oversight and monitoring of the IEA's Industry Advisory Board and Industry Working Party as mandated under the Voluntary Agreements provided by the EPCA; management and coordination of Executive Branch activities necessary to implement the Voluntary Agreement

- Technical assistance in structuring and testing the IEA emergency oil sharing program

- Providing information, data and analyses for the creation and establishment of the U.S. Early Storage Program and the Strategic Petroleum Reserve as authorized by the EPCA

- Other special participation relevant to international issues of: supply security; energy resources demand, including oil, natural gas, coal and uranium; and pricing and cooperation.

2. Promoted continuing dialogue among consumer nations, producing nations and non-oil LDC's through membership on:

- U.S. Delegate to the CIEC

- Deputy Chairmanship of the delegation to the Energy Commission

3. Represented the United States or the FEA in:

- Law of the Sea Conference

- Anatarctic Treaty Conference

- NATO Petroleum Planning Committee

- U.S.-U.S.S.R. Joint Commission on Energy

- U.S. Mexican Joint Commission

4. Promoted international cooperation to assure effective international energy resource development, as well as technological research and development, to help assure the consistency of development in these areas with our overall international energy policies and programs.

5. Published energy information report for U.S. Embassies abroad to improve their effectiveness in energy matters.

Question. What impact if any will the President's April 20 energy message have on the International Energy Affairs activity?

Answer. The President's April 20 energy message has significant implications for the Office of International Energy Affairs in at least six policy/program areas:

LNG Import Policy - The President has proposed a flexible policy of "case-by-case analysis of each project, "requiring detailed assessments of the pricing policies and security of supply of various foreign LNG producers.

Oil Import/Pricing Policy - The President's proposed goal to cut U.S. imports to 6 million barrels/day and the new U.S. oil tax system will have significant impacts on world oil markets and on our commitment to set reduced oil import targets within the IEA.

Nuclear Export and Non-Proliferation Policy - The President has called for a multilateral effort to solve non-proliferation problems, to ensure adequate supplies of natural and enriched uranium, and to encourage the development of alter-natives to nuclear power, particularly in the LDC's.

Petroleum Company Financial Data System and Industry Competition - The President's desire to expand federal oversight of the energy industry explicitly includes foreign operations.

The Strategic Petroleum Reserve and the Emergency Management Information System - Expansion of the SPR to 1 billion barrels, establishment of the Emergency management Information System, development of contingency plans will require additional analysis to consider the impact of expanded SPR purchases in the world oil market and to ensure the compatibility of U.S. contingency plans with the emergency sharing system of the International Energy Agency.

Research and Development on Coal and Solar Energy - There is significant potential for expanded international cooperation in the development of new coal and solar technologies.

FEA is currently evaluating the resource implications of the President's energy policy. It is likely that some additional resources may be required to fully implement his proposals.

GENERAL COUNSEL REQUIREMENTS

Question. The more than 190 positions requested for the General Counsel seems excessive for an agency the size of FEA, especially when we consider that 12 more General Counsel positions are also requested under Strategic Petroleum Reserve. Why do you require such a large legal staff?

Answer. The FEA legal staff is not large when one considers the volume of regulatory activity conducted by the agency, the number of lawsuits which must be defended, and the substantial number of new conservation

and other programs requiring significant legal input. All legal support for each of FEA's programs, including regulatory and compliance activity, comes from the office of General Counsel. The requirement for 193 positions (which includes secretarial and other support personnel as well as lawyers), represents an increase of only three positions in the number authorized for the Office of General Counsel during FY 1977. Of the total positions requested, 62 are for 10 regional offices.

Because FEA is a new agency with broad program, regulatory and compliance responsibilities, the legal workload is particularly heavy. Thirty-five positions, for example, will be required to handle the expanded conservation programs mandated by the EPCA and ECPA and 52 positions are required for FEA's legal responsibilities in the compliance and enforcement area. Together these 2 legal program areas alone constitute approximately 45% of the General Counsel's total resource requirements. With respect to litigation, the workload is extremely heavy. Since January 15, 1974, FEA has been involved in a total of 265 lawsuits, and approximately 25% of those have been filed in the last five months. We anticipate that lawsuits will continue to be filed at an ever increasing rate because of the new programs which have recently been implemented and because of several controversial pending regulatory decisions. FEA's litigation attorneys carry a caseload far in excess of that carried by litigation attorneys in other government agencies.

On the regulatory side, there is no need to explain in detail the necessarily complex nature of the FEA petroleum regulatory provisions required by law and the need for effective compliance efforts in enforcing the regulations. The amount of legal support necessary for the structuring and drafting of FEA's price and allocation regulations has always been substantial, as has been the need for compliance legal support. With respect to compliance activity, we anticipate that a large number of major audits conducted during FY 1977 will reach the case resolution stage during FY 1978. The substantial legal participation in the formulation of agency positions on regulatory interpretation matters and in the preparation of formal enforcement documents requires adequate staffing levels if the agency is to undertake successful remedial activities such as refunds, rollbacks or penalties and to provide the agency necessary legal support to complete actions in a time frame to which the public and the government are entitled.

It should be pointed out that the 193 positions requested are not anticipatory of any new energy legislation, but are necessary to facilitate existing Congressional mandates to FEA to develop and administer complex and innovative programs under strict statutory deadlines.

In brief, FEA's legal staff is not large in terms of the complex and extensive legal work which must be performed. An agency with a similar need for a high degree of legal expertise, the Securities and Exchange Commission, has a total of 605 attorneys in an agency with a total of 1,889 employees. FEA's FY 1978 budget requests 193 positions in an agency with more than 3,600 employees.

GENERAL COUNSEL SUPPORT OF CONSERVATION AND ENVIRONMENT

Question. You want 35 positions--up 15--for general counsel support of conservation and environment. Why do you need this kind of legal increase for what is basically your state grant programs?

Answer. The 15 new positions are needed to meet the additional legal responsibilities under the new ECPA conservation programs, primarily the obligation guarantees program. Some new staff is also requested for supplemental State grants, weatherization assistance, and electric utility initiatives.

Ten new positions are budgeted for the program of Federal obligation guarantees to encourage installation and use of measures to increase the energy efficiency of qualified existing buildings. The nature of this program--in that the full faith and credit of the United States Government is pledged to the payment of all loans guaranteed under the program--requires a high degree of legal care and involvement in virtually all aspects of its development and administration. Legal efforts mandated by this new program will include completing the needs study of the program; completing the development and drafting of program regulations; in close consultation with lawyers from the Treasury, setting forth the terms and conditions whereby the Federal Government will guarantee, and issue commitments to guarantee, the payment of loans, notes, bonds, and other obligations financing energy conservation measures and renewable-resource energy measures; assuring that the extensive requirements of law applicable to the program are adequately reflected in the program regulations; drafting loan guarantee documents and other legal documents needed to implement the program; participating in the design of information gathering and record keeping procedures to insure that the Federal Government has sufficient data to adequately protect its interest with respect to every commitment made; and providing the range of detailed legal services needed in every case of default, which potentially may involve the Government's possession, management and sale of property and other duties in the event of default.

One new position is needed to meet the additional legal responsibilities placed upon the legal office by the new program of supplemental State energy conservation plans established by the ECPA. Title IV, Part B, of the ECPA adds to the existing State grant program a semi-independent and substantively different supplemental program providing Federal funds for State conservation initiatives. Legal support of the new ECPA State plan authority will include drafting final supplemental program regulations and model plans; drafting regulations regarding energy audits and energy measures; and participating in hearings needed to guarantee the EPCA mandate that no application for funding shall be finally denied without notice and an opportunity to present views.

Two new positions each are needed for the expected substantial increase in FY 1978 in the programs for weatherization assistance and electric utility initiatives. Initiatives to improve electric utility rate design will involve increased legal responsibility as specific intervention activities proceed to more sophisticated and complex stages. The weatherization program will also involve substantial legal work in connection with approval of grants and the coordination with other agencies that is required by law.

Senator HUDDLESTON. We appreciate your testimony and that of your associates here this morning.

The subcommittee, then, will stand in recess until Thursday, at 9:30 a.m. when we will hear from ERDA.

Thank you very much.

Mr. O'LEARY. Thank you, Mr. Chairman.

[Whereupon, at 11:45 a.m., Tuesday, April 26, the subcommittee was recessed, to reconvene at 9:30 a.m., April 28.]

DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1978

THURSDAY, APRIL 28, 1977

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 10 a.m., in room 1114, Everett McKinley Dirksen Office Building, Hon. Ted Stevens presiding.

Present: Senators Huddleston, Leahy, Stevens, and Bellmon.

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

STATEMENT OF ROBERT W. FRI, ACTING ADMINISTRATOR

ACCOMPANIED BY:

DR. GENE G. MANNELLA, ACTING ASSISTANT ADMINISTRATOR FOR CONSERVATION

DR. PHILIP C. WHITE, ASSISTANT ADMINISTRATOR FOR FOSSIL ENERGY

M. C. GREER, CONTROLLER

DR. ERIC WILLIS, ASSISTANT ADMINISTRATOR FOR INSTITUTIONAL RELATIONS

BUDGET REQUEST

Senator STEVENS. Good morning.

This is the time to hear the fiscal 1978 budget estimates for ERDA. As revised by President Carter in February, they total $867.7 million, an increase of $283.7 million over appropriations to date for the current year.

The justification for the January budget submission has been printed in part 2 of the hearing record. So that the record will be complete we will ask ERDA to submit revised general statements and summary tables for the revised budget request, together with brief narratives on the changes. That will be included in the record at this point, along with the prepared statements of the acting administrator and the assistant administrators for fossil energy and conservation.

PREPARED STATEMENTS

Mr. FRI. We will be happy to provide you with the statements and the ERDA fact sheet which describes the total changes to the fiscal year 1978 budget by the new administration. The changes in

end-use conservation, improved conversion efficiency and fossil energy programs are under the jurisdiction of this subcommittee.

[The information and statements follow:]

FACT SHEET

REVISED FY 1978 BUDGET REQUEST
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

The FY 1978 budget revisions for the Energy Research and Development Administration result in total budget authority of $7,753 million in 1978 compared to $6,389 million in 1977. Corresponding outlays are $6,419 million in 1978 compared to $5,375 million in 1977. In total, the revisions reduce the previous budget request by $87 million in 1978 budget authority and $39 million in 1978 outlays.

The major changes to the January 17th ERDA budget include:

	Budget Authority	Outlays
	($ in Millions)	
Energy RD&D Programs		
Conservation		
Previous Budget	$158.3	$139.2
Revised Budget	318.3	244.2
Increase	$160.0	$105.0

This change provides a doubling of the conservation program budget by the addition of $160 million in budget authority. The increases include $33 million budget authority for Electric Energy Systems and Energy Storage; $55 million for End-Use Conservation in Industry, Buildings and Community Systems, and Transportation; and $24 million for Improved Conversion Efficiency. Funds totaling $40 million are also included for implementation of the Electric and Hybrid Vehicle Demonstration Act and $8 million for continuation of a pilot Energy Extension Program to be initiated in 1977.

The FY 1978 budget change contemplates a $20 million reprogramming action in 1977 to initiate the Electric and Hybrid Vehicle Act, and apportionment of the $7.5 million 1977 appropriation for the pilot energy extension service program.

	Budget Authority	Outlays
	($ in Millions)	
Fossil Energy		
Previous Budget	$598.3	$499.7
Revised Budget	639.9	519.0
Increase	$ 41.6	$ 19.3

This change increases funding on near- and mid-term fossil energy supply options; specifically, $23.1 million additional is provided for coal R&D, including a program for demonstration of available coal conversion technologies which could substitute for natural gas for industrial processes, and $18.5 million is added for research in enhanced oil and gas recovery.

Solar Energy		
Previous Budget	$305.0	$234.6
Revised Budget	305.0	249.6
Increase	$ 0	$ 15.0

Within the solar program, $45 million is added to permit an additional 1,300 demonstration units to be initiated (to a new total of about 240 commercial and about 4,000 residential units); $5 million is added for solar receiver project development; $3 million to fuels from biomass; and $2 million to photovoltaics. Funding for the 10 Mwe Center Receiver Pilot Plant has been reduced from $65 million to $10 million to allow a longer period for project development activities.

	Budget Authority	Outlays
	($ in Millions)	
Environmental Research and Safety		
Previous Budget	$210.0	$198.0
Revised Budget	215.0	200.0
Increase	$ 5.0	$ 2.0

This change increases funding for environmental, health and safety efforts related to near-term energy supply options so that environmental issues can be addressed in parallel with technology development.

Magnetic Fusion Energy		
Previous Budget	$370.9	$304.2
Revised Budget	310.9	272.4
Decrease	$-60.0	$-31.8

Magnetic Fusion is a long-term development effort which, if successful, could begin to contribute to energy needs after the turn of the century. Program funding increased sharply in recent years--from $118 million in 1975 to $304 million in 1977. The revised budget will allow continuation of two mainline approaches--the Tokamak and magnetic mirror concepts--with major experimental facilities for each. Funding for longer term development efforts and facilities are being stretched out or deferred in favor of the nearer term efforts to establish scientific feasibility.

Laser Fusion		
Present Budget	$142.0	$126.8
Revised Budget	122.0	120.1
Decrease	$-20.0	$ -6.7

The revised funding will better align experimental facility projects with the pace of technology development. These changes will allow completion of additional research and project development activities before beginning significant construction activities on major new facilities for near-term weapons and longer term civilian applications.

Liquid Metal Fast Breeder Reactor		
Present Budget	$854.8	$736.0
Revised Budget	656.0	651.0
Decrease	$-198.8	$-85.0

An intensive review of the Liquid Metal Fast Breeder Reactor (LMFBR) program in general, and the Clinch River Breeder Reaction (CRBR) project, in particular, is underway to assess the role of LMFBRs in the Nation's energy future. (See attached Statement.) Within the total, funds for the CRBR are reduced by $85 million in budget authority below the 1977 level.

Nuclear Fuel Cycle Activities	Budget Authority	Outlays
	($ in Millions)	
Present Budget	$636.2	$490.9
Revised Budget	611.2	473.9
Change	$-25.0	$-17.0

Except for reductions in monies for advanced uranium enrichment methods, the amounts for the Fuel Cycle Research and Development program reflect the funding contained in the FY 1978 Budget submitted to Congress on January 17, 1977. This program is currently under review by the new Administration and the details or any adjustments required will be provided after this review is completed.

Alternative Fuels Demonstration Program		
Previous Budget	$295.0	$ 3.0
Revised Budget	300.0	3.0
Increase	$ 5.0	$ 0

This adjustment reflects a change in title and content to distinguish the program from the broad-scale Synthetic Fuels Demonstration program proposed by the previous Administration which was not approved by the Congress. The intent of the program as currently proposed is to provide Federal incentives in the form of loan guarantees, cost sharing, grants, and price supports to assist in the construction of a small number of first-of-a-kind, capital intensive, energy plants. The program provides that each project would be separately reviewed by the Administration and submitted for specific consideration by the Congress.

Uranium Enrichment Add-On Plant Portsmouth, Ohio		
Previous Budget	$500.0	$210.0
Revised Budget	500.0	170.0
Decrease	$ 0	$-40.0

The adjustment reflects a more current estimate of outlays associated with project requirements. No programmatic change is involved.

Program Management and Support		
Previous Budget	$298.1	$305.7
Revised Budget	303.1	305.7
Increase	$ 5.0	$ 0

This increase provides 75 additional full-time positions for energy development activities in headquarters and field offices in support of expanding energy R&D programs. Additional funds are also provided for systems studies and evaluations, energy systems models, international energy analysis and policy assessment programs.

TABLE I

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

	Budget Authority (In Millions)			
		1978		
	1977	Previous	Amended	Change
I. Energy Research, Development & Demonstration				
Energy RD&D Programs	$2,643	$3,303	$3,201	$ -102
Supporting Research	337	385	390	5
Financial Incentive Activities	30	325	330	5
Subtotal	3,010	4,013	3,921	-92
II. Basic Research and Technology Development				
High Energy Physics	224	269	269	-
Nuclear Physics	81	86	86	-
Life Sciences and Biomedical Applications	44	39	39	-
Naval Reactor Development	200	243	243	-
Space Applications and Other	24	36	36	-
Subtotal	573	673	673	-
III. Uranium Enrichment Activities				
Uranium Enrichment Activities	1,482	1,685	1,685	-
Revenues	-699	-966	-966	-
Subtotal	783	719	719	-
IV. National Security				
Weapons Activities	1,184	1,466	1,466	-
Special Materials Production	551	671	671	-
Subtotal	1,735	2,137	2,137	-
V. Program Management and Support	288	298	303	5
Grand Total	$6,389	$7,840	$7,753	$ -87

2806

TABLE II

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

	Budget Outlays (In Millions)			
		1978		
	1977	Previous	Amended	Change
I. Energy Research, Development & Demonstration				
Energy RD&D Programs	$2,179	$2,751	$2,750	$ -1
Supporting Research	312	360	362	2
Financial Incentive Activities	4	10	10	-
Subtotal	2,495	3,121	3,122	1
II. Basic Research and Technology Development				
High Energy Physics	200	237	237	-
Nuclear Physics	75	84	84	-
Life Sciences and Biomedical Applications	42	38	38	-
Naval Reactor Development	241	248	248	-
Space Applications and Other	24	30	30	-
Subtotal	582	637	637	-
III. Uranium Enrichment Activities				
Uranium Enrichment Activities	1,246	1,447	1,407	-40
Revenues	-699	-966	-966	-
Subtotal	547	481	441	-40
IV. National Security				
Weapons Activities	1,146	1,316	1,316	-
Special Materials Production	442	597	597	-
Subtotal	1,588	1,913	1,913	-
V. Program Management and Support	163	306	306	-
Grand Total	$5,375	$6,458	$6,419	$ -39

TABLE III

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

ENERGY RESEARCH, DEVELOPMENT AND DEMONSTRATION PROGRAMS

	Budget Authority (In Millions)			
		1978		
	1977	Previous	Amended	Change
I. Energy RD&D Programs				
Conservation	$ 161	$ 158	$ 318	$ 160
Fossil Energy	483	598	640	42
Solar Heating and Cooling	86	45	90	45
Solar Electric and Other	204	260	215	-45
Geothermal Energy	55	88	88	-
Fusion Power Development	416	513	433	-80
Liquid Metal Fast Breeder Reactor	686	855	656	-199
Nuclear Fuel Cycle and Safeguards	406	636	611	-25
Other Fission	146	148	148	-
Special Foreign Currency Funds	0	2	2	-
Subtotal	2,643	3,303	3,201	-102
II. Supporting Research				
Environmental and Biomedical Research	181	210	215	5
Basic Energy Sciences	156	175	175	-
Subtotal	337	385	390	5
III. Financial Incentive Activities				
Geothermal Resources Development Fund	30	30	30	-
Alternative Fuels Demonstration Program	0	295	300	5
Subtotal	30	325	330	5
Total Energy Research, Deve. & Demo. Pro..	$3,010	$4,013	$3,921	$ -92

TABLE IV

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

ENERGY RESEARCH, DEVELOPMENT AND DEMONSTRATION PROGRAMS

	Budget Outlays (In Millions)			
		1978		
	1977	Previous	Amended	Change
I. Energy RD&D Programs				
Conservation	$ 125	$ 139	$ 244	$ 105
Fossil Energy	445	500	519	19
Solar Heating and Cooling	61	61	86	25
Solar Electric and Other	122	173	164	-9
Geothermal Energy	49	68	68	-
Fusion Power Development	322	431	392	-39
Liquid Metal Fast Breeder Reactor	595	736	651	-85
Nuclear Fuel Cycle and Safeguards	336	503	486	-17
Other Fission	122	137	137	-
Special Foreign Currency Funds	2	3	3	-
Subtotal	2,179	2,751	2,750	-1
II. Supporting Research				
Environmental and Biomedical Research	175	198	200	2
Basic Energy Sciences	137	162	162	-
Subtotal	312	360	362	2
III. Financial Incentive Activities				
Geothermal Resources Development Fund	4	7	7	-
Alternative Fuels Demonstration Program	0	3	3	-
Subtotal	4	10	10	-
Total Energy Research, Deve. & Demo. Pro.	$2,495	$3,121	$3,122	$ 1

STATEMENT OF ROBERT W. FRI

Mr. Chairman and members of the Committee:

I appreciate the opportunity to appear before you today to discuss the Energy Research and Development Administration's request for appropriations for fiscal year 1978.

Last Wednesday President Carter outlined a National Energy Plan creating the framework for solving our national energy problems. The President's plan has fully integrated RD&D activities into an overall approach which employs the full set of tools - regulatory, economic, and technological - necessary to deal with this country's most serious current problem.

The President discussed three major strategies for achieving the objectives of the Plan:

— Implementation of an effective conservation program for all sectors of energy use so as to reduce the rate of demand growth to less than 2 percent.

-- The conversion by industry and utilities using oil and natural gas to coal and other more abundant fuels to reduce imports and make natural gas more widely available for household use.

-- A vigorous research and development program to provide renewable and essentially inexhaustible resources to meet United States energy needs in the next century.

In support of this Plan, ERDA's 1978 budget request has been further amended. Chart I summarizes the budget changes from the initial submission last January to our present request. As you can see from the table, the February revisions increased significantly ($247 million) the budget request for efforts on nearer-term technologies--conservation, fossil and solar heating and cooling. The additional funding for these efforts was offset by reductions in long term programs such as the nuclear breeder, fusion and solar electric applications.

The President is now requesting further budget increases for key nonnuclear ERDA programs. The current revision emphasizes small scale energy systems in the solar and geothermal categories ($28 million) in addition to further increases for fossil ($17 million) and conservation ($7 million). Funding for these additional efforts is offset by reductions and adjustments in the nuclear program.

We are now requesting appropriations totaling $7,305 million, of which $5,420 million is for operating expenses, and $1,714 million is for plant and capital equipment. Revenues, primarily from uranium enrichment activities, are estimated at $1,067 million assuming passage of necessary legislation to revise our charges for enriching services. Accordingly, total resources of $8,372 million will be available to ERDA in 1978. An analysis of our total budget by major functional areas is shown in charts II and III. Of particular interest is our energy RD&D budget, a breakdown of which is shown in charts IV and V. Programs under the jurisdiction of this Committee are shown in charts VI and VII.

Accomplishments

Before going into the budget in detail, I would like to briefly review some of the major accomplishments of ERDA in the past year for programs of interest to your Committee. There has been significant progress in our energy RD&D programs.

In Fossil Energy:

- Construction has begun on two major coal R&D facilities: the H-Coal liquefaction pilot plant in Catlettsburg, Kentucky, and the Component Development and Integration Facility for magnetohydrodynamics (MHD) in Butte, Montana.

- Construction has been completed on two other facilities: The BiGas high Btu gasification pilot plant in Homer City, Pennsylvania, and a 30 MW fluidized-bed boiler for direct burning of coal in Rivesville, West Virginia.

- A total of 35 field projects, cost shared with industry, are now underway to test promising methods of increasing oil and gas recovery in existing reservoirs.

- A contract has been awarded to test technology for in-situ recovery of Antrim oil shales in Michigan and negotiations are underway for demonstration of modified in-situ and other promising technologies in western oil shales.

- An underground coal gasification test in Wyoming produced enough gas to generate electricity to supply the daily electrical needs of a town of about 6,000 people.

In our Conservation program:

- During this period we successfully completed a durability test on the baseline gas turbine engine. The engine accumulated the equivalent of over 150,000 miles under stringent test conditions.

- We have completed the design on and broken ground for a pilot scale plant to produce methane from urban wastes by anaerobic digestion.

- We have also entered into a joint ERDA/industry program to develop fuel cells. System design has been completed on a 4.8 MW fuel cell power plant and design confirmation is proceeding.

- Two experimental homes designed to use less than half the energy of conventional homes were completed in September in Mission Viejo, California. These homes include not only energy saving features, but also solar assisted hot water and space heating and cooling.

1978 Programs

Mr. Chairman, I would now like to turn to a discussion of our major program thrusts for 1978. The programs under the jurisdiction of this Committee total $1,192 million, including $300 million for the legislative proposal for the Alternative Fuels Demonstration Program. This represents an increase of $608 million over the 1977 level.

The following are highlights of major program increases:

Conservation Research and Development

End use conservation and improved efficiency technologies are a key element of our efforts to reduce energy demand in the near- and mid-term. The 1978 request of $235 million is $134 million above the 1977 level.

Increases in buildings and community systems will allow continuation of existing demonstration projects with near-term objectives. The Annual Cycle Energy System (ACES) technology will be emphasized in multi-family and commercial buildings and increases will be provided for performance standards and efficient light sources.

In the industry conservation area, new efforts will be initiated on energy integrated industrial parks, dewatering techniques in the paper-making processes; direct reduction of aluminum from ore; and increased energy efficiency in food processing and preservation.

In the transportation area, the budget includes $40 million to support the Electric and Hybird Vehicle Act of 1976. Increases are also provided for the development of more efficient and fuel-flexible heat engines, including testing of advanced gas turbines. In addition, under improved conversion efficiency, the development of fuel cells for generation of electricity will continue, including the completion of fabrication of a 4.8 MW demonstration module.

Included in this request is $7 million for additional Conservation energy initiatives resulting from the President's National Energy Plan. Activities include acceleration of two efforts which promise to increase the efficiency of existing fuel usage--specifically, gas fired heat pumps and the fuel cell. In addition, a new Conservation funded effort concerned with investigating the utilization of waste heat from ERDA's gaseous diffusion plants and production reactors is included. Successful demonstration of this application could be of significant benefits to communities and industries located adjacent to these facilities, as well as providing desirable stimulus for similar applications in the private sector.

Energy Extension Service

Funds were appropriated in 1977 to initiate the first year of a two-year pilot Energy Extension Service program. An additional $8 million is requested in 1978 to complete the pilot projects, to assess the results, and to evaluate the potential effectiveness of broader extension service applications.

FY 1977 Reprogramming Request

On April 6, 1977, I forwarded to the Committee a 1977 reprogramming request in the amount of $25 million. The purpose of this request was to provide funding for the development and implementation of energy performance standards for new buildings as authorized by the Energy Conservation and Production Act of 1976, and for the implementation of the Electric and Hybrid Vehicle Act of 1976. The 1978 budget request before you assumes a favorable response by the Congress to the reprogramming request.

Fossil Energy Development

In 1978, our Fossil Energy Development programs will increase 36 percent in budget authority, from $483 to $657 million. This increase will continue accelerated development and demonstration of technology to substitute coal and coal-derived fuels for increasingly scarce oil and gas, to increase fossil fuel conversion efficiencies through advanced power conversion systems, to apply enhanced recovery methods to known sources of oil and gas, and to recover shale oil resources. Major increases in the coal R&D program include funds to continue construction of two liquefaction pilot plants and a low-Btu gasification combined cycle pilot being cost shared with industry, and the start of a new high-Btu gasification pilot also to be cost shared with industry. Our request also includes two new small industrial gasifiers and a new SRC demonstration plant. The magnetohydrodynamics (MHD) program will begin larger scale development, testing, and integration of components in the new facility currently being constructed in Montana.

In oil and gas recovery, the major increase is to support field tests, either ongoing or planned. These efforts are directed at increasing the

recovery of petroleum and natural gas from resources which are presently not economically exploitable. Efforts include enhanced gas recovery from the Devonian shale in the East. Increases in oil shale and in-situ technology programs allow for funding of five processes for in-situ shale oil recovery and for continuation of field experimentation in several promising in-situ coal gasification technologies.

The President's energy initiative package includes $17 million for additional Fossil Energy programs. Efforts associated with recovery of natural gas from devonian shales are accelerated and design activities for a new solvent refined coal demonstration plant are initiated. The Devonian shale resource is particularly attractive because of its close proximity to large population centers in the fuel scarce midwest and northeast regions. The solvent refined coal process has been operating satisfactorily for over two years and a scale up of the process is feasible with moderate technical risk.

Alternative Fuels Demonstration Program

Apart from the regular budget request for Fossil Energy, the budget includes a legislative program to be submitted at a later date which will request approval of financial incentives for selected individual alternative fuel projects. These commercial demonstrations will be individually selected on a case-by-case basis to best provide environmental, regulatory, socioeconomic, and market information for future development of alternative fuel production capability by private industry.

In summary, the ERDA programs requested in 1978 offer a reasonable and balanced program in energy RD&D and other activities, building on the accomplishments of the past two years. We intend to continue to pursue a vigorous R&D program to provide the energy options that are so vital to our Nation's health and well being.

I appreciate this opportunity to appear before you today and I would be pleased to respond to any questions you may have.

CHART I

FY 1978 CARTER REVISION TO FORD ENERGY BUDGET

(Budget Authority, $ In Millions)

	Ford Budget Jan 1977	Carter Revision Feb 1977	Carter Revision Apr 1977
Conservation	$ 158	$ 318	$ 325
Fossil Energy	598	640	657
Light Water Reactors	642	617	548
Solar Heating and Cooling	45	90	96
Solar Electric and Other	260	215	224
Geothermal Energy	88	88	101
Fusion	513	433	433
Advanced Reactor & Fuel Cycle Concepts	998	799	685
Total	$3,302	$3,200	$3,069

CHART II

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

	BUDGET AUTHORITY (IN MILLIONS)				
			1978		
	1976	1977	January	February	April
I. Energy Research, Development & Demonstration					
Energy RD&D Programs	$1,657	$2,600	$3,303	$3,201	$3,069
Supporting Research	288	345	385	390	391
Financial Incentive Activities	0	30	325	330	330
Subtotal	1,945	2,975	4,013	3,921	3,790
II. Basic Research and Technology Development					
High Energy Physics	182	224	269	269	269
Nuclear Physics	74	81	86	86	86
Life Sciences and Biomedical Applications.	41	44	39	39	39
Naval Reactor Development	227	200	243	243	243
Space Applications and Other	23	24	36	36	35
Subtotal	547	573	673	673	672
III. Uranium Enrichment Activities					
Uranium Enrichment Activities	949	1,482	1,685	1,685	1,361
Revenues	-629	- 699	-966	-966	- 966
Subtotal	320	783	719	719	395
IV. National Security					
Weapons Activities	1,057	1,184	1,466	1,466	1,468
Special Materials Production	398	551	671	671	671
Subtotal	1,455	1,735	2,137	2,137	2,139
V. Program Management and Support	248	293	298	303	309
Grand Total	$4,515	$6,359	$7,840	$7,753	$7,305

CHART III

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

	BUDGET OUTLAYS (IN MILLIONS)				
			1978		
	1976	1977	January	February	April
I. Energy Research, Development & Demonstration					
Energy RD&D Programs	$1,260	$2,144	$2,737	$2,736	$2,706
Supporting Research	260	318	360	362	363
Financial Incentive Activities	0	4	10	10	10
Subtotal	1,520	2,466	3,107	3,108	3,079
II. Basic Research and Technology Development					
High Energy Physics	173	200	237	237	237
Nuclear Physics	63	75	84	84	84
Life Sciences and Biomedical Applications	38	42	38	38	38
Naval Reactor Development	230	241	248	248	248
Space Applications and Other	25	24	30	30	29
Subtotal	529	582	637	637	636
III. Uranium Enrichment Activities					
Uranium Enrichment Activities	804	1,246	1,447	1,407	1,315
Revenues	-669	-699	-966	-966	-966
Subtotal	135	547	481	441	349
IV. National Security					
Weapons Activities	1,006	1,146	1,316	1,316	1,318
Special Materials Production	329	442	597	597	597
Subtotal	1,335	1,588	1,913	1,913	1,915
V. Program Management Support	240	168	306	306	310
Grand Total	$3,759	$5,351	$6,444	$6,405	$6,289

83-107 O - 77 - pt. 6 - 20

CHART IV

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

	BUDGET AUTHORITY (IN MILLIONS)				
			1978		
	1976	1977	January	February	April
I. Energy Research, Development & Demonstration					
Conservation	$ 76	$ 161	$ 158	$ 318	$ 325
Fossil Energy	426	483	598	640	657
Solar Heating and Cooling	39	86	45	90	96
Solar Electric and Other	76	204	260	215	224
Geothermal Energy	31	55	88	88	101
Fusion Power Development	246	428	513	433	433
Liquid Metal Fast Breeder Reactor	505	686	855	656	483
Nuclear Fuel Cycle & Safeguards	167	357	636	611	587
Other Fission	84	140	148	148	161
Special Foreign Currency Funds	7	0	2	2	2
Subtotal	1,657	2,600	3,303	3,201	3,069
II. Supporting Research					
Environmental and Biomedical Research	156	189	210	215	216
Basic Energy Sciences	132	156	175	175	175
Subtotal	288	345	385	390	391
III. Financial Incentive Activities					
Geothermal Resources Development Fund	0	30	30	30	30
Alternative Fuels Demonstration Program	0	0	295	300	300
Subtotal	0	30	325	330	330
Total Energy Research, Devel. & Demo. Prog.	$1,945	$2,975	$4,013	$3,921	$3,790

CHART V

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

ENERGY RESEARCH, DEVELOPMENT AND DEMONSTRATION PROGRAMS

	BUDGET OUTLAYS (IN MILLIONS)				
			1978		
	1976	1977	January	February	April
I. Energy RD&D Programs					
Conservation	$ 45	$ 125	$ 139	$ 244	$ 249
Fossil Energy	242	445	500	519	531
Solar Heating and Cooling	15	61	61	86	90
Solar Electric and Other	48	122	173	164	170
Geothermal Energy	30	49	68	68	78
Fusion Power Development	211	328	431	392	392
Liquid Metal Fast Breeder Reactor	441	595	736	651	589
Nuclear Fuel Cycle and Safeguards	143	300	491	474	458
Other Fission	85	117	135	135	146
Special Foreign Currency Funds	0	2	3	3	3
Subtotal	1,260	2,144	2,737	2,736	2,706
II. Supporting Research					
Environmental and Biomedical Research	142	181	198	200	201
Basic Energy Sciences	118	137	162	162	162
Subtotal	260	318	360	362	363
III. Financial Incentive Activities					
Geothermal Resources Development Fund	0	4	7	7	7
Alternative Fuels Demonstration Program	0	0	3	3	3
Subtotal	0	4	10	10	10
Total Energy Research, Devel. & Demo. Prog.	$1,520	$2,466	$3,107	$3,108	$3,079

CHART VI

REVISED FY 1978 ERDA BUDGET TO CONGRESS

PROGRAMMATIC EFFORT UNDER THE JURISDICTION OF THE SUBCOMMITTEE ON INTERIOR

	Budget Authority ($ In Millions)		
	1976	1977	1978
I. Energy Research, Development & Demonstration			
Conservation	$ 37	$ 101	$ 235
Fossil Energy	427	483	657
Special Foreign Currency	7	0	0
Subtotal	471	584	892
II. Financial Incentives Activities			
Alternative Fuels Demonstration Program	0	0	300
Grand Total	$ 471	$ 584	$1,192

CHART VII

REVISED FY 1978 ERDA BUDGET TO CONGRESS

PROGRAMMATIC EFFORT UNDER THE JURISDICTION OF THE SUBCOMMITTEE ON INTERIOR

	Budget Outlays ($ In Millions)		
	1976	1977	1978
I. Energy Research, Development & Demonstration			
Conservation	$ 19	$ 77	$ 174
Fossil Energy	242	445	531
Special Foreign Currency	0	2	2
Subtotal	261	524	707
II. Financial Incentives Activities			
Alternative Fuels Demonstration Program	0	0	3
Grand Total	$ 261	$ 524	$ 710

STATEMENT OF DR. PHILIP C. WHITE

The ERDA Fossil Energy Program rests on the basic premise that no matter which projection of future energy demand and supply is examined it must be concluded that (1) we must reduce demand for oil and gas; (2) increase the use of existing fuels other than oil and gas; and (3) begin to use new fuels. The Fossil Energy role is to increase supplies for all markets using liquids and gaseous fuels as well as for electric power. Our resources are coal, oil shale, and oil and gas formations which we either don't know how to extract or for which current extraction technologies are too expensive or which leave too much resource unused in the ground.

The near-term objectives (now to 1985) of the Fossil Energy Program include the production of additional oil and gas through enhanced recovery techniques, the development of processes for the direct combustion of coal for electric power generation and for industrial process heat, and low-Btu coal gasification for use by industry or by electric utilities. Since this latter technology is evolving from existing systems and can be applied in small sizes, it can be implemented in the near term.

Mid-tern objectives (1985 to 2000) include the commercialization of developed technologies for coal liquefaction, high-Btu gas from coal and shale oil and gas production. In addition, the development of advanced electric power generation systems directly using coal, the development and operation of a commercial scale demonstration MHD power plant, and the commercial production of fuels and energy from coal in place (In Situ Coal Gasification) will be pursued.

Supporting these objectives are three essential activities. The first is the Material and Exploratory Research programs in the ERDA Energy Research Centers, National Laboratories, other Government agencies, private industry, and universities developing the basic and applied technology and data upon which present and future synthetic fuels processes depend. Another is the Demonstration Plants subprogram, the goal of which is to demonstrate on a cost-shared basis and at near-commercial scale, those selected second generation synthetic fuel conversion processes that have been developed and evaluated through industry and Government research and development. Finally, we must mention ERDA's proposed Alternative Fuels Demonstration Program effort. We intend to propose in FY 1978 specific project authorizations and appropriations for commercial demonstration plants which emphasize the use of existing technology. The commercial demonstration project requests will also identify the range of financial and possibly other incentives.

Fossil Energy projects are designed to incorporate appropriate environmental criteria. Environmental considerations, including health, safety, and socio-economics are incorporated into program planning. Environmental monitoring will be conducted at all plants and installations to insure compliance with applicable environmental regulations. Environmental impact statements and careful assessments will be prepared and issued covering proposed demonstrations. It is estimated that Fossil Energy will commit approximately $83.6 million for environmentally related efforts during FY 1978.

PROGRAM STRATEGY

The Fossil Energy Program strategy is derived from the research and development needs associated with the Coal, Petroleum and Natural Gas, and Oil Shale and In Situ Technology programs. Each of these programs requires different approaches and thus has a different strategy.

The Coal Program objectives are to develop and demonstrate, in cooperation with industry, the technology necessary for initiation of a synthetic fuel-from-coal industry as well as for improving methods of direct coal utilization. The strategy for implementing the Coal program is based on the assumption that the private sector will make widespread application of technologies demonstrated by ERDA. Thus, the program is keyed to producing concepts, processes, and equipment that meet the requirements of the private sector and will actually be used. This strategy is embodied in the cost-sharing philosophy used where sponsorship by industry is sought as evidence of substantial support for the ERDA program.

The objective of the Petroleum and Natural Gas Program is to increase the domestic production and reserves of oil and gas by accelerating the development and implementation of advanced techniques for extraction that are economically feasible, environmentally acceptable, safe, and socially acceptable. ERDA recently completed an in-depth quantitative analysis of the potential contributions from possible RD&D project areas that the Government could undertake in enhanced oil recovery. This analysis resulted in priorities for the various project areas and a recommended 5-year program. A similar effort is underway for the Enhanced Gas Recovery Program.

The Oil Shale subprogram is oriented toward the development and demonstration of technology to recover energy in a safe and economically attractive manner from each of the major types of oil shale deposits. For environmental and other reasons, attention is being devoted primarily to modified in situ methods. This process which is a combination of mining and in situ processing represents an advanced state of technological demonstration and is expected to be a candidate for a commercial demonstration plant in the near future.

The In Situ Coal Gasification subprogram has the objective of developing environmentally acceptable technology for the commercial production of fuel and energy from coal in place. In situ processing, especially gasification, provides a means to utilize otherwise unusable resources while providing benefits of minimal environmental disruption, lower water usage and relief from mine safety problems and the shortage of skilled miners. If in situ processing can be controlled and run efficiently, the savings from a smaller scale plant could permit a selling price for the gas which would be cheaper than entirely surface-based gasification processes.

The appropriations and activities for coal, oil, gas and oil shale differ because of the unequal levels of private industry R&D investment. The state of development of conversion and extraction technologies varies considerably. The FY 1978 budget for Fossil Energy is $656.9 million (BA) and, of this total, coal received 82.0 percent, petroleum and natural gas 11.7 percent, while oil shale and in situ technology received 6.3 percent. The FY 1978 budget request we will present today includes an amendment to the previous estimates transmitted to Congress. The amendment would provide an additional $5.0 million in the Enhanced Gas Recovery Subprogram to accelerate the Eastern Gas Shales Project (Devonian Shale) and $12.0 million in the Demonstration Plants Subprogram to initiate the design of a Solvent Refined Coal Demonstration Plant.

CURRENT ORGANIZATION

The additional operating experience of Fossil Energy and ERDA has led to the realignment of certain functions in early FY 1977. This realignment transferred part of the functions of the Office of Commercialization and the program management responsibilities for the Energy Research Centers to Fossil Energy. The new organization, as shown in Figure 1, consists of an Assistant Administrator for Fossil Energy, two Deputy Assistant Administrators and seven line divisions: Coal Conversion and Utilization, Oil, Gas and Shale Technology,

ERDA FOSSIL ENERGY ORGANIZATION

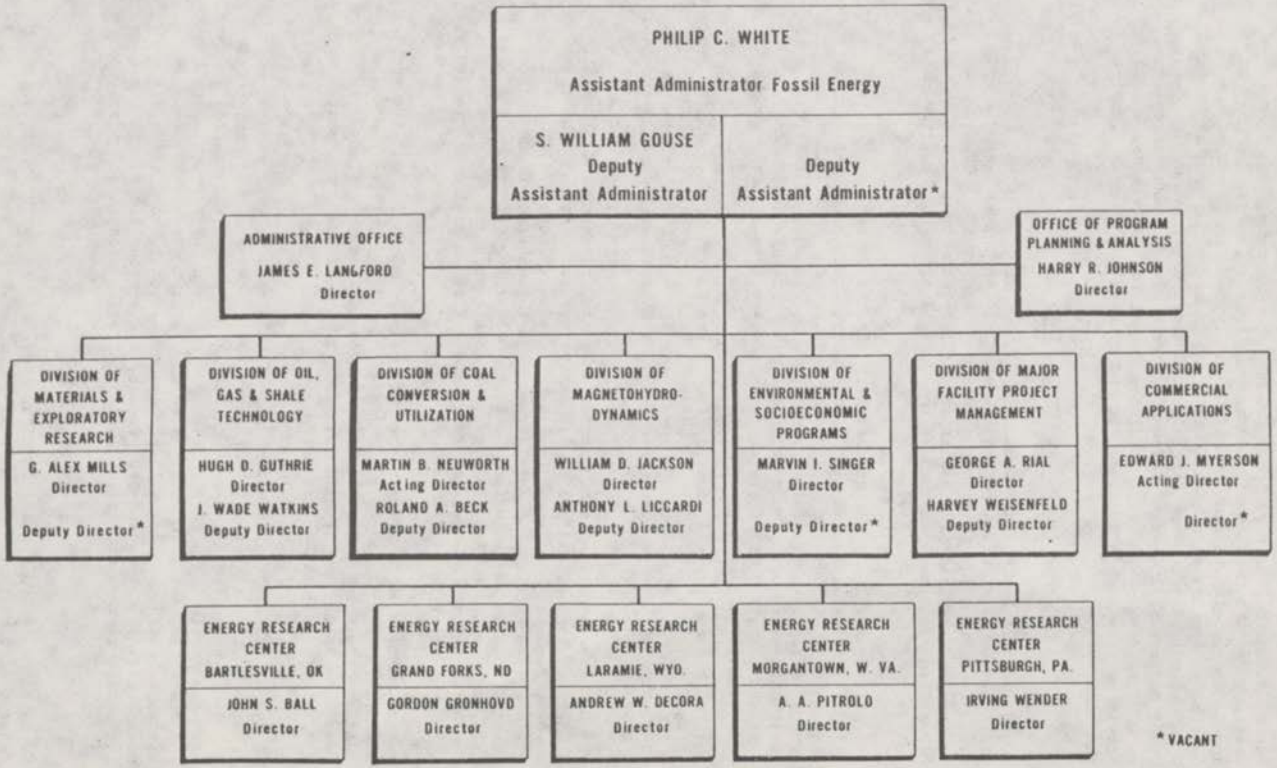


Figure 1

Materials and Exploratory Research, Magnetohydrodynamics, Major Facility Project Management, Commercial Applications and Environmental and Socioeconomic Programs. The Five Energy Research Centers are located at Bartlesville, Oklahoma; Grand Forks, North Dakota; Laramie, Wyoming; Morgantown, West Virginia; and Pittsburgh, Pennsylvania. Staff offices include the Office of Program Planning and Analysis and an Administrative Office. A small Senior Staff has been designated to provide special assistance, advice and counsel and program planning and management.

PROGRAM ACCOMPLISHMENTS

Major accomplishments during FY 1977 in the coal conversion and utilization effort will include the start-up of BIGAS, Synthane and Steam Iron Pilot Plants; the completion of the Synthoil PDU at Bruceton, Pennsylvania; the initiation of construction of the H-Coal Pilot Plant and the operation of the 30 MW Atmospheric Fluidized-bed Boiler PDU.

The Materials and Exploratory Research efforts during FY 1977 anticipate continuing the significant progress in determining reliable materials and valves for coal conversion plants. In addition, we expect to complete process research on a novel, cheaper catalytic coal gasification process, and another for making gasoline from coal, and initiate a starter grant program to stimulate fossil energy research at universities.

The MHD program started construction of the Component Development and Integration Facility (CDIF) building and initiated the first CDIF generator channel. Other significant accomplishments include the delivery of superconducting magnet for the Soviet U-25 Facility as well as a superconducting magnet for the CDIF.

The Demonstration Plants subprogram initiated conceptual designs for a High-Btu Synthetic Pipeline Gas Demonstration Plant, an Industrial Low-Btu Fuel Gas Demonstration Plant, two Small Industrial Low-Btu Fuel Gas Demonstration Plants, and a Direct Combustion Demonstration Plant. We also re-evaluated the Clean Boiler Fuel program and plans call for a clean boiler fuel test bed module to be initiated for evaluation of the process before making a final decision on proceeding with the larger scale demonstration plant.

We implemented an improved management plan for Enhanced Oil Recovery and initiated cost-shared field tests. We also completed a project plan for characterization and stimulation of Eastern gas shale (Devonian Shale) and began a plan for characterization and stimulation of Western tight gas sands.

In the oil shale program we are negotiating cost sharing contracts for several in situ retorting experiments, completed a direct combustion shale-oil production test at Rock Springs, Wyoming, and started a Michigan Antrim Shale gasification project with industry, universities and state agencies. In the in situ coal gasification area, we completed a linked vertical-well process test, started a field gasification test on the packed-bed process, and started fielding a first combustion test on directional wells (longwall generator process).

THE COAL PROGRAM

Coal is the Nation's most plentiful fuel resource with an estimated reserve sufficient to last several centuries. The Coal Program efforts are aimed at tapping this abundant source of energy for direct use as a fuel in an efficient and environmentally acceptable manner or for processing into synthetic fuels needed to do many of the chores previously done by oil and natural gas. The principal objectives of the Coal Program are to accelerate the development of environmentally

acceptable technology for converting coal to liquid and gaseous fuels; to stimulate improved methods for the direct combustion of coal; to foster the rapid development of advanced power conversion systems, including magnetohydrodynamics for generating electricity from coal; to validate the technical, economic, and environmental acceptability of second-generation coal processes by designing, building, and operating near-commercial scale modules; to foster through the use of a variety of incentives the construction and operation of a limited number of commercial demonstration plants using coal; and to expand the technological base and the supply of technically trained manpower to support the evolving conversion and utilization technologies.

To achieve the goal of increased coal utilization, we request FY 1978 operating expenses of $447.5 million and plant and capital equipment of $91.2 million. The FY 1978 request is an increase of $129.7 million over the FY 1977 level. The most significant increases occur in the Liquefaction Subprogram ($34 million directed at several pilot plant projects) and the Low-Btu Gasification subprograms $40.8 million directed at the construction of major test facilities). I would like to briefly describe the objectives of each of the subprograms which constitute the Coal program, list the major ongoing projects and describe how the requested appropriation will be used.

LIQUEFACTION

The products derived from coal liquefaction processes could compete with petroleum refined products in two distinct markets. One market uses low-ash, low-sulfur boiler fuels suitable for clean electric power generation and industrial steam generation. The other market uses high-grade fuels such as gasoline, heating oil, and chemical feedstock. The strategy of the Liquefaction subprogram is to support a number of liquefaction processes in parallel from laboratory scale, through process development unit (PDU), to pilot plant stage. This approach is based on a number of considerations. The variety of coals to be processed, coupled with the requirement for a wide range of fuels, will necessitate commercialization of a number of liquefaction processes.

Projects are supported in four liquefaction areas: solvent extraction, direct hydrogenation, pyrolysis, and indirect liquefaction. It is highly unlikely that any single second-generation process will be used exclusively. Processes may be selected depending on the coal type, the products sought, and the plant site selected. An appropriate program is being planned involving production of sufficient quantities of representative type of coal derived fuels to establish that these fuels are interchangeable in the marketplace with their petroleum counterparts.

Significant efforts under this subprogram include the following:

- Direct Hydrogenation. Construction of the H-Coal pilot plant is currently in progress. Operations of the Synthoil PDU will be initiated in FY 1978.

- Solvent Extraction. The SRC pilot plant is currently operating. Detailed design for the Donor Solvent Pilot Plant will be started in FY 1978.

- Pyrolysis. PDU's on the Clean Coke and entrained bed pyrolysis processes are in operation.

- Indirect Liquefaction. Modifications to indirect liquefaction processes are being expanded at laboratory scale.

The budget request for FY 1978 of $107.4 million in budget authority is an increase of $34.4 million over the FY 1977 level. The major

areas of increase are for the construction of a Donor Solvent Liquefaction pilot plant and increased costs for construction of the H-Coal pilot plant. In addition, FY 1978 will be the first full year of a new operating contract for the Cresap Test Facility.

A summary of the major projects and requested FY 1978 funding is shown in Figure 2.

FIGURE 2
Liquefaction

Project & Location	Product Description	1978 Funding (000)	Status
H-Coal Pilot Plant Cattletsburg, Ky.	Syncrude & Boiler Fuel	$26,000	Complete Construction
Synthoil PDU-PERC, Bruceton, Pa.	Boiler Fuel	11,000	Initial operations
SRC Pilot Plant Tacoma, Washington	Solid Fuel	15,000	Operation for data base
Donor Solvent Pilot Plant, Baytown, Texas	Syncrude	30,300	Detailed Design
Cresap Facility Cresap, W. Va.	Equipment tests (Boiler Fuel)	12,500	Operations
Coalcon Test Bed (Site to be determined)	Clean Boiler Fuel	*	Process Evaluation

* Proposed FY 1977 reprogramming action for $10,000,000 resulting from reappraisal of Demonstration Plant effort.

HIGH-BTU GASIFICATION

The major objectives of the high-Btu gasification subprogram are to develop, in cooperation with industry, new and improved second generation gasification technology necessary for the construction of commercial scale plants for processes that convert coal to substitute natural gas (SNG) of pipeline quality. This subprogram includes a number of projects for development of an improved process to manufacture SNG. Although many gasification processes under development are similar in objective each is characterized by important differences that warrant concurrent development. These differences include ability to handle different types and sizes of coal, reaction conditions, pretreatment, method of feed, reactor configuration, heat supply, gas purification, and methanation process.

As a result of the Government's efforts in combination with the work being performed in the Joint ERDA/AGA program, five pilot plants representing the further development of five different processes for the gasification of coal, an auxiliary process for the generation of electricity, have been initiated. The HYGAS and Carbon Dioxide Acceptor Pilot Plants are constructed and have been operated over periods of time long enough to demonstrate that each process is technically feasible. The construction of two other pilot plants and one PDU for the continued development of Synthane, BIGAS, and Self-Agglomerating Ash gasification processes were completed in FY 1976. The construction of the Steam-Iron Pilot Plant was also completed in FY 1976.

Although the development of work on two pilot plant projects will be completed prior to FY 1978, the budget request for FY 1978 is $7,346,000 greater than FY 1977. This increase can be attributed to a continuing escalation in costs required to operate the remaining plants, the

development of a new gasification concept, catalytic gasification at the pilot plant level, continuation in the development of the Hydrane process, and expansion of work in key support projects.

A summary of the projects and FY 1978 funding requested is shown in Figure 3.

FIGURE 3
High-Btu Gasification

Project & Location	Product Description	1978 Funding (000)	Status
HYGAS Chicago, Ill.	High-Pressure Multi-state Hydro-gasification	0	Operational
BI-GAS Homer City, Pa.	High-Pressure Entrained Flow, Multi-stage	11,000	Operational
Synthane Bruceton, Pa.	Mid-Pressure Fluidized Bed, Single Stage	14,500	Operational
Steam-Iron Chicago, Ill.	Hydrogen Generator	5,700	Operational
Hydrane	Single Stage Non-Catalytic Hydro-gasification	3,500	Feasibility Design
Catalytic Gasification Pilot Plant	Catalytic Gasification	3,500	Feasibility Design

LOW-BTU GASIFICATION

The potential market for clean burning low-Btu gas as a fuel for electric utilities and industrial users as a chemical feedstock has increased as a result of the energy crisis, the decrease in natural gas reserves, and more stringent environmental regulations. The generation of low-Btu gas from coal requires a less complex plant than required for the production of high-Btu gas. As a result, for an equivalent energy output from each type of plant, capital and operating costs are lower for an equivalent Btu.

The primary activity of this subprogram is the economical integration of low-Btu gasifiers, gas cleanup systems, and end-use systems. To achieve this result for power generation, construction of the Powerton combined-cycle test facility at Pekin, Illinois, will begin in FY 1977. For industrial use of low-Btu gas, Program Opportunity Notices (PONS) were released for Gasifier in Industry and Hydrogen-from-Coal projects. The Gasifier in Industry project involves the use of low-Btu gas in one or more industrial processes, or as a fuel for steam boilers, unit heaters, and industrial dryers. Six proposals received for this project were selected for negotiation, covering a variety of industries and institutional users. Concurrently, promising new concepts for improved gasification techniques are being actively researched at the PDU and pilot plant level. These include fixed-bed, entrained-bed, fluidized-bed, and molten salt systems. Improved gas cleanup methods that will operate at elevated temperature and pressure are under development.

A summary of the major projects and requested FY 1978 funding is shown in Figure 4.

FIGURE 4
Low-Btu Gasification

Project & Location	Description	1978 Funding (000)	Status
Fixed-Bed Gasification MERC, Morgantown, W. Va. Grand Forks, North Dakota;	Stirred Slagging	4,550	Operational
Fluidized-bed Gasification	Two stage three stage	5,000	Operational
Powerton Combined-Cycle Test Facility Pekin, Illinois	Gasifier (LURGI) with Gas Turbine Modifier for Low-Btu Gas	28,000	Design
Hydrogen from Coal Facility	TBD	18,000	Procurement Stage
Gasifiers in Industry (six awards)	Industrial/ Commercial/ Institutional Applications	10,000	Contract Negotiations

The major areas of increase for FY 1978 include the Powerton Combined-Cycle Test Facility, Hydrogen from Coal project, and Gasifiers in Industry efforts.

ADVANCED POWER SYSTEMS

The Advanced Power Systems subprogram is aimed toward the development of advanced power conversion systems which will permit, in an environmentally acceptable manner, increased use of coal for power generation using both direct coal-fired systems and coal-derived fuels fired systems. Over the past 15 years the conversion of coal-burning steam electric power plants to burn oil has been so great that current power generation from coal has been reduced by about 50 percent. Increased use of coal to produce electric power can relieve dependence on oil and natural gas for that purpose, thus releasing these fuels for other uses.

The major potential economic advantages offered by advanced power systems result from the fact that high-performance combined-cycle turbine systems are expected to have lower capital cost and higher coal to electricity power generation efficiency than systems burning coal and generating electricity from high pressure steam. Additional benefits from the use of advanced power generation systems include reduced water requirements and reduced fuel requirements of potentially high-efficiency generation equipment. The program goal is to establish a technical base for use in developing advanced power systems.

Projects initiated in FY 1976 using the open-cycle gas turbine as the topping portion of combined cycles are continuing. Efforts in blade and vane cooling, ceramic component evaluation, and materials corrosion and reliability studies are underway. In the closed-cycle power system area, work has proceeded on the high-temperature heater or boiler, on materials evaluation, and on system studies to evaluate overall power generating costs.

A summary of the major projects and requested FY 1978 funding is shown in Figure 5.

FIGURE 5
Advanced Power Systems

Project & Major Contractors	Description	1978 Funding (000)	Status
Open Cycle Gas Turbine Westinghouse General Electric United Technology Curtiss Wright	High Temp. Turbine Technology, Plant Design, Blade Cooling, Ceramic Technology and Test Combustor Design	18,700	Phase I complete Phase II in progress

The major areas of increase include efforts associated with Phase I and II of the Open Cycle Gas Turbine such as improved cooling, blade and vane research, bearings and seals selection, and combustor development.

DIRECT COMBUSTION

The primary objectives of the Direct Combustion subprogram are: (1) to develop fluidized-bed combustion systems capable of directly burning high-sulfur coals of all ranks and quality in an environmentally acceptable manner, (2) to develop technology to substitute coal for a substantial portion of oil in combustors capable of firing coal-oil mixtures, and (3) to improve reliability and efficiency of present boilers. To enable coal resources to be fully exploited, research efforts are being directed toward development of environmentally acceptable methods of combustion. To achieve this, the total effort has been integrated in terms of both broad technical approach and special technical components. Specific areas of research include fluidized-bed combustion; combustion and heat transfer characteristics of chars, coal-oil slurries, solvent-refined coal, and coal-derived liquid fuels when burned in conventional furnaces; causes of adherent slag and ash deposits and identification and control of toxic elements emitted during the direct combustion of coal.

Significant accomplishments have been made under this subprogram. The 30 MW atmospheric fluidized-bed boiler project, located at the Monongahela Power Company plant at Rivesville, West Virginia, began initial operation. Architect-engineer contractors were selected for the Atmospheric and Pressurized Component Test and Integration Units. In the Industrial Applications effort, eight contractors have been selected to design the systems that are to be built in industrial and institutional facilities. The pressurized fluidized-bed efforts include the design of a combined cycle pilot plant of approximately 13 MW capacity. Multiple contracts have been awarded to modify or retrofit, operate and test existing boilers, heaters and furnaces, and to design, operate, and test a prototype coal-oil slurry mix distribution system.

A summary of the major projects and requested FY 1978 funding is shown in Figure 6.

FIGURE 6
Direct Combustion

Project & Location	Description	1978 Funding (000)	Status
Fluidized-Bed Boiler, 30 MW Rivesville, West Virginia	Multicell-Fluidized Bed Boiler	4,000	Shakedown
Component Test and Integration Unit (Atmospheric) MERC, Morgantown, West Va.	Test Unit Fluidized/Bed Combustor/Boiler	5,500	Design
Fluidized-bed combined cycle Pilot Plant Wood Ridge, N. J.	Gas Turbine-Steam Turbine Combined Cycle	7,000	Technical Evaluation Design
Component Test and Integration Unit (Pressurized) Argonne National Lab	Pressurized Fluidized-bed Combustor Boiler Test Unit	4,729	Design Stage
Industrial Applications (Eight awards)	Industrial, Institutional and Commercial Applications	10,000	Awards in Process, Design Started
Coal-Oil Slurries	Utility, Industrial and Blast Furnace	7,000	Award in Progress, Designs Started

The FY 1978 request will support testing and modification of the 30 MW multicell boiler and provide data for design of a demonstration plant. Fabrication of several prototype systems in the industrial and institutional fluidized-bed combustion application program will continue. In FY 1978, combustion activities will be well underway for both the atmospheric and pressurized component test and integration facilities. In addition, the construction of the pressurized fluidized-bed combined cycle pilot plant will begin in 1978. Data will be obtained on the operation of the units converted to burn coal-oil mixtures in FY 1978, and this data made available to industry for prompt implementation.

ADVANCED RESEARCH AND SUPPORTING TECHNOLOGY

The Advanced Research and Supporting Technology subprogram serves as the central exploratory research arm and systems studies activities for all program areas of Fossil Energy. The major objectives of this subprogram are: (1) to develop innovative fossil energy technology leading to significantly cheaper synthetic fuel processes, (2) improve the operational reliability and efficiency of synthetic fuels plants through research on more corrosion/erosion resistant materials and components, (3) develop advanced techniques to permit increased combustion of coal in an environmentally acceptable manner, (4) help assure an adequate supply of technically trained personnel from the Nation's university system, and (5) conduct analyses of processes, technologies and systems, and to formulate planning and policy options for management decision-making.

During FY 1977 significant accomplishments include the development of a significantly lower cost, environmentally acceptable process to make gasoline from coal; process research on a novel cheaper catalytic coal gasification process; progress in determining more reliable materials

and valves for coal conversion plants; and development of an improved, integrated planning systems. The FY 1978 request will permit new emphasis on exploratory research to potentially reduce the cost of producing synthetic fuels from coal as well as complete lab development of promising processes for scale-up of selected technologies.

Major ongoing projects are shown in Figure 7.

FIGURE 7
Advanced Research and Supporting Technology

Research Area/Major Projects	Total Contract Value (Millions)	Number of Contractors
More Economical Synfuels Processes Methanol-to-Gasoline (Mobil) Catalytic Gasification (Exxon) Hydropyrolysis (Gulf, IGT, Sun BNL)	55.4	107
Reliable Materials and Components Coal Gasification (MPC, ANL, ORNL, NBS) Fireside Corrosion (Combustion Eng., Battelle, Exxon, G.E., Westinghouse) Valves for Coal Gasification (Consol, Controls, Fairchild, MERC)	14.6 7.6	29 7
Improve Direct Utilization of Coal Benefication (SRC, PERC, Ames) Combustion Processes (MRI, GFERC, MERC)	5.8	34
Exploratory Research at Universities	24.5[1/]	77[1/]

1/ Included in above.

DEMONSTRATION PLANTS

The objectives of the Demonstration Plants subprogram is to demonstrate at or near commercial scale those promising environmentally acceptable coal and oil shale processes which have either been developed and evaluated through industry or Government research and development. This subprograms objectives will be achieved through the successful construction and operation of a number of demonstration plants. Economic, technological, and environmental criteria have been used to evaluate candidates for fossil fuels demonstration. Four plants have been authorized to date in the following technologies: clean boiler fuels, pipeline gas, fuel gas, and direct combustion. For FY 1978 we are requesting authorization to add two low-Btu fuel gas small industrial plants and a Solvent Refined Coal (SRC) demonstration plant.

The subprogram strategy is based on achieving objectives via the commercial sector. The strategy encourages industry to initiate and direct demonstration of processes by providing Government funding for studies and conceptual plant design while sharing the cost (nominally on a 50/50 basis) with industry during the detailed design, construction and operation of the demonstration plant.

The Demonstration Plants subprogram is the final step in the R&D process aimed at reducing the risk and accelerating industrial process implementation. The FY 1978 Operating Expenses request provides for the design for direct combustion, SRC, and low-Btu fuel gas small industrial demonstration plants; planning for other candidate projects, equipment development and component testing; and

engineering, environmental and socio-economic, and planning support activities.

Figure 8 displays the major projects included in this subprogram.

FIGURE 8
Demonstration Plants
Plant and Capital Equipment

Major Projects	Total Estimated Cost	FY 1978 Request (Millions)	Status
Clean Boiler Fuel (New Athens, ILL.)	*	0	*
High-Btu Synthetic Pipeline Gas (site undetermined)	220.0	29.0	Under negotiation
Low-Btu Fuel Gas (site undetermined)	150.0	36.0	Under negotiation
Low-Btu Fuel Gas, small industrial (2 plants) (site undetermined)	52.0**	5.0	Planned conceptual design
Fluidized-Bed direct combustion (site undetermined)	162.0**	2,0	Planned conceptual design
Solvent Refined Coal (site undetermined)	***	2.0	Planned conceptual design

* Project being re-evaluated
** Verv preliminary estimates of Federal share.
*** Very preliminary estimate of the Federal share is 400-600 million dollars.

MAGNETOHYDRODYNAMICS (MHD)

The major objective of the MHD subprogram is to achieve successful operation by the late 1980's of a commercial scale facility to generate electricity from coal or a coal derived fuel, using MHD generation principles. The MHD process of electrical power generation is a means of utilizing our vast coal reserves in a highly efficient and environmentally attractive manner. The MHD program is structured to accomplish the successful operation of a commercial demonstration plant incorporating the MHD process--but, as an advanced technology, it is necessary to address the major problems initially while comparing alternative components and designs through parallel development.

The strategy of the program is to progress through three overlapping phases, each focused on specific development requirements for commercial demonstration. The purpose of Phase I is to develop and integrate alternative MHD core components at a scale of approximately 50 thermal megawatts and to combine these with such other components of an MHD plant as are needed to develop engineering data and experience for pilot scale facilities. Phase II will provide engineering demonstration by system testing of selected complete test trains at approximately 250 thermal megawatts and up to commercial operating durations (1,000 to 2,000 hours). Phase III will provide the capability to demonstrate commercial feasibility at approximately 1,000 megawatts and related operating parameters.

The major focus for the first phase is the Component Development and Integration Facility (CDIF), for which ground was broken on May 16, 1976. Construction of this facility is expected to be completed in 1978. It is this facility where operational test conditions will be achieved and where various MHD components will be tested and integrated along with other components of the MHD system for which pre-pilot scale data are required. The CDIF, at a 50 megawatt thermal scale, represents the minimum size that can exhibit the critical phenomena and interactions between the various components and which can provide for subsequent scale-up to the ETF. The interrelation of these components is complex and requires simultaneous development of alternative engineering approaches and their testing in a single facility (CDIF). The examination of critical phenomena associated with their operations will enable a design basis to be selected for the ETF. The testing of these components and subsystems to be performed in the CDIF will start in 1978. In the meantime, we are making progress. Laboratory tests and simulation studies, including data from international cooperation, are providing engineering experience and design data for prototype component fabrication.

The FY 1978 budget authority request for Operating Expense is $45,800,000 an increase of $10,810,000 over the FY 1977 level, primarily to continue the component development effort for CDIF hardware test. In addition, $4,200,000 is requested under the Plant and Capital Equipment appropriation for the Component Development and Integration Facility. Construction of the Component Development Integration Facility (CDIF) began in FY 1976 and will be completed in 1978. The facility is located in Butte, Montana, and covers about 50 acres of a 93-acre site. It consists of two test beds each capable of testing and evaluating MHD components of about 50 thermal megawatt size. The FY 1978 budget request will provide for the installation of equipment into this facility.

Figure 9 shows the major projects included under this subprogram.

FIGURE 9

Magnetohydrodynamics

	Major Project	FY 1978 Funding (000)	Major Contractors	Status
I.	Componenet Development and Integration Facility (CDIF)	$ 4,200		Title I completed Oct. 1976. Title II initiated.
	Capital Construction			
1.	Architect Engineering		R.M. Parsons	Completed Feb. 1977.
2.	Site Development		Taylor-Donnell	Long lead procurement
3.	Major Construction		Kaiser	initiated.
B.	Initial Test Train Experimental Hardware	12,012		Process calculations complete. Detail
1.	Combustor		Pittsburgh Energy Res. Center	combustor design initiated Engineering tests in progress. Design specs.
2.	Generator		AVCO	prepared. Procurement
3.	Magnet		TBD	initiated. System
4.	Integration		Westinghouse	integration initiated.
C.	Facility Start-up & Checkout	5,820	Montana Energy Institute	Familiarization, procedures, and environmental monitoring underway.
D.	Advanced Test Train Experimental Hardware	5,523	TBD	Design specifications in preparation.
II.	Engineering Test Facility (ETF)	600	AVCO General Electric Westinghouse	Conceptual design initiated. Preliminary site and environmental studies underway.

PETROLEUM AND NATURAL GAS PROGRAM

The objective of the Petroleum and Natural Gas Program is to increase the domestic production and reserves of oil and gas, including heavy oil deposits and tar sands, from both onshore and offshore areas. This is to be accomplished by accelerating the development and implementation of advanced techniques for exploration and extraction that are economically feasible, environmentally sound, operationally safe, and socially acceptable.

The strategy for implementing the program is to encourage and support industry efforts to develop and demonstrate petroleum and natural gas technology to increase production rates and yields from existing and future hydrocarbon reservoirs by:

- o Determining critical technology needs.
- o Identifying and prioritizing needed R&D efforts and determining the appropriate Government role.
- o Establishing and implementing cost-shared development and demonstration projects.
- o Maintaining an aggressive research program.
- o Providing for the documentation and dissemination of data.

The FY 1978 request of $76.7 million represents an increase of $33.5 million over FY 1977. The increases are for the Enhanced Oil Recovery subprogram ($22.5 million) and Enhanced Gas Recovery ($12.4 million). I would like to briefly describe the subprograms which constitute this important program.

ENHANCED OIL RECOVERY

The objectives of the Enhanced Oil Recovery (EOR) subprogram are to encourage and support industry participation in developing and demonstrating technologies to enhance the production rate and recovery of oil in place. Present extractive technology is grossly inefficient. Two-thirds of the oil discovered to date remains in the reservoirs and cannot be recovered with current practices and economics. The potential for EOR is in the area of 60 billion barrels of normal gravity oils and 28 billion barrels of heavy oils and bitumen. This potential constitutes the goal for EOR which could extend the supply of domestically available resources by at least 10 critical years.

ERDA has initiated 23 cost-sharing field contracts with industry that will test the feasibility of four EOR technologies in various types of domestic reservoirs. The funding for these projects is roughly 35% ERDA and 65 percent industry. Based on the estimates of industry activity the ERDA cost-shared contracts represent about one-third of the industry EOR projects in these four categories. In micellar-polymer flood tests, for example, well over half the acreage under test is in projects sponsored by ERDA. Some of the 23 field tests underway in FY 1977 can already be credited with small additional oil production although the production response is normally delayed by approximately 1 year and most of the incremental production comes later in a project's lifetime. While it is too early to judge the results of the tests, all the projects have already generated higher quality geological and engineering data which are indispensable in designs of successful projects like these.

The need for improved oil recovery techniques have been recognized in the recently completed in-depth strategic, analysis of enhanced oil recovery. This comprehensive study contained in the "Management Plan for Enhanced Oil Recovery" brought together available information in

a logical documented framework of analysis. Based on current and projected industry EOR efforts a 600,000 barrel per day incremental production increase from EOR has been estimated by 1985. If the budget request of $46.4 million for FY 1978 is appropriated and the projects begun are continued as programmed, the estimated incremental daily production in 1985 could be about 800,000 barrels per day.

The major projects included under this subprogram are shown in Figure 10.

FIGURE 10
Enhanced Oil Recovery

Technology	Number of Contracts	Contract * Value (Millions)
Micellar-Polymer	6	$ 77.1
Carbon Dioxide	3	7.2
Improved Water Flooding	3	25.4
Thermal	7	37.0

* The range of industry cost sharing (%) for individual projects is 12 percent to 77 percent. The average is 65 percent.

ENHANCED GAS RECOVERY

Natural gas currently supplies approximately 30 percent of the total domestic energy use. Current proved natural gas reserves amount to approximately an 11 year supply at the current consumption rate. The bulk of these proved reserves are found in conventional reservoirs which are generally located in the Gulf Coast and Southwest regions of the United States. These reserves have been developed because they can be easily produced, have high recovery efficiencies and provide acceptable profit incentives.

There are four large unconventional gas resources that are not being fully exploited.

- The gas-bearing Devonian shales of the Eastern United States.
- The low-permeability (tight) gas sandstones of the Rocky Mountain region.
- The free methane (natural gas) present within coal seams.
- The high pressure, methane-saturated saltwater aquifers of the Gulf Coast region (geopressured aquifers).

Specific near-term objectives of the Enhanced Gas Recovery (EGR) subprogram are: (1) improvement of techniques necessary for prompt, orderly development of the natural gas resources, (2) addition of 10 trillion cubic feet of producible reserves by 1985, and (3) increase gas production by an incremental 3 billion cubic feet by 1985.

Accomplishments to date primarily have been in developing an understanding of problems associated with resource characterization and evaluation of target sources and with stimulation technology development. Initial efforts include the following:

Eastern Gas Shales Project planning is essentially complete and 14 contracts have been issued.

Eight cost-shared field tests with industry in massive hydraulic fracturing were initiated.

A new directionally drilled well cost-shared project has begun.

Three new chemical, explosive fracturing cost-sharing projects have been negotiated.

A comprehensive EGR Program Strategy Document, which will coordinate planning and implementation of ERDA's EGR activities will be developed this year.

The FY 1978 budget request of $27.3 million is an increase of $12.4 million over FY 1977. The budget request will ensure continuation of the Eastern Gas Shales Project (Devonian shale) at the level of $15.0 million. The request also provides for a balanced program for the development of high priority projects addressing the considerable potential resources of the tight sandstone formations of the Western United States.

The Eastern Gas Shales Project is emphasized because it offers a substantial pay-off in the relative near-term. Preliminary information suggests that as much as .7 Quad of gas can be obtained by 1985 from the shallow formations of the Devonian Age shales. Therefore, the resource can be reached at a relatively low cost and the production would be close to large residential and industrial markets.

Figure 11 displays the major activities conducted under this subprogram.

FIGURE 11
Enhanced Gas Recovery

Technology	Number of Contracts	Contract* Value (Millions)
Massive Hydraulic Fracturing	11	$ 34.9
Chemical Explosive Fracturing	5	5.5
Deviated Well Fracturing	2	1.2
Resource Evaluation	18	11.6

* Range of industry cost sharing (%) for individual projedts, 0 to 78 percent; average 55 percent.

In addition to the subprograms discussed above, the Petroleum and Natural Gas Program includes the Drilling, Exploration and Offshore Technology subprogram and the Processing and Utilization subprogram. These important supporting efforts are essential elements in furthering the basic objectives of the Program.

OIL SHALE AND IN SITU COAL GASIFICATION PROGRAM

The objectives of this program are as follows:

- To develop oil shale technology capable of improving total resource recovery and to lower environmental impact and water requirements.

- To develop environmentally acceptable technology for the commercial production of fuels and energy from coal in place.

Coal and oil shale are the Nation's two most abundant energy resources. However, most of the coal and oil shale resources are located in deposits that are unsuitable for commercial exploitation by conventional mining and surface handling techniques. The strategy of the Oil Shale and In Situ Coal Gasification Program is to develop various extraction techniques capable of producing liquid and gaseous fuels as well as energy in an efficient and environmentally acceptable manner from coal and oil shale deposits that, for technical and economic reasons, are currently unmineable.

The FY 1977 appropriation for the Program was $31.0 million; for FY 1978 the request is $41.5 million, representing an increase pf $10.5 million. The request for FY 1978 includes $39.0 million for Operating Expenses and $2.5 million for Capital Equipment. The proposed funding increase will be used to accelerate the development and eventual commercialization of in situ coal and oil shale technologies to enhance the Nation's future usable energy resources. I would like to briefly describe the objectives of the subprogram which make up this Program, list the major ongoing projects, and describe how the requested appropriations will be used.

OIL SHALE

The near-term objective of the Oil Shale subprogram is to support development of a commercial shale oil and gas industry with a daily capacity equivalent target of approximately 300,000 barrels per day by 1985. This objective will be fostered by providing the technology base for commercial implementation by 1980 through development and demonstration projects in cooperation with industry. The midterm objective is to provide the technology base to expand an oil shale industry to its full potential by maximizing resource recovery efficiency and minimizing environmental impacts and water requirements through cooperative projects.

The program consists of shale oil production, shale gas production, environmental and supporting research. The major emphasis of the subprogram is on shale oil production and this budget category accounts for aproximately $21 million of the $28 million of operating expense requested in FY 1978 for the entire subprogram.

A major thrust of ERDA's shale oil production effort is the development of in situ technologies resulting from a Program Opportunity Notice (PON) issued in FY 1976. Of the five different potential in situ process categories addressed by the PON, projects representing four of these were selected for contract negotiations. Of the various processes being developed, no one process is applicable to all major resource types. Each process was selected because it appears applicable to a particular type of resource.

ERDA's in-house oil shale research, performed by the Laramie Energy Research Center and by some of ERDA's National Laboratories, is aimed at better understanding of process parameters needed to control underground oil shale processing. This research includes field experiments in western oil shale, closely coordinated with laboratory research, to provide data for larger scale projects expected to be performed by industry.

An initial contract to perform in situ research to obtain gas from eastern oil shales of Devonian and Mississippian age has been signed with Dow Chemical Company.

Environmental issues that are unique to in situ oil shale processing are addressed as integral parts of all field work conducted either in house by ERDA or by industry contractors.

A small but important component of ERDA's program is supporting research. This includes oil shale characterization work and shale oil refining studies. It also includes environmental monitoring of surface retorting performed by industrial lessees of the Anvil Points Facility in Colorado.

The FY 1978 operating expense budget authority request is $28,000,000, an increase of $5,722,000 over the FY 1977 level. The increases requested are to provide for continuation of shale oil production projects underway in FY 1977 ($4,855,000); provide an added $250,000 for shale gas production, increase environmental studies by $212,000;

and increase essential supporting research by $405,000. In addition, an increase of $450,000 for capital equipment will support several projects.

In addition to the oil shale efforts outlined above, ERDA will propose to Congress specific projects and project related authorizations and appropriations for selected commercial demonstration plants. A shale oil demonstration plant is considered one of the high priority projects to utilize a financial incentive arrangement under the alternative fuel demonstration program.

The major projects included under the Oil Shale subprogram are shown in Figure 12.

FIGURE 12
Oil Shale

Major Projects	Contract Value (millions)	Performer	Location
Shale Oil Production	16.2	ERC's, National Labs, Contractors, Universities	Various
Gas Production	0.45 3.15	LERC Contractors	Laramie, Wyo.
Environmental Control Technology	0.02 0.47	LBL Universities	Berkeley, Cal.
Supporting	1.25 0.66	LERC Universities	Laramie, Wyo.

IN SITU COAL GASIFICATION

The In Situ Coal Gasification Subprogram seeks to enhance the utilization of the vast coal reserves of the United States that may supply much of our midterm energy needs. More than 85 percent of our coal resources are unsuitable for commercial exploitation by conventional mining. In situ processing, especially gasification, provides a means to utilize these otherwise unusable resources while providing benefits of minimal environmental disruption, lower water usage, relief of mine safety problems, and the shortage of skilled miners.

The nature of the coal resource varies from region to region in thickness, depth, dip, and composition. The present subprogram efforts include projects that use different technical approaches to exploit different resources. Proof of commercial feasibility will require both scale-up of process size and verification of design performance at a number of sites. Process development is pursued by field tests and supported by laboratory research and analytical studies directed toward understanding and controlling process behavior. Remote instrumentation will be developed to ensure adequate process monitoring and control. Environmental studies support each project to ensure that impacts will be minimized.

The Linked Vertical Wells process is being developed by the Laramie Energy Research Center (LERC). The Hanna 1 test at a site near Hanna, Wyoming, gave 6 months production of 126 Btu/SCF gas. The gas quality was maintained over a 2 month test period ending in August 1976.

The Packed Bed process is being developed by the Lawrence Livermore Laboratory (LLL) using a site at Hoe Creek, near Gillette, in the

Powder River Basin, Wyoming. The first field test of the process concept was initiated in FY 1976. A preliminary gasification with air was run at the start of FY 1977 to scope potential process problems. Larger scale tests will be fielded starting in mid FY 1977.

The Longwall Generator process is being developed by the Morgantown Energy Research Center. The economic feasibility of this technique will be evaluated. A preliminary gasification test is being designed for fielding late in FY 1977.

The FY 1978 operating expenses request of $11.0 million is an increase of $2.8 million over FY 1977. In addition, $1.6 million for Capital Equipment is requested for FY 1978. The major area of increases are for the Linked Vertical Wells, Steeply Dipping Beds and Environmental Support projects.

Figure 13 displays the major projects included under Operating Expenses for this subprogram.

FIGURE 13
In Situ Coal Gasification
1978 Funding

Major Projects	Millions	Performer	Location
Linked Vertical Wells	4.2	LERC, SLA	Hanna, Wyo.
Packed Bed	2.2	LLL	Hoe Creek, Wyo.
Deviated Wells, Longwall	1.2	MERC	Pricetown, W. Va.
Dipping & Dry Beds and Advanced Concepts	3.4	LERC, MERC LLL, LASL	Various

ALTERNATIVE FUELS DEMONSTRATION PROGRAM

Construction of plants required to meet projected synthetic fuel production needs in the 1990's must begin in the mid 1980's. Investment capital to build these plants will not be forthcoming unless uncertainties which impede such investments are resolved. Commercial demonstration plants which would resolve these uncertainties will require about 7 years to authorize and build. Lead times involved require construction and operation over the next 5 to 10 years of several commercial demonstration projects to ensure that the required synthetic fuels industry expansion will proceed smoothly and on a timely basis.

ERDA will propose to the Congress specific projects and project related authorizations and appropriations for various technology areas. Candidate projects will include plants of the following types: Oil Shale, High-Btu Gas, Substitute Fuel (Industrial Fuel Gas), Substitute Boiler Fuels, and Direct Combustion.

Administrative funds will provide for general program support and analytical studies on regulatory impacts, market constraints, environmental and socioeconomic impacts during construction and operation, and risk incentives involved in the program. Government obligations and outlays resulting from this program in excess of administrative expense will depend on the incentive options selected. The requested budget authority for FY 1978 is for $300 million which includes provisions for various incentive awards, including loan guarantees (which have a modest budgetary impact) and grants (which have a dollar-for-dollar budgetary impact).

ENERGY RESEARCH CENTERS AND NATIONAL LABORATORIES

The Energy Research Centers and National Laboratories are playing an important role in achieving the ERDA goals in fossil energy. These facilities are staffed by highly skilled scientists, engineers and technicians with long histories of accomplishments in the production and use of fossil fuels. They are looked to for new ideas, new data

and new processes to better utilize our fossil energy resources, and project management (Figure 14).

To assist this Committee in its review of the Fossil Energy Program, we have included a summary table (Figure 15) displaying by program and subprogram, the appropriations requested. We look forward to continuing our relationship with the Committee and are pleased to have this opportunity to present our program.

Figure 14

Coal Energy Technological
Energy Research Centers/National ...oratories Support Activities

Research Center/ National Laboratory	COAL							
	Liquefaction	Gasification		Advanced Power Systems	Direct Combustion	Advanced Research & Supporting Technology	MHD	Demonstration Plants
		High Btu	Low Btu					
Ames Laboratory						Coal beneficiation, Alloy evaluation, and Development of fossil energy plants		
Argonne National Laboratory		High temperature/pressure samplers			PFB-CTIU, Fluidized-bed Combustion Studies	Materials technology for coal conversion processes	UTSI design & components development support, U-25 magnet test support	Demonstration plant technical support
Bartlesville Energy Research Center						Synthetic fuels product testing		
Brookhaven National Laboratory						Flash heat evaluation of coal, Regenerable sorbents for fluidized combustion		
Grand Forks Energy Research Center	Development of Citrecoal liquefaction process		Gasification of coals by slagging ash, fixed-bed process		Sulfur-oxide emission control	Ash fouling studies		
Idaho National Energy Laboratory						High-temperature materials		
Laramie Energy Research Center								
Lawrence Berkeley Laboratory						High-temperature erosion - corrosion resistance materials development		
Lawrence Livermore Laboratory								
Los Alamos Scientific Laboratory								
Morgantown Energy Research Center		Development of hydrane process	Fluidized pacifier, Hot gas cleanup		AFB-CTIU fluidized-bed studies	Liquefaction studies Materials and component development, Combustion studies		Valve testing facility
Mound Laboratory								Technical support - Fuel gas demonstration plant
Oak Ridge National Laboratory						Materials and components development and testing		Environmental assessment of coal conversion technology, Coal conversion demo plant support & technical assistance
Pacific Northwest Laboratory			Hot gas cleanup with molten salt				Open-cycle MHD studies U-25 electrode/insulator crash development	
Pittsburgh Energy Research Center	Development of synthoil process, Recovery by pyrolysis of synthoil solids, Hydrogenation of coal.	Synthane process, Hydrane process			Combustion testing for coal-oil slurries, Solid fuel combustion research facility	Comprehensive basic research program in coal-fossil fuel development	High-temperature coal combustion studies for MHD technology.	Technical support for fossil demonstration plants
Sandia Laboratory				Diagnostic development for advanced power systems		Carbide & sulfide formation alloys in coal processing environments	Numerical codes for MHD flows	

FIGURE 14
FOSSIL ENERGY DEVELOPMENT
ENERGY RESEARCH CENTER/NATIONAL LABORATORIES SUPPORT ACTIVITIES

Research Center/ National Laboratory	PETROLEUM AND NATURAL GAS				OIL SHALE AND IN SITU COAL GASIFICATION	
	Gas and Oil Extraction			Processing & Utilization	Oil Shale	In Situ Coal Gasification
	Enhanced Oil Recovery	Enhanced Gas Recovery	Drilling and Exploration			
Ames Laboratory						
Argonne National Laboratory						Laboratory support for in situ coal gasification
Bartlesville Energy Research Center	Microbial properties. Enhanced oil recovery technology - monitoring & field testing	Production stimulation of fracturing	Improved drilling & coring methods	Characterization, processing, & utilization studies		
Brookhaven National Laboratory						
Grand Forks Energy Research Center						
Idaho National Energy Laboratory						
Laramie Energy Research Center	Thermal recovery & tar sands support			Characterization of heavy liquid, Asphalt studies	In situ retorting techniques, Evaluation of oil shales & products, Environmental studies, Gasification of oil shale	In situ coal gasification technology development
Lawrence Berkeley Laboratory	Tertiary recovery with mobility & reactive tracers					
Lawrence Livermore Laboratory		Massive hydraulic fracturing			Modified in situ oil shale recovery	Development of packed-bed process
Los Alamos Scientific Laboratory		Eastern shale gas recovery project			Explosive fracturing of oil shale	In situ gasification of multi-seam seam
Morgantown Energy Research Center	CO_2 flooding	Resource characterization - Devonian shale				Underground gasification of eastern coals
Nuclear Laboratory						
Oak Ridge National Laboratory	Chemicals for EOR, Selection of multiple tracers for ion exchange characteristics					Pyrolysis studies on large coal blocks
Pacific Northwest Laboratory						
Pittsburgh Energy Research Center						
Sandia Laboratory		Massive hydraulic fracturing R&D	Offshore drilling technology studies		Advanced instrumentation, Diagnostic & rock mechanics support, In Situ test preparation	Instrumentation & process control development for in situ field tests

SUMMARY BY SUBPROGRAM

Operating Expenses	FY 1977 Estimate B/A	FY 1977 Estimate Obs.	FY 1977 Estimate B/O	Amended FY 1978 Estimate B/A & Obs.	Amended FY 1978 Estimate B/O
COAL PROGRAM					
1. Liquefaction	$ 72,957	$ 81,015	$ 84,983	$ 107,000	$109,800
2. High-Btu Gasification	44,054	53,021	58,704	51,200	42,800
3. Low-Btu Gasification	31,052	56,041	39,952	73,900	47,200
4 Advanced Power Systems	22,500	23,715	12,800	25,500	23,800
5. Direct Combustion	51,901	74,346	56,826	53,200	56,900
6. Advanced Research and Supporting Technology	37,070	38,727	36,570	40,000	42,000
7. Demonstration Plants	53,000	79,154	50,600	50,900 *	36,200 *
8. Magnetohydrodynamics	34,990	58,887	25,989	45,800	33,000
Total Coal Program	349,524	464,906	366,424	447,500 *	391,700 *
PETROLEUM AND NATURAL GAS PROGRAM					
1. Enhanced Oil Recovery	23,782	24,913	21,682	46,100	40,100
2. Enhanced Gas Recovery	14,874	16,643	11,274	27,000 *	23,500*
3. Drilling, Exploration and Offshore Technology	2,400	2,955	1,600	1,600	2,000
4. Processing and Utilization	1,831	1,789	1,831	1,400	1,400
Total Petroleum and Natural Gas Program	42,887	46,300	36,387	76,100*	67,000*
OIL SHALE AND IN SITU TECHNOLOGY PROGRAM					
1. Oil Shale	22,278	27,020	13,323	28,000	21,500
2. In Situ Coal Gasification	8,236	8,720	6,736	11,000	12,000
Total Oil Shale and In Situ Technology Program	30,514	35,740	20,059	39,000	33,500
Operating Expenses	422,925	546,946	422,870	562,600*	492,200*
Capital Equipment	1,020	1,110	840	5,500	3,500
Construction Projects	59,200	80,860	21,700	88,800*	35,300*
TOTAL	$483,145	$628,916	$445,410	$656,900*	$531,000*

* Amended estimate.

FIGURE 15

STATEMENT OF DR. GENE G. MANNELLA

Mr. Chairman and Members of the Committee:

I am appearing before you today to provide an overview of the End-use Conservation programs of the Energy Research and Development Administration. This includes programs in Industrial Energy Conservation, Buildings and Community Systems, Transportation Energy Conservation and Improved Conversion Efficiency.

For FY 1978 we are requesting $234.9 million in budget authority for operating expenses and plant and capital equipment. This represents an increase of $134.0 million over FY 1977. The Revised FY 1978 request includes $233.2 million in budget authority for operating expenses, and $1.7 million for supporting capital equipment. The $233.2 million request for operating expenses includes a $7.0 million amendment to provide increased emphasis on important energy initiatives in fuel cells, waste heat recovery and gas-fired heat pumps.

In FY 1978 the Conservation programs are broadened to emphasize near-term research and development. For example, the revised FY 1978 request for transportation will support research and development for the Electric and Hybrid Vehicle Act (P.L. 94-413). Funds are also included for the continuation of the Energy Extension Service pilot program. The proposed FY 1978 program will increase the effectiveness of our work to improve the efficiency of energy utilization in industrial processes, residential and commercial buildings, and transportation. The FY 1978 request provides for a vigorous but balanced program in energy RD&D, building on a solid base of accomplishments over the past two years. We intend to continue to pursue a vigorous R&D program to provide the energy options that are so vital to our Nation's health and well being.

Organization

The Conservation program is organized into several broad areas with varied missions and methods for achieving goals and milestones. For example, in transportation the main thrust is to work with industry to commercialize fuel-efficient heat engines and electric vehicles in the shortest possible time. In the buildings area, our approach is to develop and demonstrate new energy saving technologies for incorporation in both new and existing structures. In the industrial and energy conversion areas, the approach is to complement industry's interest in improved efficiency by supporting high-risk, high-payoff process developments and improvements.

Accomplishments

I believe the Conservation programs have made considerable progress this past year. Among the accomplishments that I would cite as being particularly noteworthy are these:

- We successfully completed a durability test on the baseline gas turbine engine. The engine accumulated the equivalent of over 150,000 miles under stringent test conditions.

- We have completed the design on and have broken ground for a pilot scale plant to produce methane from urban wastes by anaerobic digestion.

- We entered into a joint ERDA/Industry program to develop fuel cells. System design has been completed on a 4.8 MW fuel cell power plant and construction design confirmation is proceeding. Long lead-time components

have been ordered, permitting delivery of a 4.8 MW fuel cell in mid-1978 for test and evaluation on a utility system.

These projects reflect the diversity of our development efforts. With the Revised FY 1978 request, a much more vigorous Conservation program will be mounted in many areas, especially on near-term energy saving projects. Next, I will summarize the Revised FY 1978 request for each of the Conservation programs.

Summary of FY 1978 Request by Program

Industrial Energy Conservation

The Industrial Energy Conservation Program is directed toward increased efficiency in energy utilization and increased use of nonpetroleum based fuels in the industrial/agricultural sector. Industry now consumes about 42% of the total U.S. energy and is extremely broad in scope. It is estimated that between 30 and 50 percent of this energy could be saved through the universal application of existing, emerging and advanced technologies.

The revised FY 1978 budget is a 73% increase over FY 1977 which will accelerate and expand some key projects previously started and bring many prior starts into the demonstration phase. A total of 80% of the FY 1978 funding will be allocated to advancing projects previously started. Such projects include waste heat recuperators, heat pumps, Brayton bottoming cycles, energy-integrated industrial parks, continuous casting of steel, direct reduction of aluminum, coal as a feedstock for acetylene, aluminum smelter modifications and industrial waste recovery systems.

In addition, the increase will afford a number of key new project starts to capitalize on some of the important known but untapped opportunities for near and mid-term energy impacts. These include oxygen enriched combustion, conversion of waste polypropylene to fuel, dry coke quenching, plate food recovery for pet food, advanced irrigation systems, alternative food preservation and packaging systems, advanced paper processes, improved furnaces and computer controls in chemical plants.

The FY 1978 Industrial Energy Conservation program will be broadened and intensified to emphasize cost-shared partnerships with the private sector.

Buildings and Community Systems

The objective of the Buildings and Community Systems program is to accelerate the introduction and use of new technologies and methods to lead to more efficient use of energy in new and existing buildings, community systems and consumer products. The program is organized into four major thrusts: 1. Building design and structure; 2. Community energy utilization, including urban waste; 3. Technology and consumer products and 4. Technology dissemination and transfer. All activities are directed at providing new technologies within a framework that is both economically and environmentally sound and which lessens the need for curtailment.

During the past year, some of the progress made in this program includes: 1. Construction and initial data collection on some experimental facilities: Annual cycle energy system (ACES); minimum energy dwelling (MED); and a fast-food restaurant. 2. Design and groundbreaking for a

pilot scale plant to produce methane from urban waste by anaerobic digestion.
3. Development of a model energy code for new buildings agreed upon by the major code making organizations.

The FY 1978 budget request allows for a balanced approach between the thrusts applicable to the near-term (building design and structure, consumer products); and mid- to long-term (community systems, urban waste, new technologies). Examples of some of the efforts include:

- Development of more efficient methods of utilizing energy in existing hospitals and schools particularly as related to ventilation equipment and heat recovery systems;

- RD&D efforts leading to the development of building standards which are to be issued by HUD by August 1979 in accordance with Title III, PL 94-385, Energy Conservation and Production Act.

- Demonstration of total energy system which will balance a community's energy needs and energy supply while conserving energy and imported fuels.

- Projects which investigate the production of methane from solid waste such as the Anaerobic UpFlow (ANFLOW) digestor process.

- Development and commercialization of more efficient systems and materials for buildings. Included in this is the demonstration of a high seasonal performance heat pump for the North-Central United States.

- Development of methodology and studies of secondary impacts (employment, environment, materials) of use of more efficient technologies in the buildings sector.

Transportation Energy Conservation

The FY 1978 transportation program includes increased efforts in three major categories of work, each focusing on reducing petroleum energy consumption in the Transportation Sector and eventually eliminating the current total dependence of the Sector on petroleum energy.

The first major area is development of new energy efficient automotive engines (the gas turbine and Stirling cycle systems), new vehicle subsystems (transmissions and regenerative braking), and resolving the practical problems associated with use of non-petroleum base fuels such as alcohols, fuels from coal and shale, in highway vehicles.

The second major area of work in the budget request is the implementation of the Electric and Hybrid Vehicle Act of 1976. The FY 1978 request includes procurement of vehicles for demonstration required under the Act, provisions for loan guarantees, and additional funds to accelerate the pace of development of batteries and other key components of electric and hybrid vehicles.

The third major category of work focuses on several areas: Non-highway energy consumption, specifically work on cooperative programs with other Government Agencies (FAA, UMTA, etc.); technology assessment activities in which we are determining the social, economic, and environmental consequences of implementing the new technologies under development, and finally, the transportation data analysis activity which serves as the energy data collection center for our total transportation activity.

We have accomplished much over the past year. A few of these accomplishments include:

- Completed designs for advanced Stirling engine (80-100 hp).
- Demonstrated a new transmission in an automobile with a 25% improvement in fuel economy.
- Completed preliminary designs for three competing versions of electric vehicles.
- Initiated testing and evaluations of state-of-the-art electric vehicles to determine baseline.
- Completed publication and widespread dissemination of first edition of Transportation Energy Conservation Data Book.

Improved Conversion Efficiency

The Improved Conversion Efficiency subprogram develops the technology base necessary to permit implementation of advanced conversion devices applicable to all fuel sources and to the end use sectors of buildings, community systems, industry, transportation, and electric utilities. To achieve this overall objective, generic supporting conversion technology will be developed; e.g., chemical to electrical, chemical to thermal, thermal to mechanical. The concept of a transition from oil and gas to alternate fuels in conversion devices is a major factor throughout the program.

Major R&D efforts include research and technology development in fuel cells, combustion and alternate fuels, waste heat utilization, dispersed power cogeneration, components and heat engines, recovery of methane from coalbeds and contaminated and shut-in natural gas wells, and supporting technology.

Major accomplishments through FY 1977 include: Establishing a joint program between ERDA, the Electric Power Research Institute (EPRI), and United Technologies Corporation to develop and demonstrate a 4.8 MW fuel cell power plant; identified fuel cells (40 KW) as the most promising prime mover for integrated energy systems; initiated development of more efficient gas turbines utilizing lower grade petroleum or alternate fuels; signed a cooperative agreement with industry to develop and demonstrate a 600 KW organic Rankine bottoming cycle for utility diesels; initiated studies for the recovery of methane from coalbeds.

The additional funding for FY 1978 will result in the following increased efforts:

- Demonstration of the 4.8 MW fuel cell on a utility grid; continue R&D of 40 KW system; fabricate and test a 120 KW fuel cell utilizing waste hydrogen; expand molten carbonate, second generation technology development.
- Initiate efforts for introduction of 100 MW gas turbines utilizing heavy fuels by early 1980's.
- Design, fabrication, and preparation for Lysholm helical expander hot tests in FY 1979.
- Initiate studies of technical options, driving forces, and retarding factors for cogeneration.
- In cooperation with the Bureau of Mines to investigate the recovery of methane from coalbeds and shut-in gas wells.

- Increase number of concepts for near term efficiency improvement for internal combustion engines.

Energy Extension Service

Funds were appropriated in 1977 to initiate the first year of a two-year pilot Energy Extension Service program. An additional $8 million in budget authority is requested in 1978 to complete tests of various active outreach services, to evaluate the efficacy of such a program, and to determine what role such a service could have on a continuing basis within the framework of our developing energy policy and the proposed Department of Energy.

I have members of my staff available today to help respond to your questions.

Thank you.

CONSERVATION RESEARCH AND DEVELOPMENT

(in millions)

	FY 1977 Appropriation		FY 1978 Previous Estimate to Congress		FY 1978 Amendment		FY 1978 Amended Estimate to Congress	
	B/A	B/O	B/A	B/O	B/A	B/O	B/A	B/O
Operating								
Industrial Energy Conservation	$ 14.4	$12.0	$ 25.0	$ 18.1	$ 0	$ 0	$ 25.0	$ 18.1
Buildings and Community Systems	26.6	22.6	52.0	42.8	2.0	1.0	54.0	43.8
Transportation Energy Conservation	27.2	23.8	86.0	56.0	0	0	86.0	56.0
Improved Conservation Efficiency	23.2	12.4	55.2	45.2	5.0	3.5	60.2	48.7
Subtotal End-Use Conservation	91.4	70.8	218.2	162.1	7.0	4.5	225.2	166.6
Energy Extension Service	7.5	5.0	8.0	6.0	0	0	8.0	6.0
Total Operating	98.9	75.8	226.2	168.1	$ 7.0	$ 4.5	233.2	172.6
Capital Equipment	2.0	0.9	1.7	1.2	0	0	1.7	1.2
Grand Total	$100.9	$76.7	$227.9	$169.3	7.0	4.5	$234.9	$173.8

INTRODUCTION OF PARTICIPANTS

Senator STEVENS. Would you identify, please, for the reporter, those who are with you, Mr. Fri?

Mr. FRI. Yes, Mr. Chairman. I am Robert Fri, Acting Administrator of ERDA. On my far left is Dr. Eric Willis, the Assistant Administrator for Institutional Relations. Next to him is Dr. Philip White, Assistant Administrator for Fossil Energy. Next to him on my immediate left, is Mel Greer, our Controller. On my right is Dr. Gene Mannella, the Acting Assistant Administrator for Conservation.

In addition, we have members of our staff here prepared to answer detailed questions in various program areas.

Senator STEVENS. We would be happy to have any summaries of statements that you gentlemen wish to make. There are a series of questions prepared by the staff and other members of the committee that I would like to get to. If you have any summaries you would like to make, this will be the time to make them.

PRESIDENT CARTER'S NATIONAL ENERGY PLAN

Mr. FRI. Thank you, Mr. Chairman. I might highlight briefly my statement and ask Dr. Mannella and Dr. White if they have any summary material to add. We will try to be brief.

As you know, last Wednesday, President Carter outlined a new national energy plan creating the framework for solving our national energy problems. In that plan he fully integrated R.D. & D. activities into an overall approach.

The plan has three major strategies. First, the implementation of an effective conservation program for all sectors of energy use so as to reduce the rate of demand growth to less than 2 percent per year.

Second, the conversion by industry and utilities using oil and natural gas to coal and other more abundant fuels and, finally, a vigorous research and development program to provide renewable and essentially inexhaustible resources to meet U.S. energy needs in the next century.

ERDA'S AMENDED BUDGET REQUEST

In support of this plan, ERDA's 1978 budget request has been further amended. Chart I summarizes the budget changes from the initial submission last January to our present request. As you can see from the table, the February revisions increased significantly—$247 million, the budget request for efforts on nearer term technologies, conservation, fossil, and solar heating and cooling.

The President is now requesting further budget increases for key nonnuclear ERDA programs. The current revision includes $28 million for small-scale energy systems in the solar and geothermal categories, in addition to $17 million for fossil and $7 million for conservation activities. Funding for these additional efforts is offset by reductions and adjustments in the nuclear program.

All of the necessary budget materials on these totals will be submitted shortly.

We are now requesting appropriations totaling $7,305 million, of which $5,420 million is for operating expenses, and $1,714 million

is for plant and capital equipment. Revenues, primarily from uranium enrichment activities, are estimated at $1,067 million assuming passage of necessary legislation to revise our charges for enriching services.

Accordingly, total resources of $8,372 million will be available to ERDA in 1978.

Mr. Chairman, I would now like to turn to a discussion of our major program thrusts for 1978. The programs under the jurisdiction of this committee total $1,192 million, including $300 million for the legislative proposal for the alternative fuels demonstration program. This represents an increase of $608 million over the 1977 level.

CONSERVATION HIGHLIGHTS

The following are highlights of major program increases:

End-use conservation and improved efficiency technologies are a key element of our efforts to reduce energy demand in the near- and mid-term. The 1978 request of $235 million is $134 million above the 1977 level.

Increases in buildings and community systems will allow continuation of existing demonstration projects with near term objectives. The annual cycle energy system—ACES—technology will be emphasized in multifamily and commercial buildings and increases will be provided for performance standards and efficient light sources.

In the industry conservation area, new efforts will be initiated on energy integrated industrial parks, dewatering techniques in the paper-making processes; direct reduction of aluminum from ore; and increased energy efficiency in food processing and preservation.

In the transportation area, the budget includes $40 million to support the Electric and Hybird Vehicle Act of 1976. Increases are also provided for the development of more efficient and fuel-flexible heat engines, including testing of advanced gas turbines.

In addition, under improved conversion efficiency, the development of fuel cells for generation of electricity will continue, including the completion of fabrication of a 4.8 MW demonstration module.

Included in this request is $7 million for additional conservation energy initiatives resulting from the President's national energy plan. Activities include acceleration of two efforts which promise to increase the efficiency of existing fuel usage—specifically, gas-fired heat pumps and the fuel cell.

In addition, a new conservation funded effort concerned with investigating the utilization of waste heat from ERDA's gaseous diffusion plants and production reactors is included. Successful demonstration of this application could be of significant benefit to communities and industries located adjacent to these facilities, as well as providing desirable stimulus for similar applications in the private sector.

Funds were appropriated in 1977 to initiate the first year of a 2 year pilot energy extension service program. An additional $8 million is requested in 1978 to complete the pilot projects, to assess the results, and to evaluate the potential effectiveness of broader extension service applications.

On April 6, 1977, I forwarded to the committee a 1977 reprogramming request in the amount of $25 million. The purpose of this request

was to provide funding for the development and implementation of energy performance standards for new buildings as authorized by the Energy Conservation and Production Act of 1976, and for the implementation of the Electric and Hybrid Vehicle Act of 1976. The 1978 budget request before you assumes a favorable response by the Congress to the reprograming request.

FOSSIL ENERGY HIGHLIGHTS

In 1978, our fossil energy development programs will increase 36 percent in budget authority, from $483 to $657 million. This increase will continue accelerated development and demonstration of technology to substitute coal and coal-derived fuels for increasingly scarce oil and gas, to increase fossil fuel conversion efficiencies through advanced power conversion systems, to apply enhanced recovery methods to known sources of oil and gas, and to recover shale oil resources.

Major increases in the coal R. & D. program include funds to continue construction of two liquefaction pilot plants and a low-Btu gasification combined cycle pilot plant being cost shared with industry, and the start of a new high-Btu gasification pilot also to be cost shared with industry.

In oil and gas recovery, the major increase is to support field tests, either ongoing or planned. These efforts are directed at increasing the recovery of petroleum and natural gas from resources which are presently not economically exploitable.

Efforts include enhanced gas recovery from the Devonian Shale in the East. Increases in oil shale and in situ technology programs allow for funding of five processes for in situ shale oil recovery and for continuation of field experimentation in several promising in situ coal gasification technologies.

The President's energy initiative package includes $17 million for additional fossil energy programs. Efforts associated with recovery of natural gas from Devonian Shales are accelerated and design activities for a new solvent refined coal demonstration plant are initiated.

Apart from the regular budget request for fossil energy, the budget includes a legislative program to be submitted at a later date which will request approval of financial incentives for selected individual alternative fuel demonstration projects.

HEARING PROCEDURE

Senator STEVENS. Gentlemen, if you don't mind, we will print the other statements in the record. We have a series of questions and we are going to have several votes some time this morning.

With your permission, we will go right to the questions we have prepared. I suspect that other members of the committee may come and go.

I might state, for the record, that I am probably not the one to be chairing this hearing because I certainly do not support the changes that you have made in your program. I will perform my role of asking questions that have been prepared by the staff and by other members of the committee who cannot be here, but I have never seen a program that is more detrimental to the future expansion

of the energy resources of the country than the one that has been outlined in the last 2 weeks.

BUDGET AMENDMENTS AND REPROGRAMINGS

We have been told that a series of budget amendments will be submitted, as I understand it, and we have a 1977 reprograming request dated April 6 involving $20 million for the Electric and Hybrid Vehicle Act and $5 million for the energy standards of buildings.

We are going to include your reprograming proposal in the record at this point.

The budget amendments you have mentioned have not yet been transmitted to Congress. The committee will request ERDA to include in that transmittal the necessary justifications which will also be inserted in the record at this point.

Mr. FRI. I will gladly provide for the record a copy of ERDA's reprograming proposal as well as an overview and perspective to the President's energy policy and a fact sheet which points out the new initiatives in nonnuclear energy R.D. & D. as a result of the budget amendments. The amendments to the conservation, entirely for end-use conservation, and fossil energy programs come under the jurisdiction of this subcommittee.

[The information follows:]

Letter From Robert W. Fri

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

APR 6 1977

Honorable Robert C. Byrd
Chairman, Subcommittee on Interior
Committee on Appropriations
United States Senate

Dear Mr. Chairman:

We have conducted a review of our Conservation activities and find that FY 1977 funding will be required to implement the Electric and Hybrid Vehicle Act of 1976 (P.L. 94-413). In addition, funds are required for activities related to building performance standards to implement the Energy Conservation and Production Act of 1976 (P.L. 94-385). As a result, we are proposing a FY 1977 reprogramming action totaling $25 million in budget authority and $13.5 million in budget outlays for these Conservation activities. The source of funding for this reprogramming would be unobligated balances carried forward from the FY 1976 Transition Quarter.

Enclosed are data sheets describing the reprogramming in more detail. We will gladly furnish any additional information your Subcommittee may require.

Sincerely,

Robert W. Fri
Acting Administrator

U. S. Energy Research and Development Administration

FY 1977

(In Thousands)

Item	Present		Proposed Reprogramming			
			Proposed		Increase	
	B/A	B/O	B/A	B/O	B/A	B/O
Operating Expenses Appropriation						
Conservation:						
Buildings and Community Systems	$ 26,600	$ 22,610	$ 31,600	$ 26,110	$ 5,000	$ 3,500
Transportation Energy Conservation ..	27,170	23,790	47,170	33,790	20,000	10,000
Total Reprogramming	$ 53,770	$ 46,400	$ 78,770	$ 59,900	$ 25,000	$ 13,500

Explanation of Changes

Activities to be Increased	(In Thousands) B/A	B/O
Conservation:		
Buildings and Community Systems - Building Performance Standards	$5,000	$3,500

This increase is required to provide the Department of Housing and Urban Development (HUD) with the funding for the development and implementation of energy performance standards for new buildings as authorized by the Energy Conservation and Production Act of 1976 (P.L. 94-385). Under this law, the Secretary of HUD is directed to monitor the adoption and enforcement of model energy conservation standards and to provide technical assistance and to make grants to States and units of local government to assist them in implementing model energy conservation standards. Activities to be initiated by HUD in FY 1977 will include the classification of buildings by type to determine the current building practices, and a climatic regional breakdown of the U.S. as it relates to building energy demand or use. These buildings will then be analyzed to determine their energy use patterns. In addition, projects will be undertaken leading towards the enforcement of the standards. ERDA's FY 1978 budget request includes $10 million in budget authority for this effort and is based upon this $5 million being provided to HUD in FY 1977.

Transportation Energy Conservation:		
Electric and Hybrid Vehicles	$20,000	$10,000

Increased funding of $20 million in budget authority and $10 million in budget outlays for the Transportation Energy Conservation Program is necessary to fund the activities related to implementation of the Electric and Hybrid Vehicle Act of 1976 (P.L. 94-413).

These activities will include the following:

	Budget Authority (In Thousands)
Research and Development	$ 17,160
Demonstration	1,730
Loan Guarantees and Planning Grants	400
Studies	710
Total	$ 20,000

In the research and development category the funding will be used for activities such as the initiation of the development of improved state-of-the-art lead/acid batteries; acceleration of vehicle systems development by the initiation of subsystem fabrication and component testing; and acceleration of propulsion subsystems development efforts.

In the demonstration category the FY 1977 activities will include initiation of a comprehensive planning effort to determine such factors as the numbers and selection of demonstration sites, data requirements, vehicle/user mix, servicing and infrastructure requirements.

The FY 1977 effort in loan guarantees and planning grants will include the development of guides, regulations and procedures for submission and consideration of loan guarantee applications and will permit a limited number of planning grants to be let this fiscal year.

The studies category in FY 1977 will include the development of data characterizing the present state-of-the-art of electric and hybrid vehicles and the development and promulgation of performance standards. The FY 1978 budget request for the electric and hybrid vehicle program of $46.9 million in budget authority is based upon this increased funding being available in FY 1977.

BUDGETARY IMPLICATIONS OF THE
PRESIDENT'S ENERGY POLICY

April 20, 1977

OVERVIEW & PERSPECTIVE

ERDA's budget has changed considerably over the last couple of years. During the past year, FY 1976, budget authority totalled $4.5 billion and outlays totalled $3.8 billion. During the current year budget authority is estimated at $6.4 billion and outlays at $5.4 billion. The revised FY 1978 budget which incorporates the changes as a consequence of the President's energy policy will provide $7.3 billion in budget authority and $6.3 billion in budget outlays.

More significant however, is how individual programs have changed. For example, Conservation efforts have climbed from $76 million in 1976 to $325 million being now proposed for FY 78. In contrast, budget authority for the LMFBR program has decreased from $505 in 1976 to $483 million, although the budget of the previous administration provided for substantial growth in the LMFBR program.

The budgetary implications of the Carter Administration's comprehensive energy policy began to manifest itself early in the Administration's life.

In February, the President proposed a number of changes in the ERDA budget and request for FY 1978, which already anticipated and were in consonance with the emerging energy policy; a policy which has been more completely defined and enunciated with his energy message and proposals this week.

While not materially affecting ERDA's total fiscal 1978 budgetary request, the President proposed the following principal changes last February:

1. The FY 1978 R&D programs in Conservation were to be significantly expanded.

2. Programs in Fossil Energy and Solar were also to be expanded.

3. The proposed pace of efforts on the LMFBR program was already under extensive review. A reduction of $199 million in budgetary authority and a $85 million reduction in outlays was proposed.

4. Proposed actions associated with the Nuclear Fuel Cycle were also under review pending the President's decision on nonproliferation policy.

5. Recognizing that Fusion energy efforts were of a long time nature and unlikely to significantly contribute in meeting energy needs during this century, FY 1978 funding requests for these efforts were reduced some $80 million in authority and $38.5 million in outlays.

With the President's new energy policy for the Nation, additional changes to the FY 1978 budgetary requests for ERDA are now being proposed.

Nonnuclear Program Initiatives

The first of these additional budgetary changes cover a variety of activities in the nonnuclear programs of the agency.

Conservation

An additional $7.0 million in budget authority and 4.5 million in outlays is being requested to further expand and accelerate conservation efforts. These funds will permit additional program efforts in the buildings and improved conversion efficiency programs. Specific technologies being accelerated include fuel cells, and gas-fired heat pumps. The utilization of waste

heat from ERDA's production facilities is included as a specific initiative.

Fossil Energy

The requested increase of $17 million in authority and $12 million in outlays provides for the design of a solvent refined coal demonstration plant, and accelerated development of eastern gas shales.

Solar Energy

Three new initiatives are proposed under this budgetary activity.

Additional R&D efforts associated with solar heating, high temperature collectors, and use of solar energy for space cooling are included for an additional $6 million in authority and $4 million in outlays.

An additional $9 million in authority and $6 million in outlays would expand engineering design efforts on photovoltaic systems using sunlight concentrators as well as allowing additional development of small wind machines for remote applications.

Geothermal Energy

An increase of $13 million in authority and $10 million in outlays would be used to accelerate characterization of geopressurized resources and acceleration of non-electric applications.

Environmental R&D

An additional $1 million in authority and $1 million in outlays is being requested for efforts to assess the effect of increasing carbon dioxide levels on the global environment.

Nuclear Nonproliferation Activities

The appropriate role of nuclear power and the concerns associated with the proliferation of nuclear weapons, has been a major consideration for the Administration. Since the Administration took office, extensive reviews have taken place and a number of policy decisions have been reached. Such decisions obviously have a significant budgetary impact.

This April, the President announced a policy on Nuclear Proliferation under which the US commercial reprocessing of reactor fuels from LWR's for the recovery of unconsumed U-235 and the generated plutonium was to be deferred for an indefinite period. As a consequence, FY 1978 ERDA budgetary request changes are being proposed. The principal changes include the following:

1. Initiation of a program of international cooperation in nonnuclear technologies. An additional $6 million in authority and $4 million in outlays is requested to permit ERDA to undertake a program to provide nonnuclear technology assistance to less developed countries.

2. Expansion of Nonproliferation assessment. An additional $2.2 million in authority and $1.7 million in outlays is requested to permit expanded efforts on analysis of international nonproliferation related activities.

3. Nuclear energy assessments. An additional $6.8 million in authority and $6.2 million in outlays is requested to permit redirection and expansion of current activities. Emphasis will be on studies of low-proliferation risk systems, and conceptual design for the more promising concepts.

4. LWR Technology. Recognizing that LWRs are expected to play an improtant part in meeting the Nation's energy needs, current R&D efforts to improve their reliability and productivity are essential. An additional $5.8 million in authority and $5.2 million in outlays is requested to permit expansion of efforts to improve fuel utilization.

5. Fuel Cycle Support. A number of changes in the fuel cycle support program are proposed. These include discontinuance of the design of LWR fuel cycle facilities previously planned which results in a $50 million decrease in authority and a $27 million decrease in outlays. At the same time, R&D efforts are redirected to alternative fuel cycle technologies and the thorium fuel cycle. The net effect is an increase of $14.4 million in authority and $8.1 million in outlays is requested for efforts on the uranium-thorium fuel cycle.

   Spent Fuel Storage. Additional spent fuel storage capability may be required internationally in the near future. An increase of $20 million in authority and $10 million in outlays will be made available for efforts on monitoring, transporting, and long-term storing of international spent fuels.

   Overall; funds for nuclear fuel cycle activities decrease by $24 million in budget authority and $16 million in outlays.

Breeder Program

The pace and direction of the Breeder program is also affected by the energy policy message. As a result of intensive reviews within the Administration, an approach has been selected which revises the program as follows:

- The breeder reactor base program continues at less than its current level and is directed toward evaluation of alternative fuel cycle concepts with emphasis on nonproliferation and safety concerns

- The Clinch River project construction is indefinitely deferred, hardware procurements are cancelled and the preliminary design is completed.

As a consequence of the above, the previous budgetary requests of $656 million in authority and $651 million in outlays is being revised to a level of $483.0 million in authority and $589 million in outlays. The requested amounts will result in termination of those activities associated with CRBR components, and field construction while permitting the completion of preliminary design. There will be a reduction in in those R&D activities associated with the Clinch River project, and these efforts will be directed in support of alternative concepts.

A number of support facilities currently planned will be reexamined and modified to make them more appropriate to the modified mission and objective of the program.

Uranium Enrichment Program

It is expected that substantial reliance must be placed on nuclear energy to help meet energy needs over the next quarter century. Assuming that somewhere between 300 to 400 million kilowatts of nuclear capacity will be installed in the U.S. by 2000, an adequate supply of low-enriched uranium fuel is essential. In addition, the U.S. must also be a reliable supplier of this nuclear fuel abroad. To achieve these objectives, a number of policies have been adopted having budgetary impacts.

1. In place of the proposed gaseous diffusion add-on plant currently planned, a redirection is proposed whereby a plant utilizing the more flexible and less energy intensive gas centrifuge process be built. This approach will permit us to eliminate the need for construction of some 2,700 megawatts of electric generation capacity.

2. We will reopen the order books.

3. Congress is being asked to act favorably on proposed legislation to allow pricing of enrichment services on a fair value basis.

4. ERDA will consider relief--on a case-by-case basis--in those instances where an enrichment user has become contractually over-committed for enrichment services because of slippages in reactor schedules or reductions in generating capacity requirements.

5. ERDA will continue the existing transaction tails assay through at least the early 1980's to assure that the uranium producing industry maintains its current schedules of production and their plans for expansion.

As a result, the following budgetary changes to the uranium enrichment activities are proposed:

	B/A	B/O
	($ In Millions)	
U-235 Production		
Previous Budget	$1,685.0	$1,406.9
Revised Budget	1,361.3	1,315.4
U-235 Process Development		
Previous Budget	$ 138.7	$ 105.9
Revised Budget	130.4	99.4

Other Comments

Although no additional significant FY 1978 budgetary revisions are currently contemplated, it should be noted that the scope and pace of ERDA's efforts in energy R&D are under continuing evaluation and review. Where indicated, appropriate modification of ERDA's programs will be made and revised budgetary authority and outlays may be requested.

FACT SHEET

NEW INITIATIVES IN NONNUCLEAR ENERGY RD&D
BY THE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

April 1977

The FY 1978 February amended budget for the Energy Research and Development Administration is revised to reflect new initiatives in nonnuclear programs. These initiatives increase the requested budget authority by $53.0 million and the corresponding outlays by $37.5 million.

	Budget Authority	Outlays
	($ in Millions)	
Conservation		
February Budget	$318.3	$244.2
Revised Budget	325.3	248.7
Increase	$ 7.0	$ 4.5

This $7.0 million increase in Budget Authority accelerates work in building and community systems, and improved conversion efficiency.

In cooperation with private industry ERDA plans to accelerate the introduction of gas-fired heat pumps into the market. More efficient fuel conversion by fuel cells can be commercialized earlier with this increase. Also, the waste heat from one of ERDA's production facilities will provide thermal energy to the local community if the economics prove reasonable.

	Budget Authority	Outlays
	($ in Millions)	
Fossil Energy		
February Budget	$639.9	$519.0
Revised Budget	656.9	531.0
Increase	$ 17.0	$ 12.0

The revised funding provides for the design of a solvent refined coal demonstration plant, and early development of the eastern gas shales.

The ERDA solvent refined coal pilot plant has been operating satisfactorially for over two years. A scale up of this pilot plant is feasible with moderate technical risk.

The program to develop the eastern gas shales, or Devonian shales, is directed to providing a technical demonstration of stimulation, production, and utilization. The fuel source can be reached with relatively low-cost shallow wells and is close to large markets.

	Budget Authority	Outlays
	($ in Millions)	
Solar Energy		
February Budget	$305.0	$249.6
Revised Budget	320.0	259.6
Increase	$ 15.0	10.0

The increased budget authority for the solar program includes $6 million for solar heating and cooling, and $9 million for solar electric.

Acceleration of solar processes for space cooling are included as well as funds for developing solar high temperature collectors for use in commercial-industrial processes.

This increase will expand engineering design efforts for concentrated sunlight photovoltaic systems and allows for additional development of small wind machines to be used in rural, residential, and farm applications.

	Budget Authority	Outlays
	($ in Millions)	
Geothermal Energy		
February Budget	$ 88.0	$68.0
Revised Budget	101.0	78.0
Increase	$ 13.0	$10.0

The geothermal program will use this $13 million increase in budget authority in two projects.

The program will accelerate work to develop the geopressured geothermal resources and expand field experiments in the direct use of geothermal heat for heating and industrial processes.

	Budget Authority	Outlays
	($ in Millions)	
Environmental R&D		
February Budget	$215.0	$200.0
Revised Budget	216.0	201.0
Increase	$ 1.0	$ 1.0

This change expands the assessment of the effect of increasing carbon dioxide levels on the global environment. Included are initial surveys of forest biomass changes, studies of the interaction of atmospheric carbon dioxide with the ocean and accelerated deployment of 20 atmospheric carbon dioxide measurement stations.

TABLE I

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

	BUDGET AUTHORITY (IN MILLIONS)				
			1978		
	1976	1977	January	February	April
I. Energy Research, Development & Demonstration					
Energy RD&D Programs	$1,657	$2,600	$3,303	$3,201	$3,069
Supporting Research	288	345	385	390	391
Financial Incentive Activities	0	30	325	330	330
Subtotal	1,945	2,975	4,013	3,921	3,790
II. Basic Research and Technology Development					
High Energy Physics	182	224	269	269	269
Nuclear Physics	74	81	86	86	86
Life Sciences and Biomedical Applications.	41	44	39	39	39
Naval Reactor Development	227	200	243	243	243
Space Applications and Other	23	24	36	36	35
Subtotal	547	573	673	673	672
III. Uranium Enrichment Activities					
Uranium Enrichment Activities	949	1,482	1,685	1,685	1,361
Revenues	-629	- 699	-966	-966	- 966
Subtotal	320	783	719	719	395
IV. National Security					
Weapons Activities	1,057	1,184	1,466	1,466	1,468
Special Materials Production	398	551	671	671	671
Subtotal	1,455	1,735	2,137	2,137	2,139
V. Program Management and Support	248	293	298	303	309
Grand Total	$4,515	$6,359	$7,840	$7,753	$7,305

83-107 O - 77 - pt. 6 - 23

TABLE II

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

	BUDGET OUTLAYS (IN MILLIONS)				
			1978		
	1976	1977	January	February	April
I. Energy Research, Development & Demonstration					
Energy RD&D Programs	$1,260	$2,144	$2,737	$2,736	$2,706
Supporting Research	260	318	360	362	363
Financial Incentive Activities	0	4	10	10	10
Subtotal	1,520	2,466	3,107	3,108	3,079
II. Basic Research and Technology Development					
High Energy Physics	173	200	237	237	237
Nuclear Physics	63	75	84	84	84
Life Sciences and Biomedical Applications	38	42	38	38	38
Naval Reactor Development	230	241	248	248	248
Space Applications and Other	25	24	30	30	29
Subtotal	529	582	637	637	636
III. Uranium Enrichment Activities					
Uranium Enrichment Activities	804	1,246	1,447	1,407	1,315
Revenues	-669	-699	-966	-966	-966
Subtotal	135	547	481	441	349
IV. National Security					
Weapons Activities	1,006	1,146	1,316	1,316	1,318
Special Materials Production	329	442	597	597	597
Subtotal	1,335	1,588	1,913	1,913	1,915
V. Program Management Support	240	168	306	306	310
Grand Total	$3,759	$5,351	$6,444	$6,405	$6,289

TABLE III

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

	BUDGET AUTHORITY (IN MILLIONS)				
			1978		
	1976	1977	January	February	April
I. Energy Research, Development & Demonstration					
Conservation	$ 76	$ 161	$ 158	$ 318	$ 325
Fossil Energy	426	483	598	640	657
Solar Heating and Cooling	39	86	45	90	96
Solar Electric and Other	76	204	260	215	224
Geothermal Energy	31	55	88	88	101
Fusion Power Development	246	428	513	433	433
Liquid Metal Fast Breeder Reactor	505	686	855	656	483
Nuclear Fuel Cycle & Safeguards	167	357	636	611	587
Other Fission	84	140	148	148	161
Special Foreign Currency Funds	7	0	2	2	2
Subtotal	1,657	2,600	3,303	3,201	3,069
II. Supporting Research					
Environmental and Biomedical Research	156	189	210	215	216
Basic Energy Sciences	132	156	175	175	175
Subtotal	288	345	385	390	391
III. Financial Incentive Activities					
Geothermal Resources Development Fund	0	30	30	30	30
Alternative Fuels Demonstration Program	0	0	295	300	300
Subtotal	0	30	325	330	330
Total Energy Research, Devel. & Demo. Prog.	$1,945	$2,975	$4,013	$3,921	$3,790

TABLE IV

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST

ENERGY RESEARCH, DEVELOPMENT AND DEMONSTRATION PROGRAMS

	BUDGET OUTLAYS (IN MILLIONS)				
			1978		
	1976	1977	January	February	April
I. Energy RD&D Programs					
Conservation	$ 45	$ 125	$ 139	$ 244	$ 249
Fossil Energy	242	445	500	519	531
Solar Heating and Cooling	15	61	61	86	90
Solar Electric and Other	48	122	173	164	170
Geothermal Energy	30	49	68	68	78
Fusion Power Development	211	328	431	392	392
Liquid Metal Fast Breeder Reactor	441	595	736	651	589
Nuclear Fuel Cycle and Safeguards	143	300	491	474	458
Other Fission	85	117	135	135	146
Special Foreign Currency Funds	0	2	3	3	3
Subtotal	1,260	2,144	2,737	2,736	2,706
II. Supporting Research					
Environmental and Biomedical Research	142	181	198	200	201
Basic Energy Sciences	118	137	162	162	162
Subtotal	260	318	360	362	363
III. Financial Incentive Activities					
Geothermal Resources Development Fund	0	4	7	7	7
Alternative Fuels Demonstration Program	0	0	3	3	3
Subtotal	0	4	10	10	10
Total Energy Research, Devel. & Demo. Prog.	$1,520	$2,466	$3,107	$3,108	$3,079

2867

NEW BUDGET PROPOSALS

Senator STEVENS. We would like to go into some of the portions of the budget status before the questions.

Your statement, Mr. Fri, speaks to a budget of nearly $1.2 billion dollars for fossil energy and conservation. Part of that is in pending $24 million budget amendments that you mentioned and another part is in the $300 million alternative fuel demonstration program.

Mr. FRI. That is correct.

Senator STEVENS. Those proposals have not been transmitted to Congress in the form of specific budget estimates. Would you tell us when they will be submitted?

Mr. FRI. The amendment of $24 million under the jurisdiction of this committee should be transmitted next week. In the alternative fuels demonstration program, what we intend to do, if required, is to submit to the Congress specific projects that we believe should be authorized for funding to build first commercial plants.

And, we therefore requested $300 million in anticipation of submitting those specific projects. We would like to submit for the record a statement as to the status of the legislative proposal.

[The information follows:]

STATUS OF LEGISLATIVE PROPOSAL FOR ALTERNATE FUELS DEMONSTRATION PROGRAM

Pricing and other policy initiatives included in the National Energy Plan of April 29, 1977, should provide a significant step in encouraging private enterprise to go forward in synthetic fuels projects. The Plan states that, "In general, the Government seeks to avoid subsidization of existing technologies, although circumstances may sometimes merit an exception to that policy." Since exceptions may arise it is desirable to have available, in addition to the authorities provided to ERDA in section 7 of P.L. 93–577, generic loan guarantee authority and contingency funds. In this regard the 1978 budget now contains $300 million BA under proposed legislation to cover projects that might be submitted to demonstrate synthetic fuels plants at commercial scale.

Under the National Energy Plan, this $300 million will be retained in the President's 1978 budget, but considered in the nature of a contingency. We do not intend to seek authorization of any projects at this time. We will reexamine the necessity for carrying a contingency of this nature beyond 1978 in the development of the 1979 budget.

The Senate has now passed a bill (S. 37) which would provide generic loan guarantee authority for ERDA. That bill is now being considered by the House Science and Technology Committee. The Administration supports such generic loan guarantee authority.

At this time, however we do not support further specific authorities to the generic authority such as loan guarantees for biomass plants. We think it more appropriate to make use of the generic authority on a project-by-project basis rather than on a designated program basis.

GOALS OF PRESIDENT'S ENERGY PLAN

Senator STEVENS. We have not seen the legislative proposals that are the administration's plan, as yet. Could you tell us as far as your mission is concerned with regard to fossil energy and conservation what are the major goals of your portion of that program?

Mr. FRI. In the fossil program, our primary goal is making coal a more fully used fuel in the United States in two ways: First of all, by permitting its direct combustion in an environmentally acceptable way without the use of scrubbers by such technology as fluidized bed combustion, and the solvent refined coal process.

A second goal is to turn coal into gas, particularly low and medium Btu gas, which are adaptable to a variety of other processes that require fuel in the form of gases and, therefore, allow the use of coal.

Senator STEVENS. Do you have specific goals in terms of numbers that are attached to this program?

ESTIMATES OF MARKETPLACE PENETRATION

Mr. FRI. We have in our planning some specific estimates of the dates of our penetration into the marketplace and the rate of our penetration and the level of production we expect to achieve from these technologies. I don't have those with me, unless Dr. White has them. We could submit them for the record.

Senator STEVENS. Dr. White?

Dr. WHITE. No. We ask permission of the chairman to submit those for the record. We do not have the quantitative figures on hand.

[The information follows:]

Estimate the market penetration of Fossil Energy technologies:

Liquefaction

A major source of uncertainty with respect to the liquids from coal program is how the rate of free world oil production will change over time. If oil production peaks, as expected, in the early 1990s, a fairly large industry could develop by 2000. Our current program is concentrating on advanced coal liquefaction processes, some of which will produce a marketable product (such as gasoline) directly. These new processes and the market for feedstocks are expected to result in at least a small industry in a business as usual case.

Year	No. of Plants	Barrels/Day-Oil Equivalent
1985	0-4	0 - 50,000
1990	1-6	50,000 - 500,000
2000	3-10	250,000 - 1,250,000

High BTU (Pipeline) Gas

High BTU gas could be a major supplement to our declining reserves of natural gas. First generation technology is available and, even though substantially more expensive than natural gas, it is still expected to be competitive with imported LNG. Many of the advanced processes under development will permit the use of higher sulfur coals than current direct combustion technologies. The actual size of a substitute natural gas industry is heavily dependent on institutional issues such as price regulation, FPC decisions, etc.

Year	No. of Plants	Barrels/Day-Oil Equivalent
1985	1-5	50,000 - 250,000
1990	3-13	150,000 - 750,000
2000	8-35	500,000 - 2,250,000

Low BTU Gas - Industrial Use

This is an alternative fuel applicable to many industrial and some commercial uses, particularly where natural gas is unavailable or interrupted. This fuel has a low heating value and, therefore, will probably not be piped over large distances or stored; rather it will be generated for on-site use. The market for this product will be heavily dependent on natural gas supply and policy. If natural gas supply is good, and if rolled-in pricing is maintained for its supplements (LNG, SNG), the industry will grow slowly and mainly in regions with specific supply characteristics. However, if industrial users are unable to obtain reliable supplies a substantial market will be created.

Year	No. of Plants	Barrels/Day-Oil Equivalent*
1985	5-50	50,000 - 250,000
1990	10-100	100,000 - 500,000
2000	25-300	200,000 - 1,250,000

* Based on 180 BTU per cubic foot.

Direct Combustion

The major technology is the atmospheric fluidized bed which removes sulfur during combustion by direct chemical reaction. Other efforts include extending the technology to high pressure operation and the use of coal-oil mixtures. These technologies are applicable to both industrial and utility boilers and will compete in the marketplace with the conventional combustion of low sulfur coals, stack gas scrubbing with conventional combustion. Acceptance is essentially based on economics, technical performance and the availability of low sulfur coals near demand centers.

Year	Barrels/Day-Oil Equivalent
1985	0 - 250,000
1990	125,000 - 700,000
2000	750,000 - 3,200,000

Enhanced Oil Recovery

Conventional oil production recovers around 30% of the oil believed to be in reservoirs. Enhanced recovery refers to increases in output resulting from the use of various chemical and physical means of displacing oil from the geologic matrix, reducing its viscosity and surface tension and driving it more effectively to producing wells. Since enhanced recovery requires the use of large quantities of chemicals it is far more capital intensive than conventional extraction. In addition, there is still a large element of risk. Commercial viability is also heavily dependent on oil pricing policy.

Year	Barrels/Day
1985	100,000 - 500,000
1990	200,000 - 1,000,000
2000	1,000,000 - 4,000,000

Enhanced Gas Recovery

Like the enhanced oil recovery work, the size and rate of development of this industry is dependent on regulatory issues and the reduction of the technical and economic risks involved.

Year	Barrels/Day-Oil Equivalent
1985	100,000 - 450,000
1990	250,000 - 1,000,000
2000	450,000 - 2,250,000

Shale

There is currently available technology for surface retorting and work is progressing on in-situ processes. Several factors are affecting growth of this industry. Economic analyses of shale processes are encouraging but have not yet been proven. Environmental questions on the extraction and processing of shale are not yet resolved, particularly water and reclamation requirements. In-situ processes may resolve some of these issues, but additional development is required. Market conditions and rising world oil prices are expected to increase the commercialization rate in the future; an aggressive ERDA program would result in an even larger industry by 2000.

Year	Barrels/Day-Oil Equivalent
1985	100,000 - 250,000
1990	200,000 - 750,000
2000	500,000 - 2,500,000

Advanced Power

Advanced electric power generation combines an integrated coal gasifier with hot gas clean-up and a steam bottoming cycle with either a molten carbonate fuel cell or advanced open cycle gas turbines. This is a relatively small program now aimed at the step wise development and demonstration of basic sub-systems. The system does not exist today but will be developed in parallel with improved coal burning technology and advanced fluidized bed combustion. Their competitive position will be determined by technical performance and the availability of low sulfur coal for direct combustion. As our reserves of the cleaner coals becomes exhausted, new techniques for using the remaining higher sulfur coals will be required. In addition, this technology holds the promise for higher efficiency in the production of electricity.

This technology could produce up to 500,000 barrels per day, oil equivalent by 2000.

MHD

Like advanced power, this technology holds the promise of increased efficiencies in the generation of electricity and the ability to use higher sulfur coals than can be handled by more conventional techniques. There are, however, technical problems that must be solved. A system could be available by the late 1990s to produce as much as 250,000 barrels/day-oil equivalent by 2000.

SYNTHETIC FUEL PRODUCTION AND CONSERVATION GOALS

Senator STEVENS. The committee would like to have in terms of synthetic fuels or expanded oil and gas production or new forms of energy what your current targets are quantitatively and also in terms of the conservation aspects of your program, what are the goals in terms of a barrel equivalency.

Mr. FRI. Dr. Mannella does have some figures on the conservation part. Perhaps he could indicate those and we could supply the balance for the record.

REDUCED ENERGY GROWTH

Dr. MANNELLA. Senator Stevens, our goals in the end-use conservation program, that is, transportation, buildings, community systems, and industry, are for savings between 4 to 6 million barrels per day equivalent by 1985 and 11 to 14 million barrels per day equivalent by the year 2000.

Senator STEVENS. Is that equivalent to the 2-percent figure that is in the administration's program?

Dr. MANNELLA. The 2-percent figure is a target for total energy growth. We are talking about essentially meeting that objective without adverse inpact on the GNP through improved efficiency techniques in using less energy per unit of output.

This is the equivalent amount of savings that we have targeted.

Senator STEVENS. But if that is achieved, will you hit the 2 percent?

Dr. MANNELLA. The 2 percent is contingent upon a lot of other factors. What we can target is the savings that can be attributable to improved efficiency through conservation technology.

Mr. FRI. I think it is safe to say that a combination of things, such as new insulation standards, driving 55 miles an hour, and other things can be done pretty quickly. That plus the additional technologies would produce a growth rate in the neighborhood of 2 percent, possibly slightly less.

ECONOMICS OF ENERGY GOALS

Senator STEVENS. I was told in Salt Lake City last Friday that they estimate 20 million new people coming on the job market in the period of time covered by this program and that it takes a million barrels of oil equivalent in energy to provide jobs for 900,000 people. That is a rough figure that they used which gives us somewhere around 22 million barrels per day equivalent new energy requirements for the future.

Now, is the demand on the economy that is required to provide jobs for new people figured into your program as you talk to energy efficiency. What job rate expansion are you figuring into your program?

Mr. FRI. Most of our planning is figured in the neighborhood of 3½-percent annual compounded GNP growth over the balance of the century with very little, if any, impact on employment. The objective of the plan is to maintain what would otherwise be the GNP growth and employment rates while saving energy to conduct it more efficiently.

Senator STEVENS. The GNP could grow at 3½ percent on a real basis in terms of dollars without regard to jobs. Is your program geared to the availability of new jobs for the generations that are coming ahead in the period covered by the program?

Mr. FRI. As I say, we looked both at the GNP growth rate, and at the number of jobs.

Senator STEVENS. Can you give us quantitatively what your program covers in terms of jobs for expansion?

Mr. FRI. I would have to provide that for the record. I don't have those data with me.

Senator STEVENS. Was it figured into your program?

Mr. FRI. Yes.

UNEMPLOYMENT IMPLICATIONS OF THE ENERGY PLAN

Senator STEVENS. What factor did you use for an expansion of the job market?

Mr. FRI. What we have actually calculated is what would be the difference in the unemployment rate between a business-as-usual case, with no conservation, and what would be the unemployment rate if we adopted all of these conservation measures.

The difference in the unemployment rate is so small that it is well within our estimating error. But I don't remember the exact figures that were in that calculation.

Senator STEVENS. We would be very pleased to have it, if it could give us some explanation of the impact in terms of specific goals, not only in terms of expanded production. As I said, despite the statement that I made in the beginning, these are not my questions. These are questions the committee wished to have answered.

What are the goals quantitatively in terms of production and in terms of conservation? And my addition to that is what increase in the job market is planned as far as your program is concerned.

Mr. FRI. We would be happy to provide that.

[The information follows:]

The analysis supporting the National Energy Plan assumes an increase in population based on lower fertility rates and a shift toward a longer average lifespan. Nominal employment assumptions (about 4.8 percent unemployment) allow civilian employment to grow from 95 million in 1976 to 122 million by the year 2000.

Senator STEVENS. Senator Leahy, do you have any questions to ask?

Senator LEAHY. I can do them now or at another time.

Senator STEVENS. I am going to yield to Senator Leahy for the questions that he has prepared.

DIRECT WOOD COMBUSTION

Senator LEAHY. Thank you, Mr. Chairman.

I realize that there is a technical question on the jurisdiction of the subject of biomass. I am also aware of a number of things, for example, your publication in the field of biomass and the project status.

What is the status of the ERDA-funded Forest Service study on the direct combustion of wood as an alternate energy source?

Mr. FRI. I am afraid that I don't know the exact status of that project.

Senator LEAHY. If you don't have it, could you supply it for the record?

[The information follows:]

STATUS OF USDA PROJECT STUDY ON DIRECT COMBUSTION OF WOOD

Almost two years ago, with the sponsorship of the National Science Foundation and the Federal Energy Administration, the Forest Service completed a study on the Feasibility of Utilizing Forest Residues for Energy and Chemicals. Subsequently, with the transfer of various energy research programs from NSF to ERDA, the latter agency continued to provide support for investigation of on-site potential for using forest residues for fuel.

The objectives of the original feasibility study were to establish techniques for direct conversion of forest residues to energy and to establish techniques for conversion of forest industry residues into petro-chemical substitutes. Our discussion this morning is limited to the direct conversion to fuels portion of the study, or direct energy recovery systems.

In the U.S., industry accounts for about one-third of energy purchased annually. Forest industries purchase about 6 percent of the industry total or about 2 percent of the overall national total. In the forest industries, manufacture of paper and allied products is responsible for the lion's share of annual purchases with 85.3 percent of the total amount in 1972. Another indication of the intensity of fuel use by the pulp and paper industry is its estimated specific energy consumption of 33 million BTU per ton of product as compared to 8.8 million BTU for plywood and 2.3 million BTU for lumber.

Tied to the relative energy intensity for products are combustion systems and steam generation requirements. Sawmills with or without dry kilns would normally require less than 100,000 pounds of steam per hour and might use special direct fired combustors or packaged steam generating units. Plywood mills generally need around 100,000 pounds of steam and can use packaged steam generators. Pulp and paper mills with requirements for more than 100,000 pounds of steam per hour require more expensive field erected steam generators. Installations to generate a million pounds of steam per hour may cost $10 million.

The pulp and paper industry exhibits marked differences in relationship between consumption of fossil fuels and electricity and consumption of process wastes for fuel. In the South, which accounts for 62 percent of the energy purchases in pulp and paper industries, process wastes provide 50 percent of the fuel requirements. The North Central area purchases a significant 11 percent of total energy in pulp and paper. Industries in this part of the country obtained an average of 15 percent of fuel requirements from process wastes. Also significant in the North Central area is the use of coal for 37 percent of fuel requirements as compared to lower percentages in other parts of the country.

A problem in utilizing wood for fuel is effective control of wood moisture content or provision of means for using wet wood in a combustion system. Generally, increase in moisture content decreases wood heating value, decreases boiler efficiency, impacts adversely on quantity of steam produced per hour and increases flue gas per unit of steam generated.

If 500,000 pounds per hour of steam is required, the annual cost of emission control equipment could be $250,000 per year more if wet fuel is burned than if dry fuel were burned. Control of emissions is necessary to reduce particulates. An advantage of burning wood for fuel is that there are no emission control problems for oxides of nitrogen or sulfur.

To summarize findings from our combustion survey, the following points are emphasized:

Combustion Survey Findings

- Residue combustion equipment is available to meet most of the industries' needs.
- Steam boiler technology is well-established and improvements are supported by the industry.
- Special combustors present new capabilities for some special applications.
- Emission control standards impact residue combustion implementation.
- The key issue in residue combustion systems is the moisture content of the fuel which can adversely influence overall costs of achieving thermal recovery and meeting environmental standards.

Wood for Energy

- Will not solve the nation's energy problems.
- Can make forest industries approach energy self-sufficiency.
- Can make other industries more energy self-sufficient (Spin Off).

An example for approaching energy self-sufficiency in a forest products operation, is provided by a Kraft pulp and paper mill with a 1,000 ton per day capacity. This operation would normally require 4,320 tons of 50 percent wet pulpwood daily to sustain its manufacturing raw material needs. Bark from this wood and waste black liquor from the manufacturing process could provide a percentage of fuel requirements, but another estimated 22.4×10^6 BTU per ton of product would normally be needed. This could be obtained by gaining an additional 2,160 tons from utilization of the whole tree from which the fiber was supplied (additional tops and limbs) and 1,820 tons of additional residue.

To provide all the raw material and fuel for operating a pulp and paper mill with 1,000 tons per day capacity, would thus require about 8,300 tons of wood per day. To provide this material from an area within a radius of 50 miles from the plant would require an average productivity of about 0.4 tons per acre per year.

To summarize the conclusions from the portion of our feasibility study on direct burning of wood for fuel:

- Manufacture of pulp and paper is a key industry.
- Whole tree utilization can provide substantial fuel.
- Residue values are becoming competitive with fossil fuel.
- Removal of moisture from residue fuels enhances their value.
- In order of expected payoff, opportunities exist in improvement of the following systems:
    - Refinement/preparation of residue fuel.
    - Residue collection/transport.

- Combustor design improvement.

With the demonstrated potential for using residues for fuel, a better understanding of availability of residues in various parts of the country is needed. We estimate the total residues from harvesting operations, other tree removal operations, and mill wastes to total about 160 million dry tons annually. Much of this quantity might be available to forest industry plants or other manufacturing operations close to forested areas. In addition, there are about 1 billion tons of so-called "non-commercial" timber consisting of rough trees, rotten trees, and salvable dead trees. None of these figures include information on trees less than 5 inches in diameter at breast height.

The energy potential from the harvesting, mill, and other readily available residues is about 2 quads per year in comparison to purchased energy requirements for the forest products industry of about 1.5 quads per year. The potential for production of energy from the "non-commercial" timber is about 12 quads over whatever length of time is required for harvesting this resource. These potential sources of energy offer a significant contribution to the total U.S. energy budget of about 80 quads per year. Total amounts of residues on an annual basis added to existing "non-commercial" timber, totals equal the energy value of 2.7 billion barrels of oil or $32 billion at $12 per barrel.

To utilize the available forest residues, standing and on-the-ground, requires effective harvesting and in-woods processing procedures followed by efficient transport to the processing plant, combination with mill residue, fuel preparation, combustion and emission control. Research is underway in most of these areas.

Our current research in cooperation with ERDA is aimed at conducting site-specific studies at pulp and paper mills to evaluate the potential of approaching energy self-sufficiency by replacing currently purchased fossil fuels with wood-based fuels obtained from forest and mill sources.

Our study is centered in the North Central portion of the country which is characterized by low energy self-sufficiency in the pulp and paper industry, a significant coal burning capacity (ease of conversion to wood), a diversified pulp and paper industry, a significant land base and close proximity to Forest Service research work units engaged in the study. Michigan has a ratio of commercial forest land to pulping capacity between 16 and 20 acres/TPY, and Wisconsin's ratio is in the 6-10 range. Michigan is above average and Wisconsin below.

The 10 mills which we are studying in detail are distributed over the Upper Peninsula of Michigan and the Northern tier of Wisconsin. We will quantify and characterize the amounts, types and potential of forest residues suitable for use as industrial fuel. We will develop new information on unused forest resources and residues available for energy such as tops and limbs, rough and rotten trees, as well as identify and estimate "non-growing stock" volume, and relate this volume to harvesting opportunities. Mortality-type stands will also be included if present.

For all types of forest residues, we will investigate suitable recovery systems and estimate cost per unit of wood fuel delivered as an industrial fuel. Computerized harvesting and transportation simulation techniques will be used to determine the delivered unit cost of forest residues, and recovered material from mechanized thinning of poletimber stands.

We will develop data on energy requirements, sources of energy, and potential for achieving energy self-sufficiency for pulp and paper mills individually and collectively to determine how many residues at what price and in what condition are required to replace currently used fossil fuels. As a lead mill in conducting the study, we have chosen one which is representative for mills throughout the area. It has a 750 ton per day pulping capacity, hardwood and softwood furnish, kraft and groundwood processes, paper capacity of 600 tons per day and a large woodshed consisting of company-owned and other timber.

For all mills surveyed, we will describe in general terms the mill process and production, current sources of energy, current energy usage patterns, and energy consumed per unit of production. We will forecast future energy requirements, determine in-plant residues for fuel availability, evaluate the cost of energy, evaluate the adequacy of combustion equipment to burn wood for self-sufficiency, and determine the quantity and price of wood for fuel to replace fossil fuels.

Our time schedule calls for us to complete our feasibility analysis by August 1977 and develop our final report by October 1977. Our feasibility analysis will compare the energy requirements of the pulp and paper mills in the study area to the ability of the forest resource base to produce the wood equivalent and the ability to harvest and transport this forest-based fuel to the mill at prices competitive to fossil fuels.

In summary, we will determine if pulp and paper mills within an area of significant pulping activity can become energy self-sufficient by replacing currently used fossil fuels with wood-based fuels obtained from forest and mill sources. We will temper our conclusions based on future trends for forest productivity and fuel usage patterns.

BIOMASS PRIORITIES

Senator LEAHY. Now, the November 1976 ERDA publication that I just referred to dealing with the biomass program concedes that the direct burning of biomass such as wood could make a substantial contribution to the Nation's short-term energy needs.

Why, then, does 90 percent of the biomass research money go into alternative technologies such as gasification?

Mr. FRI. Well, you have two program problems in the biomass area. One is the problem of growing biomass, such as kelp or trees to provide fuel and the other problem is to develop a technology to take either that fuel or other biomass fuels that are lying around, such as forest waste, municipal waste, feedlot waste and so forth, and converting that into a useful energy form.

Now, the question of growing material for use is a somewhat longer term operation. But we can apply the conversion technologies to a variety of sources of the biomass and other waste material today. Consequently, throughout the agency there is a fair emphasis on the development of technologies that can turn these materials into usable forms of energy, both from existing waste and from biomass grown for the purpose of producing energy.

Senator LEAHY. But 90 percent of the biomass research money is still going into advanced technology. It seems to me, and I realize the numbers are sometimes deceiving and I realize you also don't solve the problems simply by putting more money into them, but it would seem that more R. & D. funds might further enhance direct combustion, both in the short and long term.

If you agree, why are you agreeing; and if you disagree, why are you disagreeing?

Mr. FRI. I agree, first of all, that the availability of biomass is very high today and it can be put into substantial use fairly early on. In the course of our various budget amendments, there has been some increased emphasis on the use of waste.

We, in our own planning, have learned that the use of waste or biomass as a source of energy in the near term is even more active than we originally thought.

That is one of the reasons that our 1978 budget for biomass in the solar program alone is up from about $10 million in 1977 to $20 million in 1978.

BIOMASS COMBUSTION STUDIES

Senator LEAHY. On the question of direct combustion of wood, I really feel that there has been a lack of interest on the part of ERDA in that. I see that as a particular problem because ERDA is now the only Government entity disbursing these funds. The National Science Foundation and the Forest Service have to go to ERDA for their research dollars.

Now, I personally supported various local government and private sector requests for ERDA research grants concerning wood energy. Every single one of them has been turned down, no matter how meritorious they might have appeared.

Because you are really the only game in town in that area, I am concerned, as I mentioned before, about what appears to be a lack

of interest. I want to know upon what preliminary study or data did ERDA base its operating assumptions about direct combustion of biomass? If you want to answer that for the record, you can.

Mr. FRI. I can answer it for the record. We have been doing a series of planning studies which look at, among other things, biomass and waste. As I said, those studies tend to show that the use of that resource is an increasingly attractive option.

Senator LEAHY. In doing that do you have any mechanism for monitoring, evaluating the considerable amount of direct combustion wood which is going on in the private sector?

For example, in Vermont, I know that companies are burning wood as a way to conserve fuel. Maybe they have developed processes which merit study. I am sure that it is the same in other parts of the country.

Do you have any mechanism for monitoring and evaluating that in the private sector?

Mr. FRI. Typically our program—we are in careful, close contact with the private sector so that we know what they are doing. It is essential to our programs so that we complement private sector activities, and so that we can assimilate information on what has already been done.

BIOMASS PROGRAM SPECIFICS

But I would have to give you the specifics on the biomass program for the record.

Senator LEAHY. Please do.

[The information follows:]

BIOMASS COMBUSTION STUDIES USED BY ERDA

The ERDA Fuels from Biomass program is based upon the results of studies sponsored by this agency, on research commissioned by others, and on the information produced by related industries.

What follows is a list of some of the studies used in evaluating the potential of biomass combustion, and formulating an effective program for its development.

A partial list of biomass combustion studies

Title	Researcher	Subject
Silvicultural energy farms	MITRE/Georgia Pacific.	Wood production and conversion.
Forest Industry energy program—direct conversion.	U.S. Forest Service.	Direct conversion of wood to fuels.
Comparison of fossil and wood fuels (EPA-600/2-76-056).	Battelle-Columbus.	As stated.
Wood as a source of energy—business and profit opportunities.	Gorham International, Inc.	As stated.
Fuels from sugar crops	Battelle-Columbus.	System study on production and conversion of various biomass materials.
An evaluation of the use of agricultural residues as an energy feedstock.	Stanford-Research Institute.	As stated.

MAGNETOHYDRODYNAMICS (MHD)

Senator LEAHY. I understand that ERDA originally requested $86 million for magnetohydrodynamic research. The budget request now is $50 million.

What is the history behind that cut and what effect is it going to have on the MHD program?

Mr. FRI. That program is in Dr. White's area. Perhaps I could ask him to discuss it.

Dr. WHITE. The principal activity in the MHD program is the construction of the component development and integration facility at Butte, Mont. The construction of this really involves two parallel lines of activity. One is the major facility hardware, onsite, the buildings, the coal feeding facilities, electrical substation and the like that go into this sort of thing. The second category includes the components of the MHD subsystem itself.

The reduced budget of $50 million will enable us to keep the program on the original schedule with respect to the building and the onsite facility components. There is going to have to be some delay due to the reduced funding for the preparation of the test components for that facility.

We will have the first combustor and channel more or less on schedule. Some of the other components, such as the high-temperature air preheaters which are a key part of the final evaluation, will be stretched out a year or two.

Senator STEVENS. Could the Senator yield for just a moment?

Senator LEAHY. Sure.

MHD FUNDING PROJECTIONS

Senator STEVENS. You are talking about a reduced budget in terms of the OMB allowance?

Dr. WHITE. Yes, sir.

Senator STEVENS. How much did you ask OMB for?

Dr. WHITE. $86 million.

Senator STEVENS. If you had that level of funding, would you give us the out-years requirements for that? Would you put that in the record at this point?

Dr. WHITE. Yes. We will put that in the record.

Senator STEVENS. Thank you very much.

[The information follows:]

The total MHD budget for the fiscal years 1979–84 to the start of ETF operations and based on the fiscal year 1978 buget of $86 million is approximately $575 million. Of this amount, $275 million would be applied to facility construction and operations and about $150 million to component development. The balance would be applied to continued development of the engineering design base, systems studies and research on closed cycle systems.

MHD BUDGET DEVELOPMENT

Senator LEAHY. That is OK. I am still not quite sure just what happened to the other $36 million.

Did you then request it to come out or did OMB scratch that?

Dr. WHITE. We requested it originally and they rejected it. I think that is it.

Senator LEAHY. That was not ERDA's position, then, to take it out?

Dr. WHITE. Oh, no. We recognize that there are choices that have to be made and this is a longer term program. There is a very definite emphasis by the administration on near-term technology and MHD is not going to be a technology that contributes by 1985 to the energy problem.

LOAD MANAGEMENT PROGRAM

Senator LEAHY. What is the budget request for the Division of Electric Energy Systems' load management program and what progress has been made thus far on the program?

Dr. WHITE. That particular part of the program is in conservation. Dr. Mannella could supply that for you.

Senator LEAHY. I am trying to give you all a chance to testify.

Mr. FRI. I have found the table so I will give you the figures.

The Electric Energy Systems' budget request for 1978 is $40 million, which is about a $14 million increase over 1977.

Senator LEAHY. What progress have we made so far in that program? How are we doing? How are you evaluating that?

Dr. MANNELLA. The entire Electric Energy Systems' program or specifically the load management part?

Senator LEAHY. The load management part.

Dr. MANNELLA. In load management we got underway this year a number of technologies to develop what we call accurate load management. This would be a communication system of some sort between a central power station and the energy consuming device.

We are looking at various techniques such as using radio links or using telephone wires or things of this sort to see what is technically and economically most feasible. That work is just getting underway this year.

Senator LEAHY. Is that one that has—I don't know how to best describe this—but has a degree of priority within your department? The reason that I ask is I have looked at—at least a couple of—these programs that have been experimented with. I find them intriguing. I find when we are talking about conservation it is an area that we can have major conservation.

Is it active, ongoing? Do you have the ability to monitor the effect of your own program and know whether you are going to come back and ask for more money?

Dr. MANNELLA. Yes, sir. I think we do. We are working on this program currently with the Electric Power Research Institute and other utilities.

In terms of priority, I think the greater proportion of our resources has been in the development of some of the bulk power carrying devices, such as cables.

Our work in communications for load management is sort of one technical facet, not the overall load management program because load management can also be accomplished by time of day metering, rate structure and other approaches as well.

We are very confident that these communication techniques for active load management will prove to be successful.

PEAKLOAD PRICING

Mr. FRI. I might add, Senator, that the President's message stresses two things that gives the problem—we wind up giving additional priorities to load management by whatever means, technical or other.

One of those is the proposal for peakload pricing. The other is the proposal for public generation, which requires managing not so much for loads, but additional generating capacity on the system so that there are other sources of power on the grid.

Therefore, management of the whole grid is going to be an increasingly important feature of utilities in the next several years.

Senator LEAHY. I understand pricing is important, but I also realize there will be an awful lot of people having some type of mechanical or electronic or whatever method of load management that might work a lot better in the pricing than trying to figure out when they have the right time or the wrong time to use the particular energy.

If it is done for them——

Mr. FRI. The peakload pricing is one of the criteria that the customer will use interrupted service where certain appliances will have to be on interruptable service to qualify for peakload pricing and that, in turn, means some way of interrupting the service on a dryer or a washer and so forth during peakload hours.

UNIVERSITY PROGRAMS

Senator LEAHY. I understand.

I would like to know what the budget request is for the Office of University Programs for curricula development. I am particularly interested in the development of an undergraduate energy generalist program. I think that this is a program to train people to conduct analyses of the energy needs of and conservation measures for residential and commercial buildings, as well as to collect essential data for such alternate sources of energy as solar, wind, and wood. What is the budget request for that?

Mr. FRI. The budget request in 1978 is $7,360,000.

Senator LEAHY. How does that compare with last year?

Mr. FRI. It is up from a total figure of $5.8 million.

SMALL GRANTS PROGRAM

Senator LEAHY. What is the status of your plans for small grants of $50,000 or less to develop methods and technologies to serve small communities and small industrial complexes similar to the cottage industry concept?

Mr. FRI. I will let Dr. Mannella comment on that.

Dr. MANNELLA. We have been doing preliminary work to formulate this program. We have had contact with Resource Planning Associates in Boston, to define what appropriate technology is, what the opportunities are, and the extent to which it could be relied upon to help solve our energy problems.

At this stage I believe that there is legislation pending, for the creation of appropriate technology programs and pending that we really have no position.

CONSERVATION IN EDUCATIONAL FACILITIES

Senator LEAHY. What were the findings of the Joint Committee for Energy Conservation in Educational Facilities in which the Office of Conservation's Division of Building and Industry participated? What are the plans for program development of the joint committee's findings?

If you want to answer that one for the record——

Dr. SAVITZ. Maxine Savitz, Director of the Building and Community Systems Division. Would you repeat the name of the meeting, Senator?

Senator LEAHY. What were the findings of the Joint Committee for Energy Conservation in Educational Facilities in which the Office of Conservation's Division of Building and Industry participated?

Dr. SAVITZ. I would say we came up with a research agenda. We had participation in that with HEW and FEA and their physical plant association at the university. What we are doing as part of our 1978 budget request is studying 10 schools that have done some initial analysis and using an FEA walk-through computer program to actually instrument those schools. There would be some retrofitting in those schools to monitor the retrofit. In addition, we will be looking at ventilation requirements.

So an agenda has been established and we are proceeding to implement it.

Senator LEAHY. Did you pick those 10 schools?

Dr. SAVITZ. We are using the same 10 schools that were selected by the primary and secondary school group for FEA.

Senator LEAHY. Would you identify the lady for the record, please?

Mr. FRI. Yes. Dr. Maxine Savitz, the Director of the Building and Community Systems Division in the Office of Conservation.

Senator LEAHY. Doctor, I will be very interested in watching how that goes.

Dr. SAVITZ. We will be happy to keep you informed.

Senator LEAHY. Thank you. That is all I have, Senator.

Senator STEVENS. Thank you.

Senator Huddleston?

SOLVENT REFINED COAL

Senator Huddleston. Thank you, Mr. Chairman.

Dr. White, ERDA is working on two solvent refined coal technologies, SRC I, which is a solid, and SRC II, which is liquid. I am somewhat unclear as to the relation of the two programs.

Is it ERDA's position that SRC I, with its minimum use of hydrogen and no catalyst is to be superceded by SRC II with its extensive hydrogenation or is it the position that SRC I is developing to the point of demonstration and it is beginning a new, though related effort with SRC II?

Dr. WHITE. I think that the latter statement you made more clearly reflects the present ERDA position. As you know, there has been an extensive period of operation of the pilot plant in Tacoma, Wash., as well as the small process unit in Alabama on the basic SRC process. The pilot plant's operation on SRC I has produced literally thousands of tons of this normally solid coal-like material which is cleaned up to the point of being very low in sulfur and very low in ash.

We feel that that process is simple enough that the pilot plant could be extrapolated to a small commercial SRC I unit without further experimental work by simply taking the data from Tacoma and designing a facility. It would probably not be be the optimum design after some years of experience, but it certainly would work.

This is the type of plant that is conceived of in the initiative that the President suggested in his energy message, namely a 6,000-ton-a-day SRC plant.

Now the program is to modify that pilot plant in Tacoma to operate in the SRC II mode of producing a liquid product.

We are going to start operations in another month or two, I believe, and when we have a few months of successful operation, we might well feel equally confident in building a commercial plant for SRC II. So it really depends somewhat on the timing of that decision.

We have underway a study, to get a better fix on the market in the utility sector for the solid fuel versus liquid. There is one group, a southern company of Mr. Harris, which is very interested in the SRC I fuel. They will be glad to buy and use it as an alternate to the scrubbers or low-sulfur coal as a means of using coal derived fuel for utility generation.

The number of plants that would be interested in that nationwide is something that we are a little uncertain of, as contrasted to the liquid which could be presumably a replacement fuel for utility plants now burning residual oil for power generation.

We suspect that there would be a larger market for SRC II by quite a margin.

Senator HUDDLESTON. So it is your judgment, then, that there is no further demonstration necessary on SRC I. Its feasibility is well proven?

Dr. WHITE. It is one of those cases, I think, where the technology is simple enough that we feel going from a successful pilot plant directly to a commercial unit will be successful. In other cases, like high-Btu gas we feel that a demonstration step is necessary, but not in this case.

The plant that we are talking about is rather small. It is only perhaps half as big as what we are using for demonstration sites in coal gasification.

USE OF SCRUBBERS ON SRC UNITS

Senator HUDDLESTON. This would, of course, eliminate the need for scrubbers; would it not?

Dr. WHITE. There has been the assumption that it would. Now this is something that has given us some concern. There is a statement in the President's energy message that we should use the best available technology if and when burning low-sulfur coal. If this is taken literally it would mean you should put scrubbers on even with SRC II, which would limit the extent of the use of that fuel.

Senator HUDDLESTON. I am concerned about that, too. It seems to foreclose the idea of improved technology for reducing the pollutants to start with. It seems ridiculous to put in an expensive scrubber if we have a fuel now that doesn't have a high level of sulfur and ash.

Dr. WHITE. It is my personal view that this is a policy question that really needs resolution as to whether we are operating for a specific emission standard, which could be met in the best possible way, or whether we are going to use the best available technology and keep piling it on to get some lower level, no matter how good it is.

Senator HUDDLESTON. So SRC I would be a solid fuel that would replace what is normally known now as coal-fired operations. SRC II would be the liquid that would replace oil-burning facilities.

Dr. WHITE. I think in most cases the actual fuel that SRC I would replace would be oil or gas. Where the FEA orders a plant to move off oil or gas to coal or a coal-derived fuel, they would choose SRC I or II if they could not buy low-sulfur coal, or as an alternate to putting on scrubbers.

Senator HUDDLESTON. Is SRC I lower in sulfur content than any known regular coal?

Dr. WHITE. I think that I had better defer to Dr. Neuworth. I believe that it is one-tenth of 1 percent, Dr. Neuworth?

Dr. NEUWORTH. Seven-tenths of 1 percent, but if you include the Btu content in the coal, the specifications deal with pounds of SO_2 per million Btu's. This would certainly be one of the lowest forms of solid fuel in terms of SO_2 per million Btu's. The Btu content goes up from 12,000 to 16,000 Btu's per pound by virtue of the conversion.

Senator HUDDLESTON. Do you have a figure on how much, with SRC I, a ton of coal produces of in either tonnage or Btu measure?

Dr. NEUWORTH. You get about 60 percent by weight of SRC.

Senator HUDDLESTON. And Btu's. What is the relationship to Btu's?

Dr. NEUWORTH. It would be about—well, I would have to make some calculations. I can do that for you and include it in the record.

Dr. WHITE. The SRC would have substantially higher Btu content because you are dropping out the ash in this process. It would be up to 85 or 90 percent, I would imagine. But we will provide that for the record.

[The information follows:]

EFFICIENCY OF SRC PROCESS

The recovered SRC contains 80 percent of the Btu content of the starting coal. However, if you consider the energy required to operate the process, the overall efficiency is about 75 percent on the basis of Btu's going into the process and Btu's in the products.

HIGH-BTU COAL GASIFICATION PROJECTS

Senator HUDDLESTON. But the process does hold great promise, I take it, in the problem of pollutants in coal?

Dr. White, what is the current status of the two high-Btu coal gasification projects selected by ERDA?

Dr. WHITE. Those contracts are in the last stages of negotiation. I believe one of them is expected to be signed in the final contract form within a few weeks and the other, perhaps, some time in June.

Senator HUDDLESTON. Do you have any target date for beginning construction?

Dr. WHITE. The period of conceptual design after the signing of the contract is expected to take on the order of 15 to 18 months. During the latter stages I expect perhaps some long leadtime items might be ordered. We would then go into the construction phase.

Realistically, it will be 18 months to 2 years before you can see construction really going ahead.

HYGAS PROCESS

Senator HUDDLESTON. In view of the apparent failure of the Coalcon project, and the delays in the Cogas and slagging Lurgi projects, what is ERDA's position with respect to the Ken-Tex Hygas project?

Dr. WHITE. We are proceeding to request bids from architect/engineers. We have requested them for a conceptual design phase on the Hygas process with the anticipation that this could proceed in parallel with the others.

We recognize, of course, we do not have authorization for a second high-Btu plant at this time or appropriation for it. However, with the idea of keeping that on as nearly a parallel track as we can, we want to prepare a request for a proposal for phases II and III for a Hygas plant. It would be possible to issue that during the conceptual design period once we have received authorization from the Congress for a second plant.

Senator HUDDLESTON. Would you say that the Department's position on Hygas is somewhat more positive now than previously?

Dr. WHITE. Yes, sir. It is. There are, however, some experimental data that are needed in the Hygas operation which we plan to obtain concurrently with this design activity to avoid the position we were in with Coalcon where we got to the final design stages only to find we were missing some of the information we really needed.

Senator HUDDLESTON. ERDA, along with industry, has constructed and operated pilot plants for four second-generation high-Btu technologies—Hygas and CO_2 acceptor in 1971 and bi-gas and Synthane.

As I understand it, there have been no requests for a demonstration plant or a commercial plant. Is that correct?

Dr. WHITE. There were proposals. I believe that one of the proposals that we received for the high-Btu solicitation were based on Synthane. But at that point we had not operated that pilot plant. There is no data base really to proceed.

FUTURE ROLL OF COAL GASIFICATION

Senator HUDDLESTON. What plans does ERDA have using the data that you do have on these new technologies to help alleviate this country's pressing gas shortage?

Dr. WHITE. The Hygas process, as you know, looks to be the most attractive. The CO_2 acceptor, we feel, is probably going to be restricted to installations based on the use of lignite. It is particularly attractive for that fuel. As yet, we have no particular commercial interest in moving in that direction, but I think that is one that we feel is in the bank.

It may very well be useful down the road. We do not plan, however, the operation of that pilot plant beyond this fiscal year. On bi-gas

we are just really starting up and from the small scale work. It is anticipated that this may be considerably more attractive, but because of the rather extreme condition under which that plant works, people are going to want to see it operate before we feel that we have data that will be attractive to industry to go ahead.

I think I would like again to ask Dr. Neuworth if he has any further elaboration he would like to give in answer to that question.

Dr. NEUWORTH. I think the experience gained from that pilot plant is directly applicable to almost any technology as a general body of knowledge you generate which helps improve any gasification process you might use, even though that particular configuration is not commercialized. In each case, the pilot plants are merely studied in a particular configuration for carrying out the chemistry of the process. When you go ahead with that particular reactor, it seems to me that it is not the only end result of the work.

You must recognize that the problems we have for the so-called first-generation technology in terms of size of coals you can use. The size of coals are being addressed in these other processes so the end result would be probably a hybrid process which has improvements that are generated in the pilot plant work.

Senator HUDDLESTON. Do you have any timetables or any estimates on when these technologies will be further demonstrated or when we could expect some commercial plants on line to deliver to these pipelines?

Dr. NEUWORTH. I think the late 1980's at the earliest.

Senator HUDDLESTON. That is a long time.

Dr. WHITE. The chairman asked earlier on our estimates on impact which I didn't have at my fingertips at that moment. The figures on the low-Btu gas and some of these are in our formal statement for the record. However, as we indicated earlier, we will firm those up for the record. We definitely have projections on the impact of our technologies, although, as you well understand, they are subject to a great deal of uncertainty.

HYGAS DEMONSTRATION PROJECT

Senator HUDDLESTON. As you mentioned, you have recently initiated a procurement option for the design of a Hygas demonstration plant. The action calls for a conceptual design of a commercial facility.

Is this, in effect, a call for phase I engineering work with the commercial design added?

Dr. WHITE. Yes.

Senator HUDDLESTON. Is the procurement action with respect to Hygas a duplication of the site selection, economic work, scale up rationale, engineering design, and environmental work already completed for the Ken-Tex Hygas project?

Dr. WHITE. We recognize, of course, that a great deal of work was done by the Ken-Tex group in this matter. However, a full conceptual design of a commercial plant, I believe, is not what we are talking about now and is not a direct duplication of what the Ken-Tex group did.

I think Mr. Rial, our Division Director for Major Facilities Project Management, might want to elaborate on that. Mr. Rial.

Mr. RIAL. For the record, my name is Rial, R-i-a-l. The work done by Bechtel for Ken-Tex was in connection with a proposal responding to our RFP. The type of work and the scope of that activity is not the scope which we would carry out in our conceptual design activities.

Also at that time, the laboratory work was not developed and is still not completed. There is not a firm basis for carrying out the design activities that are needed to go forward with the construction project.

It is going to take somewhere between a year and 15 months to obtain a firm basis for going ahead. So as a brief answer, the work that we will be doing is far beyond that provided by Ken-Tex.

Senator HUDDLESTON. You don't see any substantial duplications, extra costs or unnecessary delays in the manner in which you are proceeding now?

Mr. RIAL. I don't see anything of a significant level. Obviously there is some, but there is nothing of a significant nature because if the Ken-Tex project were to proceed, they would have to be doing a lot of the same thing that we are doing in our program.

HYGAS PILOT PLANT

Senator HUDDLESTON. The ERDA budget indicates that no further activity is planned for the Hygas pilot plant for fiscal year 1978. Does this mean that ERDA is terminating efforts in Hygas?

Dr. WHITE. No. I have to confess that that particular part of the budget may be a little deceptive, but not intentionally. Because it is in direct support of the plan for conceptual design, the work that is going to be done on Hygas is being funded as part of the line item that shows up in our demonstration plant subprogram. That will be transferred to the division of coal conversion for their supervision to get the necessary data in the operation of the Hygas plant in 1978.

There are also some carryover moneys, plus what we already have in the design and supporting work of the major facilities group, so there is no additional funding needed. We have enough to carry that operation through the 12 to 15 months that we anticipate now.

NEED FOR ADVANCED HIGH-BTU COAL GASIFICATION

Senator HUDDLESTON. On page 34 of the White House factsheet, the administration indicates the need for advanced high-Btu coal gasification. Let me read from that paragraph. The administration will pursue an active R.D. & D. program for advanced high-Btu coal gasification. The program will be conducted with the urgency required to insure that the new technology will be ready when needed.

Now, on your factsheet under coal conversion, you list the extent of future development work in high-Btu gasification in the issues and problems category. In light of the White House statement, what do you read into your particular statement?

Dr. WHITE. First, I should make the caveat that that statement was written prior to the White House plan being announced. But what that addressed was the philosophical point of how much further should ERDA fund third-generation technology at the bench scale level if we reach a reliable commercial coal gasification industry.

As a proponent of private sector participation myself, I felt that it was not unreasonable at some point that industry take over future development which would be mostly improvements on the existing technology. Some of what we have at the very early stages might really be considered almost in that category.

On the other hand, we do not have today an existing coal gasification industry and, therefore, if there is any work to be done, pretty clearly it will be funded by the Government program.

I don't think that there is a real inconsistency here although it may sound like it in words.

COMMERCIALIZATION OF FOSSIL TECHNOLOGIES

Senator HUDDLESTON. I think that might bring some question as to what ERDA has done or is doing with respect to commercialization analysis. Has ERDA formulated specific criteria for evaluating the prospects of coal commercialization?

Dr. WHITE. Yes, we have. Now the President's message seemed to indicate that there was not a plan to fund at the commercial scale existing technology as part of our program. We are talking to industry, particularly those companies and consortiums who are proposing the high-Btu plants.

We have been talking to them with the idea that we would propose some sort of incentive program as part of the alternative fuel demonstration program for the $300 million Mr. Fri earlier mentioned.

We feel that the individual cases that might be proposed under that now must be reexamined in light of the administration's policy to see how they would fit and whether we can justify proceeding on that basis.

We feel, however, in terms of criteria, that the acceptability of the technology and the environmental problems, of socioeconomic problems and the financability, if I can use that word, are all appropriate criteria which have to be balanced in making the final selection between processes and the decision to recommend them to the Congress.

Senator HUDDLESTON. Do you have a hard and fast idea at the present time, or are you still in the process of developing?

Dr. WHITE. We are still in the process of developing. We have been talking to industry on this matter. If we do proceed, we will talk to the local and State people and environmental groups on those criteria that are appropriate to their interest.

POTENTIAL COMMERCIALIZATION OF COAL GASIFICATION

Senator HUDDLESTON. What is your current assessment of the prospects of commercialization of coal liquefaction and gasification between high-Btu and low-Btu technologies?

Dr. WHITE. May I answer the gasification first. I think that that is a little more straightforward. On low-Btu gasification, strictly speaking, we are proceeding now under existing contracts to commercialize. Let me explain that those are very small gasifiers, the sort of thing that can be bought today on the market. What we are trying to do is show that they can be put in place, that they are operable and give reliable results and most particularly that they are environ-

mentally acceptable, which they were not in the old days. These are the same gasifiers that were used 50 years ago. We have several contracts already and we have others in the final stages for those of that type.

So to that extent in a couple of years they will be commercial on a small scale. Now, as for the big commercial plants to produce pipeline gas, I would guess that even if we go ahead on a program like we have been planning, it would be 4 to 5 years from completion of construction to the point of supplying gas to the pipeline.

Senator HUDDLESTON. You say even if you go ahead. Are there insurmountable obstacles?

Dr. WHITE. I think that there is a real question as to whether the Administration will choose finally to fund a straightforward commercial demonstration plant of the type that we have been talking about. If it is based on emerging technology, like the liquefication process I mentioned, the SRC, this is one of the initiatives selected to move ahead. You might say that SRC is coal liquefication.

In terms of a liquefaction process that would produce fuels for the transportation sector, we see this as coming along quite a bit later because these fuels are clearly going to be much more expensive in terms of 1985 dollars, probably $35 dollars a barrel by the time you refine it up to a level where it is a typical type.

So we see this coming along probably in the late eighties or nineties.

PROSPECTS FOR COAL LIQUEFACTION

Senator HUDDLESTON. ERDA's fossil energy report for fiscal 1977 suggests that the strategy in the liquefaction subprogram is to support the construction and testing of large pilot plants. There is no mention of the demonstrations.

Would this mean that ERDA's strategy involves moving from the pilot plant stage directly to commercialization?

Dr. WHITE. This is our hope at the present time. There is certainly a very long timespan involved if you have to build a pilot plant over a period of several years and operate it for a year or two, then design and build a demonstration plant and finally go to commercial size.

With the energy crisis being what it is, to the extent that we can skip one of those steps, it certainly seems to be appropriate to do so. The pilot plants which are currently under construction or we are proposing in liquefaction, specifically the H-coal and the Exxon Donor Solvent, are very expensive pilot plants, with the intent literally of providing all of the necessary data to go right to a small commercial plant.

We do expect to skip the demonstration step.

Senator HUDDLESTON. ERDA funded a study done by Fluor Engineers and Constructors, Inc. entitled "H-Coal Commercial Evaluation." Based upon that study, what is ERDA's assessment of the prospects for the commercialization of the H-coal process?

Dr. WHITE. We feel very optimistic that this is going to be an operable process. It is under construction in Kentucky today. How it will compare in terms of its operation or reliability and its final economics with others, such as Synthoil, or Exxon Donor Solvent,

or SRC II, is going to have to be developed with further experience. We simply don't know yet.

Senator HUDDLESTON. What future actions do you anticipate with regard to the construction of a commercial H-coal plant?

Dr. WHITE. We would make no decision on that until operating experience and the necessary economic evaluation in comparison with competing processes were complete. I would expect this will be 3 to 4 years at the earliest.

COAL PYROLYSIS

Senator HUDDLESTON. How much is ERDA going to spend on coal pyrolysis in fiscal 1978? And how does that compare with 1977?

Dr. WHITE. The total amount is small—$2 million. It is down from $5 million in 1977. This reflects primarily dropping a couple of projects on the so-called clean coke pilot plant which is being run to provide the appropriate data. Some hydrocarbonization work on residues work is also being terminated.

Now there is one aspect of this that I think is not covered. The small-scale work that we would propose be done on the Coalcon process will be basically a pyrolysis or a hydrocarbonization process.

The amount for this work is $10 million, so that added to the $2 million would really make $12 million total for pyrolysis.

Senator HUDDLESTON. That is still relatively small emphasis on this particular project.

Dr. WHITE. Yes.

Senator HUDDLESTON. What is the reason for this small-scale activity?

Dr. WHITE. The pyrolysis of coal is very simple and therefore inexpensive. It tends to leave you with a very low conversion level—hydrogenation is very difficult so it is better to use a catalyst. It is really not a very attractive process route for coal conversion.

Senator HUDDLESTON. How about the Occidental pyrolysis process? Do you anticipate supporting that demonstration?

Dr. WHITE. I don't believe there are any plans for that. We don't have any money in that.

Senator HUDDLESTON. What is the reason for this?

Dr. NEUWORTH. It is very early and at a very small scale. The purpose of it was to demonstrate the feeding of highly caking coals without pretreating them. We have yet to demonstrate that facet of the process.

Until we do we just don't know where we will go from there. We should remind ourselves that we had very substantial efforts on the Coed project on which we spent substantial money for many years.

It has many features of the other pyrolysis processes and it is part of the so-called Cogas development.

FIRST-GENERATION COAL GASIFICATION

Senator HUDDLESTON. In regard to your second-generation coal gasification technologies, I understand that ERDA's rationale for emphasizing second-generation technologies is that such technologies would be cheaper than the current technology and the first-generation

technology is already adequately demonstrated around the world, is that accurate?

Dr. WHITE. Yes.

Senator HUDDLESTON. To what extent do proven data exist on first generation plants under U.S. economic conditions?

Dr. WHITE. There are no direct data on full scale, even small commercial scale that we're operating gasifiers. We have some data available on the so-called fixed bed gasifiers that are operating. But basically the estimates that we have on first-generation technology are based on foreign experience translated into American conditions and economics.

Senator HUDDLESTON. You don't feel that demonstrations of a limited number under U.S. economic conditions would provide information which would lead to the acceleration of the commercialization of these gasification technologies?

Dr. WHITE. It is my personal view that it would be very useful to have in hand a commercial operation which we could look at, and from which we could take data with confidence. We could derive data on costs of not only the investment and operation of that plant, but most particularly the costs necessary to meet environmental circumstances.

We have had some discussions in recent weeks with people who are interested in seeing us have such a facility as part of a general test facility in the field of high-Btu gasification.

We think there may be some real merit in that kind of approach.

Mr. FRI. Senator, I might add one point here. I believe the President's policy states there is no desire to subsidize existing technology. What that says, I think, is that we are not going into the position of building some kind of long-term subsidy program for first-generation types of gasifiers. I think that is the right position to take.

Senator HUDDLESTON. I agree with that.

Mr. FRI. There is some holdover from the synthetic fuels commercialization program of last year, as well as the Energy, Independence Authority, the $100 million idea, that has left a belief that we could easily drift into a subsidization program.

Our view is that we clearly don't want to subsidize, but there is a great deal that could be learned from building a commercial plant that has essentially nothing to do with technology per se, which is essentially demonstrated from an engineering and environmental standpoint.

What we now need to do is go back and reevaluate the program that we have been looking at, and look at the benefits of the data that we get in terms of economics, the environment, financing, et cetera, and the risks we would take toward subsidization and the program we would conduct and come back to you with an answer that we really don't have today.

PROPOSED ENERGY PRICING STRUCTURE

Senator STEVENS. Would the Senator yield there?

Senator HUDDLESTON. Yes.

Senator STEVENS. Did you explore the possibility of permitting a product to be sold at world market prices from such a plant?

Mr. FRI. I think this is a misunderstood point. The product from exotic sources of gas, including coal gas, is not subject to the $1.75 price limitation that the product of ordinary reservoirs is subject to.

Senator STEVENS. How about the oil? Is the President's $6 tax at the wellhead going to be used as a target price or ceiling price for all producing entities?

Mr. FRI. No, the way we have to look at the policy is this: The price structure plus the tax structure essentially force industrial utility users of oil and gas to pay something on the order of the world price of oil. Natural gas from ordinary reservoirs, and oil from ordinary reservoirs, is subject to a price limitation at the wellhead.

The tertiary recovered oil, shale oil, gas from exotic sources, are not subject to the same limitation. They are priced directly at the world price of oil, or higher if necessary, in order to get to the market.

Consequently, there is in this price structure an incentive, in my judgment, both on the consumer side, in seeing the high price, and on the producer side, who is not subject to this price limitation, to exploit some of these new technologies and as quickly as they become available.

But the impact of that price structure on our commercialization program is something that we are still looking at. We do know that a lot of the prices we are looking for today for new technologies are for the most part in the ballpark of world prices.

ESTIMATED COSTS OF LIQUEFACTION AND GASIFICATION PROCESSES

Senator STEVENS. You are going to run down all these prices in the first-generation. You said you had the first generation data?

Dr. WHITE. The first generation high-Btu gasification plant is a learning-type plant. It is seen as producing gas at the lowest price of $3 per million Btu's, and more likely $3.50.

Senator STEVENS. That compares favorably to imported LNG.

Mr. FRI. It compares favorably with imported LNG. The other part is that the gas equivalent of the world oil price is about $2.25 per 1,000 cubic feet. So it is near the top of the range.

But if it works pretty well it could be competitive.

Senator STEVENS. If we're going to tax the wellhead production of oil and natural gas, you have synthetic gas coming on the world market, then you have an indirect subsidy.

Can you quantify the capital costs that would be necessary to go into commercial scale operation in the first plant.

Dr. WHITE. We have figures on that for both liquefaction and gasification plants. It depends on which you are talking about.

For the liquefaction plant, the capital costs alone would be on the order of $15 to $20 a barrel, in 1985 dollars. Generally speaking the costs of the high-Btu plants, coal and capital together, amount to 80 percent of that.

Senator HUDDLESTON. These figures take into account the improved efficiencies and possible cost saving when these operations get into large-scale, mass production?

Dr. WHITE. One of the difficulties we have faced is the extent the efficiency impacts the capital cost. It is not going to help much.

Also, the coal and the capital cost is always going to be a very large factor to the extent that the process is more efficiently using less coal for the same amount of gas. But you are probably looking at a 20- or 30-percent improvement in that part of the total cost. So it is rather uneconomical unless we get a breakthrough that we don't see today.

Senator HUDDLESTON. But the promise of enhancing the public interest seems to me to justify not only a major effort but a subsidy, if it comes through the form of taxation or whatever, to produce clean burning fuel, if the resource is in abundant supply at the time, wouldn't you say?

Dr. WHITE. Very definitely, yes.

Senator HUDDLESTON. Then you do anticipate more expanded activities on second generation technology in the future?

Dr. WHITE. Yes.

DONOR SOLVENT LIQUEFACTION PROCESS

Senator HUDDLESTON. Do you have any specific time schedule on that?

Dr. WHITE. One of the most significant ones is the donor solvent pilot plant. This is an improved process which has been developed in the private sector and looks as though it could have a significant edge on either H-coal or SRC.

It would be able to go as an alternate to crude oil with respect to fuels, and we have in the 1978 budget a $30 million request for funding of that particular pilot plant.

We are just about ready to send up to Congress a contingency report that requests concurrence to proceed either with the long lead-time procurement items prior to the start of the 1978 fiscal year.

That would be a plant that would eventually cost some $200 million. It would be so designed and carefully planned that we do not expect it would not be necessary to have a demonstration following the pilot plant.

It is 50–50 funding with private sector money, including some international money from Japan and Germany, as well as the private companies, and 50 percent ERDA money.

FLUIDIZED BED COMBUSTION

Senator HUDDLESTON. These technologies we have been talking about have very attractive potential for providing clean burning fuel from the abundant coal resources we have in this country, but they are still several years in the future.

For the short term, what is available for reconciling the burning of coal and clean air requirements?

Dr. WHITE. The most immediate ones are obviously the scrubber or direct combustion. The alternative that we are working on in ERDA fossil energy, with the knowledge of EPA, is the so-called fluidized bed type of combustion where instead of taking the sulfur dioxide out subsequent to the furnace, we put the material in the fire box and it absorbs the SO_2 in what is called a fluidized bed. Very finely divided particles of limestone or dolomite are right in there with the coal and are fed in continuously and the spent limestone is withdrawn continuously with the coal ash.

This is a quite effective technique and has the advantage of, we expect, a lower capital cost and a lower operating cost, once developed. Also, instead of having the calcium sulfate absorb the material as a sludge, which is very difficult to handle, it comes out as a dry powder.

There is still a very large volume of waste in many of these approaches, however, and we see no way to get away from the disposal problem.

Senator HUDDLESTON. Are you optimistic about this fluidized bed?

Dr. WHITE. Yes, we are. However, it is in a very early stage. There is a pilot plant in West Virginia which is just coming on stream. It is sort of a prototype. It's not a fully instrumented pilot plant. It was designed a number of years ago on a modest budget, and it is a first attempt to apply this technology on anything like a commercial scale. It has a 30-megawatt capacity boiler, adjacent to a regular utility, feeding steam into the utility operation. It looks like it will work reasonably well.

Mr. FRI. I think it is worth adding, Senator, that we can do little things faster, and consequently in the gasification area, as Dr. White said, we have already got these small gasifiers underway, in commercial plants.

Beyond that we have some low-Btu gas applications for industry, which will come along relatively quickly.

But when you get into the utilities which is, of course, where a lot of coal is burned, it takes a long time to design and build the mass of equipment that they require, and that is going to take a little longer.

Senator HUDDLESTON. Do you see the possibility of fluidized bed combustion replacing the scrubber?

Dr. WHITE. That is a definite possibility, but we will be coming along far enough behind in this development, that I think there will be a great many scrubbers in place before we can say with confidence that this is the way to go.

ERDA FLUIDIZED BED PROGRAMS

Senator HUDDLESTON. What specifically has ERDA done to accelerate this possibility? The scrubber is so expensive and the disposal problem is so great, it seems to me there ought to be extra special effort on that.

Dr. WHITE. We are pushing as fast as we can. There is a very carefully designed and thoroughly instrumented pilot plant at the Morgantown Energy Research Center for a fluidized bed, which will be our major workhorse for perfecting this methodology.

One of the problems with the original West Virginia installation is it was really designed just as a prototype with no flexibility. Since it is tied to a regular utility, you can't play with it in terms of modifying it and putting it in different modes for handling the limestone and that sort of thing.

There is also an effort to carry out a conceptual design of what a full-scale plant might look like. We have several design contracts with boiler manufacturers to look at how they would design a fluidized bed for a full-scale utility, just to give us guidance on how to proceed in this development.

Furthermore, these are all atmospheric pressure operations. One of the options for increased efficiency further down the road is to put the whole system under pressure, which enables you to shrink the size of the boiler.

We have small-scale units going on. There is work at the Argonne National Laboratory, work in the United Kingdom, and there is a contract with Curtis Wright to develop a very small pilot plant for this type of operation.

Senator HUDDLESTON. Will these operations require an additional budget request? Do you need more money?

Dr. WHITE. The key facility is this unit at Morgantown which has just been finally designed. As so often happens, the final design looks like it is going to cost a good deal more than we thought it would. It is going to be difficult to keep that on the track.

We would like to keep it and we have already decided to cancel some other projects to help keep that one going.

I would say here is a place where another $5 million or $10 million would obviously be helpful.

Senator HUDDLESTON. It seems that area has an awful lot of promise. I would hate to see a lack of funds at that particular stage.

Dr. WHITE. In direct combustion, we asked for $69 million originally, and the OMB marked it to $53 million, so there was about a one-fourth cut in that.

Senator HUDDLESTON. That was a pretty substantial cut.

LNG FACILITIES

Senator STEVENS. Let me ask you a question there. As we see the liquified natural gas regasification plants being built all over the country, there is one investment over $1 billion. This is based on rather unstable foreign supply.

Have you done any analysis at all to discover why industry is so unwilling to put the capital investment into facilities that would convert our own resource, coal, in gases to supply that region?

There seems to be adequate coal in this region of Tennessee, West Virginia, Kentucky, yet we are becoming extremely reliant in terms of the South on Algerian LNG. Yet it comes in substantially above gasified coal, as I understood it.

You said we were in the technology range of about $3.50 now. Theirs is coming in above that. Have you met with industry and tried to counsel industry to try to find out why they would put $1 billion into facilities to regasify LNG, and are not willing to put $200 million into a plant that would gasify coal?

Dr. WHITE. I think I would have to say, we have not talked with them specifically on that particular question. I might ask Mr. Myerson, who is our division director on commercial applications, if they covered that in your discussions.

Mr. MYERSON. No, sir, we did not. We have not addressed the specific question. We have, however, looked at the entire cost and the comparative cost of LNG and synthetics from coal, and determined that they are more or less equal.

Senator STEVENS. I am informed it's over $1 billion invested in Georgia for the regasification facilities alone. That is not talking about

the LNG facilities over there, or the transportation costs to get it here.

Mr. MYERSON. I am not familiar with the Georgia facilities specifically, Senator Stevens, but I understand that about a year ago a typical capacity would come in with quite an equitable capital structure.

Senator STEVENS. Have you analyzed existing Federal laws to see what disincentives there are to going into the conversion technology at the present time?

Mr. MYERSON. The analyses of coal gasification have not been exhaustive. Generally, the impediments to commercial application have been regulatory rather than statutory. The various people who would like to build these plants have requirements which they feel——

Senator STEVENS. I am merely searching to find out if there are environmental constraints on this activity that would not be present on the regasification facilities. Is there an environmental impediment in your area now?

Mr. MYERSON. In comparing the two facilities, the environmental considerations attending a coal conversion plant would be broader reaching than those for an LNG regasification plant.

Senator STEVENS. My recent analysis indicates that there are 18 regasification plants either under construction or awaiting approval of siting, or on the boards for construction within the next 10-year period.

It seems that we're going in the wrong direction in this.

Dr. WHITE. Mr. Chairman, this is a judgmental reply, rather than something based on exhaustive analysis, but I think one of the things we are seeing here is an industry which is moving into a technology area with which they are familiar.

The handling of gas, even liquefied gas is an area where the uncertainties are somewhat more narrow, even though there are uncertainties of regulatory and siting aspects, as contrasted to coal gasification, which is a new and unfamiliar area. There are not only the problems of strip mining constraints, but there are uncertainties as to what the environmental problems of a coal gasification plant would be.

One of the advantages that we see in having a commercial plant is to answer some of those questions.

Senator STEVENS. Did you seek an authorization to get a first demonstration plant?

Dr. WHITE. No, we have not done so. It was part of the generic synthetic fuels bill last year, of course. This is what we are evalutating now.

It will be an appropriation request for one plant if it is judged finally that such a request is consistent with the President's policy in first-generation technology.

Senator STEVENS. Haven't you had authority all along to go into first demonstration plant without any specific authorization?

Dr. WHITE. I think it is part of the enabling legislation, but not specific authority for a plant.

AUTHORIZATIONS

Senator HUDDLESTON. That brings us to the equally difficult problem of authorizations. In the absence of even a legislative proposal for the alternative fuels program, can you realistically expect to have it authorized in time for appropriations? As we told the Federal Energy Administration earlier this week, the Interior appropriations bill is scheduled to clear Congress some time in June–July at the latest.

Mr. FRI. The specifics of an alternate fuel program legislative proposal are currently under review within the Administration. In addition, deliberations currently underway concerning ERDA's fiscal year 1978 authorization bill may affect this proposal. It is doubtful if this activity will be authorized prior to your action on the fiscal year 1978 appropriations bill.

Senator HUDDLESTON. What about your basic authorization? Last year, as you know, there never was an authorization. This year to date doesn't seem to promise any significant improvement.

Mr. FRI. ERDA expects to receive its fiscal year 1977 authorization in a few weeks. In terms of fiscal year 1978 authorization, the House Science and Technology and Senate Energy and Natural Resources Authorization Subcommittees will report out a bill soon.

Senator HUDDLESTON. When did you submit your legislative authorization package to Congress?

Mr. FRI. The ERDA authorizations package was submitted to Congress at the beginning of this session.

DEPARTMENT OF ENERGY

Senator HUDDLESTON. What do you anticipate will be the impact of the DOE legislation on ERDA if it is enacted by Congress?

Mr. FRI. Establishment of a department having a unified responsibility with regard to energy technology will result in the integration and balancing of the generally longer range perspective of most ERDA programs with the near-term focus of most FEA programs. This action should support the development of a fully integrated, cogent national energy policy which in the past, has been hampered because ERDA and other agencies having key statutory roles in energy had tended to develop separate policies concerning their programs.

The ERDA responsibility for demonstration of economically viable technologies will benefit from the creation of a DOE. Having the energy technology development function in the same department with financial incentive and other marketplace expertise should result in accelerated demonstration and introduction of the new technologies by industrial users or individual consumers.

Creation of DOE should bring other positive results with respect to current ERDA programs. For example, consolidation of Federal-level conservation programs including energy conservation R. & D. will provide the base for a strong national conservation program. Also, the consolidation of ERDA's production and marketing of enriched uranium with responsibilities for energy resource development and power marketing will contribute to the development of consistent Federal policies and practices toward utilities, and toward pricing and related policies for other energy resources.

A program by program assessment of the impact of the DOE legislation on ERDA indicates that there will be a significant overall positive impact.

Senator HUDDLESTON. How will your activities and those of FEA be consolidated?

Mr. FRI. After completing a detailed analysis of ERDA and FEA functions and current organizations, a comprehensive consolidation plan will be developed on the basis of the functional alinement provided in the DOE legislation. Integration and consolidation of specific ERDA and FEA programs must necessarily be viewed in the context of the comprehensive national energy policy as well as the basic DOE structure, as legislated.

Generally, the commonality of certain activities of the two agencies indicate a natural blending and compatibility. For example, ERDA's environment and safety research would be consolidated with the environmental responsibilities of FEA. Likewise, the energy conservation R. & D. responsibility of ERDA has a direct relationship to FEA's role in the commercialization of conservation technologies.

Other activities of the two agencies have a natural compatibility and would be incorporated into components of DOE such as resource applications, international programs and the energy information administration.

A more detailed projection of the organizational integration of ERDA and FEA cannot be rationally postulated at this time; however, there appear to be no obstacles that would prevent a smooth transition to a DOE structure.

ECONOMIC IMPACT OF SCRUBBER UTILIZATION

Senator HUDDLESTON. I have some other questions if we don't run out of time. We have a vote coming up. We will have an opportunity later in the day. If not, we will submit them. Back on the question of the scrubber versus these new technologies that look promising, what input is your agency giving into this decision that now requires the best technology?

I am thinking of the tremendous cost of these scrubbers. If they are going to be required to be installed now, even though this other technology is in the process, they are going to be in place for the next 20 years. We may end up in 1985 or 1990 with a majority of our producing facilities with these expensive scrubbers.

What effect is that going to have on the rates the customer is going to have to pay when they might have been paying a lot less and for a better system? Do you have enough flexibility here to take into account these figures?

Dr. WHITE. In terms of direct input I would have to say that we had the usual opportunity to comment on new legislation. Also we do, of course, have a memorandum of understanding between the EPA and ERDA to try to coordinate our activities.

We have exchanged a great deal of information on scrubbers. We do that quite a bit to be sure both agencies are quite aware of the current stage of development, including the expected economics of the new technology and the economics of the scrubbers.

Mr. FRI. I think there are a couple of aspects to that, Senator. On the specific issue of requiring the use of the best available technology, which is to say, scrubbers, on all new coal-fired plants, regardless of the sulfur content of the coal, I am not aware that we have many significant inputs.

It is also largely outside our program.

Senator HUDDLESTON. It seems to me terribly shortsighted.

Mr. FRI. The issue of whether that concept extends to coal burning by other than direct firing, for example the use of solvent-refined coal, for electric generation and so forth, is an issue that I don't think is resolved in the President's policy statement. It is one that we need to resolve, and we need to have an input on it.

Somewhat more broadly we do, have a series of efforts underway, particularly on coal, and on some other things.

We are examining the health effects of coal and trying to understand the basis for the regulation better, as well as the impacts on our new technologies. Over the longer term I am sure that this program will produce substantial information on these kinds of things.

Senator HUDDLESTON. Is it not critical now to have some kind of impact before we get locked in. It seems to me there is the possibility that you might develop a coal derivative that is totally clean and has no problem at all, as far as air pollution is concerned.

The other is that you might develop a process of burning coal in another form. I don't think we ought to ignore those possibilities. It is going to cost so much and the consumer will have to pay the bill.

OBLIGATION OF FUNDS

Senator STEVENS. Senator, could I go into some other questions? I won't be here this afternoon. I would like to get a few of them in.

Mr. Fri, the budget is up again dramatically, the 57-percent increase in conservation and 36-percent increase in fossil energy. The questions from last year persist, I think: "Can ERDA effectively obligate that kind of increased funding in this fiscal year?"

Mr. FRI. Yes, I have a great deal more confidence in this fiscal year, 1978, than we had in fiscal 1977. Frankly there are two reasons for that. One, in both cases the programs themselves are much better formulated. In the fossil program, a good deal of the money is going into additional funding for projects already underway. In the conservation area, I think Dr. Mannella has done a first-class job in getting that program under control. So I think the program is structured in a way that will allow us to do that.

Second, I think at worst we have stopped falling behind on our obligation pattern in 1977, and indeed I think we will do some catching up in 1977. We should be in good shape in 1978.

Senator STEVENS. Obligation totals supplied by ERDA this month raise the committee's concern. It shows out of a total of $728 million for funding, only $204 million was obligated by the end of March. We would like to have that table in the record at this point.

[The information follows:]

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
FOSSIL FUELS AND RELATED PROGRAMS
STATUS OF OBLIGATIONS AND COSTS AS OF MARCH 31, 1977
(DOLLARS IN THOUSANDS)

Fossil Energy Development	Total Obligations Available	Actual Obligations as of 3/31/77	Total Cost Ceiling Available	Actual Costs As of 3/31/77
Operating Expenses				
Coal				
Liquefaction	$ 80,995	$ 48,050	$ 84,983	$ 48,474
High-Btu Gasification	51,195	15,175	58,704	22,065
Low-Btu Gasification	56,022	6,075	39,952	11,763
Advanced Power Systems	23,715	3,441	12,800	7,408
Direct Combustion	74,230	24,089	56,826	15,659
Advanced Research & Supporting Technology	38,873	13,277	36,570	19,954
Demonstration Plants	79,154	15,570	50,600	8,620
Magnetohydrodynamics	58,887	23,035	25,989	18,969
Total Coal	463,071	148,712	366,424	152,912
Petroleum & Natural Gas				
Gas & Oil Extraction	44,460	12,196	34,556	14,772
Supporting Research	1,840	917	1,831	712
Total Petroleum & Natural Gas	46,300	13,113	36,387	15,484
In Situ Technology				
Oil Shale	25,697	5,790	12,013	5,558
In Situ Coal Gasification	8,718	3,838	6,736	2,934
Supporting Research	1,345	633	1,310	902
Total In Situ Technology	35,760	10,261	20,059	9,394
Total Operating Expenses	545,131	172,086	$ 422,870	$ 177,790
Capital Equipment				
Coal	250	-		
Petroleum & Natural Gas	360	31		
In Situ Technology	500	189		
Total Capital Equipment	1,110	220		

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
FOSSIL FUELS AND RELATED PROGRAMS
STATUS OF OBLIGATIONS AND COSTS AS OF MARCH 31, 1977
(DOLLARS IN THOUSANDS)

Fossil Energy Development	Total Obligations Available	Actual Obligations as of 3/31/77	Total Cost Ceiling Available	Actual Costs As of 3/31/77
Plant				
76-1-a Clean Boiler Fuel Demonstration Plant	$ 51,660	$ 400		
76-1-b High-Btu Synthetic Pipeline Gas Demonstration Plant	10,000	-		
76-1-c Low-Btu Fuel Gas Demonstration Plant	7,300	-		
77-1-a Mods and Additions to ERC's	6,900	126		
77-1-d MHD CDIF	5,000	2,045		
Total Plant	80,860	2,571		
Total Fossil Energy Development	$ 627,101	$ 174,877		

NOTE: As of 3/31/77, there was $38.5 million in B/A on the Fossil Energy Financial Plans for GOCO's and ERC's which had not been obligated. Also, as of 3/31/77, there was $161.3 million in the procurement process which had not been obligated.

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
FOSSIL FUELS AND RELATED PROGRAMS
STATUS OF OBLIGATIONS AND COSTS AS OF MARCH 31, 1977
(DOLLARS IN THOUSANDS)

Conservation Research & Development	Total Obligations Available	Actual Obligations as of 3/31/77	Total Cost Ceiling Available	Actual Costs As of 3/31/77
Operating Expenses				
End Use Conservation and Technologies to Improve Efficiency				
Industry	$ 14,549	$ 2,822	$ 11,960	$ 2,880
Buildings	26,600	8,507	22,610	6,696
Transportation	27,463	8,105	23,790	6,910
Conversion	23,161	9,293	15,300	7,254
Energy Extension Service	7,500	75	5,000	75
Total Operating Expenses	99,273	28,802	$ 78,660	$ 23,815
Total Capital Equipment	2,000	262		
Total End Use Conservation and Technologies to Improve Efficiency	$ 101,273	$ 29,064		

OBLIGATION BACKLOG

Senator STEVENS. We have expressed a continuing concern over ERDA's failure to get the funds obligated. As a matter of fact the chairman himself initiated a budget reduction because of the backlog of funding.

What leads you to believe that situation is going to change in the future?

Mr. FRI. Let me take the fossil program for the moment. We had a detailed review of that yesterday, and of all our programs as a matter of fact. The fossil program has initiated, or is on schedule in initiating the procurements that it had planned. So, the fossil office is pretty much on schedule. The way we planned our procurements is that the competitive procurements which take longer in the procurement cycle come out of the office first, and are already in the procurement process. Therefore, what is left to be initiated by the program office are either noncompetitive procurements or additions to existing contracts, which can be processed much more quickly.

Furthermore, there are several contracts held over from last year, six, I think, for the demonstration plants subprogram, which add up to $60 or $70 million, all of which are on the verge of being signed in the next few weeks. So the pattern is such that we have a lot of things that are going to be signed very quickly, and the things that have not been initiated can be processed very quickly. We planned and executed our work in a way to optimize our ability.

While we may not obligate the total availability this year, and there will be some carryover, I'm optimistic that we can cut into the carryover amount in addition to obligating all of the new funds that are available in 1977.

Senator STEVENS. We asked the same questions last year and we had about the same answers. We had about a half a billion dollars, most of them in fossil energy, unobligated. We don't quite understand what causes the backup.

Mr. FRI. What fundamentally causes the backup are the carry forward contracts, the large contracts which have been in negotiation for a long period of time, with difficulties in patent provisions and that sort of thing, but those are all pretty well nailed down now.

We planned initiation of competitive contracts early in the year, so that we could get those out of the way, since they take longer. Some of the easier contracts, which happen to also involve big money like the next year's funding on a pilot plant or demonstration plant, come along a little later.

They are easier to do and take only a few months. I am optimistic that those will be completed.

Senator STEVENS. We operate under the budget resolution restraints also. If we put money in your budget that is not spent or obligated, we have reduced funding for parks or for wildlife refuges, or Indian hospitals or something else.

Why should we not see the same shadow over the 1978 request, and reduce your funding request accordingly? What assurance can we have that the obligation pattern will in fact meet your increased funding request? You have a massive funding request increase, and yet you have failed to obligate more than half the amount we appropriated last year at the reduced level.

Mr. FRI. The only thing I can tell you, Mr. Chairman, is that last year was still the first full year's operation of the new agency. Our program design and ability to manage procurement were not everything they should be.

We are very sensitive to the obligations problem. We have set up systems to manage our procurement in a way that maximizes the obligation rate that was described in the fossil program. I think that is working as planned.

I personally monitor the obligation rates every month, and as our Controller can say, we have had several vigorous discussions of why certain things are not happening.

FISCAL YEAR 1977 OBLIGATION ESTIMATES

Senator STEVENS. Last year I asked the same question, and you told us you would obligate the amount. You ended up at the end of the year with $178 million unobligated balance.

That would have funded almost a complete backlog of Indian hospitals, which this committee wanted to start. This year you again tell us there will be no unobligated balance at the end of 1977.

Again, realizing that this committee's responsibilities are in other areas, and looking at our budget ceiling for this subcommittee, can you really tell us that it is realistic that there will be no unobligated balance at the end of 1977?

Mr. FRI. I cannot tell you that because our procurements are not planned that way, Mr. Chairman. Some things take longer to do.

Senator STEVENS. That's what your budget shows. You give us a budget submission that says no unobligated balance at the end of 1977. Now, is that realistic to ask this committee to review that?

Mr. FRI. We didn't give you a budget with no unobligated——

Senator STEVENS. Yes, you did, your program and financing statement shows no unobligated balance at the end of the year.

Mr. FRI. We can come close to it, but I can't guarantee you there will be no unobligated balances at the end of 1977.

Senator STEVENS. I don't want to be antagonistic, but you leave us in a strange position of being forced to reduce an area in which there is great interest in order to be realistic.

Now, what is the realistic, unobligated balance for the end of 1977, in your opinion. Can you give us that?

Mr. FRI. Our present plans for the fossil energy program in the chart I have before me show that we might have $20 million in unobligated funds at the end of the year.

Senator STEVENS. For the total budget, the $728 million you will obligate $708 million between now and October 1?

Mr. FRI. For fiscal year 1977 in the fossil energy area.

Senator STEVENS. I am talking about your total budget request. My chart shows at the end of March there was $500 million to be obligated by October 1.

Mr. FRI. For the conservation program, our present plans show that we might fall short on obligations on the order of a couple million dollars. So the total amount might be $30 million.

Mr. GREER. Senator, our plan in developing this budget was that every dime requested would be obligated. We had a procurement

plan that was geared to that level of obligation. In other words these funds were specifically identified for procurements.

The plan was to get those into the system. There have been some slippages, there have been some corrective actions to try to obligate the funds, including the carryover of about $120 million in fossil energy operating funds that was carried over from last year.

We have had six large contracts in a fossil energy program that have been about 6 months longer in the procurement process than was anticipated.

Those six contracts are close to breaking loose, and you will see a substantial increase in the obligation rate in the next 2 months.

Our present projection is that something in the neighborhood of $25 to $30 million might not make it into the procurement system this year. We are looking to see what can be done about that $30 million.

NEED FOR REVISED OBLIGATION ESTIMATES

Senator STEVENS. We would like to request that your program and budget people take another look at the obligation estimates, to see if you can come up with a more realistic projection. We want to know what the real carryover would be in 1978, and how much of that in the 1978 request could be obligated in the next year.

It has been suggested that there be a limitation on the availability of appropriations. Would that be of any assistance or would that be a detriment to you in your operation?

Mr. GREER. That would be a detriment, Mr. Chairman, as these large contracts are funded and the funds are dedicated to those in the negotiation process. If one of those were to slip over the fiscal year and no funds were available, then up to a year's work will have been lost in the procurement cycle, and no funds available to continue the procurement.

Senator STEVENS. It appears that some of these slip over 2 fiscal years, not just 1. It is sort of hard to tell which pot you are going into——

Mr. GREER. We did, in fact, have a carryover from 1975 and 1976, and a carryover from 1976 and 1977. I don't think that they were the same funds involved, the same contracts involved. I am not aware of any specific operating expense contract that slipped successively 2 fiscal years.

DEFERRAL OF FUNDS

Senator STEVENS. Let me ask you the last series of questions on deferrals. You have submitted two separate deferrals to Congress, one for $46.7 million in the Coalcon demonstration project, and another $80.5 million in operating funds.

Do those deferrals involve any funds under this subommittee's jurisdiction?

Mr. GREER. The Coalcon funds are within this subcommittee's jurisdiction, but the $80 million involves programs that are funded from the Public Works Subcommittee.

Senator STEVENS. None of the operating funds affect us?

Mr. GREER. That is right.

Senator STEVENS. There was an additional $10 million, available for Coalcon that has not been deferred, is that correct?

Mr. GREER. Yes, we have asked OMB to approve a reprograming for that $10 million, and they have just agreed to approve the request. We will be submitting that for the committee's review shortly.

Senator STEVENS. Is that a transfer between appropriation accounts in terms of the reprograming?

Mr. GREER. Yes, sir, it involves a transfer between the plant and equipment appropriation and the operating expenses appropriation.

We believe that we have the authority for that under the merged appropriations. That will be a question the committee will have to review.

COMPLIANCE WITH BUDGET REFORM ACT

Senator STEVENS. We will ask you to submit that to the staff.

What about other appropriations available to ERDA that are not obligated this year. Have you adopted a policy concerning deferral or rescission requirements related to the Budget Reform Act with regard to any of those?

Mr. GREER. Yes, sir. At the present time we are reviewing with the Office of Management and Budget some of the deferrals that would be associated with the President's change with emphasis on the nuclear programs. Aside from that we don't believe there are any other programs that fall into the deferral category.

SUBCOMMITTEE RECESS

Senator STEVENS. Thank you, very much. The committee stands in recess until 2 p.m.

[Whereupon at 11:55 a.m., Thursday, April 28, the subcommittee was recessed, to reconvene at 2 p.m., the same day.]

(AFTERNOON SESSION, 2 O'CLOCK, THURSDAY, APRIL 27, 1977)

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

RESUMPTION OF HEARINGS

Senator BELLMON [presiding]. The subcommittee will come to order and we will resume our hearings started this morning.

I want to begin by apologizing to our witnesses for my tardiness. We just had a vote on the floor, I think as everyone knows, and the amendment was defeated. I would just as soon be over here as there, I guess.

Our witnesses this afternoon are Dr. Mannella and Dr. White, the Acting Assistant Administrator for Conservation and the Assistant Administrator for Fossil Energy of the Energy Research and Development Administration.

I see that you have others at the witness stand. Will you introduce the other gentlemen and proceed?

Mr. GREER. I am Mel Greer, the Controller, and we have with us Dr. Willis, our Assistant Administrator for Institutional Relations.

Senator BELLMON. Thank you. Do you have a prepared statement? If you have, we will make it a part of the record. Oh, I see. Your statement has already been covered.

Then we will proceed with the questions.

COAL PROCESS PILOT PLANTS

We have read with interest some of the accomplishments in the statement that Mr. Fri furnished and find them interesting. But let me go first to fossil energy.

How many coal process pilot plants does ERDA have operating or under construction at the present time?

Dr. WHITE. Mr. Chairman, we have currently operating I believe four pilot plants, and two coming onstream. One high-Btu gasification pilot is winding up its operation in Rapid City, S. Dak. There is another pilot plant in Kentucky presently under construction, the H-coal pilot plant.

Senator BELLMON. You have four operating presently under construction?

Dr. WHITE. That is true.

Senator BELLMON. These are all four liquefaction plants?

Dr. WHITE. Yes.

Senator BELLMON. And do you have gasification plants also?

Dr. WHITE. Yes, we do. We have the Hygas and Steam-Iron plants at IGT, and the Bi-Gas and Synthane pilot plants in Pennsylvania, and the CO_2 acceptor plant in South Dakota. These are high-Btu gasification plants.

In low-Btu we have actually nothing under construction at the present time.

Senator BELLMON. The plants you referred to are all pilot plants?

Dr. WHITE. Yes.

FOSSIL DEMONSTRATION PLANTS

Senator BELLMON. You seem to have made some progress with pilot plants, but how are you doing with demonstration plants? Where do we stand with those?

Dr. WHITE. In demonstration plants, there is actually nothing under physical construction at the present time.

Senator BELLMON. Nothing at all?

Dr. WHITE. Nothing at all.

ERDA has authority for only one high-Btu pipeline gas plant at the present time, but two contractors have been selected for conceptual design contracts which are still under negotiation. There are some four medium- or low-Btu gas plants for which contracts are under negotiation. Most of these selections have only been made in the last few months.

I should say, however, just by way of explaining, we do have some very small gasifier plants which are literally off-the-shelf items for commercial demonstration.

They will actually enter the commercial market once they are through the demonstration of acceptability and operability. These are just a few million dollars apiece, but there are some six of these that are either under contract or about to be under contract for gasification.

Senator BELLMON. But these do not involve ERDA.

Dr. WHITE. Yes. They are ERDA contracts in the total program. Actually, they are so small they are done under the coal conversion activity and they are in the budget as a line item, gasifiers in industry.

So, a number of these small plants will be onstream actually producing gas in potentially commercial situations. These are captive gas supply plants replacing pipeline natural gas. These are much more advanced than our big demonstration plants. On the other hand, they only cost a few million dollars.

PILOT PLANT OPERATIONS

Senator BELLMON. Let me see if I can follow you a little bit. You have four currently operating coal liquefaction pilot plants.

Dr. WHITE. We have four in our program, two are operational, one is under construction, and construction will be started on the other one in fiscal year 1978.

Senator BELLMON. And no demonstration plants in liquefaction.

Dr. WHITE. No demonstration plants. The only demonstration plant that was in the liquefaction area was the Coalcon plant for which the funds have been suspended while we go back to small-scale work and obtain some more data.

DEMONSTRATION PLANT SCHEDULE

Senator BELLMON. Last year ERDA was expressing high hopes for the Coalcon demonstration plant, and now that is apparently on the shelf. Meanwhile, you are budgeting for five other demonstration plants. What are the target dates now on functioning demonstration plants?

Mr. FRI. We will be happy to supply the target dates for initial operation of demonstration plants included in our fiscal year 1978 request.

Target Dates for Demonstration Plant Operations

Plant:	*Completed construction/start operation*
Pipeline gas	Late calendar year 1981
Low BTU industrial	Late calendar year 1981
Low BTU small industrial	Late calendar year 1981
Atmospheric fluid bed combustion	[1]
Solvent refined coal	[1]

[1] A–E work to be initiated in the first quarter of fiscal year 1978. The construction schedule for these plants will be developed later.

Senator BELLMON. On the gasification, you mentioned several. I didn't get the numbers.

Dr. WHITE. I am sorry. In gasification there are Bi-Gas, Synthane, Steam Iron, CO_2 acceptor, and Hi-Gas pilot plants, a total of five pilot plants running.

Senator BELLMON. And how many under construction?

Dr. WHITE. I don't think that we have any under construction. No, not under construction.

Senator BELLMON. You mentioned six a moment ago.

GASIFIERS IN INDUSTRY

Dr. WHITE. Those are the little gasifiers. The pilot plants I am talking about are ERDA-funded. Some of them are cofunded with AGA, but they are ERDA facilities for the most part. The small gasifiers are commercially available types of equipment. There are several vendors in the United States where you can buy these coal gasifiers today, and we have contracted with groups who want to share with us——

Senator BELLMON. Why do you use ERDA funds to buy something off the shelf, like the plant that is already being manufactured? I thought all of these were research and development funds.

Dr. WHITE. There are two very critical aspects that have not been established in this country with these commercial gasifiers. One is their adaptability to industry and the second, is their environmental acceptability.

Senator BELLMON. You need six of them to prove those questions?

Dr. WHITE. Different types of operations with different coals are very useful. Part of this program is an attempt to establish the acceptability of this technology by industry. We felt that more than one is very useful.

Senator BELLMON. Where are they manufactured? What country?

Dr. WHITE. In this country.

Senator BELLMON. But not previously used here?

Dr. WHITE. They were used widely, sir, up to the fifties when almost all of them were dropped.

Senator BELLMON. Then I don't understand why you need to buy six more to test them out if they have been manufacured here and if they were used prior to the fifties.

Dr. WHITE. But we had no environmental problem then. You can't just buy one like you did in the 1950's and run it. EPA would have you down here next week.

They are not really—let me say there is another factor I think important in terms of our attempts to meet the natural gas crisis. That is, to reacquaint people literally with the operability of this type of gas synthesis. In fact, you can take coal and gasify it in a reasonably simple operation and make it work and produce a gas that is cleaned up.

Senator BELLMON. I am aware of that.

Dr. WHITE. That is the rationale really for trying to do this.

LACK OF TECHNOLOGY DEMONSTRATION

Senator BELLMON. I was trying to get to the fact here that after years of spending money and testing these technologies we still don't have a demonstration plant for either liquefaction or gasification.

Dr. WHITE. Yes, sir. But I am trying to indicate that while we don't have anything that is terribly impressive and big, we do have some gasifiers that will be out in another couple of years doing the job in industry of supplying gas.

Senator BELLMON. You are talking about these six plants, but that hasn't anything to do with the research money that we have given ERDA.

Dr. WHITE. We have used some of this to demonstrate that these are working and to prove that they can be operated in an environmentally acceptable way. We have had to modify these.

As I say, we can buy them, but you cannot buy one of those and use it without putting in——

COAL LIQUEFACTION PLANTS

Senator BELLMON. What have we gotten for the money that we have spent in these four liquefaction plants that are operating, one under construction and the four gas plants that are presently operating, to say nothing of these off-the-shelf-type plants?

Dr. WHITE. Let me take first the liquefaction.

Senator BELLMON. OK.

Dr. WHITE. We have had the SRC plant running in Tacoma, Wash., for several years. It has recently——

Senator BELLMON. Why hasn't it gone onto demonstration stages?

Dr. WHITE. There are two reasons. There are SRC I and II, if you are familiar with these processes. You could either produce a solid cleaned-up coal with very little sulfur and very low ash, or it can be modified in such a way to produce a liquid.

The first operation is the so-called SRC I which is sufficiently simple and looks as though it could go right to commercial without much risk. This was one of the initiatives in the President's plan announced last week, to have an SRC solvent refined coal plant with about 6,000 tons a day built for commercial demonstration.

We don't need a demonstration, but that is a small plant, not much bigger than a demo plant, but still commercial.

As for the SRC II, we simply have not run the pilot plant in the SRC liquid type of operation yet. If we do, we may find again

we don't need a demonstration plant. We covered some of this this morning about the cases where we could perhaps skip the demonstration plant step and save that time and money.

PRICES OF OIL AND GAS PRODUCTS FROM COAL

Senator BELLMON. What about the economics of those plants? Are they able to produce coal fuels at prices close to the present domestic oil prices?

Dr. WHITE. No, sir. They will be considerably higher if it is simply a clean coal like the solid material or a clean boiler fuel. If we take 1976 dollars, they will perhaps be in the $20- to $25-a-barrel range.

If you move up to the Synthoil process which will be comparable to shale oil or one of the other liquefaction approaches which uses a catalyst, then I think we are talking about $35 a barrel. Again, it has to be defined whether it is 1985 dollars when they actually will be built, or today's dollars.

Certainly if it is 1985 dollars, it is in that higher range and definitely more expensive than either shale or present petroleum prices.

Senator BELLMON. You are speaking now of the output from a commercial plant, not from one of your pilot plants?

Dr. WHITE. A commercial plant at full scale.

Senator BELLMON. It would still cost $25 a barrel to get oil from such a plant.

Dr. WHITE. To get coal—excuse me—let me see if Mr. Rial will confirm that. I think we had better be sure we are talking about 1976 dollars or inflated dollars.

Mr. RIAL. On liquids? Yes, that is based on 100 percent equity, about 12 percent return.

Senator BELLMON. Those are 1975 dollars?

Mr. RIAL. 1976 dollars.

Senator BELLMON. I can see why one builds these plants. If you have control at $10 a barrel, does the President understand that, I wonder? I hope so.

What about gas? At what cost do you get gas from coal with your pilot plant technology?

Dr. WHITE. It looks as though the gas cost, again for a full-scale plant, would be on the order of at least $3 a million Btu's or perhaps $3.50. It is considerably more expensive.

Senator BELLMON. Back for a moment to the oil question. What price are you using for the feedstock? Are you using current coal prices or 1986 prices?

Dr. WHITE. It is based on present prices.

Senator BELLMON. The same with oil current prices?

Dr. WHITE. Yes.

IMPACT OF COAL PRICES

Senator BELLMON. Have you estimated the coal price and what it might be in 1985? Where would you come out?

Dr. WHITE. You would probably add another, at least, 20 percent to that just for the coal factor. The coal is about half of the cost of the final product, either gas or liquid, as far as that goes.

If you are escalating it for 10 years, then you have essentially doubled the cost on the coal part which will give you at least another 25 percent of the cost of the final product.

Senator BELLMON. Twenty-five percent increase?

Dr. WHITE. At least another 25-percent increase on the final product. I am quoting that off the top of my head.

Senator BELLMON. If you could, for the record give us your best calculations as to what oil from coal using the results of your research so far would likely cost in 1985 from a commercial plant and the same for gas.

Dr. WHITE. We will do so, sir.

Senator BELLMON. Thank you.

[The information follows:]

COST IN 1985 OF OIL AND GAS FROM COAL

ERDA Fossil Energy's R&D on liquefaction and gasification processes is not sufficiently advanced at present to be in commercial operation by 1985. It is likely that gasification processes which prove to be commercially feasible will be in operation between 1985 and 1990. Similarly, liquefaction processes will be in operation between 1990 and 1995. Cost of production estimates for the second generation gasification processes using Western coal range from about $3 to $5 per million Btu (utility financing: 75 percent debt/25 percent equity, 15 percent return on equity (balance), 20 year project life, straight line depreciation, 1976 dollars). Production costs for liquefaction processes range from about $20 to $40 per barrel ($3.30 to $6.70 per million Btu) (private financing: 100 percent equity, 15 percent discounted cash flow return, 20-year project life, straight line depreciation, 1976 dollars).

SECOND-GENERATION TECHNOLOGIES

Senator BELLMON. Would you care to speculate for the record how far we may be away from commercial use of new second-generation synthetic fuel technologies? I realize that you have to do some guessing on economics.

Dr. WHITE. Well, if one were again——

Senator BELLMON. Let's assume for the moment that economics are all right.

Dr. WHITE. I understand. If you want to take the extreme case of the solvent refined coal, we feel that we can start one of those plants with the SRC I almost immediately. We would be in operation in 3 or 4 years, possibly 3½ years.

And a second-generation gas technology, while we are still waiting for pilot plant operation to be fully established, is likely to be at least 2 more years.

I think again I should defer to Mr. Rial as to what the schedule is for the high-Btu gas plants.

Mr. RIAL. Five to six years is a reasonable time period, sir.

Dr. WHITE. For the demo plants or the commercial?

Mr. RIAL. I am talking about the demonstration plants. The commercial plants would not be much different.

Dr. WHITE. But they are following on behind.

Mr. RIAL. They are following on behind.

Dr. WHITE. So you are looking at 10 years before the second generation gasification plants will be in full operation commercially.

Senator BELLMON. Ten years?

Dr. WHITE. Ten years.

Senator BELLMON. But you said you could get a liquefaction plant in operation, if economics would allow you to, in 3 years.

Dr. WHITE. I think so, yes. Because we feel while it has only been a pilot plant, it has demonstrated operability well enough so we could build one of those with a reasonably small risk.

There is always the possibility that if the national situation demanded it, we could build a coal gasification plant without going through a demonstration step. We think the risk would be very high and we feel that it would be unlikely that private funding would be available with that high a risk.

Senator BELLMON. You mentioned the fact that there are commercially available coal gasification plants already. Are the second-generation technology plants going to be noticeably superior?

Dr. WHITE. We hope to see an investment operating cost total, given a reduced cost of 20 to 30 percent below the first-generation plants.

Senator BELLMON. The figure that you gave earlier, the $3 per million Btu gas, was that for one of the second generation technology plants or is that from these off-the-shelf——

Dr. WHITE. That is the estimate for the second generation. Today the first generation will be $3.50 at least.

Senator BELLMON. Those plants are out of reach, also.

How long does it take for the commercial installation, construction and application of one of those plants? Does it take 2 years, 10 years to build one?

Dr. WHITE. To build one, I would think 2½ years once it is designed and ready to start.

Senator BELLMON. What does such a plant that would produce commercial quantities of gas cost per million cubic feet to build? What is the reasonable output from one of those?

Dr. WHITE. A rule of thumb for a full-sized plant has been 250 million standard cubic feet a day. Now, there is talk of building a half-size plant, 125 million standard cubic feet per day, by some of the proposers that have been trying to get permission to build one of these. They are talking total investment costs of $600 or $700 million for the half-size plant, or a billion or more for a full-size plant.

Senator BELLMON. So it costs $1 billion to build a plant that would make 250 million cubic feet of gas from coal a day. How many tons of coal per day does it require to supply this?

Dr. WHITE. 25,000 tons a day.

Senator BELLMON. Those are monumental figures.

Dr. WHITE. This is one of the frightening aspects of this matter of substituting this new procedure, that it does represent a tremendous investment, a tremendous facility physically and a substantial supply, obviously requiring a capital supply for that one plant if it is going to last for 30 years. It is very substantial.

SYNTHETIC FUEL PROSPECTS

Senator BELLMON. I don't want to get you into a controversy, but the President has established the objective of reducing fuel oil imports down to 6 million barrels per day by—I believe the date was 1985.

Is it realistic to expect the coal liquefaction to make any contribution toward that objective?

Dr. WHITE. We would see coal liquefaction just beginning to come in by 1985. The estimate that we have given is in the prepared testimony and it is .1 quad which would be 200,000 barrels a day.

Senator BELLMON. And .15 would come for energy needs from coal?

Dr. WHITE. It is about that. It is probably less than .15.

Senator BELLMON. Last year we quoted from 1964 Federal assessment of coal conversion which estimated that it take a decade to be commercialized. We asked last year if that situation had really changed after 12 years and the answer was "No."

So now in 1977 let me ask the question again. After all this time, are we still a decade away from commercial use of synthetic fuels? I think that you have already given us the answer pretty well.

Dr. WHITE. Yes. I think the only thing I would want to add to that is that it is likely that we will see a decade elapsing for the simple reason that there are other steps that could be taken to supply our liquid fuel needs, and I think it would be more economically attractive to recover shale oil. However, should we deem for other reasons that it is necessary due to national needs to produce coal liquids, we could build a coal liquefaction plant today, within 3 or 4 years and the chances are reasonably good it would work, probably less than optimum design, but we could take a chance and go ahead and do it.

I think that that is something that we are much nearer to being able to do with confidence today than we were 1 year ago.

Senator BELLMON. Dr. White, I don't want to seem to be pressing ERDA to do things that are ill-advised, but I think that you can understand why Congress gets a little impatient. We have an energy crisis. The President has now made it the priority of his administration, which is certainly proper, and we have been giving to ERDA virtually all the funds that have been requested. Ever since I have been on this committee I have never heard an ERDA request that had any merit at all to be refused, and yet you have just told us the same thing that we heard 1 year ago, that we are still 10 years away from harvesting any results in this investment that we have made.

Dr. WHITE. Mr. Chairman, you are talking about coal liquefaction. Now we are a lot closer than that on coal direct combustion and gasification.

Senator BELLMON. The question I had was coal conversion.

Dr. WHITE. I am sorry. Maybe I misunderstood. I was really addressing my answer primarily to liquefaction.

PROGRESS TOWARD LIQUEFACTION COMMERCIALIZATION

Senator BELLMON. To sum up, have you made any progress in liquefaction in the last year toward commercialization?

Dr. WHITE. Yes.

Senator BELLMON. But we are still 10 years away?

Dr. WHITE. Sitting here today and saying whether you are going to have that plant in 9 years or 10 is difficult. Certainly we are 1 year closer to the technical knowledge that will enable us to build one than we were 1 year ago. We have 3,000 tons of solvent refined coal ready for testing commercially this spring in Florida which came out of one of these pilot plants. We didn't have that 1 year ago.

Senator BELLMON. At the invitation of ERDA's predecessor, I went to Princeton and looked at the liquefaction plant that was operating up there. It must now be 6 years ago at least. At that time I was given a sample of the liquids and the residue and also some other products from that plant, and I was told then that they had the technology ready to go. That is more than 5 years ago.

Dr. WHITE. I am not sure which plant you are referring to. Is that COED?

Senator BELLMON. I believe so.

Dr. WHITE. This is one of the purposes for which the demonstration plants are being negotiated now, to demonstrate that. I might say, however, that was a very small plant at Princeton. When they went to a larger facility in England, they encountered quite a few further problems that took awhile to solve. Even today they do not have the complete technical grasp of that process that we have in some of the fully funded ERDA plants.

SYNTHETIC FUELS

Senator BELLMON. Again, in our pursuit of all the varying conversion technologies, have we significantly reduced the cost of a barrel of synthetic fuel?

Mr. FRI. In selecting technologies for ERDA support, the economic outlook for the process is an important criterion. Very little support is being given to methanol of Fischer-Tropsch liquids because it is evident that these are the more expensive routes to synthetic liquids. Among the more promising technologies which we are supporting, cost savings are certain to accrue as better design and operating information is gained. Commercial plants which do not operate up to design standards or which are intentionally overdesigned to compensate for inadequate process knowledge, always increase the cost of the product.

Senator BELLMON. Last year, Dr. White said technologies were ready for demonstration which would reduce the cost of synthetic fuel by 20 to 30 percent, and he put the target date at 1980. Is that still a viable target?

Mr. FRI. The present target dates for completion of these plants are late fiscal year 1981.

1985 SYNTHETIC FUEL GOAL

Senator BELLMON. We also discussed last year Dr. Seamans' statement to the committee in 1975 that 1 million barrels of oil per day in synthetic fuel production was attainable by 1985. Dr. Seamans was not too confident about that goal last year. What are the prospects this year?

Mr. FRI. We have lost another year and naturally one must be less confident, particularly in view of the long leadtime required to bring major plants into production. The uncertainties faced by industry have diminished somewhat by the President's stand on pricing. Specifically, allowing the landed world oil price for shale oil removes one of the uncertainties for this important alternate source of liquid fuel. The environmental, regulatory, and scale-up uncertainties which face prospective oil shale operators remain as constraints and must be

addressed. The high cost of major coal gasification plants relative to the net worth of the companies that must build them, combined with the prospect of regulatory and environmental delays and socioeconomic problems seems to preclude major production by this alternative by 1985. The technical sophistication and economics of converting waste and biomass to synthetic fuels continue to restrain growth of that alternative. None of the President's initiatives in these areas are as yet law, and it will take additional time to assess industry's response to these initiatives. It seems unrealistic to plan on 1 million barrels of oil per day in synthetic fuel production by 1985 under these circumstances, unless the above institutional constraints are resolved.

Senator BELLMON. We seem to have a confusing situation. We have appropriated more than $760 million for coal research in the past 2 years. The fiscal year 1978 budget is approaching $½ billion. And rapidly increasing oil prices are helping make synthetic fuels more competitive. Yet our targets are slipping. Where are we going wrong?

Mr. FRI. Recent growth in the coal research budget reflects the building stage of several major pilot plant projects and the beginning of the demonstration plant phase. These costs have also shared the impact of inflation. The process of competitively selecting contractors, completing the engineering and design phases and finally constructing these plants takes time. The necessary procedure of testing, modification, testing again as required by such major research projects takes time. Nonetheless, the various technologies are progressing and several are being seriously considered for commercial scale development. The completion risk of first time use of new technologies, and other difficulties industry is experiencing as it attempts to obtain financing for large-scale synthetic fuel complexes, and siting constraints are discouraging industry from moving into synthetic fuels production.

While on the surface it appears that increasing oil prices would make synthetic fuels more competitive, the current world oil price is far greater than the cost of producing it. Investors recognize this and realize that the OPEC countries could drop their selling price should competition from synthetics cut into their income. This and other forms of uncertainty will continue to have an effect on the development of a synfuel industry. While the R.D. & D. program can continue to refine processes and increase the chances for technical success, institutional problems will remain key factors. On a purely technical basis the goal of 1 million barrels of oil per day equivalent of synthetic fuels is still possible by 1985, particularly when one considers shale, coal gasification and SRC. For the goal to be reached, however, institutional constraints will have to be mediated.

TECHNOLOGY TRANSFER

Senator BELLMON. One way to measure research and development success is technology transfer. To date, what has ERDA developed that is now in use commercially?

Mr. FRI. There are presently no ERDA/AFE-developed technologies in commercial use. The commercialization of new energy technologies is a long process. ERDA/AFE in its R.D. & D. programs has focused primarily on the resolution of technical risk. Recently attention has

been increasingly given to the problem of commercialization. ERDA/AFE, through its Division of Commercial Applications (CA), is integrating into its R.D. & D. functions criteria to facilitate subsequent technology transfer. CA, through the alternative fuels demonstration program, will use commercial demonstration to assure that as scientific and technical advances are made, economic and institutional barriers to commercialization should also be addressed, so that if technical success is achieved in the R. & D. program, commercialization can take place rapidly.

URGENCY OF FOSSIL ENERGY PROGRAMS

Senator BELLMON. Does your agency feel any sense of urgency about getting on with it?

Dr. WHITE. Yes, sir. Of course we do. That is the reason we have been pushing some of these things which we can do immediately.

Senator BELLMON. The only thing that you have indicated today that is in the prospect of immediate application is a commercial process that was used before 1950. You have given us no indication that ERDA has brought forth any technology that is even close to commercial application.

Dr. WHITE. The other technologies that we have not touched on, although some of these were covered a little bit this morning, were the small units in fluidized bed combustion. Here we are adapting processes in which we have done a good deal of laboratory experimentation and they are not under study anywhere else in the United States for this particular purpose. One of these is the direct combustion of coal without a scrubber. We are also doing coal oil slurries. This is not a very exotic technology; we are simply stirring coal with oil. That is not widely used today, although it was used to some degree in World War I, actually, on shipboard.

Again, it is not a brand new technology by any means, but to begin to demonstrate how to do it, what is good economics and what is good for the environment is something we thought needed proving.

We have got these going in a number of locations around the country. I feel that we have been responsive to the few things we can do really quickly, but you cannot with any amount of money—and I think with any sense of urgency—take one of these second-generation processes and just go out and build it until you have the design data with which to do so.

One reason we have four liquefaction pilot plants and five gasification pilot plants and a lot of other support is that we are just trying to keep this thing on track.

Senator BELLMON. Have we misplaced our emphasis if coal liquefaction and gasification are not economically feasible and if the technology is still 10 years away from the commercial application? Is there another area where we might concentrate these funds and get a more immediate result?

Dr. WHITE. In terms of liquid fuels, I don't think that there is any question that shale is going to be a more important early commercial contributor than coal.

OIL SHALE DEVELOPMENT

Senator BELLMON. Could we concentrate on shale for just a moment and could you give us for the record a summary of your results and your expectations as far as commercial production of oil from shale?

Dr. WHITE. We certainly will. Do you wish that for the record?

Senator BELLMON. I would like you to do it briefly if you would now.

Dr. WHITE. In shale the thrust of our program has been to concentrate on the so-called in situ technology, or working underground. We have done this experimentally working through our Laramie Energy Research Center and through Lawrence Livermore Laboratory. We have just this past year put out a program opportunity notice for jointly funded projects for different approaches to in situ because there are different approaches for different types of shale, in different formations. We are in the process of negotiating or have signed four contracts, one with Occidental, and three other much smaller firms, to try out these jointly funded projects to demonstrate their applicability.

Further, in terms of gasification of shale, we have signed a contract with Dow Chemical Co. in Michigan where there is a type of shale that is amenable to underground gasification producing a low-Btu gas. We feel there has been substantial progress in that area in this last year.

COMMERCIALIZATION OF SHALE

Senator BELLMON. Could you go ahead and talk about the likely date of commercial production from either coal or shale?

Dr. White. In terms of oil production from shale, we would see this becoming commercial very possibly within 3 to 4 years at the earliest. That would include technologies in addition to those that have been developed by ERDA. Of course, we have not done much of anything with above ground retorting because the private sector has worked with a number of retorting schemes where the shale is mined and brought to the surface.

Tosco, Union, Superior, all have retorts that they feel are ready to go. We have looked at each of these. We have heard that they are ready to go with first commercial applications, at least commercial sized modules.

BUDGET PRIORITIES

Senator BELLMON. I can't help but be impressed by the figures in your budget. Let me read them for you in case you don't have them in your mind. According to the 1978 estimate, you have budgeted $107 million for research in coal liquefaction, $51.2 million for high-Btu gasification, $73.9 million for low-Btu gasification. That is a total of about $230 million. For oil shale you have budgeted only $28 million.

You have just told us that oil from coal is going to cost $35 a barrel, and using 1976 dollars there is no way we can get any production for at least 10 years, commercial production. And you have indicated, and I certainly agree with you, that it is conceivable

that we will get commercial production from the oil shale within a relatively short period of time.

Do we have our emphasis misplaced here?

Dr. WHITE. I think those numbers would seem to indicate that. One of the motivating factors that has been in our thinking, right or wrong, has been the very big difference in the private sector's funding and the state of technology resulting from that. With oil shale, you can't really refer to a first- or second-generation shale technology. There isn't a shale retort operating anywhere in the world today with anything like the shales we have. So there isn't anything of the first generation that is available. But in terms of what is ready to go commercially there are enough competing technologies that someone could go ahead and exploit this resource commercially.

That is the reason, of course, that several companies bid on the Government's leases on shale. They were ready to go, except for environmental problems and escalation, which caused suspension of those leases.

My personal guess is the President's proposal to have shale oil produced and sold at world market prices may change that picture if that is approved. There really isn't the need to develop that technology that there is with coal.

Senator BELLMON. Perhaps the technology is there, but are the economics there?

Dr. WHITE. There are many companies who, I think, would say they are there today.

Senator BELLMON. They are there now and can produce oil from shale for $10 or $11 or $12 a barrel?

Dr. WHITE. This is claimed and from what we know about the processes, we have no reason to feel that those are probably not reasonable figures within a dollar or two. Certainly they are very close to competitive. However, there are still some very significant environmental problems.

OIL SHALE PRODUCTION PROSPECTS

Senator BELLMON. Couldn't ERDA put some money into this shale research to help solve the environmental problems? My concern, very frankly, is that we are fiddling around here as if we have forever to solve these energy problems, and we don't have.

It could be tomorrow night that Saudi Arabia decides they would like to keep their oil underground and we are stuck because now, as you know, we rely on them for more than 40 percent of our oil imports. It seems to me we should concentrate on shale, which from your testimony and from other evidence, is the most likely to be available, the most likely of the new energy sources to be available first. Then we might be able to get significant production from shale in time to help us out.

In your judgment, how quickly could we get 1 million barrels of oil from shale under commercial production? One million barrels a day.

Dr. WHITE. I think that to get 1 million barrels a day is going to require not only 20 $1 billion plants, each producing 50,000 barrels a day, but it is also going to require something we have not resolved

yet, that is, how to get the water for the process. The country can probably support 2,000 to 3,000 barrels a day with available water, but there is not water for 1 million or 2 million barrels a day.

Senator BELLMON. My question is that Sohio has at least a pilot plant now where the oil shale is produced underground. It is ignited and burned in situ and the recovery is like 70 percent of the energy that is in place. Has ERDA looked into these kinds of things?

Dr. WHITE. You said Sohio. I believe that is Occidental that you are referring to.

Senator BELLMON. No, that is Sohio.

Dr. WHITE. Let me call on Mr. Guthrie. Are you aware of some Sohio activity there?

Mr. GUTHRIE. No. It is all surface retorting. They do have a proposal for combining in situ and surface retorting, but to my knowledge that is nothing more than a paper proposal at this time.

Dr. WHITE. If they have actual——

Senator BELLMON. Could you identify yourself?

Dr. WHITE. Excuse me. Mr. Hugh Guthrie, the Division Director for Oil, Gas, and Shale Technology.

PACE OF OIL SHALE DEVELOPMENT

Senator BELLMON. To get back to your point, you say it would take a $20-billion investment and a very large quantity of water to bring on 1 million barrels of oil a day from shale.

Dr. WHITE. This is my judgment. Let me see if Mr. Guthrie would care to comment on that.

Mr. GUTHRIE. There have been some significant improvements made in this because a lot of requirements have been reduced—so I think that we can go higher in commercial production before we run into a limitation on water.

But the question of the water availability is a very real one in terms of the Western States environmental considerations. I think that the problem here is that you would want to establish a commercial scale operating plant.

You would have to defer the installation of these series of commercial 50,000-barrels-a-day plants until that was improved on. So you are looking at maybe 5 years to have this proved and then another 5 years to get onstream, but you could accelerate that technology.

The other thing that both Dr. White and I have mentioned on a number of occasions is in the modified in situ approach, which is the Occidental approach. About 20 percent of the shale is mined and if you put in a module for surface retorting of the oil shale at about 10,000 barrels a day, then 4 to 5 years from now, if we have demonstrated the viability of that, we have the option of replicating that module to move to a 50,000-barrel-a-day surface retorting facility or using that module as the surface facility for a 50,000-barrel-a-day in situ process. It is our view that viable in situ technology is being developed now. We are at that point you would be able to make that decision and make that choice.

OPTIONS TO ACCELERATE OIL SHALE PRODUCTION

Senator BELLMON. I am not sure that I got your name, but your statement is that it is going—the way that we are going, it will take 5 years to prove commercial technology and 5 more years to get significant production from the technology, but you have also said you could accelerate the process.

How do we go about accelerating as far as this budget is concerned?

Dr. WHITE. Remove the environmental restrictions.

Senator BELLMON. Excuse me.

Dr. WHITE. Remove the environmental restrictions. Literally, Senator, under the existing environmental restrictions, as you know, you can't build anything on the western slope without violating—I think it is the nondegradation part of the Clean Air Act.

We have two things we have to work up against and they are both tough out there. The air requirements are very difficult. There is another thing that we simply do not have information on yet: that is convincing at least us in ERDA, and I think also EPA, of what happens to the underground water if you have an in situ retort and leave that much shale underground where it can be leached; what happens to the underground flow?

We are just beginning to get data on that sort of thing. We will provide more information for the record.

[The information follows:]

ACTIONS CONGRESS COULD TAKE TO ACCELERATE AVAILABILITY OF RESOURCES FROM ENHANCED OIL AND GAS RECOVERY

There are four major impedances to accleration of enhanced recovery of U.S. oil and gas resources. Although there are differences in the technology and economics between enhanced oil and gas recovery, nevertheless there is considerable commonality in the effects of these. The Congress can do a great deal to lessen the effects of these.

The impedances are:

1. The technology for enhanced oil and gas recovery is emerging and not an exact science.

2. Oil pricing as set by FEA is complex and subject to change. Hence forward planning is difficult. The same applies to gas pricing.

3. Rigidity on environmental regulations is slowing down the application of enhanced oil recovery and, to a lesser degree, gas recovery.

4. A national energy policy that can be expected to remain firm for several years is needed.

The full maturation of enhanced oil and gas recovery technologies will take several years yet. Rapid progress is being made, however, in both the ERDA and private programs. The ERDA Management Plan for Enhanced Oil Recovery proposes to spend $311.7 million for the fiscal years 1978–82. Out of this $57.4 million was proposed for fiscal year 1978. Present funding for fiscal year 1978 is set at $46.2 million. The full acceleration of the ERDA plan depends on full implementation. Without full implementation a shortfall in planned ultimate recovery of about 1.2 billion barrels of oil might be expected.

The Enhanced Gas Recovery Management Plan will be completed by October 1, 1977, and should be fully implemented in a similar manner. The Rocky Mountain area gas development project will be a major budget item starting in fiscal year 1978. Also methane recovery projects encompassing gas from coal seams and geo-pressured aquifers will be initiated.

The proposed enhanced (tertiary) oil pricing regulations presented by FEA in the January 12, 1977, Federal Register are unnecessarily complex and try to operate within the composite oil price. This is impractical since most enhanced oil will cost somewhere between the new oil price of about $11.60 per barrel and world oil price of about $13.50. This new cost would include payment of royalties and an average rate of return on investment. Present enhanced oil pricing policies not only inhibit private

investment, but are also interfering with the response of the oil industry to our cost-sharing fieldttest proposals.

The overall objective of a national enhanced-oil recovery program is to recover from 15 to 60 billion barrels of incremental oil from existing reservoirs.

It appears to us that both State and Federal environmental regulations are too rigid and often restrict tertiary oil recovery. The California air pollution regulations are tighter than Federal, and will make it very difficult to operate steam generators for steam flooding (an enhanced-oil recovery process) in the future. There is a possibility that several billion barrels of recoverable heavy California oil will be left underground or delayed for years in its recovery. Similar situations arise in other states. The enahnced-gas-recovery problems are less severe.

The need for a national energy policy that will remain firm for several years is obvious. It must be recognized that no matter what alternative energy sources may be developed, we shall have to depend mainly on oil and gas for the next one or two decades. National energy policy as dictated by the Congress should recognize the special needs of the oil and gas industry to fulfill its mission.

ENVIRONMENTAL CONSIDERATIONS

Senator BELLMON. I assume that it would be a gross sin for ERDA to get into environmental research areas. Do you spend any money in that area at all?

Dr. WHITE. Yes, sir. A great deal. We have millions of dollars going into environmental tests on all of these coal pilot plants and the shale tests. We are working very closely with EPA to be sure that we get the data necessary and then develop the environmental control technology.

Senator BELLMON. Is your environmental research aimed at finding ways of meeting the standards or do you spend any money finding whether the standards are necessary and proper or whether they are excessive?

Dr. WHITE. In Fossil Energy, basically, our job is to determine whether we meet the standards and if not, to find out what control technology to add. The Assistant Administrator for Environment and Safety, Dr. Liverman, has a substantial program, on health effects of contamenants, et cetera.

Senator BELLMON. I understand that there is a considerable amount of unspent funding still left in the coal portion of the budget. It would seem to be to me entirely appropriate to move some of that money into areas that at least have possibilities of getting this more immediate result, rather than all of this emphasis on coal.

Dr. WHITE. One of these was addressed just before we broke at noon.

Senator BELLMON. Well, let's not go into it again, then. I am sorry that I was not here then.

Dr. WHITE. May I make one more point. One of the situations that we find ourselves facing is that we, in Fossil, say, will authorize a procurement, maybe reach an agreement in principle with a cost-sharing contractor. Then that goes to Procurement and some months are required to finally negotiate that contract in all of its detail and hundreds of pages.

We consider that money committed in that there is no reasonable way that we could take it out and put it in some other program.

Then by the last few months of the year, the actual negotiations may not have been finished. This is one of the difficulties in our present system, our unobligated funds are carried over, and yet in the view of the program people, it is already obligated.

SURFACE RETORTING OF OIL SHALE

Senator BELLMON. Let me get back just for a moment to oil shale. I don't want it to seem that I am arguing with the continuing concentration that the budget shows on in situ oil shale work, but I am curious to know how much is budgeted for surface retorting Have you, in fact, concentrated on in situ work at the expense of retorting?

Dr. WHITE. I am not going to say it is not budgeted. That is not quite true. We have a very small amount, maybe less than $100,000 going into building or enlarging a gasification retort at the Laramie Energy Research Center.

Basically, the knowledge for surface retorting was in hand by what was well known and published by the private sector. So we have not spent a lot of money on surface retorting.

Senator BELLMON. Are there serious environmental problems with surface retorting that ERDA might address that would help the private companies move ahead?

Dr. WHITE. They are well aware of the environmental problems also. We have a certain amount of money on the environmental aspects of how to handle the spent shale, which is a real environmental problem; revegetating, and how much water is required to compact it. We have some money in that. But it is quite modest.

Senator BELLMON. Quite modest?

Dr. WHITE. Yes. Do you know how much money is going into that environmental work on surface retorting?

Mr. GUTHRIE. We probably have about half a million dollars a year going into that.

Senator BELLMON. Out of a budget of $28 million for oil shale, and a total budget exceeding $1 billion.

Is it wise, do you feel then, to assign such a low priority to surface retorting? Don't you feel that surface retorting might have the greatest near-term payoff if it were given proper emphasis and support?

Dr. WHITE. The best estimates that we have made, and I think most private sector parties with which we are familiar agree with us, are that the economics of the modified in situ process will be $5 to $8 a barrel cheaper than aboveground retorting.

I know that there is at least one company, Superior, who disagrees with us. They are approaching it with a multimineral approach which gives some credit to other minerals, dolomite and nahcolite, coming out with the shale. But on the straight mining of the shale and taking out above ground and retorting it, it is not going to be a great competitor for a while.

OIL SHALE COMMERCIALIZATION

Senator BELLMON. Dr. White, your statement mentions that in situ oil shale technology is expected to be a candidate for a commercial demonstration plant in the near future. How firm are you when you make that statement, and how near is this future and how big—how much will the production be?

Dr. WHITE. My own personal guess today—and this is a guess that was made since the President's statement was prepared—is that we are very likely to see a resumption of the plans by the lessees on the Colorado A & B and perhaps the Utah tracts to proceed with commercial approaches before the end of the summer.

As far as our plans for a demonstration unit, we are going to be watching that situation very closely. It may be that we will be before Congress by the end of the summer with plans for a modified in situ demonstration module, but only if there seems to be reason to do it because there is no private sector action. If there is private sector action maybe the events will prove it unnecessary.

Senator BELLMON. So at this point you are sort of in a holding pattern waiting to see what the private sector does?

Dr. WHITE. I think that we are going to be continuing our plans on paper, but in terms of really crossing the bridge to request approval, we will certainly have to take a new look at the time that we are ready to come before Congress and see what has happened in the meanwhile to the private sector.

ALTERNATIVE FUELS DEMONSTRATION PROPOSAL

Senator BELLMON. If you do come to Congress, what is likely to be the size of the appropriation request?

Dr. WHITE. I would like to call on Mr. Myerson who I believe has that number.

Mr. MYERSON. Yes. The fiscal 1978 budget request contains a contingency amount of $107 million for a shale plant.

Dr. WHITE. Out of the $300 million, it is $107 million?

Mr. MYERSON. Yes. That is right. Nominally it has a 50-percent budget impact.

Senator BELLMON. Are you gentlemen aware how slow the congressional appropriations process is?

Dr. WHITE. Yes, indeed.

Senator BELLMON. Particularly when it is not even authorized. If you bring us a request late in December, when do you assume you could get the money and something going?

Do you think that you might get it by the middle of 1978?

Dr. WHITE. No, sir. I was perhaps a little more optimistic. One of the reasons that we put this—we urged the administration—I am happy to say that they went along with it—to keep this $300 million alternative fuels line in the budget, was so that it could be authorized, and basically—the package is coming up with a proviso that it would not be actually spent until we get a project-by-project approval.

Senator BELLMON. But you don't even have authorization at this point, do you?

Dr. WHITE. Not for a plant, no. We have had a great deal of encouragement from the staff of the authorizing committees that even despite the two defeats of the total synthetic fuels bill, if we are talking about one plant, in which we are talking about consensus for that plant only and not an overall program they would be quite receptive to our proceeding. I would hope with that we could get this done within a couple of months.

Senator BELLMON. Starting after you find out whether the private sector is going to move ahead?

Dr. WHITE. Yes. I would fully expect that if we came in today with such a request, in light of the President's very recent message, we would be told that we really didn't have the basis to proceed because we didn't know what was going to happen in the private sector, and I would agree with that. We don't.

I think that by the time we come in we will have a much better fix. We plan to go back to each of the companies we have already talked to in the last 60 days about this proposal for a shale plant and ask what they are going to do now: "Are you going ahead on your own or aren't you?"

STATUS OF ALTERNATIVE FUELS PROPOSAL

Senator BELLMON. How long would that process take?

Dr. WHITE. Mr. Myerson, would you want to speak to that?

Mr. MYERSON. It would only be a few weeks, Senator, for the process to start.

Senator BELLMON. I would like to suggest to you that you accelerate your investigative procedures and try to get us some indication as to which direction you want to go so that we might be able to handle the matter in this budget. I can see no reason to wait until the end of this summer and then come to us when we are going to be embroiled in a controversy with many other matters and probably fail to get the bills and the appropriation through this year. Then we will wind up working on it again next year.

Mr. MYERSON. We have in advance preparation, Senator Bellmon, an appropriation request subject to authorization, which is in the process now of being signed off.

Senator BELLMON. So there is some possibility that this might get to us momentarily?

Mr. MYERSON. Yes, very shortly. But it has to go through the balance of the process.

Senator BELLMON. Have you also submitted a legislative proposal?

Mr. MYERSON. Legislative proposals.

Senator BELLMON. For what authorization?

Mr. MYERSON. The authorization will follow. These are the two pieces of legislation we would like to refer to Congress this summer.

Mr. GREER. Senator Bellmon, the timing of this is such that by the time the projects are defined in scope and data sheets are worked up to support the proposals that we would make adequate to satisfy the various members of all of the committees that are involved with this, it is going to be a matter of weeks before that data will be ready. Then it will be reviewed within the Administration before a legislative proposal would come up.

My best judgment is that we are talking about the June or July timeframe at the earliest before that can possibly get to this committee.

Senator BELLMON. Is it a matter of top priority to get it up here?

Mr. GREER. I think there is some question as to whether it will be needed. There is a serious question that if, in fact, shale is allowed to sell at the world price, there is a considerable feeling in the Administration that industry will move out on its own.

In that case, then, this specific legislation would not be necessary.

OIL SHALE ACCOMPLISHMENTS

Senator BELLMON. It seems to me that we are spending a lot of time spinning our wheels.

83-107 O - 77 - pt. 6 - 27

Let me ask you, Dr. White, before we leave oil shale, if you could just briefly as you can, and now for the record, sum up what you think to be your specific accomplishments to date in the oil shale area and also your goals for the future in this program.

Dr. WHITE. With respect to the specific accomplishments, we have had tests of true in situ work in-house, which was the first time we ever succeeded in doing this, bringing up shale oil from underground with no mining at all, but just drilling wells, fracturing and retorting.

We have, I think, most significantly established potential contracts which, as I said, are under negotiation. Two or three of them will be ready to sign soon for further joint share tests for shale.

One that I haven't mentioned at all is small-scale work on shale refining. As you know, shale oil when it comes up is very high in nitrogen. We have a contract with one of the oil companies to do small-scale work funded by ERDA where the expertise of that company in catalytic refining technology is applied to shale and it produces a very effective catalyst to produce a refined shale oil with essentially no nitrogen. It is all cleaned up and the catalyst will last for thousands of hours. So that side of it technically is new this last year.

We have been observing the Paraho operation. We have plans developed for a further large-scale refining of shale oil when we do have it available. We have a request for proposals out for a 500-barrel-a-day refining facility adaptable to both coal and shale liquids, and which will be awarded before the end of the fiscal year.

These, I think, are about the main highlights. Can you think of anything that I missed?

Mr. GUTHRIE. I think that it is important to mention that the characterization of oil shale is one of the primary problems we have been working on. We have worked with USGS to try to identify oil shale characteristics.

As Dr. White mentioned earlier, there are additional types of oil shale, and different processes that are around today. Also, in-house we have been continuing the fracturing studies, data from which are available to industry at large on how to best fracture oil shale.

The other thing that we are doing, as Dr. White mentioned also, is the Dow Antrim shale project, which has been signed. This is a 4-year, $14 million contract of ERDA funds with Dow to produce gas by in situ gasification of oil shale.

I think that that is about it.

Dr. WHITE. We have as our target the production through ERDA and stimulated private industry work some 300,000 barrels a day of shale oil production by 1985. We would like to have that in the record as our target for our production.

ENHANCED OIL RECOVERY

Senator BELLMON. We have been talking about coal and about oil shale. Now, we will have some more questions about that later. But let me, for the moment, shift over to oil and gas, where I understand ERDA is asking for a sizable increase in the appropriation.

Can you tell us, Dr. White, where your oil and gas program stands in terms of its accomplishments?

Dr. WHITE. Let me take the oil program first, if I may. This last year we have completed what we refer to as our enhanced oil recovery management plan where we spent quite a bit of time and a fair amount of money working with a number of consultants within industry very closely to try to establish what reservoirs were available to enhance oil recovery, and which techniques to use, whether it should be a polymer technique, the technique with carbon dioxide or a thermal process, recognizing that different reservoirs are amenable to different techniques.

We have had right along a number of contracts in effect for field tests of these various techniques. A number of these were added this last year and I am gratified to say in this instance we now have, and some of this is within the last 60 days, some actual enhanced oil recovery showing up from some of these ERDA tests in both micellar polymer and improved waterflood tests in various parts of the country.

So we are encouraged that the work we are doing is really helping to encourage and publicize this work where it will be picked up not only by the majors who are familiar with it from their own work, but by many other small producers.

The increase in funding for enhanced oil recovery is based on the findings and projections of the management plan which establishes, we feel, quite a high degree of confidence in the amount of production that could be expected from a particular increase in research.

We are trying to concentrate on those fields and those types which would be most productive of oil recovery by 1985 and yield the highest ultimate recovery from the reservoirs.

ENHANCED GAS RECOVERY

In the case of gas we have most of our work focused on increasing the gas production from four types of gas reservoirs which are not conventional suppliers of gas today. These are Devonian Shale in the East where we have a major program, the so-called eastern gas shale program.

Here the gas is fairly close to the surface. It is in somewhat fractured shales, and can be produced in a small way just by drilling, but those wells are just marginally productive, certainly not enough to be of commercial interest from typical pipeline standards.

By fracturing these with hydraulic or chemical or foam fracturing, that sort of thing, we have been successful in enhancing the gas recovery. We have a fairly major program of quite a few million dollars in developing our knowledge of how widespread that resource base is and where in that resource base these techniques can be applied.

The second of those resources is the so-called tight sands of the western slope in Colorado and Utah and Wyoming, for example, where the stone is much tighter. So far, none of the techniques, including three nuclear explosive tests, has been effective in producing sustained, enhanced gas recovery.

We are somewhat encouraged there that the massive hydraulic fracturing at least in one case, has begun to show some promise. I think I am right—Mr. Guthrie, isn't that the one where we raised the gas to 1 million cubic feet a day?

Mr. GUTHRIE. Yes. That was our first success in gas-bearing sandstones.

Dr. WHITE. One blossom doesn't make a springtime, but at least that is the first encouragement we have had in that area.

Third, and here we are getting into cooperation with the conservation program, is methane from coal gas seams. We are also working with the Bureau of Mines here as a safety measure because there is a lot of gas in the coal seams of the East that can be recovered by relatively simple techniques.

Finally, and most importantly from the national standpoint, is the geopressured zone of the gulf coast where the geopressured aquifers represent a tremendous resource of geothermal energy, but the water down there in depths of 10,000 to 20,000 feet is associated with methane. The figures the USGS has published are literally astronomical in their implications of the potential if we can find out how to tap it.

We do have research in progress in the Division of Geothermal Energy in ERDA. It has its first flowing well currently producing and re-injecting the water after the thermal energy has been utilized to see how it works.

NEAR-TERM POTENTIAL OF SECONDARY AND TERTIARY RECOVERY

Senator BELLMON. Dr. White, I apologize, but we are voting and I have only a few minutes to get there. I may not be able to come back, but in case I am not, would you, for the record, respond to this question.

I have asked about the possibility of additional production of oil or gas from coal and we got a figure perhaps in 10 years. We talked about the production of oil from shale or gas from shale. Again, it sounds like 10 years before any substantial production can be made available commercially.

Is there a possibility that Congress, through this budget or any other means available to us, could take action that might give us significant production of oil or gas from tertiary or secondary recovery or any other recovery method at an earlier time? And if there is a possibility, could you give us some schedule as to how quickly this production might come on?

I don't want to miss your answer, but if you don't mind, I would like to have it in the record.

Dr. WHITE. All right. In this case, if I may, I would take enhanced gas recovery first.

Senator BELLMON. I can't wait because I will miss the vote, but I am told that Senator Byrd, who was to continue these hearings, will not be able to do so. We have a series of his questions and some from Senator Stennis. We would like to submit them for the record and ask for your responses for the record and I would like you to respond to the question that I have just asked for the record.

Well, I should be back in 10 minutes or less.

[Brief recess.]

ACCELERATING SECONDARY RECOVERY PRODUCTION

Senator BELLMON. We will resume the hearing. Dr. White, perhaps you would want to respond to the question I asked earlier about secondary and tertiary and how they might offer some hope for increased production for the near term.

Dr. WHITE. Very definitely. As I am sure you know, Senator, there is already some recovery taking place commercially from carbon dioxide injection in one or two places and thermal in California with some of the heavy oils out there being produced with steam. I don't know what the total figure is.

Our estimate of the impact here would be something on the order of 800,000 barrels a day additional production of oil by 1985 and some 3 billion cubic feet of gas a day by 1985 from enhanced gas recovery.

There is a total use today of about 20 million barrels per day, so it will be up about 5 percent in 1985, but some is already commercial and certainly there is a very substantial potential for the year 2000.

Senator BELLMON. Does ERDA have an estimate at this point of how much additional oil can be recovered from the oilfields that are now pretty well depleted?

Dr. WHITE. The estimates of this run from 20 to a 100 billion barrels, I believe. The conservative general rule of thumb figure is on the order of 40 or 50 billion which is more likely a median figure.

Senator BELLMON. When you mentioned 800 million barrels per day——

Dr. WHITE. 800,000 barrels.

Senator BELLMON [continuing]. By 1985, what economic assumptions do you base that estimate upon?

Dr. WHITE. The cost of oil from enhanced recovery is going to be obviously more expensive. It is, again, one of these cases where the President's energy message provides for the oil produced by tertiary recovery being exempt from any control, being produced at whatever it will bring on the market.

Let me say again, that such a price could make this attractive today, but I would ask Mr. Guthrie if he has anything to say about this.

Mr. GUTHRIE. Those 800,000 barrels a day are actually based on industry implementation of the R. & D. technology as it is developed and it is based on upper tier crude oil price of $11.62 a barrel.

If, in fact, the oil is sold at the landed world crude oil price, that would accelerate to some extent the implementation of the technology. We really have basically three different kinds of technology here. The technology of chemical flooding and the technology of miscible flooding with carbon dioxide being the material used for that, and then various thermal methods.

Each of these is in a different problem area. For the thermal method, the technology is both being developed and, in many instances, is a developed technology where the environmental constraints are the primary part of the problem.

The design of the ERDA program is to work closely enough with industry that we know what the constraints are to the implementation of the technology, and try to direct the ERDA funds in a way that concentrates on industry constraints. When we give this estimate of 800,000 barrels a day, that is based on the upper tier crude oil price and being able to hit those constraints that are, in fact, blocking these several approaches.

IMPACT OF OIL PRICES

Senator BELLMON. Would it be possible, Dr. White, for you or for the people in ERDA to give us a chart showing the relationship between the price and production from secondary or tertiary means?

Dr. WHITE. Yes.

Senator BELLMON. Let's use a range of, say, from $10 up to the $25 figure you mentioned earlier for coal liquefaction.

Dr. WHITE. We could certainly provide that for the record.

Senator BELLMON. Also a timeframe.

Dr. WHITE. Yes, sir.

[The information follows:]

RELATIONSHIP BETWEEN PRODUCTION AND PRICE FOR REGULAR OIL AND THAT FROM SECONDARY/TERTIARY RECOVERY

Below are time frame projections for U.S. domestic oil supply under six scenarios, prepared with the help of one of our professional forecasters based on price range of $10–$25 per barrel. The six scenarios are:

1. Existing price controls with no ERDA program and no additional price incentives.
2. Removal of price controls from EOR production with no additional advances in EOR technology and under current constraints.
3. Removal of price controls EOR production with accelerated EOR technology and constraint removal.
4. Case 3 at $15.00 per barrel.
5. Case 3 at $20.00 per barrel.
6. Case 3 at $25.00 per barrel.

The sources for the data are as follows:

1. Proved and Indicated Reserves—API data as of 1976 and as declined by Lewin and Associates, Inc., within ERDA Report 77–20/1.
2. Stripper production—from NPC study of enhanced oil recovery based on an unpublished BOM study.
3. Other extensions from Inferred Reserves—K. Hubbard data as of 1976 and as analyzed by Lewin and Associates, Inc., for FEA.
4. Enhanced Oil Recovery—as prepared by Lewin and Associates, Inc., from ERDA Report 77–20/1.

NOTE.—These data do not include undiscovered reserves.

Projected domestic oil supply from discovered reservoirs

	Controlled price	Base case (proposed prices)	Proposed prices w/EOR technology	$15	$20	+25
1976:						
Proved plus indicated reserves	7.1	7.1	7.1	7.1	7.1	7.1
Enhanced oil recovery (including steam soak)	0.4	0.4	0.4	0.4	0.4	0.4
Total	7.5	7.5	7.5	7.5	7.5	7.5
1980:						
Proved plus indicated reserves	6.7	6.7	6.7	6.7	6.7	6.7
Other extensions	0.2	0.7	0.7	0.7	0.7	0.7
Enhanced oil recovery	0.2	0.3	0.8	0.9	0.9	1.0
Total	6.9	7.7	8.2	8.3	8.3	8.4
1985:						
Proved plus indicated reserves	4.4	4.4	4.4	4.4	4.4	4.4
Increased stripper				0.1	0.1	0.1
Other extensions		0.7	0.7	0.8	1.0	1.2
Enhanced oil recovery	0.3	0.6	2.1	2.2	2.4	2.6
Total	4.4	5.7	7.2	7.5	7.9	8.3
1990:						
Proved indicated reserves	2.6	2.6	2.6	2.6	2.6	2.6
Increased stripper				0.1	0.2	0.3
Other extensions		0.7	0.7	1.0	1.3	1.5
Enhanced oil recovery	0.2	0.6	3.2	3.5	4.0	4.3
Total	2.9	3.9	6.5	7.2	8.1	8.7
1995:						
Proved plus indicated reserves	1.3	1.3	1.3	1.3	1.3	1.3
Increased stripper				0.1	0.2	0.3
Other extensions		0.7	0.7	1.0	1.2	1.4
Enhanced oil recovery	0.1	0.6	3.7	4.0	4.5	4.8
Total	1.4	2.6	5.7	6.4	7.2	7.8

ENVIRONMENTAL CONSTRAINTS

Senator BELLMON. You just mentioned different kinds of constraints. Are there environmental constraints that are holding back secondary or tertiary recovery?

Dr. WHITE. These are quite different. In one type of tertiary recovery, the procedure is to use steam. In California, there have been problems with air pollution from the boilers which generate the steam. There are small boilers used out in the field, and sometimes they are not as well equipped as a utility boiler, might be. We have just received, in the last few days, an inquiry from a company which has developed a coal-fired boiler with good environmental characteristics that they feel may be useful in overcoming this problem. Steam generation has been a constraint that has shut down some of those operations.

In the case of the micellar polymer approach, a principal concern is the possible contamination of underground aquifers. All of the field tests are carefully monitored with wells around the area of primitive fields. We want to see what is happening to the underground

water to determine if there is any possible problem. This by its nature may need to be looked at for every new field, depending on the nature of the strata and where the aquifer is in relation to the field itself.

ERDA EXPERIENCE IN ENHANCED RECOVERY

Senator BELLMON. Dr. White, you mentioned that we might be able to expect 800,000 barrels a day of new production by 1985. Can you at this time point to any specific oil or gas production increases since ERDA began running this program?

Dr. WHITE. We have fields which are definitely showing an increase in production. They were on a decline curve before, and the tests have been underway now for some years, and they're now beginning to show an increased production in at least two significant fields that are part of the ERDA programs.

Some of the programs have not gone on long enough. However, in terms of industry work that is the direct result of ERDA programs, I don't think there is any that we could point to with real confidence and say, that commercial enhanced recovery of oil has been brought about by the work with ERDA.

I'll ask Mr. Guthrie, do you have anything further to add?

Mr. GUTHRIE. As you know, Senator Bellmon, we are working with industry. One of the best things we can do is keep a low profile and not try to take all of the credit.

That is appropriate. Industry has to implement these technologies. The one thing that I can say is that the work that ERDA has been doing has complemented the work of industry. In the last year, for example, we have seen tertiary oil production increase by about 100,000 barrels a day across the industry. That is our best estimate.

We wouldn't say that that production increase is a result of ERDA's efforts, but we would say that we have been working with industry and our efforts have been consistent with moving towards steadily increasing enhanced oil production, stimulated by Government participation.

Senator BELLMON. I admire your modesty, but as a matter of survival in this business, if you're getting some results I think we ought to know about it because we might not want to—we might want to shift our emphasis and see if we can get additional results in a short range because we need to emphasize programs that can help us immediately, rather than putting all of our emphasis on programs that hold some hope in future decades.

Dr. WHITE. I can assure you, Senator Bellmon, that when we have results from our field tests, that we can, with confidence say it came out of our program, we will tell the world about it.

Senator BELLMON. You mentioned two earlier.

SPECIFIC FIELD ACHIEVEMENTS

Dr. WHITE. Two specific tests. One is Phillips Petroleum in the Burbank field.

Mr. GUTHRIE. The other is a small company, Kewanee Oil Co.

As a matter of fact, as you know, both of these had decline curves in a typical field that is steadily downward. So, when you reverse

that curve, and you know from enough data that the correction is there, the effect is clear.

In the Burbank field the production is roughly doubled. The production was less than 100 barrels a day as projected in the decline curve. They now project that when the full production from that field is achieved, this is just a test well in a field, if expanded the total field would be reasonably significant. They now expect this to peak at about 800 barrels per day.

Dr. WHITE. That is in the field.

Senator BELLMON. Can you talk a moment about the costs in the Burbank operation? What does the oil cost to recover by your tertiary processes?

Mr. GUTHRIE. We do not have the exact figure on the cost of this, but in general this will range from $4 to $10 a barrel for the cost of that chemical flood, which is a direct addition to the cost of production. That is the primary cost of this recovery.

Senator Bellmon. In the Burbank field, isn't that likely to cost $15 to $17 a barrel, and doesn't that seem to be the ball park at the present time?

Dr. WHITE. That would not surprise me. Chemical flooding is one of the most expensive methods.

Senator BELLMON. If the process succeeds, and the demand for the chemical picks up, so that it can be manufactured in large quantities, this perhaps might cause the chemical costs to go down.

Dr. WHITE. It would certainly be expected to.

Senator BELLMON. Do we have a "chicken-and-egg" situation here?

Dr. WHITE. No, there has been a good deal of understanding in the chemical industry that this is a market of great potential. There has been at least one company that has already responded with a new plan to mass-produce.

Senator BELLMON. Has the cost of the chemical come down?

Dr. WHITE. I don't believe it has yet. Do you know?

Mr. GUTHRIE. No I think the basic problem is these are sulfonates and so far sulfonation has been from the conventional feedstock areas. Now, the marathon process is using sulfonation of a crude oil feedstock. I was just listening to one of their presentations Tuesday of this week. They did not disclose the cost of sulfonate, by their process, even though they were asked directly. So we don't have that proprietary information.

But my guess is that by sulfonating a crude oil feedstock directly, you produce a lower cost sulfonate.

Senator BELLMON. If it is accurate to say that the oil from the tertiary recovery project in Burbank is going to cost $15 to $17 a barrel, then it is not going to be possible to move that project beyond the demonstration stage until oil prices rise, is that true?

Dr. WHITE. That is true.

Senator BELLMON. Is this true generally for your efforts in tertiary recovery?

Dr. WHITE. No, we would see many of them coming in well below that. I think it should be explained, however, that in a commercial operation with a tertiary flood, you really don't have your true costs until your flood has run its course because you are injecting this material and in some cases it will go on for many years.

As you do succeed you have many years of enhanced recovery from a particular field, and some of the installations are paid off in a much larger volume of oil and the unit costs will go down.

It is going to take a greater experience before we really know the cost.

OIL AND NATURAL GAS

Senator BELLMON. As you know, the GAO was not favorably impressed with the oil and gas program and didn't think your program would bring about any increase in production by 1985. What is your comment?

Mr. FRI. A detailed management plan for EOR was completed and approved by OMB in February 1977, and is being followed. Successful implementation should assure attainment of the stated goals. A similar management plan for EGR is in progress and will define the Federal role, prioritize R. & D. projects and document probable production increases related to specific projects. Production increases have already been accomplished with ERDA projects.

Even if some of ERDA's projects turned out to be partially unsuccessful from a production increase standpoint, we will still have accomplished one objective of evaluating the techniques and methods, for successful enhanced oil and gas recovery.

Senator BELLMON. With the big buildup you are budgeting for oil and gas, what are your specific targets?

Mr. FRI. The selection of targets was based on a careful assessment of the current state of EOR technology; by process, reservoir and fluid characteristics, likely near-term advances, and the major impediments that must be overcome. Those offering the highest potential were selected as specific targets and they are spelled out in the management plan for enhanced oil recovery. There are 18 research projects with specific production and technology goals, all prioritized. As an example, the first two projects are as follows: One is to develop and improve the carbon dioxide miscible process in carbonate reservoirs having a high residual oil saturation, and the other project will investigate ways to overcome emission problems in the application of steam drive to shallow, heavy oil reservoirs. Specific targets for the EGR program are the Devonian Shales in the Appalachian area, Western Tight Gas Sands in the Rocky Mountain area, coal seams throughout the United States which are principally in Appalachian and Rocky Mountain areas, and geopressured aquifers in the gulf coast area. An EGR management plan presently is being developed to provide analysis of most cost-effective projects for Government sponsorship.

DEVONIAN SHALE

Senator BELLMON. The pending budget amendment will add still another 5 million to the gas recovery program for Devonian Shale. Why are you concentrating on that area?

Mr. FRI. In addressing the problem of what R.D. & D. efforts will result in improving the natural gas supply picture in the near term, the analysis to date indicates the Devonian Shale potential for the following reasons.

The resource base of natural gas in the shale is estimated in the thousands of trillion cubic feet—TCF. Present estimations on the size of producible reserves and potentially producible reserves range from 25 TCF to 285 TCF. The sooner that state-of-the-art stimulation technology is demonstrated, the sooner full-scale commercialization operations will begin. These shale figures compare with Appalachian Basin sandstone resource estimates of 25 TCF and reserve estimates of 3 TCF.

The shale is a very widespread natural gas resource and can be developed without a large capital outlay for exploration. Many industries can develop their own gas supply on their own property if technology is adequately demonstrated.

In an area of more than 50,000 square miles, in the Appalachian Basin, the shale is less than 3,500 feet deep. Therefore, it is not very expensive to drill and complete a natural gas well.

The major obstruction to development of these vast reserves is an improvement in the rate of production of gas from the shale. It presently takes many more years to produce the same volume of gas from the shale as it does from sandstone reservoirs in the area. The accelerated program, an additional $5 million requested, will attempt to demonstrate that advanced hydraulic fracturing will allow more rapid production of gas from the shales.

More than 10,000 wells penetrate the Devonian Shale and produce from deeper horizons. Many of these have good potential for recompletion in the shale. This could result in early additions of Devonian Shale gas to the supply and reserve picture without having to drill additional wells.

Senator BELLMON. What are your expectations for the Devonian Shale?

Mr. FRI. Experience with induced hydraulic fracturing in the shale has demonstrated that commericalization is attractive if an operator can recover his investment in 4 years at a gas price of $1.42. This criteria will normally be met when a well achieves an initial open flow of 350 MCFD. This, however, is only experienced about 20 percent of the time whenever conventional size, 1,000-barrel, hydraulic fractures are employed.

A current assessment by ERDA's Morgantown Energy Research Center of stimulation technology and resource characterization of the Denovian Shale in West Virginia suggests that fracturing with 42,000 gallons of water could affect a recovery response exceeding the initial open flow of 350 MCFD. When this result is achieved, projected recoverable reserves are approximately 600 MMCF. This accomplishment is three times greater than the usual experience. While but a small portion of the total project, it is this type of analysis that could spur development leading to commercialization by the larger industrial concerns.

The selection of demonstration well locations will be made after a select number of screening wells are drilled, completed and evaluated. This data should provide the best information for identification of the most attractive areas for drilling from the geological and drilling and completion points of view. It is projected that this could result in the drilling of 14,000 commercial wells between now and 1985, with the addition of 7 TCF to natural gas reserves. This can be

accomplished by the evolving R.D. & D. technology. It is further projected that R. & D. efforts will lead to development of new technology which could result in the ultimate recovery of more than 200 TCF of gas.

The extension of this technology to existing wells that now produce from the sandstone reservoirs in the Appalachian area offers another source of increased gas productivity when successful attempts are made to produce from the Devonian Shale. Major sands such as the Clinton in Ohio, the Berea in Virginia, the Benson in West Virginia, and the Oriskany in West Virginia contain nearly 25 TCF of gas as a resource. If these sandstones were coupled with the shale—duel completions—then production from both zones simultaneously could be significant enough to offer an even quicker payout time and make it even more attractive to exploit the Devonian Shales.

The project will also address consumers who are showing growing interest in instituting a self-help program to enable themselves a direct supply of natural gas. The EGSP will explore the self-help spirit as an alternatie approach to stimulating commercial production of natural gas from the Devonian shales. This could include direct gas supplies to Federal facilities, small industrial users, small commercial sectors, and school systems. This part of the effort would demonstrate the feasibility of shale gas as a self-help supply. Along with the larger commercialization demonstrations, this phase of the project will also yield important economic data under actual production conditions.

ECONOMIC STIMULATION

Senator BELLMON. What about economic stimulation for oil and gas? Present law authorizes incentives for tertiary oil recovery and President Carter is proposing natural gas price hikes. Will these moves reduce the need for Federal research and development?

Mr. FRI. ERDA's Fossil Energy Division of Oil, Gas, and Shale Technology has recently completed a detailed management plan which defines a prudent Federal R.D. & D. role assuming a pricing scenario consistent with incentives in the President's national energy plan. A positive meaningful economic stimulus for developing and using new technology for oil and gas production is essential if ERDA's petroleum and natural gas program goals are to be realized. Supporting analysis shows that combining a coordinated ERDA/industry oil and gas R.D. & D. program is more cost-effective than using the price mechanism alone.

It is important to realize that ERDA's petroleum and natural gas program is not in lieu of industry R. & D. but is generally restricted to those activities for which there is little or no proprietary incentive. Thus, although ERDA's percent cost participation in certain more risky field tests may be reduced, the job of data analysis and technology discrimination will increase with accelerated industry activity. In the case of enhanced gas recovery tests ERDA's tendency toward a state of higher technology field tests could offset the reduced cost participation due to gas pricing incentives.

The new techniques being developed are not simple extensions of waterflooding or other stimulation programs commonly practiced today. Only the largest oil and gas producers have the required

technology capability to develop or even apply the new complex processes. Moreover, constraint removal projects which are an important part of ERDA's fiscal year 1978 request tend to be independent of oil prices.

In the fiscal year 1978 budget the Administration has and will continue to adjust the Federal program and required budget to anticipate industry activities.

FOSSIL ENERGY FORECAST FOR 1985

Senator BELLMON. Dr. White, we have been at this for an hour or more, and I came in here hoping you were going to show that something that ERDA has done gives hope that we can have substantially larger quantities of oil and gas from our fossil fuel resources in the country, in a relatively short time.

So far you haven't given me any hope. You say, 800,000 barrels of oil of enhanced recovery by 1985, and that is virtually all.

Is there anything that you can be optimistic about?

Dr. WHITE. I am sorry, I don't share your lack of optimism with what we are doing.

Senator BELLMON. Don't say that. If you have anything to make me feel optimistic say it. You haven't said it so far.

Dr. WHITE. Senator, I did explain we had a number of small projects that are going to be operational, actually producing coal in a couple of years.

Senator BELLMON. I am talking about commercial production of oil or gas by 1985, how much to expect of coal gasification, liquefaction, or from the oil shales or from tertiary, secondary recovery processes.

Dr. WHITE. As I indicated we expect 800,000 barrels a day by 1985. We don't expect much more than that in gas. I would expect to see commercial production of enhanced gas within the next 2 years, that is, enhanced gas recovery sponsored by ERDA.

Senator BELLMON. Don't talk about 2 years, talk about 1985. How much additional oil from coal by 1985?

Dr. WHITE. From coal?

Senator BELLMON. Yes. You told us practically none.

Dr. WHITE. I would not expect—we guess that coal will be about the equivalent of 200,000 barrels a day.

Senator BELLMON. That is optimistic to you. How much oil from shale by 1985?

Dr. WHITE. We are estimating between 200,000 and 300,000 barrels a day from shale.

Senator BELLMON. So that is 500,000.

Dr. WHITE. And 800,000 in enhanced recovery.

Senator BELLMON. That is the optimistic view for 1985.

Dr. WHITE. I think in terms of liquids, that is likely all that we are going to see from these particular activities as they are now projected.

Now, if we went into a national crash program and changed the rules of the game, I think these numbers would change.

ACHIEVING GREATER SYNFUEL PRODUCTION

Senator BELLMON. What do we need to do to change the rules of the game, to get a higher rate of production?

Dr. WHITE. As I mentioned for shale, that is a matter, I think, both of the environmental and water supply. In terms of coal, it is a matter of 100 percent Government funding of high risk plants because it is unlikely that private capital would be forthcoming.

And again, environmental restrictions would have to be set aside to build coal plants quickly.

In terms of enhanced oil recovery I think, again, it would take a subsidy, probably, to bring production up.

Again, we would have to proceed without fully researching the possible contamination of underground aquifers.

So I think the most important thing to move things ahead,sir, is to bring to the public arena and congressional arena a better feeling about tradeoffs between energy and the environment.

Senator BELLMON. As far as you are concerned, there is nothing we can do with this budget that would move us ahead faster?

Dr. WHITE. In terms of material produced in 1985, I don't think there is a great deal that can be done there.

Senator BELLMON. Do you have a comment?

Mr. GUTHRIE. Yes. It is true when you add up the barrels per day they represent a disappointing number to you and to us. There is a very good little book called Strategy in Poker, Business and War. It was written in the middle fifties by J. D. MacDonald. In this book, he makes a statement that while the knowledge of probabilities does not make a good poker player, a disregard of them will make a very poor one.

I think we are in a very big poker game. I think if we can establish a knowledge base which with confidence tells us in the early stage that on the schedule we choose to implement, we do have choices of alternate fuels, and it does represent the competitive level.

But if we can make shale oil, the fact that we are making only 150,000 barrels a day, has a far greater impact in that poker game we are playing with the Arabs.

DEMAND GROWTH AND IMPORT PROJECTIONS

Senator BELLMON. Let's talk for a moment about the poker game with the Arabs. The President is well aware of the stakes in this game. He has established the national objective of getting our imports from crude oil from abroad down to 6 million barrels a day by 1985. Our present consumption is slightly less than 20 million barrels a day.

His objective is 2 percent growth per year, that is 400,000 barrels a year increase. That is after all the conservation measures and everything else are put in place, and you still expect the demand to grow about 2 percent a year.

So this means that between now and 1985 our demand is going to go between 5 and 6 million barrels a day. So that our total consumption at that point will be somewhere around 25 million barrels.

You have indicated that from all of these efforts you are making you might expect the increase in production of 1.2 million barrels,

and you are now producing around 9 million barrels a day from our existing oil wells. And things are expected at best to hold steady, perhaps pick up a maximum million barrels a day.

So that would give us roughly 11 million barrels a day from our domestic resources to meet the need of 25 million barrels a day. The balance would be 14 million barrels a day, which would have to be imported.

Dr. WHITE. There is one very significant step, sir, which I think you must consider in terms of liquid demand. There is a very substantial amount of coal substituted for oil and gas in the President's program, using scrubbers if necessary.

Senator BELLMON. I think the figure I used of 2 percent growth includes those transfers.

Dr. WHITE. The 2-percent growth in energy demands, I believe, is the President's program.

Senator BELLMON. But he was referring to demand in crude oil, not total energy demand.

Dr. WHITE. You can't have a growth in demand for crude oil to get down to 6 million barrels a day by 1985. One of the major ways you do it is growth in nuclear and growth in use of coal.

RELIANCE ON COAL

Senator BELLMON. You know and I know that all the nuclear plants we're going to have in 1985 are already in the planning stage, and there are only three for this whole year. They won't make a drop in the bucket as far as total energy plans are concerned.

So all we have to rely on is coal. As I understood the President's message, he is talking about taking the growth in coal production into account when he calculates this 2-percent increase.

All I am trying to find out is if his objective is realistic, and if it is what can we in the Congress do to help reach it through the appropriations process.

Dr. WHITE. The growth in coal was——

Senator BELLMON. 400 million tons a year.

Dr. WHITE. It will not supplant oil entirely, but a fair amount will.

Senator BELLMON. There will be a growth in demand of coal, the same as there is for other energy forms.

Dr. MANNELLA. Senator, if I might interject at this point, the 2 percent is the total amount of all forms of energy and what has happened within that total demand, as Dr. White has indicated, is a shift from the liquid fuels to coal primarily.

Senator BELLMON. Then if my understanding of the President is wrong, what is your understanding of his expectations for crude oil demand by 1985?

Dr. MANNELLA. I am aware of the same information you are, that he has set up a target which is below what we are currently importing.

Mr. GREER. These specific figures, I think, he used, were to reduce imports from 16 million barrels a day to 6 million barrels a day.

Senator BELLMON. We are not importing 16 million barrels a day.

Mr. GREER. By 1985, if unchanged, his projection was that there would be 16 million barrels of oil per day imported, and his objective was to reduce that to 6 million.

PROJECTED OIL CONSUMPTION BY 1985

Senator BELLMON. I agree with your latter statement that the objective is to reach 6 million barrels a day of imports by 1985. How much is he anticipating we will be consuming in 1985?

Mr. GREER. Of liquid?

Senator BELLMON. Of crude oil.

Mr. GREER. I don't have the specific figure, what he had hoped to save was an overall savings of 10 million barrels a day of imported oil.

Senator BELLMON. That is all very good. I want to know how much we are going to have to be producing in 1985.

Mr. GREER. Senator Bellmon, I will have to get you a figure. My recollection is that it was 23 million barrels that he was talking about.

Senator BELLMON. Of production from our domestic field?

Mr. GREER. No, no, sir, the total consumption if unchanged.

Senator BELLMON. The figure I was using was 25 million barrels. We are not too far apart.

Mr. GREER. But he was hoping to say his plan projects a saving of 10 million barrels from that figure.

Senator BELLMON. I don't think I understand you. He is saying that in 1985 we will be using 15 million barrels of crude oil in this country?

Mr. GREER. His figures said that if, unless we switch to other fuel forms——

Senator BELLMON. Let's leave all that out. How many barrels of crude oil is he saying we'll be using by 1985 total?

Mr. GREER. Unless we do something about it it will be 23 million barrels per day.

Senator BELLMON. Go on.

Mr. GREER. And his hope is to save 10 of those.

Senator BELLMON. Get us down to 13 million barrels a day, a total consumption in this country.

Mr. GREER. I think that is about right. About six would be imports and seven would be domestic. I think that is about right. The 23 I don't remember. We will provide more detailed information for the record.

FEASIBILITY OF MEETING 1985 GOALS

Senator BELLMON. Do you think we can run this country on 13 million barrels of crude oil a day in 1985? And 1 million tons of coal, I mean 1 billion tons of coal a year?

Dr. MANNELLA. There are several programs in place that could impact the demand for crude very substantially, Senator Bellmon, one of which is the minimum fuel economy standards for automobiles, which represent a very large portion of the fuels we use.

The law is embodied in the energy conservation and production act of 1976. It requires the Secretary of Transportation to establish by 1985 new car standards of fuel consumption between 26 and 27 miles per gallon.

Senator BELLMON. But he talks about conservation. There is nothing new in that statistic.

Dr. MANNELLA. There was at least some question as to the rate at which that would be implemented after, I believe, 1981, because the laws give the Secretary some discretion between 26½ and 27 miles per gallon.

Senator BELLMON. Let me make my question as plainly as I can. I think we all would like to work with the President to get this country as independent of insecure costs of these four energy sources as we can. I hope that includes ERDA.

You have told me that the best we can hope for in coal liquefaction and oil shale development and secondary tertiary recovery is about 1.2 million barrels of additional production per day.

Now then, assuming that you are right, and assuming that our present production from oil stays very flat, which I think is very optimistic a projection, that would give us roughly 11 million barrels per day of crude oil from our domestic sources. Is that right?

Dr. WHITE. Yes, that is right.

Senator BELLMON. And the President's figure of 6 million barrels of imports would give us 17 million barrels of total crude oil availability. Is that right?

Dr. WHITE. Yes, sir.

Senator BELLMON. Now, in your judgment, can we operate our economy on that much crude oil? Today we are using not quite 20 million barrels a day. That means the net reduction of crude oil consumption of something like 3 million barrels a day between now and 1985.

Dr. WHITE. My answer to that would be yes. I think with conservation and switching to coal, with the contribution of nuclear which would be very modest by 1985, but much better by 1990. I think we can. However, I think it is going to be difficult. I think one reason we feel it is a crisis is that we are facing some difficult times.

BUDGET DEMANDS OF ENERGY PLAN

Senator BELLMON. Will this budget get us there, help us get there?

Dr. WHITE. I think it will provide very substantial assistance in getting us there, yes. I don't really believe doubling this budget is going to double the amount of production we have by 1985.

Senator BELLMON. I don't suggest that.

Dr. WHITE. I know, but obviously they are studying it carefully, and as you know from the data that you have available, the original request in almost every one of these programs was somewhat higher than OMB allowed.

CHANGES IN EMPHASIS IN VIEW OF PRESIDENT'S PROGRAM

Senator BELLMON. This budget was put together well in advance of the President's message, I am sure. Does it need to be restructured or does the emphasis need to be changed in light of the President's objectives?

Dr. WHITE. There are obvious reasons. Specific changes are going to be incorporated in the amendment being proposed. It seems to me that the budget is probably going to be affected but it is going to be the 1979 budget, because it is going to be necessary to see both what Congress and the President's proposals are, and then what

the private sector does in response to these. It is going to take at least 6 months after those laws before you see with any confidence what the response is going to be.

So I really think we are talking about the 1979 budget, and hearings a year from now, before we really know what has happened as a result of the President's proposals.

Senator BELLMON. So you are more or less suggesting business as usual for another 12 months.

Dr. WHITE. I think this budget is substantially more aggressive than it was a year ago. It is not quite business as usual.

Senator BELLMON. Where are the new thrusts, the new emphases in this budget?

Dr. WHITE. In oil shale, increasing to $28 million, increasing coal gasification from $8 to $11 million, an increase in petroleum and natural gas.

Senator BELLMON. Dr. Seamans was talking about all these things. They have no impact of consequence between now and 1985.

Dr. WHITE. It certainly increases your chances of getting what you need in 1985.

Senator BELLMON. We have to have gas under these burners on the cookstove and oil refineries. I am talking about what does this budget do that helps us meet the President's objective of 6-million-barrel-a-day level of imports by 1985. I don't believe what you mentioned gets to that.

Mr. GREER. Senator Bellmon, one of the key points of the President's budget was that there needed to be a massive shift in funding on the supply side of the equation, and conservation. There was a doubling of his budget.

ERDA PRIORITIES

Senator BELLMON. We were talking about problems in the progress of fossil energy programs. Perhaps one problem is priorities. Fossil gets little more than one-fourth of ERDA's 1978 appropriation request, less than 20 percent of outlays, and conservation gets only 9 percent. Does that really reflect the priorities that President Carter is giving to coal and conservation?

Mr. FRI. This question has several components that must be answered individually. First, and in terms of absolute size, the conservation programs are not nearly as capital-intensive as the energy supply programs, and require much less in the way of plant and equipment.

The second part of the answer is concerned with rate of growth of each of the programs. From fiscal year 1977 to fiscal year 1978, the fossil program grew 36 percent in terms of budget authority. During that same period conservation grew 102 percent. To accelerate program growth too quickly would result in a great deal of inefficiency and wasted effort.

The third aspect of the answer deals with the relationship of the coal program efforts to President Carter's national energy plan, and the priorities with which it is being handled. For fiscal year 1978, coal programs make up 82 percent of the total fossil energy development budget. To increase this further would result primarily in an increase in the number of pilot plants and demonstration projects.

Some selective effort and judgment must be applied to the program to prevent a "try anything" approach. Further, industry has a significant role in the development of coal technology, and funds much of the work independently or in cooperation with ERDA. We believe that the balance and priorities established are fully consistent with the initivaties and guidance of the national energy plan.

Senator BELLMON. We appreciate the added emphasis the Carter revisions have given to near- and mid-term technologies in both fossil and conservation, but the proportionate share of the energy dollar remains quite low. Are there any specific areas that ERDA could accelerate if more funds were available?

Mr. FRI. Both proposed budgets for fossil and conservation have significiantly increased since the ERDA fiscal year 1978 budget submission to Congress in January.

In terms of budget authority, the budget request for conservation increased 101.3 percent in the February revision, and an additional 4.4 percent will be requested in the May revision. For fossil energy, that budget request rose 7 percent in February and another 2.9 percent will be asked for in May. During the same time period, the budget proposals for such technologies such as light water reactor, and advanced reactor and fuel cycle concepts decreased a total of 14.7 percent and 31.3 percent respectively.

We believe that the May amended budget request for ERDA reflects a reasonable and balanced program that will build upon accomplishments of the last 2 years.

Senator BELLMON. Although taking up a relatively small part of the energy R. & D. program for fossil energy and conservation, ERDA still pursues its "try everything" policy. We see a proliferation of technologies moving through the pilot stage toward demonstration. And we keep asking, when do you reach the point when you can select the most promising processes and concentrate your resources on them?

Mr. FRI. In the early stages of a technology development it is as difficult to develop sound reasons for ceasing effort as it is to predict success with high confidence. Hence, ERDA's policy is to support promising technologies only until their technical, environmental, or cost performance is revealed as inadequate, or until commercialization activities are underway. There are enough examples of technology programs which have been drastically reduced or even terminated only to come back when circumstances change, for example, gas centrifuge uranium enrichment, to make ERDA reluctant to eliminate technologies too early in the development stages. In every case, ERDA's policy is to provide a level of support appropriate to the technology's status and potential.

In the fossil energy area, ERDA currently supports a number of competing coal gasification processes. Each process produces gas, but before ERDA can focus attention on only the most promising technology or technologies such issues as product cost, reliability, and environmental effects must be addressed. This requires operation over time and at an adequate scale, usually by means of a pilot plant. As this vital information becomes available, ERDA will be able to eliminate those which appear to be least promising.

In certain other areas, as enhanced recovery of oil and gas, technologies which seem to be directly comptetitive often are not. Each technique may prove to have characteristics which suit it for one type of geological formation, but not for another.

An important point to remember is that ERDA's programs, particularly in a rapidly growing area such as conservation, are often too new for much program attrition to have taken place. As these programs mature and are subjected to the evaluations which are part of ERDA's program planning and budgeting system, attrition will indeed take place.

COAL CONVERSION

Senator BELLMON. Let's talk coal conversion. What processes are now showing the most promise, and what are you doing to accelerate them?

Mr. FRI. In coal liquefaction, three processes have been selected for maximum activity. The solvent-refined coal—SRC—process is being studied in a 50 TPD pilot plant and a 6 TPD process development unit and a new initiative for a commercial demonstration plant has been identified. The SRC process will provide a unique coal-substitute fuel for utility applications. Two other processes which will produce distillate liquid fuels are also approaching the pilot plant scale. The H-Coal pilot plant is under construction at Catlettsburg, Ky., and a significant support activity is underway to support this pilot operation. Negotiations are proceeding with Exxon for a donor solvent liquefaction pilot plant. To keep this project moving ahead rapidly we have already funded subscale work needed for the project success. Other work in refining and equipment evaluation is underway to support the major process projects.

COAL PROGRAM PRIORITIES

Senator BELLMON. How do your priorities shape up now on the basis of near term, mid term and long term? What percentage of your coal budget is allocated to each of these goals?

Mr. FRI. In terms of overall ERDA programs and priorities, the heaviest emphases are being placed on the potential near-term successes. Although the size of a program does relate to its priority, there are other considerations that determine funding level as well. Also, the near-term programs are not the exclusive domain of ERDA. Private industry is also proceeding at a substantial pace. ERDA's role, in that sense, can be seen as supplementary to the industrial effort.

Industrial efforts in long-term developments, on the other hand, are very limited due to cost and risk, and ERDA must be the lead agent in these directions. Many of the long-term programs are funded at a high level since they are inherently extremely capital intensive, and to do anything at all in developing the inexhaustible technologies is very expensive.

The coal budget, referring to the second part of the question, does reflect the priorities as established by the national energy plan. Efforts in the near-term coal technologies, such as gasification processes, direct combustion, demonstration plants, account for 50 percent of

the total fossil budget. Mid-term technologies like liquefaction account for another 26 percent. The long-term programs, magnetohydrodynamics, advanced power systems, advanced research, are allocated the remaining 24 percent of the fossil budget. This, we feel, is a rational distribution.

DISCARDING TECHNOLOGIES

Senator BELLMON. Has ERDA reached a point where it can make conscious decisions to discard certain technologies? Do you have any examples of this kind of decisionmaking?

Mr. FRI. ERDA is prepared to discard any technology which fails to meet the necessary conditions for commercial application, including technical performance, cost, and reliability. In order to establish these conditions, we must be able to predict with some accuracy the characteristics of the marketplace in which these new technologies are to compete. In particular, we need to have a fairly reliable estimate of the likely price path of oil over the next decades.

Because of the uncertainties currently surrounding such predictions, ERDA has felt comfortable only in discarding those technologies whose predicted product costs are well outside the range of estimated price paths for oil. At present, ERDA is sponsoring a number of studies aimed at refining predictions as to the prices of future energy sources. With this information available, ERDA will be able to establish priorities among technologies with more confidence.

Examples of projects which have been or may be canceled or severely cut back are the Theta Pinch fusion device, the Coalcon clean boiler fuel demonstration plant, and the microwave vacuum grain drying system. The first of these is a consequence of technical problems while the latter two involve technoeconomic considerations.

CONSERVATION BUDGET

Senator BELLMON. Dr. White didn't mention the conservation. Where are the figures for conservation?

Dr. MANNELLA. They are right here. I would be happy to give them to you.

Senator BELLMON. Will you recite them?

Dr. MANNELLA. Sure. The original 1978 appropriation for conservation that was submitted by the Ford administration was $100 million. Shortly after January 20, the 1978 submission was increased to about $228 million, and with several initiatives that were included in the President's energy policy message the conservation request as amended is now $234.9 million.

Senator BELLMON. And that is for industry conservation and building conservation, transportation energy conservation?

Dr. MANNELLA. And conversion technology, that is correct. The three end-use sectors plus conversion technology.

SAVINGS THROUGH CONSERVATION TECHNOLOGY

Senator BELLMON. This may be an unfair question, but are you able to project the scale of the energy savings that might come from the program envisoned with these funds during these next 10 years?

Dr. MANNELLA. Yes, sir, I have some numbers here for both 1985 and the year 2000. For the end-use programs, as you have indicated, buildings and community systems, industry, transportation, and improved conversion efficiency, by 1985 we project savings between 4½ to 6 million barrels of oil per day equivalent; by the year 2000 between 11 and approximately 14 million barrels of oil per day equivalent.

Senator BELLMON. Now, if you go back to the ERDA projection of 25 million barrels of crude oil per day, at 2 percent, I think we sort of agree on that figure, and you subtract from that the 4½ to 6 million barrels a day that will be saved in these conservation efforts, that gets us down to rougly 20 million barrels a day. We will be producing 11. We are still 9 million barrels dependent on imports.

Dr. MANNELLA. There are other things which could yet favorably impact the situation. What we have not talked about are several conservation initiatives more or less in the regulatory areas, such as the maximum and minimum fuel conservation standards. We have, in addition to that, other programs such as dialing down our thermostats.

Senator BELLMON. But that is all in the President's estimates.

Dr. MANNELLA. I don't think that is necessarily the case because it is very difficult to quantify. We have also included in there the impact, I believe, of the use of solar energy.

Senator BELLMON. We won't get any significant impact from solar energy.

Dr. MANNELLA. That is true, but there are other potential areas for energy savings beside the energy conservation program, and there are things we are specifically mentioning such as the minimum energy building standards which the President intends to accelerate by 1 year.

What I am suggesting is the national reaction or the consumer reaction to the problem is possibly going to take out some of the slack between the two numbers that you mentioned.

RELATING ERDA BUDGET TO PRESIDENTIAL GOALS

Senator BELLMON. What I have been trying to get from you gentlemen is an indication of whether or not the budget we have before us, if approved, would start the country on the road that will make it possible to achieve the objective of the President's program, of 6 million barrels a day of imported crude oil by 1985. It seems to me that ERDA has to accept major responsibility for reaching this objective, if in fact it is done.

The new agency for energy will be the major governmental thrust toward meeting that objective. Could you for the record—and I'm not asking off the top of your head—give us a scenario as to how we could reach the President's objective, and relate that, if you can, to funds you are requesting in this budget.

Mr. GREER. Yes, Senator Bellmon, we will be glad to. In order to try to give you a general perspective, there are several strings to the bolt. First is the shift to coal by the utilities. There is a substantial savings there.

The second was a major increase in the conservation activities, which Dr. Mannella has described.

Senator BELLMON. That is cutting the growth from 4 percent to 2 percent a year.

Mr. GREER. Third, there was an increase in some of the supply technologies, such as coal, Dr. White's program. There was a $45 million program addition to solar heating, so as to improve the movement to solar for hot water heating. He projects 2.5 million homes by 1985.

There was a significant increase in geothermal resources to try to get savings from geothermal where available, and finally the projections for the nuclear program. Not a big impact, but all of those contributed to this 1985 scenario.

We will be glad to lay all of that out for you with the specific figures.

Dr. WHITE. I want to add one thing to quantify, to add a little bit of arithmetic here. If we increase coal production from 600 million tons a year to 1 billion, as is the President's target, an additional 400 million tons a year, in terms of oil, that amounts to about 2 billion barrels a year of oil.

Senator BELLMON. Can you reduce that to barrels a day?

Dr. WHITE. It is on the order of 5 or 6 million barrels a day. To the extent that coal will replace oil, that is the biggest single factor in reducing the total oil imports.

Senator BELLMON. Of course a good deal of that will go toward replacing gas.

Dr. WHITE. That is true, We have to see where that comes in.

Senator BELLMON. If you would do that for us it would help the committee to put this puzzle in some sort of perspective.

[The information follows:]

To achieve the President's 1985 objective, certain fuel consumption shifts which are described in figures 1, 2, and 3 must take place.

In the Residential and Commercial Sector, oil consumption must decrease from 3.5 MBOE/D in 1976 to 2.7 MBOE/D in 1985. Over the same time period natural gas consumption increases by .2 MBOE/D and electricity increases from 6.3 MBOE/D to 8.4 MBOE/D. To support these shifts and these reduced rates of growth in energy consumption, ERDA has a variety of energy conservation programs for retrofitting existing residential buildings and certain schools and hospitals. ERDA will also promote efforts to increase consumer education insuring that existing conservation techniques are understood and that adequate attention is given to their economic attractiveness. Efforts to develop appropriate energy efficiency standards will also be pursued.

In addition, ERDA has been examining the technical opportunities for increasing appliance efficiency. Some of the work in this area involves improving components such as controls, motors, and heat exchangers.

A shift to electrification in the Residential/Commercial sector which is a shift from direct uses of oil and natural gas is supported by ERDA through the development of higher efficiency heat pumps.

In the Industrial sector, the primary shift is to higher utilization of coal which goes from 1.9 MBOE/D in 1976 to 5 MBOE/D in 1985. ERDA programs which support this shift include industrial demonstration projects of atmospheric fluidized bed coal combustion and coal gasification to produce low and medium Btu gas. The atmospheric fluidized bed coal combustion technology provides industrial process heat which substitutes for industrial process heat otherwise obtained through oil and natural gas. Low and medium Btu gas from coal for industrial uses allows greater amounts of clean natural gas to be available to the Residential/Commercial sector.

In the Transportation sector, ERDA programs strive to increase the fuel economy of passenger cars by developing more efficient heat engines, improved transmissions, improved accessory drives and to assist with development and demonstration of electric cars to achieve fuel switching.

The ERDA program developments are also applicable to light duty trucks which will be covered by fuel efficiency standards under the Energy Policy and Conservation Act.

In addition, the ERDA Non-Highway Transport Systems Program is evaluating technology contributions to more fuel efficient rail and bus transportation.

In order to generate electricity more efficiently, the ERDA conservation program is developing advanced methods of design and control to ensure efficient management and reliability of more complex and heavily interconnected systems. In addition, ERDA's load management program will reduce the amount of oil required for oil fired peaking plants and permit coal and nuclear fuel to be substituted for oil and gas.

On the supply side, the President's program shows a .9 MBOE/D increase in domestic oil production between 1976 and 1985. During the same period coal production goes from 7.9 MBOE/D to 14.5 MBOE/D. Natural gas supply decreases from 9.5 to 8.8 MBOE/D, and Nuclear increases from 1.0 to 3.8 MBOE/D.

ERDA programs supporting domestic oil production include enhanced oil recovery, advanced technologies for drilling, and demonstration of shale oil production. ERDA is currently negotiating contracts for development of four in-situ technologies, each applicable to different kinds of shale resources, and is monitoring activities in surface shale processing.

ERDA programs which enhance the supply of natural gas include hydraulic fracturing, chemical explosive fracturing and directional well drilling.

In order to make coal environmentally acceptable, ERDA has developed some coal cleaning processes, and has provided some funding of Bureau of Mines coal planning activites. ERDA has also funded equipment development for coal preparation and is conducting studies to integrate coal cleaning into the coal fuel cycle from coal through combustion, gasification, of liquefaction.

In the near term, ERDA programs which support the development of the neclear option emphasize improving the reliability of the LWR in such a way that we can depend on nuclear power with minimum risks.

The above summarizes the main ERDA activities which are likely to have the greatest impact in the near term (i.e., 1976–1985) and which can contribute measurably toward achieving the President's objective of 6 million barrels of oil imports per day in 1985. ERDA programs that begin to have impact after 1985 are not discussed here. Figure 4 shows the ERDA budget modified to reflect the National Energy Plan.

Figure 1

Fuel Balances by Sector

[Millions of barrels of oil equivalent per day]

	1976	1985 without Plan	1985 with Plan	1985 Plan plus additional conservation
Demand	37.0	48.3	46.4	45.2
Residential and commercial:				
Oil	3.5	3.2	2.7	
Natural gas	3.9	3.8	4.1	
Electricity	6.3	9.1	8.4	
Coal	.1	(1)	(1)	
Total [2]	13.8	16.1	15.2	
Industry:				
Oil	3.2	7.0	4.0	
Natural gas	4.4	4.5	4.5	
Electricity	4.2	7.2	7.1	
Coal	1.9	2.7	5.0	
Total [2]	13.7	21.4	20.6	
Transportation:				
Oil	9.2	10.6	10.2	
Natural gas	.3	.2	.3	
Total [2]	9.5	10.8	10.5	
Electricity: [3]				
Oil	1.6	2.0	1.3	
Natural gas	1.5	.9	.5	
Coal	4.9	8.2	8.3	
Nuclear	1.0	3.6	3.8	
Other	1.5	1.6	1.6	
Total [2]	10.5	16.3	15.5	

See footnotes at end of table.

Figure 2

Fuel Balances by Sector

[Millions of barrels of oil equivalent per day]

	1978	1985 without Plan	1985 with Plan	1985 Plan plus additional conservation
Supply	37.0	48.5	46.4	45.2
Domestic:				
Crude oil [4]	9.7	10.4	10.6	----
Natural gas	9.5	8.2	8.8	----
Coal	7.9	12.2	14.5	----
Nuclear	1.0	3.7	3.8	----
Other	1.5	1.7	1.7	----
Refinery gain	.4	.9	.6	----
Total [2]	30.0	37.1	40.0	----
Imports/exports (—):				
Oil	7.3	11.5	7.0	5.8
Natural gas	.5	1.2	.6	----
Coal	—.8	—1.2	—1.2	----
Total [2]	7.0	11.5	6.4	5.2

[1] Less than 0.05 million barrels of oil equivalent per day.
[2] Detail may not add due to rounding.
[3] Included in previous sectoral totals.
[4] Includes natural gas liquids.

Figure 3

Balances by Fuel [1]

[Millions of barrels of oil equivalent per day]

	1976	1985 without Plan	1985 with Plan	1985 Plan plus additional conservation
Oil:				
Consumption	17.4	22.8 [2]	18.2	17.0
Domestic supply [3]	9.7	10.4	10.6	10.6
Refinery gain	.4	.9	.6	.6
Imports	7.3	11.5	7.0	5.8
Natural gas:				
Consumption	10.0	9.4	9.4	----
Domestic supply	9.5	8.2	8.8	----
Imports	.5	1.2	.6	----
Coal:				
Consumption	6.8	10.9	13.3	----
Domestic supply	7.9	12.2	14.5	----
Exports	.8	1.2	1.2	----

[1] Detail may not add up to total due to rounding.
[2] Assuming compliance with automobile efficiency standards under current law, and reduced driving as a result of higher gasoline prices. Without these assumptions, consumption would be 25 million barrels per day.
[3] Includes natural gas liquids.

Figure 4

ERDA ENERGY PROGRAMS
(Budget Authority - $ In Millions)

Program	FY 1976	FY 1978 Ford Budget Jan., 1977	FY 1978 Carter Revision Feb., 1977	FY 1978 National Energy Plan April, 1977 1/	Increase in FY 1978 NEP over 1976	
					$ Millions	% Increase
Conservation	76	158	318	325	249	328%
Fossil	426	598	640	657	231	54%
Renewables	146	393	393	421	275	188%
Nuclear	1002	2152	1848	1656	654	65%
Total	$1650	$3301	$3199	$3059	$1409	85%

1/ Excludes increases of $1.0 million for CO_2 study programs budgeted in Environmental Research;
Excludes increases of $6.0 million for international efforts to assist less developed countries budgeted in Program Support;
Excludes increases of $2.2 million to track the movement of Special Nuclear Material abroad budgeted in National Security.

MAJOR CONSERVATION ACHIEVEMENTS

Senator BELLMON. By the way we have another vote, but I have another 5 minutes.

You ask here—and I think we may be inclined to agree—for a very substantial increase in the funding for conservation efforts. Can you point to any major accomplishments in the conservation area as a result of your efforts?

Dr. MANNELLA. Yes, we have several. This is still a very young program, but we have several things which are successful.

One I might tell you about very quickly was a demonstration we ran in Indiana during this last winter. It was conducted in a plant that coats very large coils of steel. These steel coils are passed through a very long gas-fired furnace, using considerable amounts of natural gas. Furthermore, they incinerate the fumes from the dried curtain or the dried paint with additional natural gas to meet the ambient air quality standards.

The demonstration we ran took the fumes from the dried paint and fed it back into the natural gas supply which fired the furnace. In the first test we reduced the natural gas consumption by 68 percent. With some modification and the addition of another heat exchangor we reduced consumption by 80 percent.

This one demonstration alone saved enough gas to heat 15 homes in Indiana last winter. This is very, very attractive to the industry, not only for the economics but because their gas supply is on an interruptable basis. We understand from the Natural Coil Coaters Association that this modification to these huge gas-fired furnaces will become standard in the industry in the next several years.

Senator BELLMON. What will be the total impact of reducing, if you can, in terms of the number of homes when the technique is fully applied?

Dr. MANNELLA. I don't have the number. Mr. Harvey, who is the Director of our Industrial Energy Conservation Division may.

Do you have the number with you?

Mr. HARVEY. I will have to have some help from Maxine, who translates the number of homes. We projected the penetration of this on the market would be 18,000 barrels of oil per day by 1985.

Dr. MANNELLA. The Senator asked what the savings would be if it were standard throughout the industry.

Mr. HARVEY. It will be 10 times that. But the total potential is about three quarters, I'm sorry, 800,000 barrels a day equivalent.

Senator BELLMON. That would be a significant conservation savings. Do you have others?

Dr. MANNELLA. We have several others that may not be as dramatic as that. We have been running a very successful experiment in a fast food restaurant in Albany, showing how you can save substantial amounts of energy in this type of operation.

These types of restaurants are very energy intensive, and the results there were very attractive. The company indicates to us that they are going to put these techniques in all of their new restaurants, and another company is saying that they may retrofit their existing restaurants.

In other areas, a portion of our program was directed to the agricultural and food processing industry. A very promising study is underway in Oklahoma State University on beef.

We had a test on that several months ago, which I know you are familiar with because both you and Mrs. Bellmon attended. We think that this has some attraction.

In the transportation area we do have one fairly new term project for very large truck engines, taking the waste heat that normally goes out the exhaust, and using it to boil an organic liquid. The vapor from that drives an additional turbine, which provides more power to the transmission of the truck.

This is currently on a dynamometer in a laboratory, and it looks as if it will cut fuel requirements by 15 or 20 percent. We are working with the Mack Truck Co. We will have it actually on the road, testing it, and if it holds up the way it has been in the laboratory, we will see that becoming commercialized in just a few years. This could substantially reduce energy requirements for the large trucks, of which there are about a half a million on the roads in the United States.

We have made substantial progress in our large phosphoric acid fuel cell program. We will be demonstrating the 4.8 megawatt unit in an operational utility next year.

We have several very promising programs in middle grade waste heat utilization taking the waste heat from an industrial process, or diesel, and again going through an organic cycle, either using it to drive a turbine and getting useful work, or possibly producing electricity. We are going to the Sundstrand Corp. in a very novel contracting kind of arrangement where we are paying for the development of a 600-kilowatt unit.

If it is successfully commercialized, Sundstrand has the opportunity of either repaying the Government for those advance funds, or paying the Government a royalty on each unit that they sell. It is a very innovative contracting arrangement.

NEW ENERGY EFFICIENT ELECTRIC MOTOR

Senator BELLMON. There was a story, I believe in the morning paper, about a new type of electrical motor that has been developed in California. I am sure you haven't had a chance to look into this. They said it was going to represent a 20-percent energy saving cost.

Is this realistic?

Dr. MANNELLA. First of all we have had a study done by the Arthur D. Little Co. on the potential for saving energy in many types of electric motors. We did look into the particular one you're referring to that was reported in the Washington Post about 1 week ago. It does look as though the inventor has perfected a device which for certain applications, particularly where the load varies, it does a good job of cutting down the amount of current that the motor uses, hence reducing energy.

As a result of that innovation the motor runs cooler, which means it runs more efficiently, and will last longer. It seems to be well on its way toward commercialization.

The inventor has several companies, including Southern California Edison and MacDonalds, testing them. We understand that he has a number of people who would like to have him license them to sell the product.

Senator BELLMON. As a part of your report you are giving the committee relating to whether the objective of the President can be reached, and how we might go about assuring that we do reach that goal, could you give us an estimate of what these various conservation techniques might save so far as these are concerned?

Dr. MANNELLA. We will be happy to, Mr. Chairman.

ADDITIONAL QUESTIONS

Senator BELLMON. That is five bells. We have the additional questions I mentioned earlier which we would like to submit in writing and ask your response, for the record.

[The following questions were not asked at the hearing, but were submitted to the department for responses subsequent to the hearing:]

Questions Submitted by Senator Byrd

Q. As a result of last year's appropriations bill, the committee placed a personnel ceiling on the Energy Research Centers. As a result of this personnel ceiling, ERDA submitted a reprogramming request to raise the ceiling.

What is your current full-time permanent personnel ceiling for the Energy Research Centers?

A. The five Energy Research Centers (ERC's) have a FY 1977 full-time permanent ceiling of 824. This ceiling is increased by 10 to 834 positions for FY 1978. The chart below gives the personnel ceiling for each center for FY 1977 and projected for FY 1978.

	FY 1977	FY 1978
Morgantown ERC	179	181
Bartlesville ERC	160	162
Laramie ERC	140	142
Grand Forks ERC	46	47
Pittsburgh ERC	299	302
	824	834

Q. During the past three years, how many additional full-time permanent have been authorized at the Energy Research Centers?

A. The total increase in full-time permanent personnel at the Energy Research Centers from FY 1976 through FY 1978 is 31. This represents an increase of 4% total during these three years.

Q. The budget for the Energy Research Centers has approximately doubled during the past three years, yet your personnel ceilings have essentially remained constant.

How does ERDA explain this discrepancy?

A. The budget for the five ERC's has increased from $36 million in FY 1976 to $58 million for FY 1978. This represents an increase of 61% over the three years. This additional workload was accomodated by reducing the amount of work that each ERC performed for other agencies. As an example, during FY 1975-FY 1976, approximately 65 man-years of effort at the ERC's was used to support other Federal agencies. With the expanded Fossil Energy program, support to other Federal agencies in FY 1978 will be less than 15 man-years. Also, the ERC's have used temporary personnel to help handle the increased workload.

Q. Can the Energy Research Centers handle additional work without an increase in personnel?

A. Additional personnel, either permanent or temporary, would have to be hired to support any significant additional work at the Energy Research Centers.

Q. When ERDA is merged into the Department of Energy, will the Government personnel at the Energy Research Centers be covered by Civil Service?

A. The Department of Energy, as proposed by the President, would bring the Government personnel under the Civil Service system. The only proposed exception is for 600 executive positions. Therefore, if the Department of Energy is enacted as proposed, the personnel at the ERC's will be covered by the Civil Service system.

Q. The committee is concerned that ERDA has not assigned additional personnel to the Energy Research Centers to keep pace with a rapidly expanding budget. How can the Energy Research Centers continue to manage an expanding budget and still retain the in-house research capability necessary?

A. The Energy Research Centers must retain a viable in-house research capability to provide the necessary expertise for an aggressive Fossil Energy program. This becomes even more important as projects are assigned to the field for management and the necessary research to support these field projects must be provided by the ERC's. Due to an overall limitation on personnel for the Fossil Energy program as well as the ERC's, the management of the rapidly increasing budget is becoming a severe problem that must be solved.

The ERC's will need additional personnel in order to continue managing an increasing number of projects and field tests while maintaining critical in-house research capabilities.

Q. If the temporary positions that are now being utilized at the Energy Research Centers were converted to full-time permanent Government positions, would this solve your critical personnel problems?

A. This obviously would help solve the personnel problem at the ERC's. However, since some of the temporary personnel at the ERC's perform strictly support service functions that could be contracted, it will be necessary to analyze the use of temporary personnel at each ERC before any recommendation can be made to the committee. Also, since the Energy Research Centers are now assigned as part of the Fossil Energy program, it may be desirable to consider the personnel ceiling for Fossil Energy instead of just the ERC's.

As you requested, ERDA will provide you with an analysis of the full-time and temporary personnel at the ERC's within 30 days. Included in the analysis will be an impact statement on the programs at the ERC's if the use of temporary personnel is prohibited by the Department of Energy.

The ERC's will need additional personnel in order to continue managing an increasing number of projects and field tests while maintaining critical in-house research capabilities.

Q. Coal programs of the Bureau of Mines and Office of Coal Research within the Interior Department have been carried on for many years. Has any of that work and the follow-on work by ERDA shown sufficient promise to allow design of commercial scale facilities?

A. In the area of liquefaction, progress in the operation of the SRC pilot plant in Tacoma, Washington has been sufficiently successful to consider this process as a candidate for a commercial demonstration plant. The pilot plant has produced 3000 tons of specification Solvent Refined Coal and successful combustion of this fuel in a utility boiler in Georgia will complete this phase of the program. This project has been funded by OCR and ERDA.

In the area of gasification, the ICGG group was the recipient of an award in connection with the High Btu Demonstration RFP. A critical part of this gasification process is the preparation of char by pyrolysis of coal. The char pyrolysis process was identified as COED. The latter process was developed entirely with government funding under OCR including support of a 36 ton per day pilot plant at Princeton, New Jersey.

We believe that a number of processes are economically attractive and technically sound. We have not to date, however, found industrial organizations who wish to provide 50% of the funding for the demonstration plant program. Similarly, no one has come forward with plans for a commercial unit.

However, a number of BOM and OCR coal programs have resulted in the design, construction and operation of ERDA pilot plants. These processes include COED, Hygas, U-gas, AFBC, and SRC. The results of these pilot plant

programs indicate sufficient promise to permit initiation of demonstration projects.

Q. Would you tell the committee those processes you consider ready?

A. Candidate second generation processess that could be designed, built and placed in operation include Solvent Refined Coal (SRC), currently being developed for ERDA by the Gulf Development Corporation at the Tacoma, Washington pilot plant and fluid bed pyrolysis of coal which could be demonstrated as part of a fluid bed coal processing plant.

The production of liquids from synthesis gas might be demonstrated in conjunction with a second generation gasifier.

Q. Have any of these projects been proposed or suggested to this committee?

A. We have included conceptual design studies for several of these processes. It should be noted that an SRC demonstration plant is part of ERDA's amended request for FY 1978. In addition ERDA is proceeding with developing a conceptual design for a possible Hygas demonstration plant.

Q. Does this mean that we have no plan for utilization of processes developed in the ERDA program and do not have a mechanism for transferring this technology to the commercial sector?

A. We hope that initiation and publication of conceptual designs will encourage industry to come forward and propose demonstration plants or proceed with commercialization on their own. These conceptual studies are usually undertaken before demonstration plants are requested because the studies offer the best basis for determing those process which should be considered for demonstration. These studies allow technical and economic comparisons and include environmental considerations of the candidate processes. The mechanism for transferring the developed processes to the private sector is through cost sharing contracts with an Industrial Partner.

Q. I notice your program includes a conceptual design for an Advanced Liquefaction Plant. What is the status of the design?

A. We have contracted with Fluor for a conceptual design of an advanced liquefaction plant. This effort which is about 50 percent complete is intended to scope out the problems and further investigate the feasibility and the design based on the CSF process that was used in the Cresap pilot plant. It should be pointed out, however, that this pilot plant never operated in an integrated mode. A satisfactory solids/liquid separation technique was never demonstrated. At the present time, the Cresap pilot plant is being refurbished and will function as a test facility for evaluating critical systems such as solids/liquid separators. An integrated liquefaction process designed to produce boiler fuel will be operated at Cresap to provide realistic test conditions. In the course of operation of the test facility, we will have an opportunity to prove out the CSF process. So, until we have demonstrated a satisfactory method for separating the liquid product from the solid coal residues we would not proceed beyond the current conceptual design phase.

Q. In view of our problems with fuel in the Northeast section of the country during this past winter, I would like to know if any of the processes you listed can use Eastern coals? I use Eastern in the sense of East of the Mississippi River.

A. Both the SRC process and Cogas process can handle high sulphur Eastern coals.

Q. As I recall, the CSF process was originally proposed for use of West Virginia/Pittsburgh No. 8 Seam Coal. Is that process still capable of processing our typical Eastern coals?

A. Yes, this process is capable of using Eastern coals.

Q. You previously mentioned potential testing, both low and high pressure pyrolysis, combined with fluid bed combustion and fluid bed gasification. Do you have any details on a fluid bed pyrolysis plant?

A. The COED Pilot Plant (36 tons per day) studied fluid bed pyrolysis. The work on this project was completed in 1975 and the plant has been dismantled.

Q. Have you performed any engineering work on this project?

A. No work has been done on the COED process itself since 1975, however, the COGAS project proposed by the ICGG contains the COED process and engineering work has been done in that connection.

Q. Could you begin engineering of this plant if money were available, and if so, how much would be required?

A. COED could be engineered, but the process economics are poor when the process is considered independently. The COGAS project has been selected under the High Btu RFP as a potential Major Facility project.

Q. Did I understand you to say you had a support plan for the advanced liquefaction plant?

A. The support plan to the demonstration project is specific to the pyrolysis plant. The operations planned for the Cresap Pilot Plant could serve that purpose, of course. The CSF process was developed at that facility.

Q. Would it assist if support money for the advanced liquefaction demonstration plant were earmarked in the budget?

A. Provision of support money would make the intention of the Congress clear and would assist us in developing our operating plan to support the demonstration plant by providing $10 million for the Cresap Pilot Plant.

Q. Now that the Clean Boiler Fuel demonstration project is under a technical reevaluation, what are ERDA's plans to maintain adequate progress for a liquefaction demonstration plant?

A. We are looking at a liquefaction plant as a potential project for our FY 1980 budget. A number of pilot plant programs and some of our advanced conceptual designs appeared to be good candidates for future liquefaction projects. Of these the Solvent Refined Coal (SRC) Process is furthest advanced.

The addendum to the FY 78 Budget which is being forwarded to Congress includes a project for initiating in the first Quarter of FY 78 the design, construction and operation of an SRC demonstration plant.

Q. Provide an analysis of the feeds and the daily production of the projects included in the current and planned ERDA Demonstration and Commercial Demonstration plant program.

A. We will. (See attached)

PROJECT	CONTRACTOR	INPUT	OUTPUT
Pipeline Gas	Continental Oil Company (Contractor) Conoco Coal Development Co. (CDC) Operator	Coal-Ohio #9 3,800 TPD	-Pipeline Gas - 58.9MM SCF/Day -Light-Oils 67.5 TPD -Sulfur 168 TPD -Ammonia 13.6 TPD
Pipeline Gas	Illinois Coal Conversion Group (ICGG) -Consortium of Illinois Public Utilities	Coal-Harrisburg #5 Herin #6 Blend 2,222 TPD	-Pipeline Gas 17.7MM SCF/Day -Liquids, Hydrocarbon 2,680 BPD -Ammonia 5.5 TPD -Sulfur 74.1 TPD
Fuel Gas-Industrial	Memphis Gas, Light and Water Division	Coal-Kentucky #9 2,800 TPD	-Fuel Gas (285 Btu/Cu. Ft.) 175MM SCF/Day -Sulfur 89 TPD
Fuel Gas-Industrial	Grace/Ebasco	Coal-Kentucky #9	-Fuel Gas (160 Btu/Cu. Ft.) Synthesis Gas For Ammonia Mfg.) 90MM SCF/Day -Sulfur 57 TPD
Fuel Gas-Small Scale	Erie Mining Company	Coal-Illinois 500 TPD	-Fuel Gas (170 Btu/Cu. Ft.) 43.5MM SCF/Day -Sulfur 7 TPD
Fuel Gas-Small Scale	New Jersey Zinc	Coal-Ohio 300 TPD	-Fuel Gas (160 Btu/Cu. Ft.) 37.5MM SCF/Day -Sulfur 7 TPD

Q. What other demonstration plant programs are available at this time, and what are the feeds and production quantities that can be provided to the market place? Also provide an assessment of the technical risks associated with these programs.

A. We decided to go ahead with process design only for HYGAS and SRC. SRC was included in the FY 1978 Amended Budget. We will provide for the record, additional processes which can be scaled up to Demonstration Plants above our current program. (See attached)

POSSIBLE DEMONSTRATION PLANT PROGRAMS

DIVISION OF MAJOR FACILITY PROJECT MANAGEMENT

PRIORITY	TYPE	FEED (TPD)	COST ESTIMATES (1) (MILLIONS $) CAPITAL	WORKING CAPITAL (2)	START UP OPERATIONS	OPERATIONS (5 YRS) (3)	TOTAL	PRODUCT PRIMARY	SECONDARY	BY	DAILY PRODUCTION	PROCESS TO BE DEMONSTRATED (4)	APPLICATION END USE	RELATED PROJECTS	SMALL SCALE	FEATURES
1	ADVANCED LIQ DONOR SOLVENT	7500	600 (15)(6)	20	20	100	740	GASOLINE	SNG, LPG, FUEL GAS	SULFUR, POWER	GASOLINE 16,375 B ETHANE 2,050 B LPG 4,025 B SNG 14,500 MCF NH_3 58 T S 300 T	DONOR EXTRACTION, EXTRACT HYDROGENATION CRUDE UPGRADING AND REFINING	TRANSPORTATION INDUSTRIAL UTILITY		CRESAP	• BEST PROCESS ECONOMICS • FUEL SOURCE FOR NE COAST • PROCESS ALL COALS
1	HYDROCARBONIZATION (5)	3000	450 (15)	15	15	50	530	SOLID BOILER FUEL (0.3%S) LIQUID BOILER FUEL	SNG, POWER, COALS	SULFUR	SNG 4,700-22,000 MCF SYNCRUDE 1690-4200 B LOW S FUEL 0-1340 T POWER 0-2,898,000 KWH	FLUID BED CARBONIZATION FLUID BED CHAR GASIFICATION FLUID BED COMBUSTION CHEMICAL RECOVERY	POWER UTILITY RESIDENTIAL CHEMICALS PETROCHEMICALS	CLEAN COKE	RIVESVILLE ORNL	• PROCESS SIMPLICITY • LOW COST FUEL • LOW COST POWER
2	SRC (5) (5)	6000 (6000 TOTAL)	500 (10)	20	10	70	600	SOLID BOILER FUEL, SRC	ELECTRODE COKE, SNG, CHEMICALS		SNG 28,000 MCF LPG 6,700 B NAPHTHA 1500 B FUEL OIL 9400 B	HYDROGEN EXTRACTION	POWER UTILITY CHEMICAL RESIDENTIAL		TACOMA WILSONVILLE	• LOW COST FUEL
2	FISCHER TROPSCH SYNTHESIS	6000	500 (13)	20	15	50	585	MOTOR FUEL, SNG, POWER	ALCOHOLS, METHANE/ NH_3		LOW BTU GAS 0-225,000 MCF SNG 5,000-100,000 MCF DISTILLATE 0-1,000 B SULFUR 250 T CHEMICALS 90 B POWER 3,800,000 KWH TO 9,000,000 KWH METHANOL 0-2000 B	FIT SYNTHESIS METHANOL SNG	CHEMICALS PETROCHEMICALS TRANSPORTATION RESIDENTIAL	GAS SOLID PIPELINE COMBINED CYCLE	BI GAS B&W CE MOBIL	• PROCESS ALL COALS • HIGH THROUGHPUT • LOW COST PER UNIT OF OUTPUT • RANGE OF PRODUCTS • GREATEST ULTIMATE POTENTIAL
3	PIPELINE GAS (HYGAS)	6000-10,000	500 (13)	15	25	100	640	SNG		SULFUR	SNG 100-125,000 MCF BTX 800 B	LOW COST GAS PRODUCTION	RESIDENTIAL INDUSTRIAL		HY GAS	• SINGLE PRODUCT WHERE NEEDED

NOTES:

1. All estimates presume no interest, no allowance for depreciation and no profit.
2. This would be an authority only with an advance to the selected contractor.
3. Total cost after sale of products.
4. Each plant will provide data and information on environmental problems including emissions, water clean-up.
5. HC + SRC together form a combined process plant.
6. "(GE)" indicates potential operators and/or cost sharing contributors.
7. (15) indicates cost of engineering design included in capital costs.
8. Currently included in the FY 1978 ERDA Amended Request to Congress.

2966

Q. In view of the fact that to date six demonstration projects have or will have been authorized through FY 1977, what is the status of each? Why are the contract negotiations taking so long?

A. The six companies with whom ERDA is negotiating are:

Conoco Coal Development Co. (CDC)-High Btu
Illinois Coal Gasification Group (ICGG) High Btu
Memphis Gas Light & Water Div. - Low/Medium Btu - Industrial
Grace-Ebasco - Low/Medium Btu - Industrial
Erie Mining Co. - Low Btu - Small Industrial
New Jersey Zinc Co. - Low Btu - Small Industrial

These companies are now at various stages of negotiation. The first four are in the final stages of negotiation. Contractor selections have been recently made on the last two and negotiations are now underway.

Based on experience thus far with the first four, the following observations can be made relative to the reasons for the length of time required for negotiation. Although the first two have taken a considerable amount of time we anticipate significant improvements on the next four contracts.

The fact that these types of cost sharing contracts are relatively new to both ERDA and the industrial partners involved coupled with complexities such as negotiating patent and data right provisions, royalty sharing, etc. have resulted in taking more time than originally anticipated. In addition, we have experienced delays in negotiating the final statement of work on these contracts with the industrial partners. This has been caused by the fact that the original statements of work submitted with the response to the request for proposals have undergone many changes as a result of the contracts selection process. This give and take situation with the industrial partners has taken longer than expected.

It must be also appreciated that the offering entities are joint ventures (ICGG and CDC) and comprise regulated public utilities which do not possess great flexibility in modifying their business approach. Any cost exposure in such organization implies need for approval from regulating agencies before cost increments may be passed to the public in rate schedule changes.

Q. During the hearings on the FY 77 budget, this committee indicated a strong interest in ERDA exploring the feasibility of building at least 2 or 3 government financed synthetic fuel plants. During these hearings, you indicated that completely government financed plants were undesirable due to the fact that industry through cost sharing must be involved in the program. Has anything transpired during the past year to change your view on government financed plants?

A. NO. ERDA still believes that government financed synthetic fuel plants are neither the most effective nor efficient method to transfer energy technology to the private sector.

Under a Government Owned Contractor Operated (GOCO) arrangement the level of Federal financial involvement is total.

GOCOs lack the profit motive, which may lead to inefficiency and increased costs.

GOCOs will not generate information indicating the commercial viability (or lack thereof) of a synthetic fuel operation.

GOCOs will not provide information regarding conventional private sector financing of synthetic fuel facilities nor the competitive influences on marketing the output of such facilities.

ERDA believes that maximum industry participation in first of a kind plants is the most effective means of accelerating the commercial application of new fossil energy technologies.

Q. Does the President's new proposed energy program which opposes financial incentives for current technology synthetic fuels plants impact your

proposed Alternative Fuels Program? If so, how is the Nation going to get the first of a kind synthetic fuels plants built unless the Government finances the construction?

A. ERDA believes that access to free market prices for synthetic fuels will prove to be a powerful incentive to spur potential project sponsors toward proceeding without Federal financial support.

ERDA seeks to obtain generic loan guaranty authority to augment the forms of Federal assistance available to it under Sec. 7 of P. L. 93-577; and a contingent appropriation for the implementation of such assistance should it prove to be both warranted, and consistent with National Energy Policy as articulated in the National Energy Plan.

Q. What progress during the past year has ERDA made in getting these large commercial plants built?

A. During the past year, a number of studies were completed with respect to a synthetic fuels demonstration program, including, among others, a risk and incentive analysis, the development of criteria for the award of incentives designed to mitigate the identified risks, an analysis of optimum technology/plant mix, and other cost and feasibility studies. Authorizing legislation to provide financial assistance in the form of loan guaranties to implement a synthetic fuels commercial demonstration program was not enacted by the 94th Congress.

Aside from these preliminary efforts, an ERDA/AFE High Btu Gasification Working Group was formed for the purpose of developing the high Btu coal gasification portion of the Alternative Fuels Demonstration Program, and similarly an ERDA/AFE Oil Shale Working Group was formed for the purpose of developing the oil shale portion of the Alternative Fuels Demonstration Program. Activities in these areas have included Government briefings, Congressional testimony, option papers, and a series of meetings with industry representatives to facilitate an exchange of views.

Q. Since the Coalcon program has experienced technical problems and ERDA has withdrawn its plan to construct a demonstration plant, what are ERDA's current plans for building a liquefaction demonstration plant?

A. A number of pilot plant programs and some of our advanced conceptual designs appeared to be good candidates for future liquefaction projects. Of these, the Solvent Refined Coal (SRC) Process is furthest advanced.

The addendum to the FY 78 Budget which is being forwarded to Congress includes a project for initiating (in the 1st Quarter of FY 78) the design, construction and operation of an SRC demonstration plant.

Q. Isn't the bottom line really that one year has past and ERDA is no closer to building these large demonstration plants than they were at this time last year?

A. There are significant long term business arrangements which have to be clarified by both industry and government. In view of their complexity we do not feel that the negotiations have been unduly long.

The six companies with whom ERDA is negotiating are:

1. Conoco Coal Development Co. (CDC)-High Btu
2. Illinois Coal Gasification Group (ICGG)-High Btu
3. Memphis Gas Light & Water Div. - Low/Medium Btu - Industrial
4. Grace-Ebasco - Low/Medium Btu - Industrial
5. Erie Mining Co. - Low Btu - Small Industrial
6. New Jersey Zinc Co. - Low Btu - Small Industrial

These companies are now at various stages of negotiation. The first four are in the final stages of negotiation. Contractor selections have been recently made on the last two and negotiations are now underway.

Based on experience thus far with the first four, the following observations can be made relative to the reasons for the length of time required for negotiation. Although the first two have taken a considerable amount of time we anticipate significant improvements on the next four contracts.

The fact that these types of cost sharing contracts are relatively new to both ERDA and the industrial partners involved coupled with complexities such as negotiating patent and data right provisions, royalty sharing, etc. have resulted in taking more time than originally anticipated. In addition, we have experienced delays in negotiating the final statement of work on these contracts with the industrial partners. This has been caused by the fact that the original statements of work submitted with the response to the request for proposals have undergone many changes as a result of the contracts selection process. This give and take situation with the industrial partners has taken longer than expected.

It must be also appreciated that the offering entities are joint ventures (ICGG and CDC) and comprise regulated public utilities which do not possess great flexibility in modifying their business approach. Any cost exposure in such organization implies need for approval from regulating agencies before cost increments may be passed to the public in rate schedule changes.

The economic incentive for a joint venture is difficult for industry to justify at this point in time when so many new alternatives are being considered by the new administration. This gives an environment of uncertainty to the whole effort and acts to slow negotiations in anticipation of a change which might be more favorable to the industrial partner.

The monies involved are large and require, for the private sector, that the negotiators get an agreement with the consortium, the boards and/or the president's office before firm agreements can be made by industry.

For the public utilities the negotiators must get an agreement from the state utilities commission and the local governments before finalizing an agreement.

Q. Based on the President's new energy program, how does ERDA propose to build a high Btu gasification plant based on LURGI technology?

A. ERDA does not, at this time, plan to offer Federal financial support for a high Btu gasification plant based on LURGI technology. In general, the Government seeks to avoid subsidization of existing technologies, although circumstances may sometimes merit an exception to that policy.

Q. Since this (high Btu gasification based on LURGI technology) is current technology and the President opposes financial incentives for current technology, won't any such plant have to be Government funded?

A. In general, the Government seeks to avoid subsidization of existing technologies, although circumstances may sometimes merit an exception to that policy.

Q. What is the minimum size of a LURGI High-Btu Plant that could be built that would demonstrate commercial sized equipment and provide critical technical and economic data essential for future development of synthetic fuels plants?

A. Approximately 75 mm cfd.

Q. Has ERDA considered building government financed test facilities for the major synthetic fuels technologies that would include as part of the test facility a commercial sized process train of current technology? In other words, a Lurgi plant as part of a high btu test facility?

A. ERDA has no objection to the Congressional proposal to consider building a High Btu Coal Gasification Test Facility. That facility could result in having facilities representing both first and second generation coal

gasification facilities operating side by side in the same location. This facility can complement the presently planned demonstration plant program. The initial basic plan could involve installing an existing technology (Lurgi) together with a second generation technology that currently isn't in the Demonstration Program. The specific details (benefits, disadvantages, costs, procurement approach, schedules, etc.) have not been finalized at this time.

Q. Dr. White, the key question still is how does the Nation get at least one high btu, one liquefaction and one oil shale plant built within the next 3 to 5 years so that essential information is obtained on these processes? Is there really any viable alternative to government financing of these first plants? If so, please provide for the Record, ERDA's plan to accomplish this task.

A. Our current program includes engineering of three high Btu gas plants. Depending on our authorization, one or perhaps two of these plants will be built. As currently proposed, these projects are cost-shared (50-50), and each of them will provide data for design of full scale plants. We have recently included a solvent refined coal plant in our FY 78 budget, as requested by President Carter. Our Office of Commercialization has continued discussions on construction of a shale oil plant.

Government funding is involved in all of these projects, but we would expect and hope to obtain private sector cost-sharing. We have given some thought to building one or more government-owned contractor operated plants, but this would require authorization and approval that we do not currently have. As our energy situation becomes more acute we may be required to consider this technique.

On the surface it appears that Government owned facilities might be the quickest to construct. Of equal, if not greater, importance is the need to have the processes and products accepted by the industrial community. The need to demonstrate effective integration of these processes and products into the energy market is the ultimate test of the success of the program. We believe it is desirable to continue our efforts in this direction.

Q. In reviewing the ERDA FY 1978 budget for Direct Combustion, I see that the requests for funding was cut $16M by OMB. That essentially leaves a level budget from FY 1977 to FY 1978.

This cut does not seem valid especially in light of the President's Energy Program presented to Congress on April 20, 1977. In this plan he stressed mandatory conversion of industry and utility boilers from oil and gas to coal.

The President also stressed an expanded research program in fluidized bed combustion systems as discussed on page 23 of the Fact Sheet that was distributed with the Energy plan.

An increase of only $1.3M is not an expanded program.

Dr. White, does ERDA consider fluidized bed technology a promising option for utilizing high sulfur coal?

A. Fluidized-bed combustion technology is a highly promising technology which will enable us to use inexpensive and abundant high sulfur coal for heat, steam and power while emitting combustion products which contain no more noxious sulfur oxides than would be the case if costly scrubbers were used. The technology is very promising. The research shows that it is feasible. We are in the process of starting up the world's largest fluidized bed boiler, an experimental unit which should produce 300,000 lbs/hr. of steam, and have found few difficulties aside from the coal feeding equipment. On this basis, we are prepared to build the R&D test facilities, which should have been built years ago, and to expand the program to include low grade coals and other inexpensive and abundant problem fuels.

Q. What are some of the major problems?

A. Besides developing reliable coal feeding equipment to handle the run-of-mine coal, the major problems include achieving high combustion efficiency with minimum unburnt carbon, minimizing limestone use, demonstrating that the sulfated sorbent bed waste can be used as a stable material, qualification of materials for superheater service, and improved designs suitable for larger utility service.

Q. Are you building test facilities to investigate these key problems? Where are they located?

A. We have just finished the design of a flexible test facility to solve these problems for the simplest system; that of a combustor which can be used in place of conventional coal firing for steam generation. This facility is in Morgantown, West Virginia. A flexible test facility for pressurized combustion in a fluidized bed, an advanced concept which would enable us to get five percent more power from each pound of coal and possibly lower the emissions of NO_x is being designed for installation at the Argonne National Laboratory, near Chicago, Illinois.

Q. Dr. White, the program plan for the fluidized bed test facility to be constructed at Morgantown indicates an operational date of late FY 1979.

Is this key test facility still on schedule to be operational in FY 1979?

A. We presently expect to be able to have a bare bones unit built by the end of FY 1979. We are giving this facility priority over all other projects. Costly elements in its construction are being stretched out until FY 1980 so that other projects will not suffer appreciable delay.

Q. How much additional funding is required in ERDA's FY 1978 budget to keep this facility on schedule?

A. An additional $10 million would be required to keep this project on schedule without taking money from other projects.

Q. Can you use the additional funds in FY 1978 to start construction of the Morgantown test facility?

A. We can use the additional funds in FY 1978 to ensure that this project is built without compromise and that other projects do not suffer.

Q. The OMB budget cut in "The In-Situ Coal Gasification Program" was extremely severe. Hasn't this program enjoyed some recent success in the project conducted by the Laramie Energy Research Center?

A. The Laramie tests have been run at a site near Hanna, Wyoming. The first test, Hanna 1, resulted in six months of gas production at an average heating value of 126 Btu per standard cubic foot. The second test series was run in three phases. Phase 1 gave an average gas heating value of 152. Phase 2 gave an average heating value of 172 Btu/Scf. Phase 3 gave an average value of 138 lower than Phase 1 and 2 because we extended the test past the optimum cutoff to get additional data. The rate of gas production averaged 8.5 million standard cubic feet per day and went as high as 11.5. If the gas had been converted to electrical power, it would have produced about 6 megawatts of electricity. These results were very encouraging.

Q. Dr. White, on page 26 of your statement, you indicated that the Linked Vertical Well process was successful and had actually produced gas for six months. Additionally, you state that the Longwall Generator process being developed at the Morgantown Energy Research Center is being designed for testing on the Eastern coals. If this technology is successful, won't it greatly expand the Nation's utilization of our vast coal reserves?

A. Yes, a recent estimate suggests that almost 1.8 trillion tons of coal could be used by underground coal gasification if economic processes were available which could be applied to Eastern, Western, and Alaskan coals.

Q. This process has potential for greatly expanding our coal reserves and has already achieved a partial success in the limited field test conducted today. Why shouldn't the pace of this program be increased?

A. We believe the pace should be increased. In particular, we plan to emphasize the development of the Linked Vertical Well process, using all of the major ERDA laboratories in the current program. The Laramie Energy Research Center will continue process scaleup for air gasification. The Lawrence Livermore Laboratory will run a small air gasification test at Hoe Creek, Wyoming, to give us performance data at a different site. They will also begin development of steam/oxygen technology for the LVW process, while testing explosive fracture at a slower pace. The Morgantown Energy Research Center will attempt an LVW test at the Pricetown, West Virginia site next spring. This will show how well the LVW concept works in Eastern coals, while providing combustion data for a later test of the Longwall Generator concept.

Q. We understand that one of the major problems is that of developing a market for the low-Btu gas. If a successful in situ gasification process can be developed for Eastern coals, couldn't this solve most of the marketing problem?

A. The eastern coals are adjacent to major use centers, and this is an important factor in pursuing process development in the East, despite the greater difficulty in gasifying swelling bituminous coals. There are also market opportunities in the West. In particular, if underground coal gasification with steam and oxygen can be shown to be commercially feasible, the product can be upgraded to a synthetic natural gas and distributed by the national pipeline network.

Q. Since Morgantown Energy Research Center is primarily working with the Eastern coal seams, why shouldn't this project be fully funded and additional work conducted in the East so that if we are successful, the gas will be located near industrial users?

A. We recognize the need for additional funds in the eastern program. However, it is not certain what process concept will work in the highly-swelling, thinner bituminous coal seams of the East. The western coals have the greatest promise of commercial success in the near-term, and the program has put a greater emphasis on Western coal. The FY 1978 request increases support for both the Eastern and Western projects.

Q. Dr. White, would an additional $5M in this program for an accelerated development of research on the Eastern coal seams be adequate to increase the pace of the program so that it approaches that of the program in the West?

A. This would be a substantial increase which could expand the program beyond the work at the Pricetown site. The Western program is in a more advanced stage of development, but the Eastern program would be benefited by a more rapid pace, including an acceleration of the Pricetown tests and the development of other potential thin-seam concepts.

Q. Could you successfully utilize an additional $10M to accelerate the Eastern coal seam work as well as your Linked Vertical Well work conducted at the Laramie Energy Research Center? Would this level of funding be sufficient to accelerate this program so that we have answers within the next 2 to 3 years?

A. The optimum distribution of an additional $10M would be $3M in the Eastern program and $7M in the Western program.

The addition of funds to the Morgantown Energy Research Center will provide a more reasonable funding level for the Linked Vertical Well minitest and the Longwall Generator test. This will also include an increase for the instrumentation and environmental areas where added data would be most useful. The tests will examine at least two process options, including the drilling of another deviated well. The increased funds would also support university work and applicability studies in the Narragansett Basin and elsewhere.

An additional $7 million to the Western program will allow us to accelerate Hanna 4 for timely completion, complete Hanna 5 tests in FY 1979 and proceed into a pilot project, clean-up for Hanna 5 product gas, support controls and subsidence information, fund a site applicability test at Hoe Creek, support steam/oxygen technology development, support tests of shaped charges to link the gasification wells, and accelerate industry-run steeply dipping bed test.

The added funding could give important indications for success of these concepts in the next few years.

Q. The FY 78 request for Advanced Research was reduced $19M by OMB. What was the impact of this major budget cut?

A. OMB reduced the FY 1978 request for Advanced Research and Supporting Technology from $59,180,000 to $40,000,000, reduction of $19,180,000. Of this reduction, $13,080,000 was from the experimental research effort of the Materials and Exploratory Research Division (MER), i.e., research on processes, direct utilization, and materials and components. The remaining $6,100,000 reduction was in the Program Development and Coordination area.

The overall effect of the reduction is to maintain essentially level funding compared to FY 1977 (the increase barely covers inflationary effects). Specific impacts are as follows:

Materials and Exploratory Research Division
(Dollars In Thousands)

		FY 1978		
	FY 1977	Request	OMB Allowance	Decrease
Materials & Components	$ 8,585	$16,470	$ 9,264	$ 7,206
Direct Utilization	5,535	9,470	5,972	3,498
Processes	15,200	18,740	16,401	2,339
Program Development & Coordination	7,750	14,500	8,363	6,137
Total	$37,070	$59,180	$40,000	$19,180

Since materials and equipment breakdowns are the major cause of delays in synthetic fuel plants, a vastly expanded materials and components program is needed. An increase from $8,585,000 in FY 1977 to $16,470,000 in FY 1978 was therefore requested, but OMB allowed only $9,264,000 which will not support even a minimal program of activities conducted in actual plants:

- Inplant testing and failure analysis will be curtailed.
- Short range materials evaluation and development will be inadequate.
- Materials R&D at the National Laboratories will be cut 30%.
- Delays in components development will occur.

Research on novel and more efficient methods to utilize coal directly in power plants is an immediate pressing need. Accordingly, an increase in funding from $5,535,000 in FY 1977 to $5,972,000 is barely enough to

maintain only a minimal research effort in beneficiation, combustion, and power.

An increase in funding from $15,200,000 in FY 1977 to $18,740,000 in FY 1978 was requested to continue and expand modestly the promising effort begun in research for converting coal to synthetic fuels. The OMB allowance of $16,401,000 allows no significant expansion in this area, because of inflation.

Program Development and Coordination studies would be curtailed resulting in a reduced level of program and field integration efforts, comparative economic studies, market analysis, environmental monitoring, cost/benefit analyses and feasibility studies.

Q. Are the exploratory research funds for the Energy Research Centers included in the budget line item?

A. Yes. This line item contains exploratory research funds for the Energy Research Centers with respect to work on coal.

Q. If so, then a reduced budget in this area actually reduced your field research conducted at the ERC's?

A. The exploratory research work on coal in the Energy Research Centers will remain at the same level.

Q. Dr. White, do you feel this budget cut is justified since the key to reducing the cost of synthetic fuels from coal and shale is based on research?

A. Yes. We believe research can lead to substantial reductions in the cost of synthetic fuels. An increase in funds for research for this purpose was therefore requested.

Q. If funding is increased in this area, will some of the funds flow through to the Energy Research Centers?

A. Yes. An increase in Advanced Research and Supporting Technology will allow increased funding of the Energy Research Centers?

Q. How much additional funding is required to keep the pace of the research program on track?

A. The original funding request to OMB, indicated above, is needed for an aggressive research program.

Q. If the funding in this area is increased by $8M, will this allow for full funding of the exploratory research programs at the Energy Research Centers?

A. An increase of $8,000,000 will permit some selective increase in field funding.

Q. Dr. White, how much is contained in the FY '78 budget for continuing the work at the Cresap facility? Please break that figure down into the amounts for capital expenditures and operating funds.

A. The amount in the FY 78 budget for continuing the work at the Cresap facility is $12.5 million. All of these funds are operating funds.

Q. Is the amount in the budget adequate?

A. The amount is sufficient to perform the established tasks.

Q. Please provide for the Record an up-to-date summary of the work there, including a date when the test operations are scheduled to commence.

A. Mechanical completion was achieved January 14, 1977. Start-up activities are now in progress. Integrated operations (test operations) are scheduled to begin July 11, 1977.

Q. In view of the energy crisis we face, which the President has brought so dramatically to our attention, what alternatives may come from the projects you sponsor which may supply liquid fuels and gaseous fuels which can reduce our dependence on foreign sources; and when will these alternatives be available?

A. ERDA is presently negotiating four major contracts for in-situ oil shale technology field development and demonstration at the technical feasibility level, as a result of Program Opportunity Notice No. 2 issued in 1976. Assuming successful completion of these negotiations, each contract should be completed through the technical feasibility phase in approximately four years or 1981. At this demonstration level decisions can be made as to either the commercial viability of the process, or need for larger-scale commercial feasibility demonstration. Each of these four projects involves extension of extensive prior or ongoing industrial and/or Government field-scale research and development. Each addresses a different specific resource target within the western Green River Formation oil shales, thus maximizing the potential for economic and environmentally-sound technologies addressing extensive parts of the total resource presently estimated at 1.8 trillion barrels of shale oil equivalent. ERDA has also recently signed an extension to a contract with Dow Chemical Company, that provides for a four-year technology assessment program in the Antrim organic-bearing shales of Michigan. Because of the chemistry of these shales, a low to medium Btu synthetic gas is expected to be the major product, with some oil as byproduct. Under the four-year program, four in situ fracturing techniques are to be evaluated in separate field tests. Two of these experiments will include combustion-gas production tests. Data at the end of this four-year project should be sufficient for decisions regarding larger-scale technical feasibility demonstration needs. Thus, commercialization of this technology is unlikely before the latter part of the 1980's. All of these projects will make use of extensive process control, computer simulation, product evaluation, environmental, and other supporting research conducted by our ERDA laboratories and under various university contracts.

One major technical feasibility demonstration program for surface retorting technology, the Paraho processes for direct combustion retorting and hot gas retorting, continues to receive nominal ERDA support. This company has released estimates of costs for shale oil indicating that their processes could potentially be economic at present world oil prices. When and if a commercial-scale demonstration or application of this technology will be made is unknown, as Paraho hopes to sell equipment based on this technology rather than be a primary shale oil producer. ERDA support of the developmental and demonstration phases of this project was limited to the inherited responsibility for managing the Government-owned facilities on the Naval Oil Shale Reserves near Rifle, Colorado, under a lease agreement originally negotiated by the Department of the Interior with Paraho. These management responsibilities include monitoring of industrial activity at the property commonly known as the Anvil Points Facility when under lease, and maintenance of the property at all other times. Part of ERDA's responsibility includes publication of its independent evaluation of research results obtained by lessees of the property. We presently anticipate completion of our analyses of Paraho's initial demonstration project, that was conducted under private industrial funding of about $9 million, by the end of calendar year 1977. At the present time, we are continuing to monitor Paraho operations, under the base lease agreement, whereby they are producing shale oil under contract with the U.S. Department of the Navy. ERDA is also in the process of funding additional environmental research by Paraho, as an extension of work previously funded by the U.S. Bureau of Mines and also monitored by ERDA. The present production runs funded by the Navy, with lease management and data monitoring and evaluation by ERDA, are providing the Government with extensive new data on the Paraho process operability and reliability

over extended periods of operations compared with the initial demonstration funded totally by private industry. A major finding of this project to date relative to environmental impacts is the ability to operate with much reduced water requirements for spent shale management than have been reported or estimated for other surface processes at similar stages of development.

Q. What are the environmental problems of surface retorting and how do you assess them?

A. Environmental problems of surface retorting are mainly gaseous emissions, retort water cleanup, and disposal of spent shale.

The potential sources of gaseous emissions include off-gas from retorting operations, stack gases from shale oil upgrading, release of fine particles from shale processing, transport and disposal activities. Retort water generally contains concentrations of dissolved solids, and organic compounds. Leachate and runoff from processed shale areas may result if the shale is exposed to rain and snowfall. The disposal of spent shale and the associated revegetation is also of concern and is a subject of current study.

Comprehensive environmental monitoring and characterization plans are implemented for each ERDA oil shale project. These environmental plans are included in the environmental impact assessment which is prepared for each oil shale project. Environmental assessment reports are also issued for each project. These reports summarize the results of the environmental monitoring and characterization plan and also indicate the need for improved pollution control/processing equipment where necessary.

In addition, an Oil Shale Environmental Development Plan (EDP) is currently being prepared. This plan will be the major ERDA document for planning and managing environmental aspects of the oil shale program. The EDP will provide for continuing assessment of the oil shale program from an environmental standpoint.

Q. What is the relationship of the Commercialization Program to the Oil Shale Research Program?

A. The mission of the commercialization program is to enlist the support of industry and state and local governments in the development of alternative fuels to meet the Nation's energy shortage. The recovery of clean fuels from oil shale is a promising technology as an alternative to petroleum, and therefore, oil shale projects have been identified as one of the commercialization goals. The oil shale research program has as its purpose developing the technology necessary for an oil shale industry. Emphasis is given to in situ retorting rather than surface retorting, which is considered a known technology. In addition, laboratory and bench scale studies on composition and conversion for clean fuels from oil shale have been initiated to provide a technology basis for improvements and new process development. Accelerated scientific achievement as a result of this research will hasten the availability of technology for the private sector to expand oil shale operation to a greater variety of resources and improve the efficiency of resource recovery.

Q. Would Oil Shale Demonstration Plants be a program which should be put out under competitive bid?

A. ERDA does not plan to provide Federal financial support to a commercial shale oil facility. As in the past, support for Research and Development activity will, where possible, be provided pursuant to a competitive process.

Q. Will the commercialization program be a follow-on to any of your research projects?

A. ERDA will continue to support technology in its research and development phases where such technology offers the promise of commercial viability. However, ERDA does not plan to provide financial support to such technology after it has been reduced to commercial practice.

ERDA believes that access to world market prices will be a sufficient incentive to motivate one or more commercial shale oil projects to go forward.

Q. At what price can shale oil be sold?

A. The Administration has proposed that crude shale oil be permitted to sell competitively with the price of world oil landed in the United States, currently in excess of $13.60 per barrel. At this price some, but not all, shale conversion processes are believed to be presently economic. For instance, a recent study by Shell Oil Company under a cooperative agreement with the U.S. Bureau of Mines calculated that a modified in-situ process producing 55 percent of the shale oil in a 54,000 barrel-per-day plant, combined with surface retorting by the TOSCO II process to produce 45 percent of the product, could yield a 12 percent rate of return at $12.50 per barrel. This study also indicated that the combined process would be more economic than either surface processing or modified in-situ processing alone. Using the same assumption for calculation, this study gave required selling prices of $13.10/barrel for surface retorting and $13.40/barrel for in-situ retorting to yield a 10 percent rate of return. However, testimony by Walter Herget, President of Rio Blanco Oil Shale Project, November 30, 1976, stated that the surface mining and surface retorting process that they had evaluated for Colorado Lease Tract C-a would require a selling price for oil of $20 per barrel to yield a 15 percent rate of return. Recent testimony by officials of Occidental Petroleum Company has stated that their modified in-situ process can produce crude shale oil at $ 8-11 per barrel based on studies by the Ralph M. Parsons Company, when applied to Colorado Tract C-b. We do not know the rate of return this oil could provide in the $13 per barrel range, but it would appear to be economic. Recent public statements by Superior Oil Company and by Paraho Corporation have given respectively the ranges of $10-15/barrel, and $11-14 barrel, as prices at which their processes are believed to be economic. Crude shale oils as discussed here would require upgrading by hydrogenation to make a suitable refinery feedstock, but could be burned directly as boiler fuel.

Q. Is shale oil equivalent to Mid-East oil?

A. No, shale oil from western U.S. oil shale has higher nitrogen and sulfur content than most Mid-East crudes. Shale oil also contains arsenic which will poison refinery catalyst unless removed. Finally, shale oil is generally more viscous than Mid-East crudes and must be heated or specifically treated to be pumped. These properties will vary with the retorting process used. Retorting in the presence of steam or in a hydrogen rich atmosphere results in improved properties.

Q. What is the cost of upgrading shale oil by hydrogenation?

A. Present estimates for upgrading both surface- and in situ produced shale oils are in the range of $3-4 per barrel. However, such upgrading produces a superior refinery feedstock of a quality in terms of high middle distillate yields that has traditionally commanded a premium price of $1-2 above the market price of crudes that give high gasoline yields. Thus, the cost of upgrading is partially offset by premium selling price.

Q. What is the price of Mid-East crude today in the heartland of the United States, for example, at a place such as St. Louis?

A. The estimated selling price landed at St. Louis, via barge up the Mississippi River, would be about $14,10 per barrel. The cost if transported via pipeline would be about the same.

Q. Can surface or in-situ produced shale oil be commercially viable when sold in competition with Mid-East crude oil priced at $13.50 per barrel?

A. We believe that some shale oil processes may be competitive at a selling price of $13.50 per barrel. Recent publically released estimates by industry for surface processes give economic price ranges that in some cases overlap the $13.50 per barrel figure, showing that some of these processes could be commercially viable although none have yet been demonstrated in full-scale equipment. Recent cost estimates for modified in-situ shale oil production, by Occidental Petroleum Company, of $8-11 per barrel; and of required selling price of $13.40 per barrel to yield a 10 percent rate of return, by Shell Oil Company; both indicate that this type of process is at least marginally competitive with present world oil prices. Again, actual demonstration of commercial-scale operations will be required to confirm these estimates. It should be noted also that shale oil economics for any given process will be significantly affected by site-specific variables.

Q. Will either surface or in situ oil shale processes require price supports?

A. No. ERDA believes that access to world market price will be sufficient to induce one or more project sponsors of each of these processes to proceed.

Q. Is there a direct use for raw shale oil that has not been upgraded?

A. Crude shale oil has been demonstrated to be an excellent boiler fuel when blended with regular boiler fuel. No problems were encountered by a California utility when using several thousand barrels of blended shale oil, produced by the Paraho process, as feed to a electric generating plant. Until dependable daily production of major quantities of shale oil is reached, it is expected that a large portion of the oil produced will be used in this manner. Tests have also demonstrated that crude shale oil at low but reasonable percentages can be blended into normal crude oil and used as feedstock for current refineries. Depending on costs and availability of import crude, this also might become a preferred use of shale oils as supplies become more limited.

Q. Can shale oil be refined in a way similar to petroleum?

A. After hydrotreating, a standard practice in the oil industry for many years, shale oil syncrude can be refined in nearly any refinery in operation in the country. Because hydrotreated shale oil would probably be a premium product because of its high paraffin content necessary for production of middle-distillate jet and diesel fuels, it would be refined by techniques developed to take maximum economic advantage of its unique characteristics.

Q. Does ERDA have an active program to verify the refining qualities of in-situ produced shale oil?

A. ERDA, and its predecessor agency, the Bureau of Mines, has had an ongoing project for over 20 years at the Laramie Energy Research Center to study the problems associated with upgrading and refining of shale oil. This project has studied various catalysts and refining problems. Its program has been somewhat restricted because of limited amounts of shale oil, personnel and funds.

Currently, ERDA has a contract with Chevron research to evaluate the application of commercial hydroprocessing to synthetic liquids and is evaluating the processing of shale oil with very encouraging results.

A thoroughly-planned, broad-based, adequately-funded, multi-year program for upgrading and refining of shale oil is currently being prepared to allow maximum advantage to be taken of the large amounts of various crude shale oils expected in the near future.

Questions Submitted by Senator Huddleston

Q. Would you explain your coal-oil slurry program?

A. The coal-oil slurry program is to demonstrate that a mixture of coal in oil can be substituted for oil, and possibly gas, in utility and industrial boilers and heaters. By substituting coal for oil in these systems they can continue to operate, with minimum disruption of production, and still substitute coal for a substantial portion, approximately 30%, of the oil which is used by these industries. The basic technology is old. What is not known are the practicalities, operational requirements and real economics of such conversions.

Q. What role do you see from coal-oil slurries?

A. Coal-oil slurries can be retrofitted into a large portion of existing equipment, thereby making good use of in place boilers and heaters, drastically reducing the costs, time delays and lost production associated with coal conversion. While not affecting complete coal conversion, the 30% energy substitution is seen as a cost-effective way to use existing equipment while new equipment is being built. A substantial portion of the existing oil-fired equipment can be so converted, enabling us to reduce oil use by over a million barrels per day in a few years. Industry needs to know what the real costs and operating requirements are so that they can compare this option with other options and so that they can experience minimal delays and cost overruns during conversion.

Q. Can it accelerate the shift from oil to coal in utility and industrial boilers?

A. The coal-oil slurry program can accelerate the switch from oil to coal in existing utility and industrial boilers. It can be used in those facilities that do not have the space for coal handling equipment. It can do this at low cost (compared to full coal conversion). It is appropriate for the conversion of existing units and not for use in new equipment. It can accomplish a limited (30%) conversion of oil to coal faster than any other conversion method.

Q. In your assessment, what is the potential for extracting chemical feedstocks from coal?

A. Excellent. Chemicals can be obtained in the course of refining coal-derived liquid synthetic crudes and from coal-derived synthetic gases such as carbon monoxide and hydrogen.

Q. How much is specifically budgeted for this purpose and how is it to be used?

A. The total program for conversion of coal to liquids and gases inherently contributes to potential chemicals from coal. However, specific chemicals projects are small, about $500,000 per year in total.

Q. What are your future plans in this area?

A. Chemicals from coal will become of great importance in the future. Plans for research on chemicals from coal will develop as choices are made on the coal liquefaction and gasification processes now in the research stage. Coal liquefaction products are likely

candidates for refining to commodity chemicals such as benzene and toluene.

Q. Several technologies are being developed which offer the potential for the clean combustion of coal for power generation. Two of these technologies, which seem to have the greatest potential, are atmospheric fluidized-bed combustion and low-Btu combined-cycle power generation.

What is ERDA's assessment of these technologies?

A. The atmospheric fluidized-bed combustion and low-Btu combined-cycle power generation systems both promise a 10% to 15% reduction in power generation costs compared to conventional technology using low cost high sulfur coal. While other, more advanced systems promise savings of similar magnitude, the advanced systems require the development of more new advanced components than these systems with the practical consideration that when all of the unknowns are included it is not likely that any more advanced system can generate power from coal at appreciably lower cost. These systems can be developed faster than any of the more advanced systems and can be tested with the majority of components being current technology items.

Q. What efforts does ERDA have underway in these areas?

A. ERDA is building a flexible test facility to develop improved components for the atmospheric fluidized-bed combustor for utility power plants. An intermediate size, approximately 200 Mw, utility demonstration plant is planned.

ERDA is planning on building an integrated low-Btu gasifier combined-cycle power plant on a utility site to develop and evaluate the desulfurization aspects of gasification, the desulfurization equipment, and the plant controls, and to be used to test the advanced gas turbine which will be used in utility service.

Q. What have been the results thus far?

A. The 30 Mw experimental utility atmospheric fluidized-bed combustor is presently in the start-up phase. We have learned that there are no size-related problems when going from laboratory equipment to units of this scale. As of this date, three of the four cells in the boiler have been operated successfully; the fourth cell has not yet been tried as the start-up procedure requires the cells to be started in sequence. Laboratory work has shown that the capture of SO_2 in the unit, the suppression of NO_2 generation, and the stability of combustion are feasible.

Q. What future efforts will ERDA undertake?

A. In the future, ERDA will build an intermediate size, approximately 200 megawatts, utility application atmospheric fluidized-bed steam generator. ERDA will build an integrated low-Btu gasifier, gas cleanup, combined cycle test plant and will build an advanced high temperature gas turbine to demonstrate improved performance. The advanced gas turbine will be tested at the low-Btu gasification combined cycle facility. In addition, R&D will continue on improved components and subsystems.

Q. How will such efforts be reflected in future budget requests?

A. These projects will require substantial funds in the next several years. The cost of each of these projects will be well over $100 million.

Q. What was the impact of the OMB budget cut in your request for Drilling and Offshore Technology?

A. In the area of Drilling Technology, cost-shared downhole motor demonstration will be terminated in FY 1977 and cost-shared downhole telemetry demonstration will be terminated in mid FY 1978. No new projects will be started.

Bartlesville Energy Research Center project monitoring will be terminated in mid FY 1978. No BERC in-house projects will be funded.

Sandia projects, e.g., improved drill bits, drilling mud instrumentation and hostile-environment materials applications, will proceed at FY 1977 level which is down 37% from FY 1976 level.

In the area of Offshore Technology, Sandia seafloor instrumentation development including transfer and adaptation of defense technology will be terminated at the end of FY 1977. No projects will be started.

Planning assessments will proceed at modest levels and a Program Management Plan will begin.

Q. Do you actually need the $8.5M requested from OMB to continue this program?

A. To "continue" the program, we need at least a modest increase over the $2.4 million appropriated by FY 1977.

Q. How much is needed for a reasonable program?

A. For a "reasonable program" the $8.5 million ERDA request is needed to:

Continue projects already started,

Assess needs and define specific projects in area already identified as high payoff areas for ERDA efforts, and

Start up projects (mostly feasibility studies or OCS engineering data collection) already identified as high priority needs to accelerate drilling and OCS production which will not be met by industry or other Federal agencies.

Q. This cut from $8.5 million to $1.6 million reduces your funding below FY 1977. Can you continue your program at this level?

A. This level cannot be effectively continued at the OMB level.

Q. Didn't recent reports from both the FEA and the National Academy of Sciences recommend an expanded program in Drilling Technology development?

A. We are not aware of such an FEA report. The National Academy of Sciences did indeed recommend an expanded program in Drilling Technology at a recommended level of from $57 million to $99 million over five years.

Q. How would ERDA use additional funds in the Drilling, Exploration, and Offshore Technology program?

A. I will provide that for the record. (The information follows.)

	Budget Request		Examples	Payoff*
1.	Application of Defense Technology and Drilling	$1.0M	Downhole Electronics	Extend Operational Capability
			Severe Service Elastomers & Steels	Long Life Components
			Improved Bit Design/ "Stratopax" Cutters	Improved Penetration Rate
2.	Testing and Evaluation	$1.5M	Telemetry systems, downhole motors, instrumentation, etc.	Faster market penetration by new technologies
3.	Environmental and Advanced Concepts			
	* Planning & Analysis	$1.5M	Problem definition and program plan	Identify near term projects, effective program execution
	* Engineering Force Data	$2.0M	Gulf of Alaska Seafloor Data (Seismic and Sediment Stability)	Accelerate development and increase reserves in Gulf of Alaska
	* Environmental Effects	a/ $ .6M	Identify OCS Environmental Research Needs	Reduce delays caused by environmental concern (e.g., Baltimore Canyon)
	* Advanced Concepts	b/ $1.9M	Erosion drilling	Breakthrough in penetration rates
			Tunneling	Makes under ice resources exploitable
			New downhole motor concepts	Improved penetration rates

a/ This reduction of $.4M from original budget request is due to a late start on the time-phased program recommended in CURC report #152 (because no FY 77 funds could be applied).

b/ This increase of $.4M over original budget request applies the reduction in "Environmental Effects" to a new project on high pressure jet erosion drilling.

* For pure oil and gas, sooner.

Q. During the hearings before the House subcommittee last year, Dr. White testified that the Division of Fossil Energy (FE) was shorthanded to some degree. He testified that FE estimated its manpower needs at 733. Subsequently, the estimate was revised downward to 532 and then finally set at 340 in the President's FY 1977 budget. Was FE's coal program development and implementation constrained by manpower shortages?

A. Very definitely. Comparing FY 1975 with our original 1978 resource estimates, the FE program has increased 2.7 times with only a 50% increase in personnel. For the Coal Program only, the program increase was 2.5 times as compared with a 90% increase in personnel.

Q. In what ways?

A. A study we did shows that the number of R&D contracts to be managed by Headquarters staff has increased between FY 1975 and FY 1976 at a rate faster than available personnel to monitor them to insure quality of deliverables. In the Coal Program, the average contract management workload per manager is 4 each in FY 1976. As programs expand without additional personnel, this problem will get worse.

Q. With the heavy emphasis on coal, as evidenced by the 23 percent increase in budget authority for FE's coal program budget request for FY 1978, what will FE's manpower needs be?

A. Our manpower requirement for managing our FY 1978 budget program is 483 for Fossil Energy of which 271 are required for direct work in the Coal Program area.

Q. What are the prospects for in situ gasification and do you see the process as applying only to western coal?

A. The prospects of commercializing the technology in the West in the near-term and developing a sound technology in the East are good.

Recent tests at Hanna, Wyoming have given a high quality low-Btu gas at production rates up to 11.5 million standard cubic feet per day with high coal utilization. A pilot project could be started in FY 1986. This may be sufficient to prove commercial application since further scale-up would primarily consist of drilling and operating yet more gasification wells.

Analysis of foreign tests using oxygen-enriched air and 100% oxygen injection suggests that steam/oxygen gasification is technically feasible. If this is proven true, the conversion of some of the vast western coal deposits to a synthetic natural gas for national distribution is possible. Likewise, the successful gasification of steeply dipping coal seams has already been done in the Soviet Union, and the prospects for this technology in the Rocky Mountain and Pacific Northwest coals are very good.

The Eastern bituminous coals, characterized by high swelling and thinner seams, are the most difficult resource to gasify. Although commercial prospects lie in the intermediate term, a vigorous program of technology development offers a good chance of eventually using these coals.

Q. I was interested in the editorial in yesterday's Wall Street Journal, especially the reference to natural gas:

> "ERDA, though, has unofficially estimated that at an uncontrolled price of $2.25 the nation would be awash with natural gas. It would bring in 230 trillion cubic feet of what USGS calls 'inferred reserves', make economic the 285 trillion cubic feet of Devonian shale in Appalachia, the 600 trillion cubic feet in Western 'tight sands' and between 200 trillion and 300 trillion cubic feet of coal-seam methane."

Would you comment on that paragraph?

A. The information cited in the Wall Street Journal editorial is taken out of context and is misleading. The estimates contained in the above paragraph were one of several sets of such estimates advanced for use in an internal study of our nation's energy alternatives. They were the most optimistic estimates set out for consideration, and they are not the estimates currently being used in the study. But, whatever resource figures are "unofficially estimated", several important points must be kept in mind when considering such estimates.

1) The technology for producing natural gas from the uncoventional sources mentioned above is still in the experimental stages. ERDA currently has research and development programs directed toward finding ways of producing energy from these resources at competitive prices and with an acceptable degree of risk. However, substantial progress is needed in these areas before industry will be willing and able to recover a significant amount of gas from these exotic sources.

2) Resource estimates assess the amount of fuel that, in our best judgement, resides in the ground and can be recovered with a given technology which may or may not be presently available and at a given price range. These estimates include no time dimension and do not incorporate capital, environmental, socioeconomic, or institutional constraints. For example, much of the gas from these unconventional sources may be many miles from the nearest pipeline. There are legal questions surrounding the ownership of gas that is contained in coal seams. There are environmental issues to be addressed before significant amounts of methane can be produced from geopressured aquifers. Such factors can present considerable time delays. Thus, the probable existence of a resource under the ground cannot be equated with its timely production.

3) ERDA does not make resource estimates but must rely on other sources for basic data. Our natural gas figures are gleaned mainly from the U. S. Geological Survey, the Federal Power Commission, other agencies and industry. However, their numbers are often subject to interpretation, especially with regard to the economic and technical conditions under which the resource may be produced. This is to be expected where the resource is largely uncharacterized or even undiscovered. As a result, the estimates are open to interpretation and a wide range of conclusions may result. The important point is that there is uncertainty attached to each estimate and this must be kept in mind when dealing with such figures.

Q. When would the U.S. be "awash" with natural gas?

A. ERDA does not expect that the United States will ever have an overabundance of natural gas production. Regardless of the size of the resource in place, production is constrained by economic, technical, environmental and institutional barriers. Such factors as the number of drilling rigs and the availability of skilled manpower limit resource development. Also, investment capital is limited. Even if a gas project is expected to give an acceptable rate of return, it must compete with other investment opportunities.

Industry will invest in those projects having the highest expected net present value with an acceptable degree of risk. There are many investments that offer higher potential payoffs than gas production from unconventional sources.

Many wells will have to be drilled each year if we are to just stem the decline in domestic gas production. An increase in that production will be difficult indeed. A surfeit of natural gas in the U.S., in the face of the many barriers present, is not expected.

Q. Would you explain the reference to coal-seam methane?

A. All coal seams contain methane gas, which is a by-product of the chemical processes involved in conversion of plant material into coal. Methane, which is the predominant gas in natural gas, remains locked within the coal seam until it is released during mining operations.

Q. What is the feasibility of removing methane before the coal is mined?

A. Methane removal from coal seams prior to mining is a practical means of improving mine safety by reducing explosion hazards and thereby improving mining efficiency.

Q. What research is being done in this area?

A. The Bureau of Mines has an on-going program in methane drainage related to mine safety. ERDA has an on-going program directed at utilization of the methane released during mining. A new initiative to investigate the production of methane from coal seams not associated with mining operations is scheduled for FY 78. This initiative will be a joint effort involving the Division of Conservation Research and Technology and the Division of Oil, Gas, and Shale Technology. Conservation Research and Technology will conduct systems studies and technology assessments related to technical development of equipment such as LNG plants, fuel cells, turbines, etc. for efficient utilization of methane produced from coal seams. Oil, Gas, and Shale Technology will be responsible for technical assessments related to unminable coal resources and for development and demonstration of all technologies required for physically producing methane from coal.

Q. Would you explain your Devonian shale program?

A. The Devonian shale program, officially entitled the Eastern Gas Shales Project, is a multi-year effort aimed at commercially developing the gas resource locked within the Devonian-age shales of the Appalachian, Illinois, and Michigan basins. The project objectives are to:

1) determine the true magnitude and distribution of all potentially productive gas reserves in the shales,

2) characterize the physical and chemical parameters which govern shale reservoir behavior,

3) improve upon state-of-the-art stimulation and production technology to maximize the open-flow production rate and recoverable reserves attributed to each new Devonian shale well.

Removal of technical risks and development of more cost-effective technologies will provide incentives for commercial development of this resource by the gas industry.

Questions Submitted by Senator Bellmon

Q. Would you please provide for the Record a statement indicating the relationship between ERDA's FY 1978 budget and the President's Energy Plan?

A. An overview of ERDA's budget is contained in the National Plan for Energy Research, Development and Demonstration (ERDA 77-1). It contains key initiatives of ERDA's FY 1978 budget as compared to FY 77 and a comparative analysis of changes that have occurred as a result of Carter Administration and National Energy Plan (NEP) initiatives. A copy of the relevant portions of that document follows:

Chapter 7

Overview of ERDA's Budget[1]

The President's FY 1978 budget request to Congress for all activities of the Energy Research and Development Administration totals $7.3 billion in budget authority and $6.3 billion in budget outlays. Of this amount, $3.8 billion in authority and $3.1 billion in outlays are directly associated with energy RD&D. The total budget is allocated as shown in Table I.

This ERDA budget overview focuses on decisions related to the energy RD&D portion of the budget for nonnunclear and nuclear RD&D activities and discusses the trends in the development of that budget since FY 1976.

Energy RD&D Budget Nonnuclear Initiatives

Recognizing the importance of a strong technology program, President Carter made major revisions to the ERDA budget request in February (Table II). Increased authority of $247 million was requested for near-term effort on conservation, fossil, and solar heating and cooling. Funding for these new emphases was provided primarily from reductions in long-term programs such as the nuclear breeder, fusion, and solar electric applications.

In line with this initial shift in emphasis, the President requested further budget increases for key nonnuclear ERDA programs in April, coincident with the publication of his National Energy Plan. The emphasis in the current revision was on small-scale energy systems in the solar and geothermal categories ($28 million) with further increases for fossil ($17 million) and conservation ($7 million). Funding for these further emphases was provided primarily from reductions and adjustments in the nuclear program of $183 million.

---

[1] Includes the February and the April budget changes initiated by President Carter.

Table I

ERDA'S FY 1978 BUDGET REQUEST
($ in Millions)

	Budget Authority	Budget Outlays
Energy Research Development and Demonstration	3,790	3,079
Basic Research and Technology Development	672	636
Uranium Enrichment Activities	1,361	1,315
(Revenues)	(966)	(966)
National Security	2,139	1,915
Program Management and Support	309	310
Total	$7,305	$6,289

Table II

FY 1978 Energy Budget
(Budget Authority — $ in Millions)

	Past Administration Budget January 1977	New Administration Budget Revision February 1977	New Administration Budget Revision April 1977
Conservation	$ 158	$ 318	$ 325
Fossil Energy	598	640	657
Light Water Reactors	642	617	548
Solar Heating and Cooling	45	90	96
Solar Electric and Other	260	215	224
Geothermal Energy	88	88	101
Fusion	513	433	433
Advanced Reactor & Fuel Cycle Concepts	998	799	685
Total	$3,302	$3,200	$3,069

Some of the key initiatives in the total FY 1978 budget request as compared to FY 1977 can be summarized on a program-by-program basis as follows:

- **Conservation** — Increases are provided for efforts to develop efficient and fuel-flexible heat engines for transportation, to improve energy conversion efficiency, and to support the Electric and Hybrid Vehicle Act and a pilot energy extension service program. To help conserve natural gas, programs for development of small fuel cells and gas-fired heat pumps are being accelerated. Studies will be conducted aimed at the recovery of waste heat from ERDA's present enrichment plants and production reactors for use both in its own facilities and for supply to nearby external users, thus emphasizing the Federal Government's own commitment to waste heat utilization.

- **Fossil Energy** — Increases are provided for programs to substitute coal and coal-derived fuels for oil and gas and improve techniques for recovery of petroleum and shale oil resources. Design for a solvent refined coal demonstration plant will be initiated. Development of gas extraction from eastern shales will be accelerated. Possible environmental problems of carbon dioxide production from fossil fuel combustion will be studied.

- **Solar Energy** — Funding allows continued implementation of the solar heating and cooling demonstration program. Additional R&D effort associated with solar heating, high temperature collectors and solar space cooling will be pursued. Increases are provided to expand agricultural and industrial process heat and biomass applications and support to solar electric R&D activities. Specific efforts will be made to expand engineering design efforts on photovoltaic systems with concentrators and to pursue additional development of small wind machines for remote locations.

- **Geothermal Energy** — Increases are provided to intensify resource exploration, assessment, and utilization and to initiate a 50-megawatt geothermal demonstration power facility. Characterization of geopressured resources and non-electric applications of geothermal energy will be accelerated.

- **Fusion Power** — The budget provides for continued work on magnetic confinement alternatives and construction of the Tokamak Fusion Test Reactor at Princeton, New Jersey, and for expanded work in laser fusion on laser development and target experiments.

Energy RD&D Budget Nuclear Initiatives

The appropriate role of nuclear power and the concerns associated with the proliferation of nuclear weapons has been a major consideration for the Administration. Since the Administration took office, extensive reviews have taken place and a number of policy decisions have been reached.

The United States has a technology — the existing light water reactor (LWR) with a once-through fuel cycle — on which it can depend today for nuclear power with minimum risks.

The President has indicated in his National Energy Plan that the United States intends to use the LWR to help meet today's energy needs and to give increased attention to the production of uranium fuels for LWR's, LWR safety, licensing, and waste management. This policy will permit nuclear power to be used safely to meet U.S. energy demands for many decades. In seeking advanced nuclear technologies, the Nation must minimize the risk of nuclear proliferation, but with the knowledge that no advanced nuclear technology is wholly benign in this regard. Thus, the President announced on April 7 that the United States will defer indefinitely commercial reprocessing and recycling of plutonium. ERDA's nuclear research program is being reoriented to study alternative reactor and fuel cycle technologies.

The budgetary consequences of these changes in the nuclear program are shown in detail on Table III.

ERDA is also reorienting, within existing budgets, its National Uranium Resources Assessment Evaluation program to focus more sharply on a timely evaluation of the ultimately available domestic resources of uranium.

The President has proposed that construction of the Clinch River Breeder Reactor (CRBR) project be indefinitely deferred. The Breeder Program funding would be reduced, but a base program would be maintained. Efforts would now be directed towards evaluation of alternative breeders with emphasis on nonproliferation and safety concerns. A number of the breeder program support facilities previously planned would be delayed in light of the program reexamination. However, the Fast Flux Test Facility at Hanford, Washington, would be completed and used for fuel studies needed by the program.

The proposed reoriented LWR Fuel Cycle activity would be redirected to develop Advanced Fuel Cycles for alternative reactor concepts with enhanced nonproliferation characteristics and expanded work on thorium fuel cycles. Supporting nuclear energy assessment activities would be increased for more detailed study of alternative total reactor systems (including advanced converters) and other concepts to enhance proliferation resistance.

Recognizing the legitimate aspirations for the benefits of nuclear power on the part of many nations of the world, ERDA will reopen the order book for provision of enrichment services both at home and abroad from U.S. Government capacity. Such fuel services will be assured to any country that shares U.S. nonproliferation objectives and can accept certain conditions consistent with those objectives.

Table III

FY 1978 Fission Budget
(Budget Authority — $ in Millions)

	Past Administration Budget January 1977	New Administration Budget Revision February 1977	New Administration Budget Revision April 1977
Light Water Reactors			
Fuel	$ 369	$ 344	$ 248
Technology & Safety	98	98	104
Waste Management	175	175	195
Subtotal LWR	$ 642	$ 617	$ 547
Advanced Concepts			
LMFBR Base Program	620	506	450
CRBR	235	150	33
Other Advanced Reactor Concepts	75	75	75
Advanced Fuel Cycle Concepts	52	52	104
Nuclear Energy Assessments	16	16	23
Subtotal Advanced Concepts	$ 998	$ 799	$ 685
Total LWR & Advanced Concepts	$1,640	$1,416	$1,232
Uranium Enrichment			
Enrichment	$1,685	$1,685	$1,361

The expansion of U.S. enrichment capacity had previously been planned to occur using the historic gaseous diffusion technology. A vastly improved and energy efficient technology (using less than one-tenth of the electric power), namely centrifuge enrichment, has now reached the stage of development where it is suitable for application. It is this newer and less energy-wasteful technology which ERDA will now employ for expanded government capacity.

Budget Trends

Excluding uranium enrichment and supporting programs, ERDA's energy budget has radically changed in dollar and program distribution between FY 1976, the first full-year ERDA budget, and today's revised FY 1978 budget (Table IV).

Conservation and renewable technologies, starting from low levels in 1976, have increased by factors of about 3 and 2 respectively.

Table IV

ERDA Energy Programs
(Budget Authority — $ in Millions)

Program	FY 1976	FY 1978 Budget January 1977	FY 1978 Revision February 1977	FY 1978 National Energy Plan April 1977[1]	Increase in FY 1978 (April revision) over FY 1976	
					$ Millions	% Increase
Conservation	76	158	318	325	249	328
Fossil	426	598	640	657	231	54
Renewables	146	393	393	421	275	188
Light Water Reactor	153	642	617	548	395	158
Advanced Concepts	602	998	799	685	83	14
Fusion	246	513	433	433	187	76
Total	1,649	3,302	3,200	3,069	1,420	86%

[1] Does not include $1.0 million for carbon dioxide study programs and $5.0 million for international efforts to assist less developed countries.

Light water reactor work, also starting from a low level, first expanded significantly, but (with current decisions to defer chemical reprocessing) has been reduced, showing an overall growth factor of about 1.5.

Fossil efforts, starting from a higher initial level in 1976, have increased by 54 percent.

In the long-term programs, fusion has grown at about 75 percent, and advanced nuclear concepts first showed large increases but (with current decisions to defer the CRBR and to study alternatives) has been reduced, showing an overall increase of about 15 percent.

In the ERDA FY 1978 budget, as revised to reflect the emphases of the President's National Energy Plan, conservation and renewables together represent about 25 percent of the energy budget; fossil, light water reactors, and advanced nuclear concepts represent about 20 percent each; and fusion represents the remaining 15 percent.

As noted in the President's National Energy Plan:

> "A balanced RD&D program should have near-term as well as long-term benefits, should promote conservation and nonconventional resources as well as conventional resources, should support small-scale as well as large-scale projects, and should enlist the talents of individual inventors and small business as well as major corporations. In its revisions of the fiscal year 1978 budget, the Administration began the process of reorienting RD&D priorities to meet the country's real needs."

The President's overall energy plan provides the needed context for the National Energy RD&D effort. ERDA's activities in this area, combined with those of other federal agencies involved in energy RD&D, can provide the basis for technological change needed to allow the United States to weather a major transition in energy supplies and successfully meet the energy needs of the future.

83-107 O - 77 - pt. 6 - 31

Q. Please furnish for the record a mission-oriented budget pinpointing the accomplishments ERDA expects to achieve from on-going research activities between 1978-1985?

A. The estimation of precise out-year RD&D outputs is difficult and subject to some uncertainty due to such factors as the final disposition of the National Energy Plan, other relevant legislation and initiatives, RD&D success or breakthrough and "failures," energy price-effects and institutional barriers or impacts. The following "Energy Impact Estimates," presented as relating to the National Energy Technology Goals contained in ERDA 76-1, was prepared last Fall and provides energy contribution and funding estimates for both the 1985 and 2000 time frames.

To obtain these estimates, many assumptions had to be made for each technology. The assumptions deal with such factors as:

- status of competing technologies
- dates and types of technological innovations
- probability of success
- rate and degree of interaction by industry
- public preferences and attitude
- long-term economic trends, including world oil prices
- relative energy prices
- resource availability
- consumption or demand patterns, etc.

These estimates will change as improved data are obtained and methods of estimation are further developed. Some of our continuing efforts include modeling the Nation's energy system with attention to macroeconomic impacts and the use of other analytical tools such as market potential analyses, venture analyses, and cost-benefit analyses.

Please note that the energy impact estimates given are not the results of selecting a single set of input assumptions describing the Nation's energy and economic future. Key input assumptions concerning the price of oil, environmental degradation policy, nuclear power restraints, or federal incentives program for example, can significantly alter the market share achieved by a given technology. The impact estimates presented represent a range of probable impacts which a given technology may achieve in futures generally favorable to the technology. The estimates are therefore not additive since they are derived from different future scenarios.

It is important to understand that the RD&D program cost estimates assume a high priority for each particular technology over the stated time. Although such an assumption is the best we can do now for planning purposes, it is to be expected that cost estimates for some programs will be reduced in the future as choices are made and priorities are further refined based on more complete data and analysis. Furthermore, these cost estimates generally represent federal activities and do not include efforts by the private sector.

ENERGY IMPACT ESTIMATES

ERDA is presently implementing a new system to develop a consistent set of energy impact estimates for new technologies. The most comprehensive set which currently exists was prepared in the spring of 1975 for ERDA-48 and appeared again as Table 1 in ERDA 76-1, Volume I.

This attachment discusses each of the numbers presented in this table and indicates our current thinking with respect to possible changes. It is our intent to have a complete set of updated impact estimates available in the near future. Before reviewing the old estimates and presenting our latest views, however, it is necessary to discuss the

major problems associated with developing a coherent list and the methodology employed in making these estimates.

The first problem is where in the energy system to measure the quantity of energy saved or supplied. For consistency, measurement of all impacts must be made at the same point in the energy system. The two logical choices are at the point of resource extraction and at the point of end use, see the attached energy flow diagram. The latter point has been chosen as it is considered more important to examine the impacts of a new technology from the perspective of the final consumer since it is his decision with respect to which type of energy he purchases that ultimately drives the system. As a consequence of this convention, supply impacts have been adjusted downward to reflect the losses incurred during cleaning and processing of the fuel and transmission to the point of sale. Consumption impacts have been increased to reflect combustion losses.

To facilitate appropriate comparison and aggregation* of these impacts, it is necessary to express them in units which are consistent. The unit of measurement chosen for this list is a quad, equal to one quadrillion (10^{15}) Btu's. This is generally accomplished by converting the quantity of fuel purchased to Btu's on the basis of its theoretical heating value. Conversion from kilowatt hours (kwh), the standard measure for electrical output, to Btu's, however, presents a particular problem. At one extreme the kwh can be measured at its theoretical heating value, 3413 Btu's per kilowatt hour. However, this understates the impact of electricity generating technologies relative to the others as electricity is more valuable in its use than a Btu of oil or gas due to its greater versatility and application in end uses with higher efficiencies. At the other extreme one can convert a kwh in terms of the fuel required to produce it. The average heat rate of a typical fossil fuel electric power plant is approximately 10,000 Btu's per kwh. More efficient technologies have a lower heat rate while some new sources such as solar and geothermal power plants will have higher rates. A middle ground conversion factor is provided based on the amount of oil and gas which would be replaced by electricity in those end uses where they compete - space heating, water heating, industrial heat, etc. Such a conversion factor can be calculated for each new scenario or case used in estimating impacts. The resulting value is in the range of 5500-7000 Btu's per kwh hour.

The current estimates presented here are in most cases less than or equal to those contained in ERDA-48 and ERDA 76-1. These changes have come about not as a result of changing the methodology for estimating them but rather due to refinements of that methodology and the availability of additional information. The initial ones were from the six hand-generated Reference Energy System scenarios presented in ERDA-48. The current estimates are primarily the inputs to computer simulations of new Reference Energy System scenarios. These scenarios represent possible energy futures in 1985 and 2000 considering economic growth and energy consumption patterns under various constraints. The upper bound for the impact of a technology is computed considering its potential market, technical characteristics, possible institutional constraints, and other economic factors independent of competition from other technologies for the same markets. Further refinement involving the results of additional scenario calculations and environmental considerations will be incorporated in the system for the development of

---

* This list of impact estimates is not additive since the individual estimates are based on futures generally favorable to the particular technology rather than a single future which balances one set of supplies against a set of demands. Secondary impacts are not included such as the energy savings resulting from reduced capital equipment requirements due to conservation.

a complete set of estimates. At a minimum, annual revisions of the impact estimates are anticipated to reflect further model refinements and our expanded knowledge of the technologies, market and constraints.

Symbols

Symbols used in this attachment are:

MMBPD - Million Barrels of Oil Per Day
MWe - Megawatt Electric
GWe - Gigawatt Electric
KWH - Kilowatt Hour

GOAL I: EXPAND THE DOMESTIC SUPPLY OF ECONOMICALLY RECOVERABLE ENERGY PRODUCING RAW MATERIALS

		1985*	2000*
Oil and Gas - Enhanced Recovery:	ERDA-48	5.4	13.6

These estimates are for incremental increases in oil production and were used in all of the scenarios but Scenario 0. They were based on gross resource assumptions as shown in Figures 2-1 and 2-2 of ERDA-48. The 1985 estimates reflected very preliminary program targets and the 2000 estimates an extrapolation constrained by resources.

Current Estimate:		0.4-2	3-12

The estimate reflects more realistic RD&D program goals for 1985 and 2000. It also reflects partial deregulation of domestic oil and natural gas prices and concurrent increases in the price of imported oil.

Oil Shale:	ERDA-48	0.9	7.3

The estimates reflected enactment and implementation of the Synthetic Fuels Commercialization Program as envisioned in mid-1975 and growth to a level of 4 MMBPD by 2000. The high rates were used in Scenarios II, IV and V.

Current Estimate:		Up to 0.4	1-5

The current estimates reflect a more realistic market penetration potential. Environmental considerations may require a shift to second and later generation in situ techniques.

Geothermal:	ERDA-48	0.7-1.4	3.1-5.6

Two sets of estimates were provided reflecting more or less electric generation depending on whether or not there was a nuclear moratorium. Direct thermal applications were the same in both estimates.

Current Estimate:		0.1-0.3	1-5
(converted to trillions of kwh of electricity)		(.03-.09)	(0.3-1.5)

The high estimate reflects 20% compounded annual growth rate from an existing base of 500 MWe. It includes both hydrothermal and geopressured resources. This case also assumes rapid resolution of associated environmental problems. This estimate could be substantially reduced by environmental and other delays. Only hydrothermal resources contribute to the low impact. Impacts are geographically limited to the Pacific and Southwestern states.

* All impacts estimates are for the particular year indicated only.

GOAL II: INCREASE THE USE OF ESSENTIALLY INEXHAUSTIBLE DOMESTIC ENERGY RESOURCES

		1985	2000
Solar Electric:	ERDA-48	0.1-4	2.1-4.2

These estimates reflect the combination of wind, photovoltaic, solar thermal and ocean thermal power plants. As in the case of geothermal, two cases were provided, one reflecting a nuclear moratorium and the other the best that might be done in competition with nuclear. No more explicit considerations of cost were included in the analyses.

Current Estimate:	Up to	0.1	Up to 2
(converted to trillions of kwh of electricity)	(.03)		(0.6)

The solar electric program consists of the following components:

Wind - The estimate assumes installation of 21,000 wind generators in wind parks of 100 units by 2000. Growth starts in the mid-80's and continues at 15% compounded per year.

Photovoltaic - In this case a 1980 commercial introduction is assumed. A 1% penetration of the lighting, miscellaneous and electric drive application markets is assumed in the first year and 5% by the fifth year.

Solar Thermal - An early 1990's introduction is assumed with a growth rate slightly below wind generators.

OTEC - The estimate reflects a 1992 commercial introduction with a conservative growth rate.

Breeder Reactors:	ERDA-48	Negligible	3.1

The estimate is based on commercialization in the early 1990's and rapid growth to 80 GWe installed in 2000.

Current Estimate:	0	Up to 2 (.6 trillion kwh)

A 1993 on-line date is assumed for the first plant with market penetration paralleling the LWR experience. This leads to about 54 GWe installed by 2000.

Fusion:	ERDA-48	0	0

Commercialization is not expected until after the year 2000. Test and demonstration plants should operate sooner.

Current Estimate: No change from ERDA-48.

GOAL III: EFFICIENTLY TRANSFORM FUEL RESERVES INTO MORE DESIRABLE FORMS

		1985	2000
Coal-Direct Utilization Utility and Industry	ERDA-48	15.4	24

These estimates include coal consumption for heat and power in industrial and utility markets. Direct use of low Btu gas produced on site was included. No attempt was made to distinguish between existing and new technology based

on the assumption that RD&D was required to overcome environmental problems such as sulfur oxides control.

Current Estimate: 12-13 23-25

This estimate includes all coal consumption for utility and industry markets except low Btu gas. It includes fluidized bed combustion and other advanced, clean, direct combustion technologies for utility and industrial use.

Waste Material to Energy ERDA-48 1.2 4.9

These estimates reflect the direct combustion of solid wastes to replace coal and energy savings resulting from recycling of primary metals.

Current Estimate :

This category has been revised. The energy contributions from conversion of forest and agricultural residues are included in the new impact estimates for fuels from Biomass.

Gaseous and Liquid Fuels From Coal ERDA-48 1.4 14

These estimates include synthetic liquids and high Btu gas from coal resulting from passage and implementation of the Synthetic Fuels Commercialization Program as envisioned in 1975. It is based on 0.7 MMBPD of product in 1985 and 7 MMBPD in 2000. The explicit split between gas and liquid was not analyzed in detail.

Current Estimate : Up to 1 1-9

The current estimates include coal liquifaction, high Btu coal gasification and low Btu coal gasification (including in situ) for non utility use. Utility use of low Btu gas in combined cycle systems is included under advanced power systems. Each of the technologies should have commercial scale demonstrations in the early to mid 1980's and grow at rates based on their economic attractiveness in the markets as they exist then. It is generally expected that high Btu gasification will be commercially viable soonest. Both first and second generation plants are included when competitive.

Fuels From Biomass ERDA-48 Negligible 1.4

These estimates reflect the assumption that the growth of specific crops to produce liquid and gaseous fuels will be relatively modest through the remainder of the century.

Current Estimate: Up to 0.1 Up to 2

The technology includes the contribution of synthetic liquids and gases derived from forest and agricultural residues as well as from crops grown expressly for their energy content. The impacts reflect potential difficulties attributable to economic and environmental uncertainties, principally alternative land use questions, and the technical problems of aqua-culture.

GOAL IV: INCREASE THE EFFICIENCY AND RELIABILITY OF THE PROCESSES USED IN THE ENERGY CONVERSION AND DELIVERY SYSTEMS

		1985	2000
Nuclear Converter Reactors	ERDA-48	8.8	28

These estimates were based on relatively optimistic 1975 assumptions of 185 GWe installed capacity in 1985 and 720 GWe installed capacity in 2000. Both LWR's and HTGR's were included in this category.

Current Estimate: 4-5 13-17

(converted to trillions of kwh of electricity) (1.2-1.5) (3.9-5.0)

The changes reflect major delays in building of new capacity -- a maximum of 166 GWe in 1985 and 566 GWe in 2000 -- as well as a slightly lower assumed capacity factor. The higher impacts include the effects of streamlining licensing requirements and resolution of current concerns involving:

- resource assessment
- enrichment
- recycle
- waste management
- safety and safeguards.

Electric Conversion Efficiencies ERDA-48 Negligible 2.6

These estimates reflect improvements in the efficiency of generating electricity from coal. The quads are in terms of the coal saved. No tie to explicit new technologies was made.

Current Estimates: 0 up to 4

This area now includes the impacts of all the new technologies which convert heat mechanically, electrochemically, and thermodynamically into electricity. Of the various advanced power systems, MHD, fuel cells, and combined cycles (including those using low Btu gas) are expected to be the principal users of coal. Implementation assumptions are consistent with those of the other direct combustion technologies discussed previously. However, a slight lag in the operation of the first commercial scale facilities is assumed due to the greater complexity of the technologies and the response time of the utility users.

Energy Storage ERDA-48 -- —

No impacts were provided in ERDA-48 for the reasons discussed below.

Current Estimate:

The technology impacts result from direct energy savings through more efficient energy utilization, recovery and storage of waste energy, and facilitating the implementation of solar and wind sources. Examples include thermal storage for solar heating and cooling, batteries for electric vehicles, and closed loop chemical systems as a more efficient energy transfer and storage technique. As a result, the role of storage is critical to the success of electric transport, solar heating and cooling, and solar electric systems. This fact is reflected in the impact estimates for these related technology areas.

Electric Power Transmission and Distribution ERDA-48 Negligible 1.4

These estimates are based on widespread implementation of new, lower loss transmission technologies which reduce losses by 25%.

Current Estimate: Negligible 1.4

These estimates reflect only the savings available from reduced electricity transmission and distribution losses which represent a portion of the total energy savings impact of the ERDA research under the Electric

Energy Systems subprogram. Methods for estimating the impacts of these additional savings are being evaluated and the results will be incorporated in future impact lists. An additional motivation for this research includes facilitation of the use of more abundant domestically available energy forms and new sources to replace oil and gas.

GOAL V: TRANSFORM CONSUMPTION PATTERNS TO IMPROVE ENERGY UTILIZATION

		1985	2000
Solar Heating and Cooling	ERDA-48	0.4	5.9

These estimates include both solar heating and cooling for building use as well as agricultural and industrial use. They were used in Scenarios I, III, IV and V.

Current Estimate:	Up to 1	1-6

The projection assumes solar conditioning in 10% of the new building starts by 1985 with ten times as many solar installations by 2000. Further increases are attributed to higher rates of market penetration. Economics are assumed to be favorable for solar heating and cooling due to higher competing fuel costs or as a result of various subsidies. Agricultural and process heat applications are included.

Waste Heat Utilization	ERDA-48	0.7	4.9

Estimates assume widespread use of waste heat from electric generation for other low grade energy uses.

Current Estimate:

This category is being reviewed. Some savings may be included in conservation items; no new estimate is available.

Electric Transport	ERDA-48	0.1	1

Assumes a 1% market penetration for electric automobiles in 1985 and 10% in 2000.

Current Estimate:	Up to 0.1	Up to 0.6

Assumes a 2% market penetration for electric automobiles in 1985 and 13% in 2000, and that electric cars average 7,000 miles per year, per vehicle. Differences from ERDA-48 are due to reduced estimates of market size, vehicle efficiencies and mileage traveled per vehicle. The impact is significant in that it represents direct savings of oil assuming the electricity is not generated by oil fired power plants.

Hydrogen in Energy Systems	ERDA-48	0	0

A distant technology with widespread commercialization potential not expected before 2000.

Current Estimate — No change from ERDA-48

GOAL VI: INCREASE END-USE EFFICIENCY

		1985	2000
Transportation Efficiency	ERDA-48	4.9	9.0

Estimates reflect all of the savings anticipated from improved efficiency, lower vehicle weight and new mileage standards resulting in an increase of the fleet average to 28 MPG in 2000

Current Estimate		2-3	5-8

Efficiency improvements due to engine and vehicle design RD&D, plus increased load factors in sea, ground and air transportation modes will contribute over half of the total savings estimated. These estimates also assume federally enforced fuel consumption standards for the automobile industry.

Industrial Efficiency	ERDA-48	2.8	8.1

Assumes various improvements in process and combustion efficiencies as shown in Table B-2 of ERDA-48.

Current Estimate:		2-3	3-5

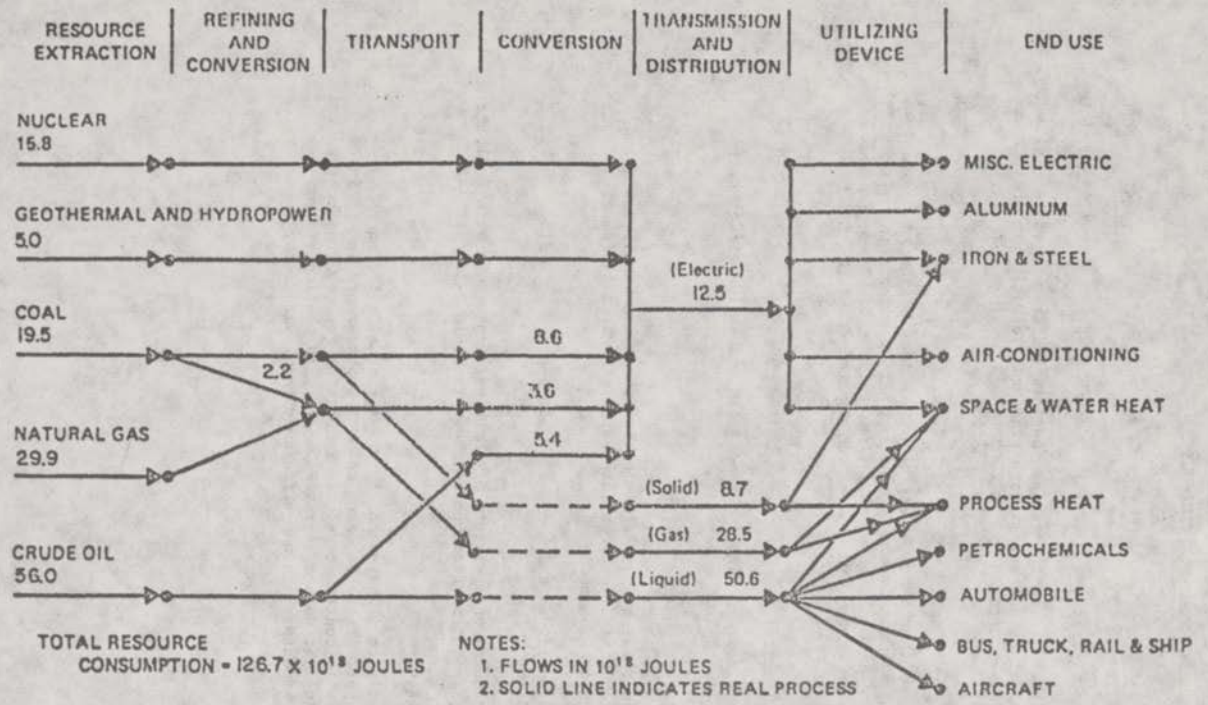
Increased industrial process efficiencies through federally enforced standards ; RD&D; and incentives for energy efficient equipment and process design are assumed.

Conversion in Buildings and Consumer Products	ERDA-48	3.5	7.8

Estimates are based on a variety of technical improvements in building shells and equipment performance as shown in Table B-2 of ERDA-48.

Current Estimate:		1-2	3-6

The impact estimate is based on stringent thermal efficiency standards as part of the building codes. Improvements in appliance efficiencies will contribute also. Incentives for new construction and retrofit of insulation and improved heating and cooling systems is assumed with mandatory minimum efficiency requirements for these systems.



REFERENCE ENERGY SYSTEM (1985)

PROJECTED PROGRAM COSTS FOR MAJOR TECHNOLOGIES

The total ERDA Program Costs listed below by technology goals are gross estimates based upon the President's Fiscal Year 1977 Budget Request. Dollar projections through a given year (e.g., 1982) do not imply the program ends that year, but represent projections that can be made at this time with some degree of confidence for each program. Generally, the lower estimates represent a moderate program growth for existing efforts. It must also be noted that these cost estimates were derived independently from the quad estimates in Attachment A and are not based on a common source; thus, there is no validity in comparing the quad and the dollars within or among programs.

Goal 1: Expand the Domestic Supply of Economically Recoverable Energy Producing Raw Materials	
Oil & Gas - Enhanced Recovery	$ 250-600 million through 1982
Oil Shale	$ 100-700 million through 1982
Geothermal	$ 650-1100 million through 2000
Goal 2: Increase the Use of Essentially Inexhaustible Domestic Energy Resources	
Solar Electric	$ 800-3500 million through 1986
Breeder Reactors	$ 9,000-10,000 million to 1990 for LMFBR Program
Fusion	
Magnetic	$10,000-15,000 million through 2000
Laser	$ 4,000- 6.000 million through 1995
Goal 3: Efficiently Transform Fuel Resources Into More Desirable Forms	
Coal - Direct Utilization	$ 800-1,800 million through 1982
Waste Materials Technology	$ 50-200 million through 1985
Gaseous & Liquid Fuels from Coal	$ 1,500-3,500 million through 1982
Fuels from Biomass	$ 300-1,800 million through 1990
Goal 4: Increase the Efficiency and Reliability of Processes Used in Energy Conversion	
Nuclear Converter Reactors	$ 4,000-6,500 million through 2000
Electric Conversion Efficiency	$ 300-1,400 million through 2000
Electric Storage	$ 500-1,000 million through 2000
Electric Power Trans & Dist	$ 200- 650 million through 2000
Goal 5: Transform Consumption Patterns to Improve Energy Utilization	
Solar Heating and Cooling	$200-700 million through 1985 (Includes Agricultural and Industrial Process Heat)
Waste Heat Utilization	$ 50-60 million through 1982
Electric Transport	$200-300 million through 2000 +165 million
Goal 6: Increase End-Use Efficiency	
Transportation Efficiency	$300-1,800 million through 2000
Industrial Energy Efficiency	$150-200 million through 1985
Conservation in Buildings and Consumer Products	$250-700 million through 1985 (Includes Energy Extension Service)

QUESTIONS SUBMITTED BY SENATOR STENNIS

Q. Does not the MHD program need $86 million during FY 1978 and can't this amount be expended without any difficulty?

A. The MHD Divisional request for FY 1978 funds as shown in the Holifield Tables was for $86 million. This request was based on a program structured to conduct the engineering development required on:

MHD channels,

MHD combustors and other MHD flow train components,

key subsystem integration, and

"balance of plant" development.

The scale at which such engineering has to be conducted is about 50 thermal megawatts or 6 tons of coal per hour so that these activities can be properly brought together to provide the design basis for the Engineering Test Facility and to initiate preliminary design-Title I of that facility in FY 1980. This proposed budget can be effectively applied to this scale of engineering development to maintain a realistic program schedule.

Q. If MHD is developed and becomes operational, how would you rate it in the area of protecting the environment?

A. The MHD system has the basic feature of increasing the efficiency of conversion of the energy in a fuel to electrical energy at the bus-bars to 50 percent or more. This represents an increase of 10-15 percentage points over conventional technologies. This increase in efficiency enables better use to be made of nonrenewable energy resources such as coal and substantially reduces the amount of effluent for a given size of installation. In particular, thermal discharge is significantly reduced.

The MHD process also has unique built-in features for controlling pollutants and does not require additional control technology for this purpose. The three types of pollutants which are subject to control in the MHD process are sulfur dioxide, oxides of nitrogen, and particulates.

The use of a seed material to render the plasma in an MHD generator electrically conducting is usually accomplished by injecting a salt of potassium, potassium carbonate being favored. After the electrons released by the salt have performed their function in the MHD generator, the chemical recombination which occurs favors the formation of potassium compounds, particularly potassium sulfate, and there is a built-in sulfur removal capability which has been experimentally demonstrated to reduce the SO_2 content from an MHD plant burning high sulfur to a level below that currently achieved with natural gas.

In all combustion processes involving high temperatures, the formation of oxides of nitrogen is to be expected. These oxides are chemically not stable and can be disassociated if their treatment at the power plant is carefully controlled. This is

done by a combination of controlled combustion conditions and cooling rates which are readily applicable to the MHD system. NO_x emissions have been experimentally demonstrated in the laboratory to be substantially below current EPA standards.

The need to achieve a high level of seed recovery in an MHD system (99.5%) guarantees that particulate emissions will be reduced to very low levels.

Q. Under the same assumptions, how would you rate MHD in the area of conservation of natural resources?

A. For the energy situation of the United States, coal is the preferred fuel for MHD. MHD raises the efficiency of conversion and so provides a more economical use of this valuable resource. Specifically for direct electric power generation, up to twice as much useful electrical energy could be obtained from our coal resources as would be possible with conventional technology.

QUESTIONS SUBMITTED BY THE COMMITTEE

Q. It is interesting that shale oil production has now slipped to the mid-term (1985-2000) after we were told the resource had great near-term potential. Why the stretch-out?

A. The response to the initial offering of oil shale leases in the early 1970's was so encouraging that it was assumed that production technology for shale oil by conventional mining and surface processing techniques was well-advanced and would be commercialized in the near-term without major Federal assistance. At least three promising surface technologies were known to have reached the large pilot or semi-works demonstration stage under private funding and industry was continuing to sponsor additional process development. The Government therefore continued only a minor role in research supportive of surface processing and devoted its major effort to development of in-situ technologies that at that time were considered potential second-generation plant alternatives, offering lower environmental impacts including reduced water and manpower requirements, and also improved resource recovery. Subsequent events that have impacted this scenario include rapid double-digit inflation that has tripled the estimated costs of commercial-size surface plants, environmental base-line studies that have shown natural background pollutant levels in excess of legally permissible levels, delays in resolving questions pertaining to land use and land exchange, oil pricing policy and divestiture questions, and important advances in technology for in-situ processing. At the present time, initial commercial-scale plants may be constructed based on either surface or in-situ technology, or a combination of both, if non-technical road-blocks are removed. The first plants can still reach full production capacity in the near term, but fewer plants will be on-stream than were previously predicted. Current ERDA projections are a range of 100,000 to 250,000 barrels per day by 1985.

Q. Most of the $34 million increase in coal liquefaction is for the H-Coal and Donor Solvent pilot plants. How far away are we from production in these plants?

A. The H-Coal pilot plant is scheduled for startup about September 1978. The Donor Solvent pilot plant should be operational by about January 1980. Based on successful pilot plant programs, the earliest commercial production by either of these processes would be in the 1986-87 time period.

Q. More than half your available appropriations for liquefaction--$48 million--were unobligated at the beginning of this month. The question, then, is how badly you need all of the $107 million you're requesting for 1978?

A. It is estimated that all funds available in FY 1977 ($81 million) for the Liquefaction subprogram will be obligated or committed by the end of the fiscal year. In addition to the $48 million obligated as of April 1, 1977, an additional $24.4 million is committed to procurements for actions in process. Additional procurement actions are currently being evaluated and will be in procurement channels shortly. All funds requested for FY 1978 are, therefore, required to continue Liquefaction activities described in our FY 1978 Budget Request.

Q. What are the industry contributions you expect in response to your $107 million request?

A. The major cost contributions occur in H-Coal (approx. 20%) and Donor Solvent (50%). These two programs will be cost-shared to the extent of nearly $38 million in FY 1978. Part of this non-Federal contribution is provided by EPRI and the Commonwealth of Kentucky, as well as by industrial cosponsors. A contribution by EPRI on the order of $2 million is possible for the solvent refined coal project and lesser amounts (totaling perhaps $0.5 million) are anticipated in other projects. The overall figure for FY 1978 approximates $40 million.

Q. Your solvent refined coal pilot plant in Washington may be upgraded, according to your justification. Why is this expensive project failing to attract industry support?

A. The pilot plant work on SRC was started by the Office of Coal Research before industrial cost sharing was considered appropriate and the project has always been carried out with only Government funding. No company has any special rights or proprietary position and it is difficult to introduce industrial cost sharing at this point. However, several companies have expressed interest in helping to scale up the SRC process toward commercialization.

Q. If you do upgrade the plant, are you going to get any private financing? (If not, why not?)

A. There is no expectation that significant industrial financing will be available for future work on SRC or modified SRC technology at the Ft. Lewis, Washington, pilot plant. The reason for the lack of industrial cost sharing is discussed in answer to the previous question.

Q. You say you have a $12 million budget amendment in the works to launch an SRC demonstration plant. Why, then, do you need the continuing expense of the pilot plant?

A. The FY 1978 amended request of $10 million operating expense and $2 million plant and capital expense would be utilized to accelerate efforts on producing clean liquid or solid fuel by the SRC process. It is quite common and justified for ERDA to maintain operation of the pilot plant after initiation of a demonstration plant. The justification is that the pilot plant will generate key design parameters that cannot be realistically scaled up or extrapolated with computer models nor based solely on bench scale or PDU data. These design parameters are needed for optimization of the demonstration plant for production of nearly sulfur-free and ash-free fuel. Furthermore, the pilot plant during FY 1978 and FY 1979 will be testing an improved separation technique to eliminate the high risk of filtration scale-up. In addition, it will test environmental and technical acceptability of full-scale utility combustion and ability to scale-up all sections of plants to provide data bases for demonstration plants.

Q. The big increase--$28.3 million--is for the proposed donor solvent pilot plant. How much will Exxon and Electric Power Research Institute be contributing to the <u>initial</u> funding?

A. The private sector funding will be on a dollar-for-dollar basis with ERDA throughout all portions of the Donor Solvent pilot plant project. Exxon and EPRI are presently planning to provide over 95% of the private funds although new participants are being sought by Exxon (unsuccessfully, so far) to reduce the Exxon and EPRI combined share to two-thirds of the private sector funding.

Q. How do all these solvent extraction processes tie together? Can they be complimentary, or are they just different options?

A. Each of the solvent extraction processes is a particular set of chemical operations which are of a similar nature, but different in significant detail. The products made in each case are also somewhat different. The way in which each of the programs supported by ERDA complements the others is through the similarity in equipment and individual process steps. Engineering knowledge gained in the successful operation or scale-up of any of these processes is useful to all of the others which follow.

Q. Considering all the solvent technologies that are still in pilot process, is not the SRC demonstration plant a bit premature?

A. The pilot plant at Tacoma has produced not only data but product as well. Product tests are encouraging. In addition, all engineering evaluations of the SRC process have shown low overall capital cost, high operating efficiency, and low product price. This process, in one variation or another, should be taken to commercial scale equipment as soon as possible.

Q. You are increasing the Cresap test facility from $5 million to $12.5 million to initiate operations there. And this is mainly a process and equipment testing facility now?

A. Yes, the principal program thrust for the first operational phase is the testing of equipment and process components which are common and important to most coal liquefaction processes.

Q. Why is there no private support for Cresap since it's so important to the liquefaction program?

A. The program being carried out at the Cresap Test Facility is an important support activity with the results equally applicable to all coal liquefaction processes. Because the results are of general utility rather than process-specific, it is appropriate that ERDA provide the funding. Individual process developers would prefer to contribute toward direct process work. However, when the contract was initiated two power companies who had no specific process interests, together provided a two million dollar contribution to encourage this work.

Q. Now, through a proposed reprogramming, you apparently want $10 million to take the Coalcon demonstration plant back to the drawing board. Will you be getting any help from industry?

A. Program reviews of the Clean Boiler Fuel demonstration plant project indicated that too great a technical risk was involved in proceeding directly to plant design and construction. In order to select the proper course of future action, a process review is required. The reprogrammed funds will provide the Government share of this work. Industrial cost-sharing is anticipated. The normal guidelines for industrial support will be used in defining the level of industrial cofunding to be sought.

Q. You call it a reprogramming. Actually, a transfer between appropriations is required since the existing funds are in plant and capital equipment. Doesn't that require full Congressional approval?

A. The Interior bill contains a provision for the merger of appropriations with other ERDA appropriations. We believe this provision, along with that in the Public Works bill allowing a transfer of up to 5% of appropriations between Operating and Plant and Capital Equipment, provides adequate authority for such transfers. Although we do not believe full Congressional approval is required, such a transfer should be subject to regular reprogramming requirements or related agreements with the Committees.

Q. You have no transfer authority in the fossil fuels part of your appropriation, do you?

A. This question is answered in the previous response.

Q. The request for high-Btu gasification is $51.2 million up by $7 million. With pilot plant development work winding down, it's not clear why you need such a large increase for this program. What are the principal cost factors?

A. For FY 1978, the principle cost factor for the high-Btu gasification program is still the continued development of second generation gasification processes representing almost 60% of the budget. While the CO_2 Acceptor and HYGAS Pilot Plants are being scheduled for phaseout, funds for two promising third generation technologies are being increased--Hydrane and Catalytic Gasification. A major impediment to successful demonstration of current pilot plant processes has been found to be the environmental impacts of various effluents. Additional funds are required to develop techniques for minimizing these impacts. Finally, to make intelligent decisions on the desirability of continuing or phasing out processes currently under development, more rigorous cost evaluations are now required. These important efforts account for the need for increased funding.

Q. What is the meaning of the case-by-case approach to joint federal-industry funding for all but two of your high-Btu pilot plant and PDU projects? If industry isn't interested in supporting certain processes, doesn't that tell you something? If the Synthane process shows so much promise, why is it continuing as a total Federal project?

A. Industry funding for the high-Btu gas program has been provided entirely by the American Gas Association (AGA). The limited funds available to AGA allowed them a budget of approximately $10,000,000/year towards the joint ERDA-AGA program. This limited budget did not allow AGA funding for Synthane or the Agglomerating Burner processes. This does not imply that both of these processes are inferior. In fact, data on these processes are being furnished to AGA and their gas industry committee visits these test facilities regularly. With the phaseout of the CO_2 Acceptor pilot plant, discussions are planned with AGA for considering the funding of the Synthane pilot plant.

The Agglomerating Burner PDU is being evaluated together with DuPont as a possible means of producing synthesis gas from coal.

Q. No funding is requested for the Hygas pilot plant in Chicago. Does this mean the process is fully ready for commercial demonstration?

A. It is true that no monies have been requested in FY 1978 for the Hygas Pilot Plant. This does not mean, nor should be interpreted

as meaning, that no further testing is needed and that Hygas is ready for commercialization.

ERDA is planning concurrent activities using the Hygas process. These include (1) conduct of a study to conceptually design the commercial plant as well as the demonstration plant, conduct detailed process design and develop economic/environmental/risk data from the project, and (2) generate firm base parameters for optimization of the demo-plant at the pilot plant. The pilot plant will provide design parameters that cannot be realistically scaled up with computer model, or based solely on other data such as bench scale or PDU.

Q. What is the outlook on industry response for a demonstration plant, and what is the general feasibility for commercializing this process in the near future?

A. It is anticipated that the industrial response to the solicitation for a Hygas Demonstration Plant will be sufficient to create a competitive environment. This opinion is a result of discussions with interested proposers and review of the 17 proposers to conduct a Hygas conceptual study.

In FY 1977 a concept study will be initiated to prepare commercial and demo concept designs, process design of demonstration plant and economic/environmental evaluation of a commercial plant. Not until completion of that study and successful additional testing at the pilot plant can a statement relative to the general feasibility of the process be established.

Q. Where do we stand on the whole concept of high-Btu gasification? If natural gas prices are allowed to rise, are we looking at any process that has true commercial appeal?

A. The primary question is not the <u>average</u> price to which natural gas is allowed to rise, but what will be the cost and price of <u>incremental</u> supplies of natural gas. These incremental supplies are estimated to cost $4.00 or higher per 1,000,000 Btu by the 1985-1995 time frame. Second generation high-Btu processes should be competitive with such costs. However, for these processes to be available by the 1985-1995 time frame, demonstration plants should be in the design stage by 1978. ERDA's program is in accordance with this requirement. Future third generation processes should be more competitive than current second generation gasification processes. Acceleration of the development of these processes is a major item in the FY 1978 budget for ERDA/FE.

Q. You have a big, $50 million increase in low-Btu gasification for a total of $73.9 million. What led you generally to recommend this sharp emphasis to this technology?

A. The FY 1977 budget for low-Btu gas was $33 million. However, there was also available in FY 1977 a carryover from the FY 1976 budget of $20 million. Thus, the increase from FY 1977 to FY 1978 was effectively approximately $20 million. This technology provides the lowest cost potential for converting coal to an environmentally acceptable gaseous fuel. It has attractive near-term potential as evidenced by appreciable industrial cofunding. In FY 1977, over $12 million of industrial cofunding was provided. For FY 1978, this is expected to increase to over $25 million.

Q. You have $10 million budgeted for the small gasifier in industry program and we hear indirectly that you may have a reprogramming in the works as well. What is the situation?

A. The $10 million budgeted has been applied to a program of six small industrial gasifiers initiated under a Program Opportunity Notice (PON-4). These gasifiers are in various stages of construction or design. The FY ERDA Authorization Bill (H.R. 6796) as reported by the House Science and Technology Committee provides that 40 million dollars be reauthorized from the Clean Boiler Fuel Demonstration Plant and be designated for the small gasifiers program.

Q. Basically, what is the advantage of several small gasifiers? Isn't it essentially one technology?

A. The purpose of the several demonstrations is to demonstrate the commercial viability of small gasifiers over a wide range of types of coal used, conversion technologies, location, and industrial applications. Successful demonstration of this type should lead to some acceptance for the industries, coal types and technologies demonstrated and thus provide relief from the effects of current and projected shortage of natural gas available to industrial users.

Q. Your justification states that the small gasifiers will be "heavily cost-shared by industry." What does that mean? Give us the figures, please.

A. It is anticipated that industry participation will be between 50% and 67% of the total cost of the gasification systems. The level of industry participation will be a key selection criteria.

Q. It would seem the small gasifiers are close to commercialization. What is the target date for that goal?

A. The technology for gasification is now ready for commercial demonstration to determine the full impact of environmental and socioeconomic and production cost consideration.

Q. How many of these small gasifiers are you talking about, exactly, and at what average Federal cost?

A. As we stated earlier, our request of $10 million for the gasifiers in industry project provides for six small industrial gasifiers. Based on a range of 50% to 67%, industry participation (50% to 33% Federal share) and an average price per gasifier of $3.5 million, the average Federal cost would be $1.5 million.

Q. Another heavy increase (plus $11.5 million) is for the Powerton Combined Cycle Test Facility, in Illinois, which your justification indicates is going into the pilot plant construction stage. Powerton represents a heavy investment by both Federal and private participants. What is this project expected to achieve and what is the commercialization goal?

A. The objective of the Powerton test facility or pilot plant (it really fits either description) is to establish the feasibility of the generation of electricity from coal via gasification and the use of the low-Btu gas in a combined cycle. The primary problem to be solved is the integration of the various processing

units with power generation modes of operation. Development of a suitable operating scheme and control system should make the commercialization of this technology possible in the 1985 to 1995 time frame. This technology offers the potential of one of the lowest cost options for generating electricity from coal.

Q. Hydrogen-from-coal -- You have $18 million to move the hydrogen-from-coal test facility into construction with 50-50 Federal and private support. How close are you to awarding a contract? To what extent will industry be expected to cost-share in the conceptual design and actual construction of the test facility? What has been spent to date on the hydrogen-from-coal project, and what has this funding achieved? What is the economic feasibility of hydrogen-from-coal as compared to, say, solvent refined coal?

A. It is anticipated that a contractor will be selected by the Administrator by June 15, 1977 with contract award being made shortly after that date.

Industry is required, by the terms of the procurement, to provide at least 50% of all costs including design and actual construction.

No contract funds have been nor will be committed by ERDA until the contract period.

The Hydrogen-from-Coal project represents a required processing step to produce hydrogen for solvent refined coal or any other liquefaction process. It is not a competitive project at this time.

The type of coal to be processed will be selected by the contractor based on cost and availability at the plant site.

Q. What type of coal is to be processed in this facility?

A. Texas Lignite, Kentucky, Illinois, and Pittsburgh seam coal will be processed in the Hydrogen-from-Coal Test Facility.

Q. The request for advanced power systems is $25.5 million, up $3 million from 1977 funding. What advanced power generation technology has been developed to date under this program?

A. The programs of the advanced power system branch include R&D programs for improved power generation technology for the open cycle gas turbine burning coal-derived fuels and for closed power systems burning coal. Several programs have started: the High Temperature Turbine Technology (HTTT) Program and the Closed Cycle Gas Turbine Primary Heat Exchanger. These new programs have only proceeded to the first phase; that of conceptual design, and program definition. Phases 2 and 3 of the HTTT program should be completed by 1982 or 1983. At that time we will have demonstrated the operation of an advanced gas turbine using coal-derived fuel. While the HTTT program has not yet tested hardware, we believe that under this program the design engineering of turbines and systems has been advanced.

In the closed power systems area, we are presently testing an alkali metal (potassium) boiler at the Oak Ridge National Laboratory. The alkali metal boiler is part of a topping cycle feasibility program to improve power plant efficiencies from 39% to 43%, and might lead to a new power generation technology.

Q. You note that the closed cycle systems do not appear as attractive as open cycle systems. Why, then, don't you shelve the closed cycle efforts and concentrate your resources on the more attractive technology?

A. Primary emphasis is on the open cycle turbine/steam combined cycle system. Only approximately ten percent of the FY 1978 funding will be applied to the alternative closed power systems. The closed power systems (Closed Cycle Gas Turbine and Alkali Metal Vapor Turbine) would be used in combination with a conventional steam technology system and are compatible with Fluidized Beds burning high sulfur coal. The Alkali Metal Vapor System holds promise of increasing power plant efficiencies from 39% to 43%. It is uncertain whether the increased costs for the stainless steel boiler, turbine, and condenser and pump are warranted by the increase in efficiency.

Closed cycle gas turbines offer attractive opportunities for burning coal in industrial co-generation applicators. European closed cycle gas turbines are currently achieving 65% thermal utilization of fuel in co-generation plants. For ERDA to ignore the alternative Closed Power Systems which show promise of high fuel utilization efficiency, capability for burning high sulfur coal in an environmentally acceptable manner, and with potential for a wide range of both industrial and utility applications is not considered prudent.

To place all the Advanced Power Systems eggs in the Open Cycle Gas Turbine basket would represent a gamble of high risk.

Q. Your preliminary estimated cost of open cycle gas turbine development is $307 million. To what extent is private industry sharing this cost?

A. While the present Technology Readiness program does not involve direct cost sharing, subsequent programs in Open Cycle Gas Turbines which build operational prototypes will be directly cost shared. The time frame for transition to new technology must be shortened if significant impact on energy use is to be achieved before major reductions in oil and gas supply occur.

Technology research, development, and demonstration (RD&D) is needed today to insure significant impact in the mid-term (1985-2000) and beyond. The advanced power systems program is based on the fact that successful development of these systems will require a comprehensive research and development program if commercial implementation is to be in time to meet increased needs for electrical power from coal. A strong federal role is required, especially in the early phases of technology readiness development, because the time frame, cost, risk and project magnitude exceed the usual limits for industrial RD&D.

At the present time the utility industry, through the mechanism of the Electric Power Research Institute (EPRI) is funding programs with industry. Some of these have strong, and in some cases overlapping, relationships with ERDA programs. Both ERDA and EPRI are exerting considerable effort to prevent duplication. These similar programs do not, however, include EPRI-ERDA jointly funded programs.

Costs and risks are high because systems with substantial advancements in major components are being developed. (As opposed to improvements in existing systems)

Long time to commercialization discourages large industrial investment in RD&D.

Q. Again, what are your specific goals in this program?

A. None of the large utility size gas turbines in use in the United States today burn a coal-derived fuel. In order to increase the usage of coal within the utility industry, the ability to burn a coal-derived fuel in gas turbines must be developed. It is the goal of the Advanced Power Program to develop this ability, while at the same time increasing the efficiency in the near term. Such systems are intended to generate base and intermediate load electric power in a clean, reliable, economical manner. The role of the ERDA program is to provide that technology readiness with and for the gas turbine industry so that these goals can be demonstrated by the industry in the middle 1980's. This means accelerated support to the technology of burning coal in large utility gas turbines including the activation of other elements that must be coordinated with this effort.

Specific objectives include developing the ability of the existing large industrial gas turbines operating on clean, petroleum-based fuel at 2000 degrees F to be able to operate on a semi-clean, coal-derived fuel at 2600 degrees F. The increased temperature provides an increase in efficiency. These gas turbines are intended for use in the combined cycle (combined gas turbine-steam turbine) plant. In order to operate at increased temperatures, the gas turbines must be provided with vane and blade cooling, which does not exist and must be developed.

In order to operate at these increased temperatures, new combustors must be developed.

One possibility exists which also must be investigated; that is, if ceramics can be developed which can tolerate these temperatures as an uncooled structural material, it might be that uncooled turbine parts can be used. This eliminates the performance penalty caused by the cooling fluid for the cooled blades and vanes. Such a possibility must be explored and developed.

Q. The request for direct combustion is $43.2 million, up about $1.3 million. Isn't this somewhat modest in view of your own statements on the near-term potential of this program?

A. While the FY 1978 request of $53.2 million is only $1.3 million above the amount appropriated in FY 1977, we believe that we can make significant progress in developing environmentally acceptable technology for direct burning of coal that will have near-term payoff.

Q. Could you accelerate this work, since it goes so directly to the President's specific goal of increasing coal utilization? (If so, to what extent? Details for record)

A. The present fluidized-bed combustion program will provide design data and cost estimates for utility scale demonstration unit construction and operation. Additional funding would not accelerate the existing utility demonstration program, but would be essential in broadening the industrial base and reducing the risk through parallel projects.

All existing fluidized-bed combustion contracts involve the use of bituminous coal as the primary fuel. No programs are directed to the utilization of our vast lignite reserves, of both the Great Plains and Texas types, peat, and other low grade fossil fuels. They warrant specific attention due to the basic

differences in composition and combustion characteristics among the several deposits and between peat, lignite, and bituminous coal.

Additional funding would be used to extend the FBC program into lignite, peat and other low-rank coal application categories to obtain sufficient engineering and cost data to demonstrate the feasibility of using these fuels for steam, power generation and process heat application. The feed stock proposed would be representative of a major portion of the national supply of that fuel type.

This additional funding would also expand the existing industrial application program to include direct and indirect process heating applications. Recent curtailments and interruptions of supply of oil, natural gas and propane have shut down or cut back production in textile mills, brick kilns, chemical plants, steel mills and manufacturing plants. Additional attention must be given to the application of FBC in process heating.

The direct combustion of coal for natural gas and oil in such energy-intensive industries as structural clay products, glass and steel has been demonstrated on a very limited basis. The affected industries have plans to extend investigations to include high-sulfur and high-ash coals. Their announced pace is dictated by availability of research funds. Several discussions with industry leaders indicate that ERDA funding could accelerate these planned investigations, and the resulting conversions to coal.

Q. Where does the Rivesville fluidized-bed boiler project stand at this time, and what have you accomplished there?

A. Construction has been completed. The plant is presently undergoing shakedown. We have operated three of the four cells and produced superheated steam at a rate of 160,000 lbs./hr., which is over one-half the rated plant capacity. The plant will be fully instrumented by mid-summer of this year so that during the test program we will obtain a broader data base so as to reduce the risks for a demonstration plant and eventual commercialization.

Accomplishments to date include demonstration of the ignition and operation of the world's largest fluidized-bed boiler, thereby increasing the interest and reducing some of the concerns of the major boiler manufacturers. We have found no problem with burning coal in larger beds than had ever been tried before. We have had no problems with the multi-level tube bundle immersed in the bed. We have successfully produced superheated steam in tubes immersed in the bed. We have successfully and reliably transferred hot bed material between beds to propagate bed ignition. As soon as the steam safety valves are properly set, we will be able to deliver steam to the host power company. The Electric Power Research Institute, the utilities, boiler manufacturers, state energy development groups, and many other groups are following the Rivesville operation very closely.

Q. What is the private participation to date and estimated for the total project cost of $42.6 million?

A. The contract for the 30 megawatt plant at Rivesville was initiated in the Department of the Interior through the Office of Coal Research (OCR) prior to the initiation of the cost-sharing policy which is presently used by ERDA. The contract does not reflect

any cost share although it is present in forms such as the host site, the steam turbine, the coal, and credit for steam from the boiler used for power generation.

Q. Your justifications seem to imply the atmospheric fluidized-bed combustion is much farther along than pressurized. In view of the growing importance of near-term fuel solutions, why aren't you concentrating more of your resources on the atmospheric technology?

A. The Direct Combustion Branch of ERDA/FE/CCU has committed more than $27 million of their $51.9 million FY 1977 budget on atmospheric fluidized-bed combustion (AFBC). The major projects for AFBC are: the Rivesville 30 megawatt boiler, the prototype industrial applications units, the component test and integration unit at Morgantown, West Virginia, and the technology test unit at Oak Ridge National Laboratory.

In addition ERDA, through the Demonstration Plant program, has conceptual design contracts for utility-scale AFBC plants. The AFBC program is considerably larger than the PFBC program.

Q. When do you expect to begin getting useful experience with the industrial applications program, for which you are budgeting $10 million a year?

A. Useful experience in the industrial application of the fluidized-bed combustion program includes the data necessary to confirm process specifications and to support commercial design. Such data are being obtained now from the sub-scale units which precede and provide guidance for demonstration unit design and operation. Also these data become a part of a general design base for access by all entities engaged in fluidized bed combustion commercialization.

The demonstration units which follow and parallel sub-scale work begin operation in late CY 1978 with the Georgetown University boiler startup. Successive demonstration unit operating starts are: FluiDyne Engineering in early CY 1979, Exxon Research and Engineering, mid CY 1979, Battelle Memorial Institute by the last quarter of CY 1979, and Combustion Engineering in early CY 1980.

Q. Under enhanced gas recovery you are proposing an expanded test program for hydraulic fracturing at the Nevada test site. What funding is earmarked for this effort and what will be done there, specifically?

A. At this time, we anticipate spending $1 million - $1.5 million for this program in FY-78. Specific activities programmed for 1978 are (1) mineback and evaluation of formation interface test (determine fracture behavior as it passes through two different rock types), (2) design, execute, and mineback a fracture conductivity test, (3) design and perform a proppant distribution test, (4) initiate support research in rock mechanics, fluid dynamics and geophysical/geochemical studies, (5) conduct in situ stress measurements and (6) evaluate basic well completion and stimulation procedures in conjunction with mineback studies.

Q. For explosive fracturing you indicate that you plan "an expansion of a successful program." Would you like to tell us a little more about this successful effort?

A. Tangible successes can be measured in two program areas - (1) development of equipment for safely mixing and injecting large quantities of high explosives in the borehole and (2) a more than two-fold increase in well productivity using a tuned chemical explosive. It may be argued that the commercial success of the first well in a mine well

contract is not proof positive of the viability of that particular chemical explosive fracturing technique; however, the results are most encouraging.

A less tangible, but extremely vital measurment of success is the large data base on chemical explosive fracturing and rock fracture mechanics which has been amassed to date. Also, program visibility has increased markedly during the past year, resulting in the receipt of several unsolicited proposals aimed at testing new CEF techniques. These proposals are currently being evaluated for technical merit and cost effectiveness.

Q. How much is earmarked for expansion of this particular project?

A. Funding levels will be increased from $1,560,000 in FY-77 to $2,000,000 in FY-78. These funds will be used to conduct additional field tests of successful techniques and for discretionary testing of any future CEF proposals. ERDA is currently evaluating three unsolicited proposals relating to chemical explosive fracturing techniques.

Q. Does the deviated well project shown any promise? You propose level funding for a third test well, but say little else.

A. The initial two deviated wells were to be drilled and tested by one producing company. The first well was a commercial failure in that no extensively fractured zone was encountered in the wellbore. Due to the unexpectedly poor results and lack of good data on the first well, the contractor has been granted additional time to conduct intensified geologic studies prior to drilling the second well.

The third well is to be drilled by another producing company. The preliminary geologic and engineering design studies are almost complete. The well will be drilled in the fall of 1977.

The proposed level funding effort in FY-78 is based upon the poor results and slow progress to date. Due to the extremely erratic producing characteristics of the Devonian shale, we believe that a minimum of 3 technically well-documented field tests are necessary to have any statistical validity.

Q. Under resource characterization you mention work in extracting methane from coal seams. How does this differ from the coal bed methane program in your Conservation program.

A. As presently structured, the Methane from Coal Seams program is to be a joint effort involving both the Fossil Energy Division of Oil, Gas, and Shale Technology (OGST) and the Conservation Division of Conservation Research and Technology (CONRT). CONRT will be responsible for management of technology assessment studies related to utilization, near-term exploitation/utilization projects and equipment development for methane utilization. OGST will be responsible for assessment of the unminable coal resources and the development/demonstration of drilling, stimulation and production technologies related to methane recovery from coal beds.

Q. Is the methane effort being coordinated with the Bureau of Mines?

A. Yes, a working agreement between ERDA and the Bureau of Mines (BOM) provides for delineation of responsibilities and coordination between the two agencies. Routine contact between ERDA and BOM program personnel takes place on a continuing basis.

Q. Shouldn't this methane work be consolidated in fossil fuels?

A. Since the proposed program addresses both production (Fossil Energy) and utilization (Conservation) technologies, there is a clear-cut rationale for division of the work.

As the program evolves the overall emphasis may shift toward one specific area or technology. Should one area of emphasis be sufficiently restricted then it would be appropriate to realign the objectives and transfer program responsibility to one office. Fossil Energy presently is developing an Enhanced Gas Recovery Management Plan which will provide an analysis of the Federal role in methane recovery both from geopressured aquifers and coal seams. This management plan study includes representatives both from Geothermal and Conservation.

Q. The gas industry has recently indicated strong interest in accelerating the methane utilization program on a cost-sharing basis. ERDA has about $3.5 million in total for this program. To what extent could this be effectively expanded to, say, a $15 million level?

A. Informal contacts with representatives of utilities, coal companies and the oil and gas industry indicate a general awareness and interest in developing the methane resource associated with coal beds. The factors limiting commercial development of the resource are the technological risks and large amounts of investment capital required. The initial ERDA RFP for utilization/exploitation work will be issued by the Division of Conservation Research and Technology within the month.

The infusion of $15 M will allow funding a greater number of proposals investigating a broader range of technologies. The resource base is so widespread and physically diverse, that a successful utilization system for the Pittsburgh coal seam in Appalachia may be totally unworkable for the very deep, thick coal resources in the western United States. Since the knowledge base relating to commercial development in other than presently mined seams is practically non-existent, a very broad-based program will allow us to rapidly build up both the resource and technology data bases.

Q. Please supply your best recommendations for an accelerated methane recovery program, including cost-sharing potential, and develop proposal for consolidating this work so that it won't be so fragmented in the future.

A. In order to accelerate this program we would suggest additional work in the areas of resource characterization and production technology. Government-industry cost-share for production technology tests for methane recovery hopefully could be negotiated on a 50-50 cost-shared basis. However, much of the resource definition work (except that obtained in conjunction with Government-industry tests) would be sponsored mainly by Government. Work to date has necessarily been fragmented because of historical government programs. The Bureau of Mines has been active in methane drainage of coal seams both ahead of and concurrent with mining activities. Most data available has been generated by the Bureau and they have done excellent work. However, all the data pertains to coal seams that are being, or proposed to be, mined and represents only a very small fraction of the coal seams from which methane could be recovered, ERDA's Conservation program was initiated to investigate utilization of the large volumes of gas that are being released as a result of mining activities. They, as well as Fossil Energy, realized the great potential for methane recovery from large geographical areas other than those presently being investigated, particularly in the western United States.

A logical division of methane related programs would be: (1) Extraction not related to mining activities - Fossil Energy (2) Utilization - Conservation and (3) Methane drainage (Health and Safety) - Bureau of Mines/MESA. Fossil Energy presently is developing an Enhanced Gas Recovery management plan which will provide an analysis of the Federal role in methane recovery both from geopressured aquifers and coal seams. This management plan study includes representatives both from Geothermal and Conservation with cognizance of and input from the Bureau of Mines relevant technology development program.

Although technology applications generated by the Bureau of Mines in their methane drainage program should be utilized in ERDA's future work, their effort to improve safety in coal mines should remain an intergral part of their health and safety program.

Q. You are also getting into methane recovery from geopressured aquifers which is also funded under your geothermal program. Again, why can't this be consolidated?

A. The current cooperative arrangement between the Division of Geothermal Energy (DGE) and Fossil Energy (FE) will allow the most efficient use of presently available management personnel to run the program. the geopressured aquifers constitute a wide spectrum of physical environments involving a complex interaction of heat, pressure, and diverse fluids. Specific areas of research which are more closely related to the existing enhanced gas recovery projects may not relate to geothermal projects and vice versa. A demarcation line between DGE and FE responsibilities can not be drawn at this time. Fossil Energy presently is developing an Enhanced Gas Recovery management plan which will provide an analysis of the Federal role in methane recovery both from geopressured aquifers and coal seams. This management plan study includes representatives both from Geothermal and Conservation.

Q. With your pending budget amendment you will be mounting a 15 million dollar Devonian shale effort - please give details of how the money will be spent and what specific results you expect.

A. The 5 million dollar additional funding for the Eastern Gas Shales Project (EGSP) will be targeted for near term demonstration (less than three years). The project, as currently structured, does not specifically address the immediate increase in production from these shales. Rather, the proposed 10 million dollar FY-78 project is an eight year R&D effort to delineate the production areas and understand the technology required for commercial application. To a limited extent, there are existing gas wells in the region which can produce the gas at a rate sufficient to provide existing pipelines and/or local users with a supply. It is the intent of the unexpanded project to accelerate this development by encouraging more rapid commercial use and explore the development of a "self-help" initiative for use of the Eastern Gas Shales.

The additional funds would be spent in developing various alternatives encouraging this production over that which currently exists. The primary reason why the natural gas has not been more fully exploited is that the wells that have been completed are normally low-productivity producers, i.e., produce at an average rate of 50,000 scf per day. While the project to date has been addressing stimulation methods to increase this production, the accelerated project will expend this development as well as directed end usage towards local consumption. For example, not only will interstate transmission tie-ins be addressed, but several local utilization schemes will also be a major portion of the expanded project. In this latter case, utilization by local commerce, federal facilities, schools, and/or small industries would be promoted as an alternative to placing the gas in the interstate market.

The original proposed EGSP FY-78 budget is divided into the following categories:

Current Budget	
BB 01-02-01 - Advanced Hydraulic Fracturing	$ 4,000,000
BB 01-02-02 - Explosive Fracturing Technology	1,000,000
BB 01-02-03 - Deviated Wells	300,000
BB 01-02-04 - Resource Characterization	4,000,000
BB 01-02-05 - Environment and Support	700,000
	$10,000,000

The accelerated project will expand the demonstration phase particularly in well drilling, stimulation and production. A proposed FY-78 budget in addition to the above for the accelerated project would include:

Additional Accelerated Budget	
BB 01-02-01 - Advanced Hydraulic Fracturing	$ 3,500,000
BB 01-02-02 - Explosive Fracturing Technology	500,000
BB 01-02-04 - Resource Characterization	1,000,000
	$ 5,000,000
Total - Current Budget + Accelerated =	$15,000,000

Q. Define what the additional $5 million in funding will produce.

A. The Eastern Gas Shales Project is a highly integrated natural gas development project. The three primary elements which are driving the development are:

1) a thorough characterization of the resource,

2) an R&D technology program to improve the rate of production of gas from the very tight shales, and

3) a demonstration program to stimulate widespread development of the gas-bearing shale deposits in the eastern U. S.

The characterization and R&D technology elements of the planned eight year project cannot be greatly accelerated, but the demonstration element can be accelerated. The accelerated program is designed to demonstrate state-of-the-art stimulation technology at different locations and then to select the most promising locations for commercial development. Since several promising development areas have already been identified, field tests could be started to test commercial feasibility. This field test development would more than double the currently planned field activity for FY-78.

The total accelerated project, if completely funded, would eventually call for the drilling, testing, producing and economic analysis of 240 wells over a period of three years. It is projected that this activity could accelerate the drilling by the private sector from less than 100 wells per year to 1500 wells per year.

Q. How many field projects will the TOTAL requested budget fund?

A. The previous 10 million dollar budget for the Eastern Gas Shales Project would support the following well tests.

(1)	SE OHIO	9 wells	Advanced hydraulic fracturing
(2)	NE OHIO	5 wells	Advanced hydraulic fracturing and recompletions
(3)	W. WEST VIRGINIA	2 wells	Advanced hydraulic fracturing
(4)	WEST VIRGINIA	2 wells	Explosive fracturing
(5)	KENTUCKY	2 wells	Explosive fracturing
	TOTAL	20 well tests	

The accelerated technical demonstration project ($5 million budget request) will support the following additional well tests.

(1)	NEW YORK, OHIO, WEST VIRGINIA, PENNSYLVANIA, AND KENTUCKY	10 wells	Advanced hydraulic fracturing, resource assessment, screening wells leading up to commercial demonstration
(2)	NEW YORK, OHIO, AND WEST VIRGINIA	8 wells	Advanced hydraulic fracturing, resource assessment, self-help technical demonstrations
(3)	OHIO, WEST VIRGINIA, AND PENNSYLVANIA	4 wells	Advanced hydraulic fracturing, resource assessment, technical demonstrations for federal facilities
	TOTAL	22 Additional well tests for accelerated project	

Q. To what extent does industry cost-share in this program?

A. To date, most of the cost-sharing with industry has been on a 50-50 basis between government and industry. There have been some exceptions where the government has received the benefit of industrial R&D data by cost-sharing at a 10-20 percent level. For example, when the government pays for only the formation coring and electric well logging to obtain scientific data for determining Devonian shale production potential.

The cost-sharing for the Eastern Gas Shales Project is divided into several categories.

	Approximate Percents	
	Government Share	Industry Share
Commercialization completed (Information to Industry only)	0	100
Cost-sharing with large industries leading to commercialization	40	60
Cost-sharing with small industries or self-help demonstrations	67	33
Self-help on federal lands for federal facilities	100	0

The purpose of this type of breakout is to encourage maximum participation from a representative cross-cut of potential users.

In a few areas, commercialization has already taken place, therefore, government involvement is not necessary other than to provide data to encourage development. In many other areas, industry is actively attempting to achieve commercialization for natural gas production and their interest is in joint cooperative projects. The R&D efforts (coring, logging and wellbore stimulation) are normally supported by the government, while the drilling of the well is supported by industry. In these instances, the government's share is generally held at less than 50 percent. With smaller industries, they feel the risk to them is greater, because of lack of experience, and require additional initial capital to justify participation.

If the federal government is to show direction in the self-help initiative, then the conversion of several federal facilities to natural gas in the area of Devonian shale production will demonstrate this leadership. At these facilities, all costs will have to be borne by the federal government.

Q. Tell us what has been accomplished to date with the western tight gas formation and what you expect to achieve with your 1978 funding.

A. Work on the Western tight gas sands progressed at a nominal level of effort until the FY-76 budget. With the FY-76 budget seven massive hydraulic fracturing (MHF) and one chemical explosive fracturing (CEF) field tests were initiated. The FY-77 budget was used to complete most of the funding of these projects. These contracts have been in existence eight months. Encouraging results have been achieved in the Natural Buttes Unit of the Uinta Basin of Utah. Three wells have been stimulated by MHF. Two of the wells were new and production tests before stimulation were in the 10 to 20,000 cubic feet/day range. Thirty days after the MHF treatment, one of the wells averaged 1,200,000 cubic feet/day and the second well averaged about 160,000 cubic feet/day. The third well, whichis two years old, averaged 50,000 cubic feet/day over a 12-month period immediately prior to stimulation. After stimulation the well produced at a rate of 900,000 cubic feet/day - an 18 fold increase in productivity.

Current technology for evaluating the gas producing potential of the various zones could not determine which of these wells or zones within each well could be successfully stimulated.

The FY-78 budget will concentrate on coring, core analysis and correlation of this information with geophysical logs, so that better reservoir analysis can be interpreted from these logs, for these lower quality reservoirs. Another accomplishment of the western tight gas program is the development of fracture analysis using equipotential resistivity measuring techniques and tiltmeters (highly sensitive level devices). Progress is being made on both of these techniques to determine the direction of the fracture, the lengths of the fracture, relative depths and at what time during the MHF treatment the fractures are growing and closing. These data combined with the pressure and pump rate data have greatly advanced the understanding of the fracture process.

Work at the Nevada Test Site in mine-back operations (in conjunction with MHF testing) have initiated an attempt to the understanding of the fracture process, especially the sand (proppant) distribution as related to pump ratio, sand size and viscosity of the fluid.

Although this program has been underway only nine months we feel that much has been accomplished in understanding MHF in these tight gas sands and in generating industry interest in developing these resources.

Our FY-78 budget is designed to support basin characterization of each of these tight gas sand basins and to expand the stimulation and formation evaluation work into two other geologic areas not now being addressed, the Green River Basin and Northern Great Plains Province.

Q. What industry cost-sharing do you have and what is projected?

A. To date for the Western field cost-shared industry projects ERDA has funded approximately 25% of total costs. However, these initial tests were strongly influenced by industry's proposed test design and site selection. As additional data is obtained resulting in improved resource definition as well as technology development, ERDA will require testing in specific areas with designated stimulation design resulting in higher percentage government participation. However, it is hoped that in most projects ERDA participation can be limited to 50%.

Q. One of the objectives listed under your offshore technology program is "to expeditiously satisfy leasing, inspection and regulatory requirements, socioeconomic impacts and ecological concerns, both real and imagined." Exactly what is ERDA doing to meet this objective?

A. The major efforts in the Drilling, Exploration and Offshore Technology subprogram which address the leasing, inspection, regulatory and environmental requirements in offshore petroleum resource areas are offshore marine environmental data collection, seafloor instrumentation, analytical model development, and data acquisition.

The offshore marine environmental data project will convert data previously taken in oil and gas producing areas of the Gulf of Mexico into a format so that it can be utilized to establish criteria for OCS engineering and operational design and assess environmental monitoring and control requirements associated with energy-resource developments in OCS and deep ocean areas. The results of this activity should provide ERDA with the capability to conduct analyses and display the environmental-dependent aspects of energy-resource research and development programs; and reduce OCS data to a format that can be utilized for engineering and operational design and for Federal certification and monitoring-requirements formulation.

The seafloor instrumentation activities in FY 1976 and FY 1977 are designed to incorporate previous experience with marine sediment penetrators (MSP), seismic instruments implanted in the ocean bottom with a high data-rate telemetry link. The initial project conducted in FY 1976 consisted of assembling and testing the equipment to demonstrate whether the concept was feasible. The results of the initial demonstration were used to identify differences and problems requiring redesign or advanced development. Another result identified the need for increased flexibility in test parameters. Following an evaluation of the results of the initial testing, additional acoustical equipment was ordered and installed in preparation for the next phase of testing. The equipment and test procedure will allow maximum flexibility in varying the test conditions and signals propagated, direct monitoring of the transmitted wave, and direct comparison of the received signal to to the transmittal signal. Such control is expected to optimize the acoustic-link parameters and result in an acoustic-link design to be incorporated in the instrumentation-system prototype scheduled for ocean testing at the end of FY 1977.

The program will also work toward the development in FY 1977 of an analytical model which represents the process of offshore oil

and gas development from the initial geologic survey to transporting oil ashore. This proposed model will be utilized to identify high-priority areas where ERDA can institute RD&D and/or problem-solving activities to accelerate development of oil and gas in the OCS. The model will also be used as a tool to identify and assess long-range strategies and the impact of these strategies on the national energy plan.

Finally, data acquisition, analysis and dissemination activities will identify users and their needs for information relevant to offshore oil- and gas-resource development (exploration, development, production, transporation, and onshore impacts); identify data, data sources, and acquisition methods; and assess the completeness of data for satisfying requirements and developing a plan for ERDA involvement in assisting users in acquiring timely data in a useful format.

Q. We realize that your offshore program is a joint effort with the industry. Roughly, what is the ratio of ERDA funding as compared to industry funding?

A. Presently all funding ($600K) is ERDA money, but industry has supplied company personnel for consultation, various base data and equipment (rigs, boats) at no charge to ERDA.

Q. With offshore techniques becoming more and more sophisticiated, are you making any effort to place more of the cost burden on the industry instead of the Federal government?

A. ERDA/Industry is expected to cost share at least 50/50 when technology development is not all in-house and/or needs assessment and basic research. To date, offshore projects have involved inputs from industry advisors and data sources, plus use of industry "work boats" and other industry support.

Q. Under processing and utilization you briefly mention the need for a relatively small physical facility for engine testing of fuels and lubricants. First of all, what is your interpretation of "relatively small?"

A. The facility for engine testing at the Bartlesville Energy Research Center utilizes ounces to gallon quantities of the synthetic fuel of interest. It is thus basically an engine testing facility for carrying out research.

Q. Isn't this the kind of testing that should be done by the industry? Why should ERDA get involved?

A. Yes, industry should certainly evaluate the synthetic fuels it produces, and this may very well be done at their own expense - especially if they have the fuels in question and a position for their commercialization. At the same time, there is a need for ERDA/Fossil Energy to independently evaluate the engine performance of selected synthetic fuels whose research and development the Government is largely supporting. The Bartlesville Energy Research Center provides this service, and its work in this area is highly regarded by industry as being technically authoritative and unbiased.

Q. Under your oil shale program you mentioned that the vertical modified in situ process is the most technically advanced and appears closest to economic commercialization. When do you think that might take place?

A. Ashland and Occidental began planning activities for the C-b tract in January 1977. Current plans call for four shafts to be started in September 1977, one a 12-foot-diameter shaft serving the "ancillary" facility where first retorting operations are scheduled to begin in approximately 2 years, the others of approximately 30 feet in diameter for major commercial production operations. Construction of the commercial facility is planned to be complete by September 1982 with full 57,000 barrel per day capacity to be reached by September 1983. Timing of this construction is such that results of Phase I of a proposed contract with ERDA for advanced retort design and demonstration on Occidental's DA Shale property would be available for use in design and demonstration of the initial C-b retorts at the ancillary facility as tentatively planned for a Phase II ERDA contract. Alternatively, Occidental and Ashland plan to use a scaled-up version of Occidental's Retort 3 technology that is presently sufficiently developed for commercial application. In either case, the timing for full-scale commercial operations would be similar, but the successful demonstration of advanced retort design would permit improved resource recovery and economics. Fewer retorts should be required to achieve a given level of production if improved retort designs are demonstrated to be capable of processing greater thicknesses of shale than the 300-foot maximum considered feasible for Occidental's present technology.

Q. Your shale gas program includes incremental funding for the Devonian shale program in Michigan. You indicate that testing will continue for at least three more years. I wonder if you have an estimate as to ERDA funding for the total project? It would also be helpful to know when you anticipate completion of the project.

A. ERDA funding of the Dow Antrim Shale gas project through the fracturing and technology assessment phases will require approximately $13.9 million over a four-year period to end in 1980. At this time, the entire program will undergo thorough review as to desired options such as: (1) increased funding of larger scale demonstration; (2) Further research and assessment of any areas of technology showing definite promise; or (3) abandon this line of research.

Q. Under supporting research for the oil shale program you seek to establish a fund to support research projects by Universities and private institutions that cannot be funded in the normal context of the budget. What exactly does that mean, and what are you proposing here?

A. Prior funding for the Supporting Research category of the Oil Shale subprogram, under which basic research to accelerate general oil shale development is performed, has been sufficient to maintain normal progress on four ongoing inhouse projects, and to fund only one university contract over a two-year period scheduled for completion in FY 1978. A limited number of university-type contracts that address specific in situ oil shale technology problems, that would otherwise be addressed by our in-house laboratories, are funded under the Shale Oil Production, Shale Gas Production, and Environmental categories that are presently oriented entirely to near-term in situ technology development. We propose increased funding under the Supporting Research category specifically to permit broader funding of basic research proposals from universities and other private institutions that are supportive of oil shale development problems outside the scope of our present in situ research. Many worthwhile proposals are regularly received related to innovative processing or production methods that are rejected for lack of funds.

Q. Under the Linked Vertical Well process of your in situ coal program you indicate that in FY 1979 an industrial partner will be sought

for the pilot stage. You say that this will result in a site change. Is this necessary or wise after the extensive work has been done at the Hanna site?

A. If we want to verify the Linked Vertical Well process in a different coal or get into the pilot stage, we would seek an industrial partner on a cost sharing basis by using an RFP or PON. Since that is a competitive process, it will most likely result in a site change. Also, the coals are very heterogeneous in nature, therefore, this kind of testing will be necessary for commercialization of this technology.

Q. What is the progress to date on the Longwall Generator process, and would you rate this process against the others?

A. The deviated well, 2000 feet in length, was completed into the six-foot thick seam at a depth of 850 feet. The well was turned to lie horizontally for 500 feet in the coal seam. A field test along this long seam has not yet been made. The lack of this detail and the lack of any other comparable underground test in eastern coal means that we cannot at this stage rate the processes against the others. Preparations are underway for Princeton I minitest sometime in mid-FY 1978 to get preliminary field data on eastern bituminous coals. This will be the first trial of the Linked Vertical Wells process in an eastern coal seam and will provide useful data on permissible well spacing for such coals. A series of experiments that simulate the field tests were completed in determining the mechanical and physical properties of coal under overburden stress.

It should be kept in mind that the different types of coal resources will have different processes. In that sense, it is difficult to rate one process against the others. Each is intended primarily for a particular kind of coal resource.

Q. Have you made any progress with the FY 1977 funding provided for the Steeply Dipping Beds project? For example, have you awarded the Phase I contract, or have you selected a site?

A. The RFP on Steeply Dipping Beds was released on May 17, 1977, for competitive bids from industry. The preproposal conference will be held on June 3, 1977, and the contract is expected to be awarded (Phase I) by September 30, 1977. The announcement of the RFP appeared in Commerce Business Daily on April 22. The site selection will take place after the bids have been received.

Q. Overall, as we have already mentioned, you have $39 million budgeted for In Situ Coal Gasification. What is the amount the industry will provide on a cost-sharing basis under this program?

A. The amount budgeted for In Situ Coal Gasification is $11 million and not $39 million. The $39 million represents the total for the oil shale and in situ technology program. The budget of $11 million is for projects entirely funded by ERDA.

Since the technology is in research and development stage, no industrial contribution has been made as yet. However, the competitive bids on the RFP on Steeply Dipping Beds will provide some information on industry's contribution to the program. This information should be available by September, 1977.

Q. Do you have any idea how much industry is investing on its own for in situ coal program?

A. Several companies have shown interest in Underground Coal Gasification. These are as follows:

(1) It is our understanding that the Texas Utilities Company has field-tested Soviet technology in Texas lignites. They have visited the Laramie Energy Research Center several times to seek information during their field testing effort.

(2) The Alberta Research Council in Canada is field testing based on the Linked Vertical Wells process.

(3) Gulf R&D ran a field gasification test in the past using corporate funds. They are supporting a task force to perform extensive economic analysis on the process and have presented papers at the Underground Coal Gasification Symposium and Society Meetings.

(4) Texas A&M University plans to conduct a field test using university and industry funds.

(5) University of Texas is doing research work in this area using industry funds.

(6) Cost-shared proposals from AMAX and Resource Sciences Corporation were presented to ERDA, but were rejected due to contractual reasons.

(7) In Situ Technology, Inc., is working on its own in this area and is applying for patents on a regular basis.

(8) During the Second Annual Underground Coal Gasification Symposium, a number of attendees from industry indicated that they were working on their own in this technology.

In light of this, it is safe to conclude that industrial interest is increasing and that industry will be investing more on its own to this program.

Q. What is the status of the Georgetown University contract, including cost-sharing, and when can we expect useful results from this small demonstration?

A. A letter contract, in effect since June 30, 1976, between the Georgetown University and ERDA, has been replaced by a definitized contract signed on April 27, 1977, in the amount of $14,181,312. Of that total amount, ERDA will provide $9,569,350 for the design, construction and start up of a 100,000 lb./hr. steam boiler. Georgetown will provide $4,611,962 for operation and maintenance of their boiler for three (3) years, supplying all pertinent data to ERDA for dissemination. Boiler start up is presently scheduled for late CY-1978. At that time operating results will begin to become available.

Q. The fluidized-bed combined cycle pilot plant in Wood-Ridge New Jersey, would cost an estimated $50 million total, with industry contributing only $5 million. Why can't this kind of pressurized work be deferred in favor of emphasizing promising aspects of the atmospheric program?

A. If the contract is increased from the present $27.5 million, plus a one-third cost share on the part of the contractor for the construction and operation phases, to $50 million due to escalation and contingencies then the contractor would be expected to increase their cost sharing accordingly.

The pressurized fluidized bed program is viewed as a mid-term benefit for utility applications with the potential for increased efficiency, and lower electricity costs. It is our viewpoint that every avenue of promise of lower cost and higher efficiency and offering potential for the transition from other fuels to coal should be explored.

Recently American Electric Power, the nation's largest privately owned utility and an acknowledged pioneer in the development of improved power plants, began a project to evaluate to their system. They chose the pressurized system in preference to the atmospheric system because of the higher efficiency of these systems.

American Electric Power is the major, privately owned, coal burning utility in the country. It is among the leaders in overall fuel efficiency and has one of the best financial ratings. It is their opinion the pressurized fluidized bed system is the most promising technology.

We believe that to defer development of the pressurized system is not appropriate.

Q. What do you expect to get from the Wood-Ridge plant in specific near- or mid-term benefits?

A. The nearest term benefits from this project are operating and performance data, starting in July of 1977, on a small pressurized fluidized-bed test unit (1.5 MWe) with a slip stream providing hot gases to a gas turbine. This operating data would more clearly define and hopefully answer many of the areas of concern in PFBC combined cycle technology i.e., hot gas clean up, corrosion, erosion, combustion efficiency, and tube and gas turbine materials.

Extended operation of this unit plus additional development work with this unit would greatly reduce the risk as well as developmental costs in the pilot plant thereby increasing credibility for pressurized fluidized-bed combustion applications.

Relatively near-term benefits from the pressurized fluidized-bed pilot plant would be a turn key offering on the part of the contractor to small utility applications, i.e., coal-fired peaking plants, and municipal power plants approximately 30 MW size. In addition there are many mid-size industrial sites in which this size pilot plant may have application.

For mid-term benefits the technology would be developed and demonstrated for utility applications up to the 800 megawatt power plant size as well as large industrial plants in the 90 MW size range.

Q. Can't you expect to get just as much, if not more, from the cooperative project in England, and at less overall cost?

A. The IEA project, while it is a PFB, does not have a gas turbine, only a blade test cascade. The pressurized fluidized-bed pilot plant in Wood-Ridge, New Jersey, is building a different combined cycle configuration than is being built in the IEA project. The IEA project is for a pressurized boiler with a power recovery turbine, the Wood-Ridge, N.J., pilot plant is a coal-fired gas turbine with a heat recovery boiler.

The IEA unit is being funded on equal shares with the United Kingdom and West Germany. Each partner has different objectives in the data to be obtained from the facility. The Direct Combustion program is geared toward the direct participation of industry, with

industry providing the site and obtaining "hands-on" experience. This will provide industry with design data and the operating experience necessary for mid-term utility commercialization.

Q. What specifically has been accomplished to date?

A. Accomplishments to date include:

Pittsburgh Energy Research Center (PERC)

Achieved over 1000 hours of successful firing of coal-oil mixture in a 100 HP four pass fire-tube boiler.

Established and operating an additive (surfactant) evaluation laboratory.

Began construction of a 700 HP water-tube boiler under construction for extensive coal-oil mixture combustion testing to begin early FY 1978.

General Motors (GM)

Completed successful test firing of coal-oil mixture (35% coal, 65% oil by weight) in a 120,000 lb/hr water-tube package boiler under-load conditions in June 1976. 1000 hrs.

Completed successful test firing of coal-oil mixture (50% coal, 50% oil by weight) in same 120,000 lb/hr water-tube package boiler under full-load conditions in April 1977. 700 plus hours.

Program Opportunity Notice/Fossil Energy (PON-FE3)

Letter contracts signed September 1976 with two utilities (New England Power, 80MW unit; and City Public Service, 69MW unit) to retrofit and combust coal-oil mixtures as a primary fuel. Both definitive contracts in May 1977.

Definitive contract signed (May 1977) with Interlake, Incorporated (1000 ton/day of hot metal blast furnace) to inject coal-oil mixture (50% coal - 50% oil by weight) through tuyeres instead of oil. Engineering underway.

Authorization to proceed issued to Acurex-Aerotherm in April 1977 to retrofit and combust a coal-oil mixture in an 80,000 lb/hr package boiler at P. Lorillard tobacco drying plant in Danville, Va.

All contracts under PON-FE3 are cost-share (50-50 for construction and operation).

Q. How will the slurry approach improve utility and industrial conversion to coal burning from an environmental aspect?

A. From an environmental aspect, "Coal-Oil slurries are considered a combination of solid and liquid fossil fuels and therefore, the SO_2 and NO_X emission limits would vary depending upon the heat input derived from each of the fuels."*

However, the net results with respect to allowed sulfur content and SO_2, NO_X and particulate emissions is identical to separate compliance units burning compliance coal and oil. Hence, there is no direct improvement or detriment environmentally.

* U.S. Environmental Protection Agency, Division of Stationary Source Enforcement.

Q. Give us some very specific goals in the coal-oil slurries program. Include an explanation of how this will help achieve the President's goal of switching to coal.

A. The specific goals of the coal-oil mixture program are to:

(1) Verify under commercial conditions
   a. combustion characteristics (degree of slagging erosion, corrosion, etc.)
   b. retrofit economics
   c. mix-store-transport capabilities of coal-oil mixtures

and

(2) Obtain sufficient verified data to enable applicable commercial, industrial, and utility operations to convert to coal-oil mixture firing with minimum modification and capital appenditures.

The realization of those goals will provide a near-term coal-based alternate fuel capable of using existing equipment to allow a rapid and orderly transition from 100% oil/gas firing to 100% coal firing. From an economic point of view, it allows, during the transition period, that segment of industry having units with appreciable remaining economic life to continue to use their existing units with minor retrofit expenses.

Q. Your budget for advanced research and supporting technology is $40 million, but no explanation is given for the $3 million increase. Why the increase, aside from normal cost increases?

A. The increase of $3 million for advanced research and technology corresponds to (a) an increase from $29.32 million to $31.6 million (or 7.7%) for research supported by our Division of Materials and Exploratory Research in Universities, our Energy Research Centers, the National Laboratories, private research institutes, and industry, and (b) an increase from $7.75 million to $8.40 million (or 8.4%) for Program Development of our Office of Program Planning and Analysis. The increase of $2.28 million for the research supported by the Division of Materials and Exploratory Research should permit continuation of the most promising ongoing projects. However, the cost of doing research has increased due to inflation. This necessitates termination of research on various projects whose potential is more questionable in order to sustain a meaningful effort on the more promising research developments.

The FY 1978 request also includes $8.4 million, an increase of $600,000 over FY 1977, for Program Development and Coordination activities. These funds will be used to continue initial planning, financial management, review and analysis, and environment and safety activities in support of the Fossil Energy Program.

Q. What parts of this program are directly geared to near- and mid-term technology? Please identify them and their funding.

A. The proposed program for FY 1978 of the Division of Materials and Exploratory Research is divided into three major areas: Processes, $16.4 million (vs $15.2 million for FY 1977); Direct Utilization, $6.00 million (vs $5.535 million for FY 1977); and Materials and Components, $9.20 million (vs $8.585 million for FY 1977).

In the area of Processes, approximately 35% of the funding (or $5.7 million) is for research related to the development of near-term technology and 65% (or $10.7 million) for research aimed at

mid-term technology. In the area of Direct Utilization, approximately 50% of the funding (or $3.0 million) is geared to near-term technology and 50% (or $3.00 million) for mid-term technology. In the area of Materials and Components the split is more like 60% (or $5.5 million) geared to near-term technology and 40% (or $3.7 million) for mid-term technology.

Q. We touched earlier on the solvent refined coal demo plant for which $12 million is to be requested in the pending budget amendments. To what extent will this plant utilize technology that is being developed by ERDA in existing SRC programs?

A. Any solvent refined coal demonstration plant must utilize, almost exclusively, technology being developed by ERDA. Depending on the final product form desired and the ultimate use of the final product, some limited proprietary process data may be utilized by some industrial proposers.

Q. What led to the decision to seek this additional demonstration plant funding? What will the plant achieve, if all goes reasonably well?

A. The decision to seek additional funding was a result of goals set by President Carter in his April 20, 1977 energy message.

The SRC Plant's aim is to convert high sulfur content eastern coal to a low sulfur and ash-free clean burning fuel. The processing of coal will produce products such as solid and liquid fuel, pipeline gas, LPG and Naptha in an environmentally acceptable manner. The production of this clean burning fuel will help promote our independence from foreign oil. In addition, as a result of environmental regulations, many utility companies and industries which have previously used high sulfur coal have been forced to switch to clean coal and petroleum products which are in scarce supply. The production and utilization of processes such as those in the SRC Plant would reverse this trend.

Q. To what extent does industry participate financially in the conceptual design of demonstration plants?

A. The conceptual design phase of a cost shared demonstration plant is fully funded by the government. ERDA is investigating the concept of requesting offerors to propose cost sharing from the inception of a demonstration project. The approach would provide greater assurance of this financial commitment to the continuation of the project.

Q. Based on experience to date with Coalcon, why don't you require industry cost-sharing at the outset? Wouldn't that give you a better reading on the true economic feasibility of these demonstrations?

A. Industry cost sharing at the outset would help assure that a realistic industry viewpoint was expressed during this period. We plan to explore in future procurement actions the possibility of having some portion of the cost sharing allocated to Phase I of the project.

In most demonstration plant projects there are a certain number of R&D type technical problems which still need to be clarified in the pilot plant before the Phase I activities can be completed. Therefore the technical risk and the economic feasibility will not be established until the completion of Phase I. It will be necessary to plan the cost sharing in Phase I so that the maximum contribution can be made by industry at an acceptable financial risk. Each specific project will be investigated to take into account the resources of the industrial partner and the technical risk associated with the project.

Q. You are going into the construction phase with your $34 million request for a high-Btu gas demonstration plant. What process has been selected, and where is the plant to be located?

A. The objective of the High Btu demonstration plant program is to demonstrate the commercial economics and technical feasibility of converting coal to synthetic pipeline gas. There are several promising technical approaches in various stages of development. Viability of an industry for converting coal to pipeline gas will depend largely on the competitive stature of conversion processes. The ERDA program has been structured to assure competition in terms of process efficiency and economics. Based on solicitation for Industrial Partners to cost share construction and operations of a demonstration plant, two offerors having technical and financial capabilities have been selected for contract negotiations to undertake demonstration plant engineering and design, construction, and operation, with the Government option to select only one offeror for plant construction and operation following the engineering and design effort. The processes selected as a basis for contract negotiation, and proposed plant locations are the slagging Lurgi (A) and the COGAS Process (B), and the proposed plant locations are as follows:

Key Process Unit	Offeror	Proposed Plant Location
Slagging Lurgi Gasifier	Conoco	Noble County, Ohio
COGAS Gasifier (A three part unit, air combustor, heat transfer chamber, and steam-char reactor)	Illinois Coal Gasification Group (ICGG)	Cutler, Perry County, Ohio

(A) This process is a modification of the Lurgi process now in commercial use in Europe and South Africa. All of this plant, except the gasifier, is composed of commercial processes and equipment; and thus affords minimal risk in this application.

The gasifier is a modified dry bottom commercial Lurgi gasifier with operating conditions changed so that slag is produced rather than dry ash. A pilot plant size gasifier has been operated at Westfield, Scotland, and has produced sufficient data to verify operability and yields.

(B) This process is an integration of the COED (Coal, oil, energy, development) process successfully piloted and dismantled and the licensed COGAS process system in developmental pilot plant status in Leatherhead, England. Each major portion of this process has been operated successfully but not together in the same process stream.

The COED portion is a multi-stage pyrolysis process that produces syngas, volatiles and a syncrude oil. The COGAS portion processes the char produced by pyrolysis into hydrogen, for in-process use and syngas using air as the oxidant.

Q. Your justification for this plant are vague. Since the taxpayers will be asked to supply about $220 million for the project, why don't you give us some specifics, including the contractor, construction timetable and specific goals. If the selected process is not any of those supported by ERDA, explain the selection and justify the feasibility.

A. The High BTU program is directed to demonstrating the commercial viability of process(es) for converting coal to synthetic pipeline gas. Solicitation for an industrial partner has resulted in selection of two offerors for contract negotiations. Specifics concerning the projects as offered are shown in Attachments A and B.

One feature of the cost shared demonstration plant program, is to share both the technical risk, and the responsibility for process technical evaluation with the industrial sector. Based on the process evaluation conducted by the industrial offerors, and ERDA in the selection processes, the two processes as indicated in the attachments have been identified as meriting demonstration. The key process of "Unit A" incorporates the slagging Lurgi gasifier, a process based on Lurgi (Lurgi Mineraloel Technik GMBN) and British Gas Corp. technology with ownership of the process held jointly with the developers and an American consortium which has financed the development. This process is an advancement over the commercially demonstrated Lurgi gasifier.

The key process of Unit B is the COGAS process, which includes technology developed under the Office of Coal Research "COED" program, and design of a three-part air blown gasifier developed independently by the COGAS Development Company, an American Consortium. The COED program was very successful in the pilot plant stage, and produced a liquid product, the use of which has been demonstrated in a number of applications, including fueling of a Naval Destroyer.

The respective offerors (the CONOCO Consortium and the Illinois Coal Gasification Group) evaluated these processes carefully, and selection of their offers was based in large part on the respective evaluations. Both processes promise significant improvement in conversion efficiencies over current technology, and have been found sufficiently mature to warrant demonstration.

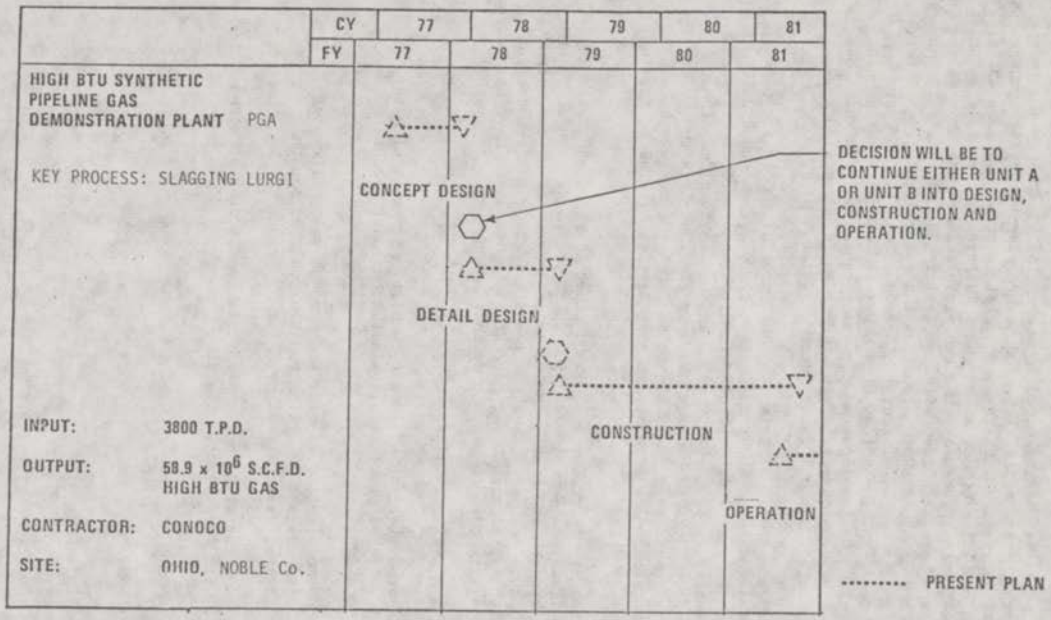
The goals of these projects include:

a. demonstration of long term plant operation with the selected process using indigenous coal (moderate caking).

b. demonstration of selected process suitability for processing low caking western coal and a highly caking eastern coal.

c. demonstrating process efficiency and process economics with the selected coals.

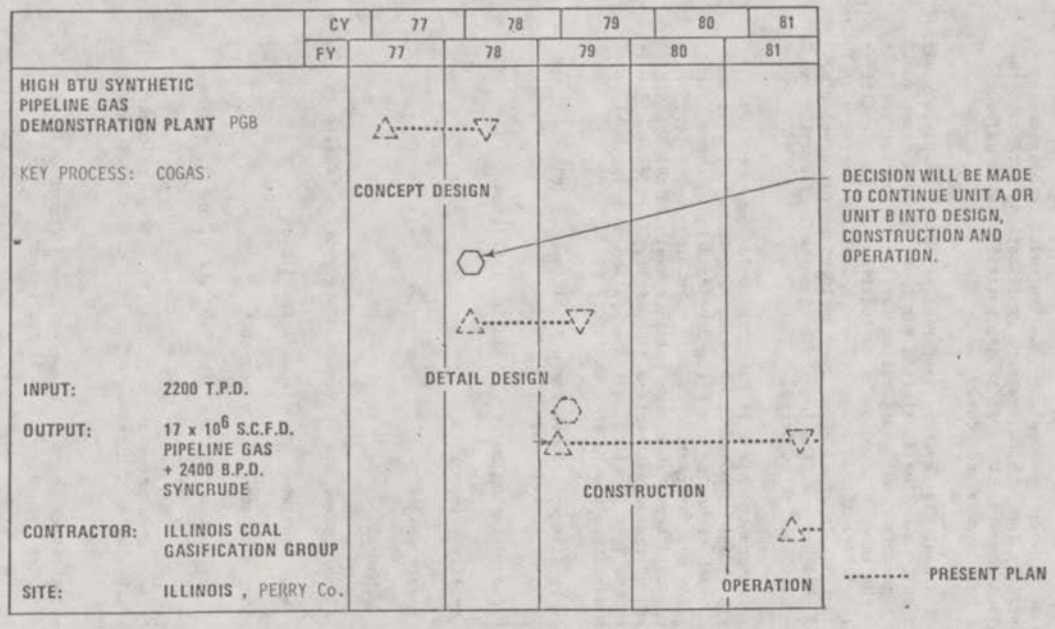
PIPELINE GAS — UNIT A



ATTACHMENT B

MFPM ERDA AFE
20 May 1977

PIPELINE GAS — UNIT B



3035

Q. The House authorizing committee, we are told, is considering a test facility approach to high-Btu gasification instead of the demo plant concept. What is ERDA's position? Give us your version of the pros and cons.

A. A High Btu Coal Gasification Test Facility as presently visualized would result in having facilities representing both first and second generation coal gasification facilities operating side by side in the same location. The co-location of these facilities would facilitate a true technical and economic comparison of these technologies. It could serve as a springboard for developing improvements and modifications to both technologies which can be made available to industry.

Equally important, this Test Facility could complement the presently planned demonstration plant program. In the present program, each technology is being developed by industry in an application most attractive to each technology. The Test Facility would serve as a base point to evaluate the benefits from each of these applications. Hopefully, many of the developments in the Test Facility could be applied advantageously in all the demonstration plants at some future time.

The side-by-side relationship could utilize the following common facilities and activities:

- Transportation and coal handling facilities
- Utility supply
- Management
- Technical and maintenance manpower
- Product movement, storage and disposition facilities
- Waste treatment and disposal facilities
- Single construction contractor
- Other common offsites like laboratory, shops, office buildings, etc.

While these common items may not total to a large cost saving on a percentage basis, the absolute level of cost sharing could be important.

The benefits which might be expected from a direct side-by-side commercial type comparison are listed below:

- The co-location will facilitate a completely consistent and objective evaluation of the processes involved, the value of alternative coal feeds, and relative economic values.
- The environmental differences will be clearly defined.
- Performance and operability testing of various equipment types can be carried out.
- Operator training for the future coal utilization industry can be facilitated.
- Materials of construction can be evaluated under comparative circumstances.

- Testing of Second Generation Medium Btu Gasification technologies might ultimately be carried out.

- Longer range, evaluations of third generation technologies can be performed.

Obviously, not all of the above can be carried out concurrently. The basic plan would involve installing an existing technology such as a conventional Lurgi together with a second generation technology not presently in the demonstration plant program. Many of the above evaluations can be included in the base plan. The other aspects can be included in a timely manner as funds become available. The basic program could also permit the testing of commercial processing equipment, thus eliminating the need to consider the construction of a separate equipment testing facility.

As we see it, there are disadvantages to the High Btu Coal Gasification Test Facility idea which need to be considered. They are:

1. It would be difficult to obtain industry participation, thus requiring a GOCO type of operation and 100% government funding.

2. It might be difficult to dispose of the facilities to private industry as planned for the specific demonstration plants.

3. Because of the variability of the production of high Btu gas, it might not be possible to realize the maximum price of the product.

4. Operation under government contract might cause industry to question the validity of the economic results.

It is understood that the presently planned High Btu Pipeline Gas Demonstration Program will be continued on a high priority basis in parallel with any proposed High Btu Coal Gasification Test Facility. This would result in a comprehensive evaluation of the most attractive technologies on a broad basis for the National interest.

Q. We must ask the same questions about your $36 million requests to start construction on a low-Btu fuel gas demonstration plant that we asked on the high-Btu.

A. Grace/Ebasco

The Texaco, high-pressure 1700 tons/day coal conversion process has been selected. If the project proceeds to the construction phase, the plant will be located in Baskett, Kentucky.

Memphis Light, Gas and Water

The U-Gas low-pressure, 2800 tons/day coal conversion process to be used by this public utility. If the project proceeds to the construction phase, the plant site is beside the Mississippi River, Memphis, Tennessee.

Erie Mining Company

The Woodall-Duckam gasifier will be used by this firm at its Hoyt Lakes, Minn., site. The demo plant will process 500 tons/day of high sulfur, high caking coal.

New Jersey Zinc Corp.

McDowell-Wellman gasifiers capable of processing 300 tons/day of high sulfur coal will be used at this firm's Palmerton, Pennsylvania plant site.

Q. The projected construction cost of the low-Btu plant is $150 million - another sizable investment. If the contractor and process selection are not final at this time, how can ERDA expect Congress to begin funding this kind of commitment? That question also applies to the high-Btu proposal.

A. Grace/Ebasco

Contract negotiations are nearing completion. Assuming July 1, 1977 execution, Phase I costs to ERDA will require about $8,000,000 during FY 1977 through FY 1979. Cost sharing during Phase II and III (FY 1978 through FY 1983) will require ERDA participation of about $136,000,000.

Memphis Light, Gas & Water Co.

Assuming early July 1977 completion of negotiations, Phase I costs to ERDA will be about $6,500,000 during FY 1977 - FY 1979. Cost sharing during Phases II and III (FY 1979 - FY 1983) will require ERDA participation of about $82,000,000.

Erie Mining Co.

Assuming early June 1977 completion of negotiations, Phase I costs to ERDA will be about $1,000,000 (FY 1977 - FY 1978). Cost sharing during Phases II and III (FY 1978 - FY 1981) will amount to about $46,000,000 for ERDA's share.

New Jersey Zinc Co.

Assuming an early June 1977 contract execution, Phase I costs to ERDA will be about $1,400,000 (FY 1977 - FY 1978). Cost sharing during Phases II and III (FY 1978 - FY 1981) will amount to $25,000,000 for ERDA's share.

ERDA requires funding to make a public commitment of its share for each project at this time, in order to encourage the Industrial Partner to begin raising funds for its share of costs so that work on the contract can be immediately initiated upon execution of the contract.

The investment costs listed above will be finalized at the end of the Phase I conceptual design activities. At that time, more accurate investment costs will be available which will be used as the basis for: (a) deciding whether the project is economically viable, and (b) forecasting and controlling project costs.

Q. Wouldn't the willingness of industry to invest heavily in a demo plant demonstrate enough feasibility to go directly to commercialization, given the proper government incentives? Wouldn't this help avoid some of these costly demo plant investments?

A. Industry believes that there needs to be a first step to the commercial level before going to the full commercial scale operation. This first step is a size smaller than a full commercial size (roughly 30,000 - 40,000 tons per day of coal). The demonstration plant program is being implemented on the basis that if these plants are successful they can be expanded to commercial size taking advantage of the investment which already has been made in these facilities. Therefore, this investment can be partially utilized. Obviously, if the

demonstration is not technically successful, the investment will be lost. The investment in the demonstration plant minimizes the high financial risk which might occur if the commercial plant results in a technical and economic failure.

Q. Your $2 million request for a fluidized-bed plant will start you toward an estimated $162 million investment in a direct combustion demonstration. In view of your pilot plant efforts in this area and TVA's reported plans to go into an even bigger demonstration, why shouldn't we defer a commitment to an ERDA demonstration of this technology?

A. ERDA plans for a demonstration plant, involving industry participation, need not and will not interfere with or duplicate any plans TVA may pursue. Widely varying applications, load characteristics, coal composition and/or rank and site characteristics can assure the two programs need not be duplicative and both can be cost effective means of advancing direct combustion technology.

Q. What existing data give you good reason to believe you should pursue a demonstration plant at this stage?

Data from the Alexandria, Virginia test facility was used to design the 30 MW Rivesville Atmospheric Fluidized Bed Combustion Boiler. The Rivesville facility has gone through initial operations, and operating data will be available for utilization in the demonstration plant design and operation. Operating data from England and Europe and smaller sources in the U.S. will also be available.

Q. The request for MHD, including operating and construction, totals $50 million, an increase of $10.8 million over 1977 funding. What is the status of obligations in this program?

A. MHD: Status of Obligation as of: April 30, 1977

Operating Expenses

FY 1976/TQ Carryover	FY 1977 B/A	Total Available	4/30 Obs.	Balance
$23,897	$34,990	$58,887	$45,591	$13,296

Plant

-	5,000	5,000	2,905	2,095

Status of Funds as of April 30, 1977

1. Operating Expenses:

   FY 1977 availability of $58.9 million includes $35.0 million of new B/A.

   As of April 30, 1977, $45.6 million had been obligated leaving a balance of $13.3 million (22.6% of availability).

2. Plant and Capital Equipment:

   Total availability for plant project 77-1-d, CDIF, Butte, Montana, is $5.0 million.

   As of April 30, 1977, $2.9 million had been obligated.

Q. Has there been any slippage in the CDIF construction schedule?

A. No slippage has occurred from the schedule that was established after funds for this project were made available through FY 1976 reprogramming.

Q. There are MHD advocates in Congress who think ERDA should fund this technology at the $125 million level. Do you have that capability? (If so, how would the increase affect the MHD time table and projected goals?)

A. During the past two years, ERDA has developed the MHD program from a number of small research efforts to a structured effort directed towards the goal of the design, construction, and operation of a pilot scale Engineering Test Facility. The engineering effort required to implement this type of program has been carefully considered. The MHD Divisional request of $86 million, as shown in the Holifield Tables, represents the level at which development of MHD generators, coal combustors and other key components, system integration of hot gas flow train, and study of "balance-of-plant" components can be conducted in parallel to establish a firm basis of design for the Engineering Test Facility at the earliest possible date.

Q. What about the $86 million levee ERDA requested of OMB? Tell us what was dropped.

A. The MHD budget request of $86 million included $81.34 million for operating expenses and $4.66 million for capital expenses. The operating budget was subsequently reduced by an amount of $35.54 million to the current level of $45.8 million. The reductions were made in Component Development (-$24.187 million), Systems and Design Analysis (-$2.63 million), Preliminary Engineering (-$3.887 million), Engineering Test Facility (ETF) (-$2.0 million), Supporting Science and Technology (-$0.17 million) and Closed Cycle MHD (-$2.666 million). Basically, the reductions result in stretchout of the initial CDIF power train development, stretchout in the CDIF #2 power train, elimination of the high temperature air preheater in the CDIF, postponement and stretchout of balance-of-plant development, postponement of a third CDIF scale power train, and postponement of the large-scale (250 MWt) Extended Duration Generation Facility (EDGF) activity.

Q. Please break down MHD funding by geographical location and tell us how much this scattered research all ties together with the Montana project.

A. The funding obligated and in progress in FY 1977, including carryover for the previous year, is distributed by state approximately as follows:

	Total
Alabama	$ 400K
California	25600K
D.C./Maryland/Virginia	1800K
Illinois	6350K
Massachusetts	9700K
Minnesota	400K
Mississippi	400K
Montana	3250K
New Mexico	150K
Pennsylvania	11750K
Tennessee	2950K
Washington	200K

The MHD Division has developed an integrated program to carry forward all component development efforts, and is proceeding to implement it within the capability of existing facilities, modification of these facilities where appropriate, and the funding constraints of the program. The CDIF, currently under construction in Butte, Montana, is to be utilized as the central facility in the current phase of the MHD program. The engineering information necessary for the successful design, construction and operation of the ETF cannot be obtained from ongoing work on individual system components in existing facilities, even if supplemented with analytical studies aimed at defining component integration requirements. Rather, components must be developed and tested as part of an integrated system to reveal the interaction of each component in the system and to provide operating experience with the complete system. In this setting, problems concerning the electrical, mechanical, aerodynamic and materials performance of individual components and of the entire system will be identified, studied and corrected. Final designs will represent component concepts which can be scaled to ETF size and which can achieve durability, efficiency and cost levels acceptable for commercial application.

The current CDIF construction effort includes R. M. Parsons as architect/engineer and Kaiser Engineers as the constructor of the test facility. Synchronizing with the construction, the component development and integration schedule for the CDIF currently involves the design, construction, and delivery to Butte of a coal-fired combustor (Pittsburgh Energy Research Center), an ash injection combustor (currently in procurement), MHD generator channels to operate with these combustors (AVCO Everett Research Laboratory, Inc.), conventional and superconducting magnets (currently in procurement), and special components required for integrating these MHD components (Westinghouse Corporation). This first group of test components can be assembled into two test trains to obtain critically needed data. Coupled with these efforts, supporting work is being conducted at the Montana Energy and MHD Research Institute, Inc., the Montana State University, and the Montana College of Mineral Science and Technology.

Q. Please compare your current construction estimates with your original ones and explain any difference.

A. The current construction estimate for the CDIF (as shown in the Construction Project Data Sheet dated December 1976) is $37 million. This differs from the original (February 1976) estimate of $31.5 million for the following reasons:

a. The original estimate was based on conceptual design work only. At the completion of the Title I A-E design, the estimate was $34 million.

b. Based on analyses by the Office of the Controller and Facilities and Construction Management, the contingency allowance for the project was considered inadequate. The total estimate was, therefore, increased to $37 million.

Q. Your Management Plan for Enhanced Oil Recovery established priorities on possible new areas for research and development and had an analysis of price and tax benefits as alternatives to increased R&D. Does your program emphasis under oil recovery follow the recommendations in the report?

A. The Management Plan for ERDA's Enhanced Oil Recovery Program and its budget were developed on an unconstrained basis. Fossil

Energy's budget submission reflects only the more critical priority items. However, our program emphasis for the enhanced oil recovery follows the recommendations in the report with greatest emphasis on projects identified as having highest potential.

Q. Tell us a little more about the tax and price considerations. Has this led you to believe certain efforts should be curtailed in favor of economic adjustments for industry?

A. Our analysis shows that combining ERDA activities with the industry R&D is more cost-effective than using the price mechanism alone.

The ultimate recovery, a good measure for analyzing the effects of price/tax changes, shows only a limited response across all price/tax considerations:

- Increasing prices from $11.63 per barrel to the world oil price of $13.00 per barrel, with or without improved taxes, increases ultimate recovery from 11.9 to 13.1 billion barrels.

- Increasing price from $11.63 per barrel (with current taxes) to $20.00 per barrel (with favorable taxes) increases ultimate recovery from 11.9 billion barrels to 17.0 billion barrels. Here the inelasticity of supply to price is significantly affected by the technological barriers that limit the technical application of EOR to a broader range of reservoirs. The bulk of the increase is due to reaching a threshold price for the surfactant/polymer recovery process and from the ability to apply economically other EOR processes to less favorable reservoir conditions.

- Reducing the investment tax credit and requiring that intangibles and injection materials be capitalized, while keeping prices constant, reduces ultimate recovery from 11.9 billion barrels to 11.2 billion barrels, and has little effect on the production rate or cumulative production. The relatively insensitive response to unfavorable taxes is because a large portion of the ultimate recovery is attributable to the thermal techniques of steam drive and in situ combustion. These techniques are not affected by the requirement to capitalize injection materials (the production of steam and air being accepted operating costs). Moreover, the threshold price for thermal recovery, particularly for the more favorable reservoirs included in the Industry Base Case, is lower and less affected by modest price or tax changes.

When ERDA research and development achievements are brought into the analysis, EOR production and ultimate recovery become more sensitive to price and tax. Whereas without ERDA R&D the introduction of the $20.00 per barrel price (alternate fuel) with improved taxes added 5.1 billion barrels, now the equivalent price/tax changes add 10.9 billion barrels.

Q. Heavy emphasis has been placed on the micellar-polymer process and thermal recovery efforts. You indicate further study requirements, but fail to speak about accomplishments. Exactly what significant gains have you made in these two efforts?

A. Significant gains have, in fact, been made in both areas. For example, the two year old micellar-polymer project by Phillips Petroleum in Oklahoma has reported more than a two-fold oil production increase. The Cities Service Oil Company in situ

combustion project in Louisiana has resulted in a ten-fold increase in production of oil, even though the project is only one year old. In all fairness, however, it must be said that more in situ combustion projects have failed than succeeded. The reason for the poor success ratio is not well-understood. Further field studies are required as well as some basic research to resolve this problem.

Q. Environmental studies also take a sharp increase - up $6.2 million for a total program of $11.5 million. One new program you mention is a study to ascertain if offshore abandonments will occur and what can be done to avoid this. Why is ERDA getting involved in this type of assessment?

A. The President's budget request for Enhanced Oil Recovery (EOR) environmental studies and other support, not only includes our environmental studies ($2.6 million) but also our general support ($8.0 million) for EOR. Approximately half of the FY 1978 request would support more fundamental work at leading universities and ERDA laboratories to expand our knowledge base of EOR processes; the level of funding is increasing slightly over previous years to protect for inflation and to reflect our expanding program in EOR. The new emphasis in the support relates to better documentation of the amount and distribution of remaining oil in place and to more effective technology transfer.

Approximately $2.6 million of the $11.5 million request is for environmental support, an increase over previous years which reflects both our intensification of environmental consequences of EOR processes in general as well as the programmatic shift to the environmental and socio-economic aspects of oil production and utilization in California.

One of our special target projects relates to the "time-window" recovery opportunities in the Gulf of Mexico. Because of the high operating costs and environmental problems of operating offshore, the economic limits of individual platforms are reached earlier than corresponding wells onshore. The cost of reactivating platforms is so excessive that abandoned reservoirs are lost for subsequent enhanced recovery operations.

Because of the relatively high recovery that has been experienced in the Gulf reservoirs, it is necessary, more than in other producing provinces, to reach a high degree of understanding of where the residual oil is in these reservoirs and what are the factors that limit recovery. A $1.4 million budget item, not included in the general support activities discussed above, is planned (1) to build a knowledge base through conduct of environmental and economic studies of offshore operation and assess rate of offshore abandonment, (2) to plan basic and applied research to test suitable recovery processes, and (3) to participate in field-based activities with industry support to accelerate the introduction of enhanced recovery operations and assure a wiser use of United States National resources.

The implementation of this project will rely heavily on industry data and operational capability. Industry will also contribute substantially to the field-based activities. ERDA's activities will be limited to well-defined tasks determined to be within the Federal role.

Q. In the case of the electric/hybrid vehicle program, you are funding a major new program through the backdoor, so to speak. Shouldn't the Congress as a whole have an

opportunity to decide whether this program is to be implemented?

A. ERDA requested reprogramming authority of $20 million FY 1977 funding for the purpose of implementing P.L. 94-413 with the understanding that the Congress intended the program to be implemented as expeditiously as possible.

Q. Your reprogramming request for the building standards program cites Title III of the Energy Conservation and Production Act. ERDA is not mentioned in that title, only FEA. Why isn't this an FEA program?

A. Title III of P.L. 94-385 involves the development and promulgation of standards for new construction. The responsible organization in the law is the Department of Housing and Urban Development. In the initial formulation of the legislation, the research activities specified were to be carried out by numerous agencies with the major research support effort to be done by ERDA in support of HUD. The initial legislation was drafted and sent to Congress by the President in January 1975. During the time interval taken by the legislative process, ERDA initiated RD&D activities which would provide the research underpinnings of a performance standards program and thus was directed at providing the necessary engineering and scientific data which would allow HUD, with the passage of legislation, to develop and promulgate standards.

The development and promulgation of standards is a HUD responsibility under the present legislation. A decision was made by the Office of Management and Budget that all funding for Title III, P.L. 94-385, activities concerned with the research effort and the development and promulgation activities, exclusive of the grants to states, should be centralized in ERDA. This is consistant with the Administration proposals for the creation of a Department of Energy which would, in effect, transfer the lead responsibility for energy standards from HUD to the new Department, although the Secretary of the Department of Energy could then redelegate the responsibility, although the overall policy would remain with the Department of Energy.

The primary reasons the program is not an FEA program are that (1) the promulgation and enforcement responsibility was given to HUD in the legislation, and (2) energy conservation RD&D activities are the primary responsibility of ERDA. ERDA supports other agencies, such as HUD and FEA, through its RD&D activities.

Q. Isn't FEA already doing this kind of work with HUD?

A. No. The only standards activity FEA is supporting is in awarding grants under Title III of the Energy Policy and Conservation Act, P.L. 94-163, to those states which have implemented five mandatory activities including thermal standards for buildings.

BUILDING PERFORMANCE STANDARDS

Q. You propose to allocate $5 million to HUD for the development of energy performance standards for new buildings. Who came up with the $5 million figure, ERDA or HUD?

A. The $5 million figure is an estimate made by HUD of their initial needs. The basis for developing that estimate is early estimates made for the overall program two years ago. Of course, HUD will have to account for the expenditure of such funds in FY 1977, and any residual amount would be applied toward their requirements in FY 1978.

PERFORMANCE STANDARD GRANTS

Q. The authorization provides for grants to states and units of local governments. Will any of the $5 million in this reprogramming be used for grants? If so, how much?

A. None of the $5 million will be used for grants. This requested $5 million will be used for obtaining the data and other base-level information needed to develop performance standards for all new buildings. HUD is preparing a separate appropriation request for the State grants program.

CONTRACTING FOR BUILDING STANDARDS

Q. Will HUD develop the data on which to base standards internally, or will this largely be contracted?

A. The effort will be contracted. The primary contract HUD is executing is with the American Institute of Architects (AIA). AIA will be subcontracting to trade associations representing engineers, home builders, and individual architectural and engineering firms. HUD plans to also contract with the National Institute of Building Sciences (NIBS) for independent assessment and evaluation. HUD will also utilize the data which has been developed over the past two years in the ERDA Buildings and Community Systems Research programs.This data can be used to provide a significant part of the data base for various buildings. Tools, such as a "white box" computer methodology for buildings energy analysis, has been funded for by ERDA (with additional funding from the State of California) and is now operational which can provide a method for the HUD contractors to quickly and at low cost analyze many building configurations for energy consumption characteristics.

ERDA is one of the largest owners of real estate in the U.S. Government, owning some 80,000,000 square feet of diversified-use space, all of which has provided data on current energy use and economic refit for energy conservation. That information too would be utilized in the data base as would the information developed under ERDA contract concerning energy consumption in 900 commercial buildings in New York City, perforamnce data on the GSA New Hampshire experimental building, etc.

Q. Will ERDA have any direct involvement in the program? It appears that all you are doing is requesting funding on behalf of HUD.

A. The ERDA role and specific operating procedures are being developed at this time. We have established a continuing dialogue with HUD so that, where possible, our RD&D programs can be tailored to serve the immediate needs of HUD in addition to meeting the primary objective of bringing energy-efficient economical technologies to the marketplace. Specific tasks are specified by HUD in addition to the general approach mentioned above. On a continual basis we review and make substantive input to the HUD program. We have assigned an individual from the ERDA staff to comonitor the work with the HUD project staff.

Q. The law allows three years for HUD to develop and publish in the Federal Register proposed standards. With that amount of time available, why can't funding wait until FY 1978?

A. The legislation was enacted into law in August 1976. The three-year clock, therefore, runs out August, 1979, nearly the end of FY 1979. Waiting until FY 1978 for funding would reduce the overall program time to two years.

A three-year schedule is difficult to make considering the diversity in building types, uses and climatic conditions. The types have a further breakdown by architectural preferences depending on geographical conditions; for example, single-family, detached housing most likely would be configured as a two-story Colonial or split level in the northeast and as a ranch style in the southwest. These two styles would have significant differences in energy consumption to meet minimum living conditions, yet have the same floor area. Within now less than three years, data must be collected, buildings analyzed, solutions to the proposed standard developed, public input obtained, etc. Three years appears to be a tight time frame to carry out the requirements of the law. In addition, in the April 20 energy message to Congress, the President stated that the Secretary of HUD will advance by one year the effective date of the standards required for new residential and commercial buildings. In order for the states to meet this shortened time frame, some of the standards may have to be published in less than three years to allow for comment, etc.

ELECTRIC AND HYBRID VEHICLES

Q. The remainder of the reprogramming request - $20 million - is for implementation of the Electric and Hybrid Act (P.L. 94-413). You have outlined some rather ambitious tasks in this area. Will you be able to complete the work planned by the end of the fiscal year?

A. It will obviously not be possible to complete all the tasks outlined for initiation in FY 1977 before the end of the Fiscal Year, but it is very important that the efforts be initiated for timely completion as required by P.L. 94-413.

Q. What about the funding - can you obligate the entire $20 million before the end of the fiscal year?

A. It is the intent of ERDA to obligate the entire $20 million before the end of the Fiscal Year.

VEHICLE RESEARCH AND DEVELOPMENT

Q. The largest portion of the electric and hybrid vehicle funding is for research and development - $17.2 million. I wonder if you could be a little more specific about what you plan in this area? All you mention is lead/acid battery work and acceleration of ongoing efforts. Give us some specifics.

A. The largest portion of the FY 1977 research and development effort is approximately $9.0 million for research and development which is mostly devoted to lead acid battery improvement. Approximately $5.3 million will support two advanced technology electric car programs, one by General Electric and one by AiResearch Division, Garrett Corp., which were initiated in FY 1976. Two million eight-hundred thousand dollars is for propulsion system technology efforts, to be accomplished through NASA-Lewis Research Center. Remainder is for small engineering support activities.

Q. The law states that $30 million is authorized for FY 1977, but goes on to stipulate that at least $10 million shall be for battery research and development. Will the reprogramming proposed at this time satisfy that requirement?

A. It is proposed that approximately $9.0 million FY 1977 funding be devoted to battery research and development. Since we only expect appropriations in FY 1977 of $20 million rather than $30 million as authorized, the proposed $9.0 million for battery research and development will meet the spirit and intent of the law.

VEHICLE DEMONSTRATION

Q. For the demonstration category you propose $1.7 million. From the material provided with the reprogramming request it would appear that this is all for planning. Is that correct, and if so tell us why you need nearly $2 million to plan a demonstration plant.

A. Only $650,000 FY 1977 is to be devoted to the planning of the Demonstration Activity. The remaining $1.08 million is devoted to characterizing the current state of the art of electric and hybrid vehicles, as required by Section 7, Demonstrations, of P.L. 94-413.

VEHICLE LOAN GUARANTEES

Q. You have $400,000 earmarked for establishing loan guarantee guidelines, and you indicate you will be able to permit a limited number of planning grants within this amount. How much money do you estimate will be available for grants, and how many grants will you issue in FY 1977?

A. Of the requested $400,000 to be allocated for financial incentives $300,000 has been reserved for support of planning grants. Procedure and criteria are currently being established to enable implementation of Section 9 of Public Law 94-413 which directs that "The Administrator shall . . . make planning grants available to qualified small business concerns which require assistance in developing, submitting, and entering into . . . contracts for research, development, or demonstration of electric or hybrid vehicles." The number of grants that will be issued depends on the number of firms qualifying under the criteria to be established and the ceiling established for each such grant. At the present time, it is anticipated that the grant ceiling will be about $10,000. It is, therefore, estimated that funds for about 30 grants may be available from funds requested for reprogramming in FY 1977.

ELECTRIC VEHICLE STUDIES

Q. You have another interesting item - studies, for which you propose $710,000. You say that this will allow you to develop data and promulgate performance standards. Will you be able to establish performance standards in the months remaining in FY 1977? Also, will you be able to complete this within the funding requested?

A. Contracts for establishing performance standards for the procurement of electric vehicles to be used in the demonstration program required by Public Law 94-413 are in progress and will be promulgated by the end of CY 1977. Additional studies mandated by Public Law 94-413 have also been initiated through an Interagency Agreement with the Department of Transportation and other outside contracts. The additional funding request for $710,000 is necessary to complete all of the study requirements as outlined in Public Law 94-413.

CONSERVATION OVERLAP

Q. In the detailed justifications, many of your programs under conservation seem to duplicate FEA's conservation effort, which is also budgeted for heavy increases. Why don't you concentrate ERDA's efforts on technology and leave management and promotion of conservation to FEA?

A. The apparent overlap of ERDA/FEA conservation efforts may be due to the fact that major components of both programs are organized along the lines of the three end-use sectors--Transportation, Buildings, and Industry. However, I can assure you that the focus of the ERDA conservation program is indeed technological in nature and not areas such as regulations of energy prices which are the purview of FEA.

Q. Your conservation activity is also getting into coal transportation and utilization and extracting methane from coal. Both of these are high priority programs with the Bureau of Mines. What are you doing that the bureau can't do?

A. The Bureau of Mines efforts have concentrated on removing methane from coalbeds as a means of improving the safety and productivity of coal mining operations. ERDA has treated the estimated 300 trillion cubic feet of methane trapped in coalbeds as a potential source of non-conventional natural gas. Because of the potential of this gas resource, ERDA has proposed expansion of the program into unminable coalbeds and placed emphasis on recovering and utilizing that gas which is presently being wasted.

Q. What efforts are being made to coordinate and consolidate these apparent overlaps within the proposed Department of Energy?

A. In addition to the efforts made by the Administration to minimize duplication of program areas in developing the proposed Department of Energy, informal task forces are comprehensively examining the proposed DOE functions to insure coordination and consolidation of potential program overlaps.

ENERGY EXTENSION SERVICE

Q. Your budget continues the Energy Extension Service, which we funded without specific authorization in the current year. In this unusual situation, do you feel you have problems with your authority to conduct this program?

A. The FY 1977 Appropriations for the Interior Department and Related Agencies (P.L. 94-373) included $7.5 million for the conduct by ERDA of an Energy Extension Service (EES) in FY 1977. The FY 1977 authorization for ERDA was reported out of Conference Committee by the 94th Congress, but was not enacted prior to adjournment. However, enactment of the urgent Power Supplemental Appropriation (P.L. 95-3) had the effect of deleting the requirement for authorizing legislation. Given P.L. 95-3, ERDA has adequate authority to conduct the EES.

Q. How is the EES to be administered? Are you working through the university system, or directly with the States, or what?

A. The EES pilot program will be managed by ERDA at the Federal level, and operated by States within their jurisdictions. In their proposals, the Governors will indicate the organization to be responsible for the EES operation, which may be a unit of State government, a university, or any other appropriate organization.

Q. How does the Energy Extension Service differ from the State energy conservation grant programs administered by FEA?

A. Both the EES and the FEA State Energy Conservation Program share the common goal of increasing the use of energy-saving measures through State planned and operated programs. The provision of direct face-to-face assistance to small energy consumers is one of several thrusts of the FEA program, while it is the central focus of the EES. Unlike the FEA program, the EES also places a high degree of emphasis on obtaining feedback regarding energy consumers' needs and concerns, and evaluation of the merits of the EES approach.

Despite these differences, ERDA and FEA recognize that the two programs are related in many respects. Agreeing that encouraging consumers to conserve energy is a larger endeavor than either program above can adequately address, the two agencies have jointly signed an agreement regarding coordination mechanisms In addition, various certifications are required of States in their EES proposals which have the effect of ensuring non-duplication of effort.

Q. What specific conservation areas will the Energy Extension Service concentrate on?

A. The primary objective of the EES is to encourage the adoption by small energy consumers of techniques and technologies that save energy and use renewable energy sources, such as solar heating and cooling. Within this range, States will specify in their EES proposals the techniques and technologies that will be addressed. The States have the flexibility to choose techniques and technologies appropriate to their particular circumstances. Besides those relating to conservation and renewable energy sources, states may include other techniques and technologies as appropriate.

Q. You mention ten States. Which States are you talking about, and will the program be limited to these States?

A. The EES is being initiated on a pilot basis which will involve approximately ten States. The States will be selected competitively on the basis of responses to the EES Program Research and Development Announcement (PRDA). The PRDA was issued to the States on April 29, with responses due on June 30. ERDA anticipates that grants will be awarded to the winning States in mid-August.

With regard to States not participating in the pilot program, ERDA is considering awarding them small grants to track the pilot program progress. Selected pilot program States will be required to devote resources to sharing the results of their EES programs with those States not selected.

S. 36, currently before Congress, provides that on October 1, 1978 ERDA will issue guidelines for a nationwide EES program, which will involve all States.

Q. How did you select the States?

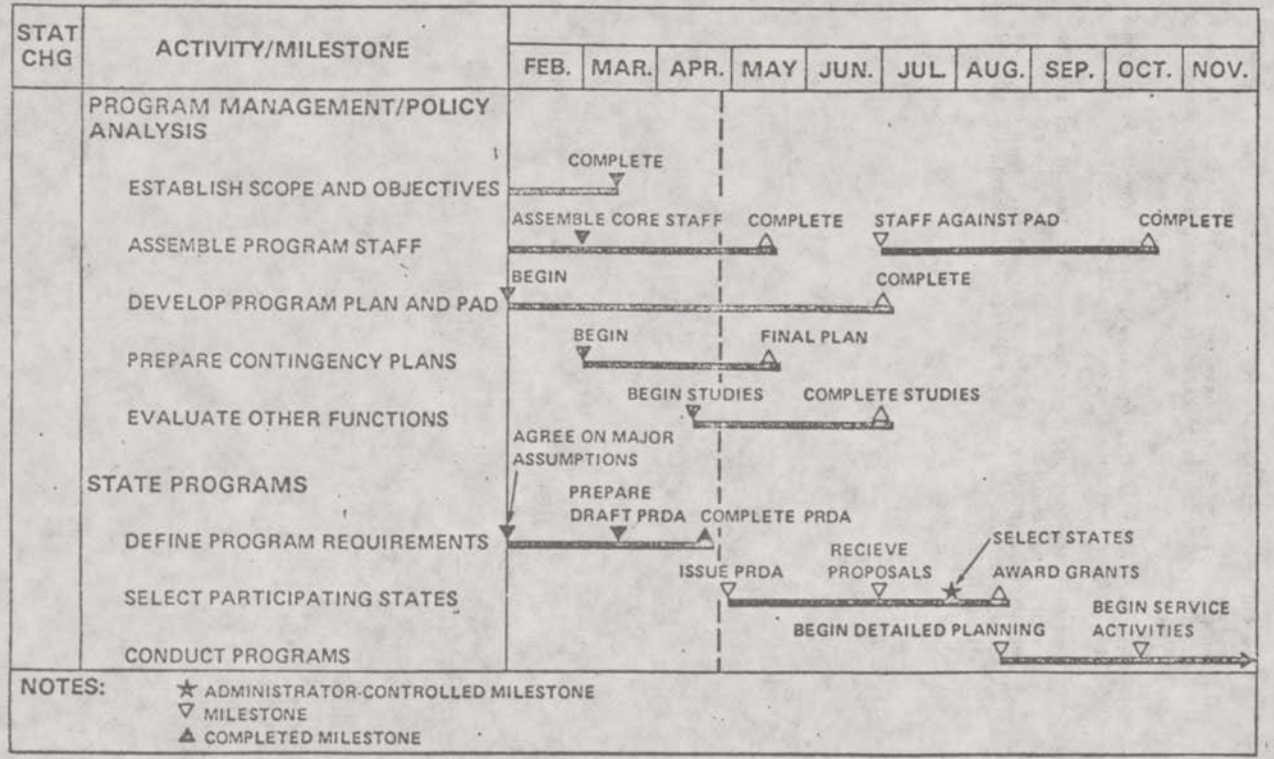
A. The pilot program States have not yet been selected. As disussed in the previous question, ERDA is awaiting State responses to the PRDA.

Q. What have you been able to accomplish this year in the program with the 1977 appropriation that was finally released?

A. A major accomplishment is preparation and issuance of the PRDA, which details program parameters and requirements. The pilot program evaluation strategy also has been formulated. More detail regarding accomplishments and further tasks is contained in the EES program milestone chart

ENERGY EXTENSION SERVICE

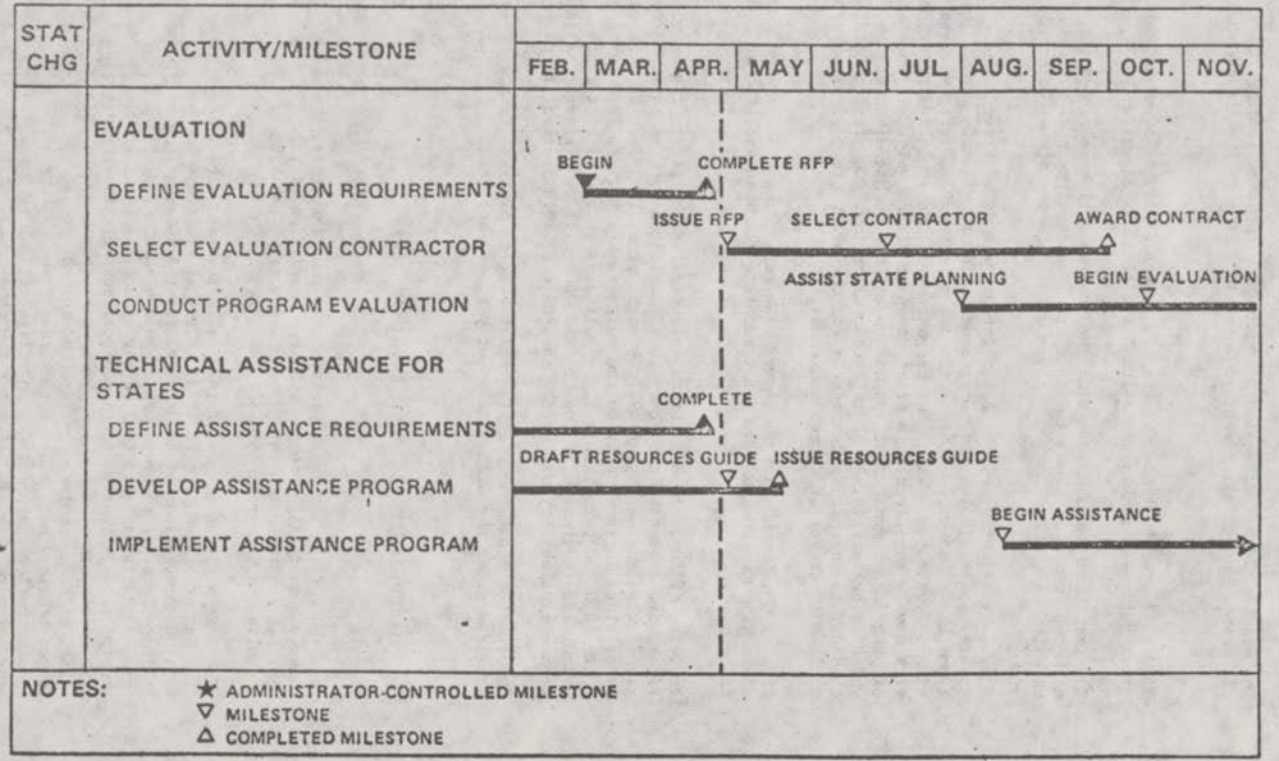
APRIL 27, 1977



3052

ENERGY EXTENSION SERVICE

APRIL 27, 1977



3053

Q. You mention that funding will be combined with State funding. Do the States have to match what you provide? (If not, what is the requirement?

A. ERDA will provide funds for the EES to the States on a non-matching grant basis--no combination with State funds is required.

Q. The justification indicates that the program will have varied target markets, from individuals to State and local governments. Have you established a mix of target markets within the ten States selected?

A. A primary objective of the EES pilot program is to provide the greatest possible learning experience prior to assessing the value of various types of EES services. State responses to the PRDA first will be technically evaluated. Then, the responses will be evaluated programmatically, with a view to selecting a pilot group of States which provides a mix of program and management approaches and geographic distribution, and which is collectively high in technical rating. One factor ERDA will consider is that it is desireable for the pilot group of proposals to include a variety of target audiences.

Q. Give us the details for the record . We would like to know what kind of funding is going to each selected State and what specific program each State plans.

A. In terms of funding, each State selected for the pilot program will be awarded a grant totaling up to $1.1 million for the period from grant award during August 1977 through March 31, 1979. Funding will be provided incrementally to the selected States. FY 1977 funds of up to $650,000 per State will be obligated at the time of grant award, and the remainder (up to $450,000) will be obligated subject to the availability of funding in ERDA's FY 1978 appropriation.

Information about the specific pilot States' programs cannot be provided since the States have not yet been selected.

INDUSTRY ENERGY CONSERVATION GOALS

Q. You indicate in the justification that your industrial energy conservation program will see completion of it's initial contract efforts and planning work. What kind of results can we expect for FY 1978?

A. There is a wide spectrum of results that we anticipate for our program during FY 1978. First of all there will be completions of seven significant demonstrations -- high temperature recuperators, vacuum blanching, textile process modifications, fuel saving system for curing coil coated material, steel forge monitor, new fertilizer process and modification of a cupola furnace. Laboratory and pilot tests will be completed for four additional projects, demonstrations will start for another five projects, demonstration equipment design will start for two more and one (blended cement) will enter the commercialization phase.

With at least 65 active programs of which 19 will be in some phase of demonstration, FY 1978 is expected to be a rather dynamic and fruitful year.

INDUSTRIAL CONSERVATION ACCOMPLISHMENTS

Q. Your justification mentions two industry programs which were scheduled for demonstration in March of 1977 - a system to save natural gas in paint curing lines, and air/fuel ratio controls for industrial boilers. Do you have any preliminary results to share with us on these efforts?

A. Yes. Relative to the fuel saving system for coil coat curing - a retrofit system to burn paint vapors as fuel - the demonstration line of a large coil coating concern has been retrofitted with this system so that the eight natural gas burners of the two curing ovens have been operating for about seven weeks now by burning paint fumes supplemented with natural gas. Although the official demonstration will not start until May 27, 1977, when the final item (a waste heat boiler) is installed, the savings are already measured as about 68% --that is, it's saving two/thirds of the fuel -- enough to heat about 7500 average homes. When the waste heat boiler is added, the energy savings are expected to increase to 80%.

The demonstration of the air-to-fuel ratio control system for industrial boilers (featuring individual burner feedback control loops from spectral flame analysis) will start in September as scheduled.

WASTE ENERGY REDUCTION

Q. Under your waste energy reduction program you mention a demonstration program for the Rankine Bottoming Cycle. Where will this demonstration program take place, and what specific industry are the tests related to? Why do you need five separate demonstration projects?

A. The contractor for the Rankine Cycle Demonstration Program is currently negotiating with various host companies for demonstration sites after which, such selected sites will be referred to us for approval. At this time the sites have not been identified.

In that regard, the specific industries have not been identified although such would be those with large amounts of waste heat available in the thermal range of 800°F to 1000°F such as aluminum, glass or heat treating concerns. Only two of the demonstrations will be by industry, two by municipal utilities, and one by a community system.

We have been advised by industry leaders (including a vice president of a large stationary diesel maker) that a minimum of five demonstrations for one year of running time would be required to convince industry and utilities of the feasibility and economics of the systems.

COGENERATION

Q. Under your In-Plant Power Generation Study you mention cogeneration programs under Conversion Efficiency. How much of your budget is directed to the cogeneration concept?

A. Within the Division of Industrial Energy Conservation during FY 1977 a total of $605,000 is being allocated to cogeneration including a total of $300,000 support funding to programs of conversion efficiency technology.

During FY 1978, the budget allocations for cogeneration for these two divisions are: $1,500,000 for the Division of Industrial Energy Conservation and $2,400,000 for the Division of Conservation Research and Technology (CONRT). In addition, the technology branches within CONRT, e.g., Components and Heat Engines, are developing cogeneration related technology since cogeneration is really an application rather than a technology.

It should be noted that the cogeneration projects currently underway are directed towards utilization of waste heat and as such are "bottoming cycles." New initiatives under consideration are directed towards fron end or "topping cycles" and do not constitute any duplication of current efforts.

Q. If cogeneration is used widely throughout Europe, why do you need an extensive research and devleopment program? Don't you have access to information they have developed?

A. First, the European figures on cogeneration are somewhat misleading. That the Federal Republic of Germany produces 29% of its industrial electrical energy through cogeneration is often quoted. Their method of accounting, however, includes industry-owned central power stations which are not cogeneration systems per se. Nevertheless, true cogeneration is more widely used in Europe than in the U.S. A very large portion of European cogenerated power is produced through "topping cycles" with coal-fired back pressure steam turbines. This technology is well known but the ERDA Program addresses an entirely different set of issues. We believe the European experience will be valuable in guiding our work, but EPA requirements, state, federal, and local laws, etc., dictate that the equipment we use will be significantly different than that used abroad.

Our program is organized in two steps. First, in recognition of the urgent need to reduce the drain on natural gas and liquid petroleum fuels, immediate results will be obtained by using state-of-the-art technology to improve conversion efficiency of the devices suitable for cogeneration applications. This is the thrust of the Industrial Energy Conservation demonstration program.

If a new initiative on "topping cycles" were to be initiated, it would encompass the following areas:

- emphasize the use of abundant fuels where possible (coal, coal/oil slurry, residual fuels, and waste materials such as bark.
- emphasize front end or "topping cycles" where fuel is burned to produce electrical power and then process heat.
- consider systems which export power or which would use all of the energy produced in-plant.
- conduct demonstrations which are designed to fully examine the institutional problems associated with industrial export power including such factors as: standby power availability requirements, cost and price relationships for export power, Public Utility Commissions regulation, wheeling power, ownership of plants, environmental impacts, etc.

- perform demosntrations which are cost shared by industry.

The program will be designed to fully examine the technical, economic, and institutional factors which govern the increased use of cogeneration in the industrial marketplace and to establish the incentive or regulatory changes required to enhance such use. In addition, demonstration projects will serve as showpieces and, as such, will help promote the use of cogeneration.

Secondly, we should, and this is the thrust of the R&D effort planned by the Improved Conversion Efficiency program, initiate development of second generation technology which can economically and reliably use low quality and synthetic fuels without compromising conversion efficiency. This effort was initiated in FY 1976 but will not be available in the time frame required without the levels of funding requested.

BOILER FUEL/AIR RATIO

Q. You mention a follow-on demonstration of a boiler fuel/air ratio control. Why do you need a second demonstration? What are the results of the first demonstration?

A. The fuel/air ratio control system is a device applicable to all industrial systems in which multiple burners are used, regardless of fuel type. The first demonstration will be in an oil fired four burner steam generator and will start in September, 1977. This installation covers a significant portion of the potential applications, but other applications must also be demonstrated before full potential can be reached. A major second application is in direct heating furnaces. A steel reheat furnace or glass lehr may have several hundred burners and operates at temperatures in excess of 2500°F. The problem of air/fuel control is considerably different from the steam boiler since the furnace walls are at extremely high temperature which tends to mask the response of the sensor equipment. The second demonstration would determine the applicability of this device to this more difficult environment.

HIGH TEMPERATURE HEAT PUMPS

Q. You mention that in FY 1977 three contracts will be issued for the development and demonstration of high temperature heat pumps. Have the contracts been awarded yet, and if so, what kind of work is currently underway?

A. The three contracts for industrial heat pumps are all in initial contract negotiations by the Division of Procurement and are therefore, not on contract at this time. These contracts are expected to be signed within two months.

AGRICULTURAL AND FOOD PROCESSING EFFICIENCY

Q. Under your agricultural program you have several projects related to the paper industry. One is the characterization of paper pulp. How does this save energy?

A. Waste paper stock currently is recycled to a limited extent. The energy benefit derives from the reduction of initial wood pulping and the prior requisite processes. The objective of the pulp fiber characterization program is to increase the utilization of waste paper derived from mixed sources.

Currently, the use of recycled paper is limited to manufacturing low quality papers and paper products. This is because the physical properties of the lowest quality constituent in the mix of paper sources generally determines the characteristics of the finished product. If the fibers in the waste paper pulp are "characterized" by observable qualities, e.g., length, shape, distribution, etc., then a given batch of pulp can be directed toward the production of a paper grade optimally suited to that batch. The result of selectively utilizing mixed source waste paper stock will be an extension of utilization to higher grades and a consequent increase in energy savings.

Q. In another related program, you say you will study the possibility of mechanically removing more water from paper before the evaporation cycle. Do you have any indication of any overall savings in energy?

A. On a typical Fourdrinier paper machine, the fibers are delivered to a moving wire mesh at a consistency of 0.5%, which means 0.5% fiber and 99.5% water, or approximately 200 tons of water per ton of paper.

The consistency of the sheet as it leaves the wire is roughly 20%, or 4 tons of water per ton of paper. The balance of the water was drained through the wire.

The sheet then goes to a press section where pressure is applied via rolls on one side and a vacuum on the other to squeeze still more water out, raising the consistency to 40%, or 1 1/2 tons of water per ton of paper.

The balance of the water is removed by evaporation, by passing the sheet over a large number of steam heated dryer rolls, and the final sheet is dried to a solids content of 94% (6% moisture).

By changing the consistency of the slurry being delivered to the front end of the machine from 0.5% to 2.0%, and by other mechanical improvements, there are some energy savings by reducing the volume of water being supplied, treated, pumped, etc., by a factor of four. But more importantly, the characteristic "formation" of the sheet is changed in a manner such that water will more easily drain from the sheet on both the wire and press sections. We expect to be able to raise the consistency of the sheet leaving the press section, and going to the dryer section, from 40% to 45%. This will lower the dryer steam requirements, and the fuel energy used in Btu per ton of paper, from $5.5X10^6$ Btu down to $4.4X10^6$ Btu, a savings of $1.1X10^6$ Btu per ton. On the basis of $60X10^6$ tons production per year, this amounts to $66X10^{12}$ Btu per year or .066 Quads.

Q. You propose a new program for FY 1978 involving restaurant food scrap recovery for use in pet food production. Is this really a major effort? It would seem to be a rather unusual program for ERDA to undertake.

A. The original proposal for recovering restaurant food scrap for use in pet food production indicated a significant energy savings -- sufficient to constitute a major program for us. We have recently completed some detailed analyses of the related savings potential which contradict the results of the proposer (which were done using another method) and indicate only marginal savings of energy.

If these results are verified it seems likely that this project will be deleted from our list of FY 1978 candidates. We prioritize our projects by figures of merit derived from project costs, energy savings, return on investment, and degree of risk. With only marginal savings, this program would not meet the threshold criteria that have been established.

TECHNOLOGY TRANSFER

Q. Under your technology transfer activity for industry you mention that you will initiate a program in FY 1978 to evaluate contractor performance. Haven't you been monitoring contractors all along?

A. Yes, of course. Each contractor is monitored by the program manager as the related work progresses. The activity reference here is the evaluation of the performance of the contractor at the conclusion of each contract -- a sort of "report card" for the particular job -- and the development of a computer data bank of such historical data for retrieval and review in the case of consideration of a given contractor for subsequent contracts or, for identifying candidate contractors for certain types of contracts. At this point there has been only one contract (a small study effort) completed. Therefore, up to this time there has been no requirement for such a system. During FY 1978, however, there will be several other contract completions.

Q. How much will be earmarked for this performance evaluation work in FY 1978?

A. A total of $50,000 has been estimated for such work in FY 1978.

BUILDINGS AND COMMUNITY SYSTEMS

Q. Your buildings and community systems activity goes up by $25.4 million which amounts to a 95 percent increase. In addition, there is a pending budget amendment of $2 million for the gas-fired heat pump. Why such a large increase in this area?

A. Of the $25.4 million increase, only $15.4 million is for the ERDA RD&D program in Buildings and Community Systems (BCS). $10 million is the funding required by HUD for development of standards and will be passed through to them. The BCS program was started at a low level in FY 1976 and really developed during FY 1977. The program is balanced between mid- and near-term objectives and the increase in FY 1978 over FY 1977 (from $26.6 million to $42 million, 58%) reflects the move from

the feasibility-study stage to demonstrations where appropriate energy data will be developed to prove the technologies and to overcome the institutional resistance to energy conservation efforts. For example in FY 1977 research agenda for schools and hospitals were were developed utilizing task forces composed of other agencies (in case of hospitals - ERDA, FEA, HEW, DOD, VA) and non-Federal associations (American Medical Association, American Hospital Association, Joint Committee on Hostital Accreditation). In FY 1978 these recommendations will be implemented by initiating clinical studies regarding ventilation requirements, demonstration of the use of waste-heat recovery devices in hospitals, humidifiers, etc.

In community energy utilization area, one of the five grid-connected total-energy systems will be selected for demonstration. ERDA will pay only the overcost and monitoring. A general methodology for comprehensive community energy planning was developed in FY 1977. In FY 1978 plans are to issue a program opportunity notice to test this out in several different-sized communities. In the consumer products and technology area, feasibility study has been done to determine the best combination in an energy-economic manner of integrated appliances; e.g., refrigerator heat to preheat water heater, dryer exhaust to preheat water heater. In FY 1978, one of these systems will be developed and demonstrated with an appliance manufacturer and/or mobile home manufacturer.

Thermally activated heat pumps, of which the gas-fired heat pump is the simplist example, have large potential for improved energy efficiency in space conditioning.

In FY 1977 we initiated two heat-pump programs in partnership with industry, and certain key steps have been taken to further investigate technology problems and methods of overcoming those problems, market potential, cost-benefit analyses, etc. Everything has come out positively, including our ability to enter into a contract with a trade association and an appliance manufacturer (a three-way agreement) which opens the path to rapid commercialization. The signs are all positive, and we are convinced that it is appropriate to move out in completing the RD&D for this technology and begin commercialization as soon as possible, hence the request for an additional $2 million in FY 1978.

BUILDING DESIGN AND STRUCTURE

Q. Much of the work under building design and structure is related to assisting HUD in developing building performance standards. Please explain exactly what your responsibilities are and what HUD is responsible for in regard to performance standards.

A. HUD has the responsibility to develop the performance standards; that is, to come up with the actual targets to be met for different types of buildings, climate and new construction. They also have the regulatory function, if enacted at a later date by the Congress, to enforce such standards through processes spelled out in Title III of P.L. 94-385.

ERDA is responsible to carry out research in buildings conservation which includes activities to support the HUD standards development (e.g., development by ERDA of analytical techniques to quickly undertake energy analyses of buildings; establishing data on current consumption and economic refits for energy conservation; supporting the requirements of P.L. 94-163 which lead, in time frame the HUD standards, and thus are clearing a path for the promulgation of performance standards; developing technologies which will allow designers, builders, owners, etc., to meet and exceed the HUD-promulgated standards in an economical manner; developing training programs for code officials so that they will be prepared to enforce performance standards, etc.).

The ERDA activities are multifaceted. Their research, development and demonstration work stands on its own merits of bringing energy-efficient technologies and methodologies of operation to the marketplace in an economically and environmentally sound manner. This same work does in fact support FEA needs under P.L. 94-163, as well as HUD needs in developing and promulgating performance standards under P.L. 94-385.

Q. In the justification you mention that there are "efforts to develop institutional mechanisms to encourage homeowners to make the necessary investments to achieve maximum energy conservation." What mechanisms do you plan? Again, isn't this within FEA's province?

A. Preliminary studies have indicated that lack of convenient financing is a significant barrier to consumer purchases of higher cost energy efficient products such as heat pumps and/or insulation. One of the most reasonable times for consumers to consider purchase and installation of such products appears to be at the time a house is purchased. In FY 77, discussions were held with several Savings and Loans, which provide approximately 60 percent of the financing for 1-4 family dwellings, and a plan was developed to demonstrate an innovative financing technique to encourage homebuyers to invest in energy efficient products. This plan essentially consists of offering the homebuyer the option of including the costs of approved energy efficient products in the first mortgage without raising the interest rate or the down-payment. This approach does not involve government support or subsidy, and is attractive to financial institutions.

In FY 78, in cooperation with FEA, USDA, and other appropriate agencies, we are conducting a research demonstration with first mortgage lenders to determine if homebuyers will in fact use this voluntary mechanism.

In coordinating with the Federal Energy Administration it was evident that they they were not conducting any programs of this nature. Since this approach needs to be tested and refined before being implemented on a large scale it was agreed that ERDA, with the cooperation of FEA, will take the lead in this research project.

COMMUNITY ENERGY UTILIZATION

Q. Your Community Energy Utilization program increases from $5.9 million in the current year to $14.8 million in FY 1978 an increase of 148 percent. You mention that this increase is a result of shifts from research to

development and demonstration. What specific efforts will reach the demonstration stage in FY 1978.

A. Efforts which will reach the demonstration stage in FY 1978 fall within the two thrusts of the Community Energy Utilization Program, Integrated Community Energy Systems and Community Design. The following brief description will provide you with details on the project, and where the determination has been made, with the site name/location.

Integrated Systems

Grid-Connected ICES - One or more sites (up to five) will be entering demonstration stage; previously feasibility analyses were conducted in FY 1977. These are: University of Minnesota (and adjacent community)/ Independence, Missouri/Health, Educational Association of Louisiana, New Orleans/Trenton, N.J. and Clark University, Worchester, Mass.

Coal Using ICES: Georgetown University will be entering the demonstration stage; during FY 1977 a detailed work management plan was developed.

Total Energy Plant Retrofit: The retrofitting of the Jersey City, N.J. Total Energy Plant (now in operation) will be in the demonstration phase in FY 1978.

District Heating and Cooling: A demonstration will be initiated to expand and/or improve the operating efficiency in one community with an existing system. Evaluation and selection of the city is being undertaken in FY 1977.

Community Design

Demonstrations will be initiated in the following areas: Energy Master planning - four to seven site specific case studies will begin in order to demonstrate energy conserving measures in design or site planning for new development and/or redevelopment projects. This will be undertaken for different community scales including the Design of the Alaska State Capitol.

Comprehensive Community Planning P.O.N.

Up to ten communities will be selected to test and demonstrate the utilization of the methodology for energy management and conservation (developed during FY 1977). This activity will be initiated in FY 1978 and is expected to continue during FY 1979.

Q. Your justification in this area is a little difficult to understand since it is not really clear about goals and what you are doing to achieve them. Why don't you explain the main goals and thrusts of the community utilization program, including how they differ from FEA conservation programs.

A. The Community Energy Utilization Subprogram area has four Major Objectives. They are as follows:

a. Develop practical and workable definitions, concepts and tools to demonstrate and effect the optimal interrelationships between urban development to meet human needs and minimized energy use (Ekistic-Energy Community Concept).

b. To evaluate the role in community development for integrated community energy systems (ICES) and develop and demonstrate such systems which reduce by more than 50% the energy consumption for delivery of energy related services and which substitute abundant and non-depletable energy sources for scarce fuels.

c. To develop, optimize and demonstrate energy efficient community designs which satisfy human needs.

d. To mobilize and coordinate local, state and federal government agencies, the utilities industry, the urban design and engineering profession financing institutions through a comprehensive commercialization program to accelerated widespread adoption of ICES and community design RD&D outputs.

These objectives can be accomplished by application of the Concept of Integrated Community Energy Systems (ICES) that is designed to develop community-scale energy systems with the characteristics of energy conserving, safe, environmentally acceptable. These systems will represent an integration of community design, energy planning and energy technologies, all tempered by the commercialization aspects as defined from efforts to mobilize the private sector for adoption of the concept.

An integrated community energy system will not necessarily supply only a single service, e.g., electricity, in an energy-conserving fashion, such as by recovering waste heat from the energy system. Rather, the whole ICES concept seeks an optimal combination of all dimensions to meet the energy requirements of a particular community. An ICES is an investment in integrated human, building, network, and hardware systems that becomes an integral part of the larger community. These systems will provide energy-using services to support the residents' lifestyles in a stable and environmentally sound fashion. One may simply refer to the concept as the integration of energy requirements, the sciences of human settlements (Ekistics), environmental considerations and economics. The approach is to utilize alternative energy resources and select a combination of technologies, community design and governmental arrangement that will provide a highly efficient, integrated community energy system.

This is the only Federal RD&D Program that is designed to look at the total community and its functions in development and evaluation of conservation options. It is not designed to look at either individual technologies or actions, such as fuel allocation, building insulation, increased electrical generation efficiency, rather at the site-specific tailoring of a community and its energy system to assure conservation and need satisfaction.

Q. Why don't you give us a detailed listing of the programs under Community Energy Utilization and the dollar amounts associated with each for the record?

A. The following listing covers all programs within Community Energy Utilization. A brief description, along with estimated energy savings, funding level and cost-sharing for each program have been included.

COMMUNITY ENERGY UTILIZATION SUBPROGRAM
FY 1978 PROJECT LISTING

Integrated Systems

A. Integrated Community Energy Systems (ICES)

- Grid-Connected ICES B/A 2,000,000 Savings: 250 MB/DOE

  Cost Sharing: None in FY 1978; 25% ERDA, 75% Contractor for total demonstration.

  The goal is to develop systems which operate at highest possible energy efficiency by relying on the network of the local power company to act as an electrical flywheel. In FY 1977, the feasibility analysis for five specific sites were completed and the preliminary design for one site was initiated. In FY 1978 detailed design will be completed and the construction of a demonstration system will be initiated with expected completion by FY 1981.

• Coal-Using ICES B/A 1,000,000 Savings: 300 MB/DOE

Cost-Sharing: 25% ERDA, 75% Georgetown University

The goal is to develop the coal-using ICES and replace oil and gas. The technological advances of coal RD&D within and outside ERDA will be utilized for the development of these systems. In FY 1976 and 1977 the development of analysis and design tools for coal-using ICES were developed. In FY 1978 these tools will be utilized for the application of a coal-using ICES at Georgetown University, Washington, D. C. Construction of a fluidized bed boiler is underway under the ERDA Fossil Energy program. Construction of the rest of ICES utilizing this fluidized bed boiler is expected to start in FY 1979 and finish in FY 1981.

* Note: All Savings are estimated for the year 2000 given and are given in thousands of barrels per day.

B/A 14,750,000 Savings: 2,290 MB/DOE

• Heat-Pump-Centered ICES B/A $500,000 Savings:100 MB/DOE

Cost Sharing: None for Feasibility Analysis and Design;ERDA 50%, HUD 50%

The goal is to demonstrate the feasibility of incorporating heat-pump technology into community systems, thereby conserving energy resources by utilizing nondepleting, free or low-cost energy sources. These free or low-cost sources include heat from the ambient air, sea or ground water, liquid wastes, low-quality thermal discharges which might otherwise be wasted, and similar sources. In FY 1977 a technology evaluation of large built-up heat pumps, the initial evaluation of a large built-up heat pump system for the heating of three high-rise, multioccupancy buildings and the evaluation of an annual storage ICES utilizing heat pumps were completed. In FY 1978 one or more site-specific feasibility analyses for the application of this system will be initiated. These are expected to lead to a demonstration by FY 1983.

• District Heating and Cooling Systems B/A $800,000 Savings: 400 MB/DOE

Cost Sharing: None for Feasibility Analysis and Design: 25% ERDA, 75% Contractor for total demonstration.

The goal of this project is to develop district heating and cooling systems which will have a higher energy efficiency, operation and maintenance and a better environmental impact than the existing comparable systems. In FY 1977 an analysis was completed of the various subsystems, their impact on overall performance and ways of optimization for each subsystem. In FY 1978 site-specific feasibility analysis and design of a new system for major retrofit of an existing system will be undertaken with development and demonstration following in subsequent years. Completion is expected by FY 1982.

B. Advanced Technology Mix Energy Systems (Systems Engineering)

• Evaluation of Advanced ICES B/A $300,000 Savings: 20 MB/DOE

Cost Sharing: None

Perform detailed engineering and economic evaluations of applications of emerging technologies to community energy needs. This immediately precedes ERDA decisions to invest in extensive R&D or demonstration programs where mission includes application to communities. Relies upon Technology Evaluations, Design Methods, Testing and System Development activities for input.

- ICES Testing Facility B/A $300,000 Savings: 20 MB/DOE

Cost Sharing: None in FY 1978, future share dependent on industry interest.

This activity will provide a facility for system and subsystem testing, as well as for the study of component interfaces to support the preceding program elements. Since ICES will incorporate both new technologies, as well as new applications for existing technologies, performance data necessary to maximize the potential of ICES will not be readily available without such a test facility. The ICES testing effort will also address integration of topping and bottoming cycles and advanced storage technologies in community energy systems, as well as provide data acquisition systems for ICES demonstrations. Use of the NASA MIST facility developed under HUD/MIUS program is scheduled.

- Technology Evaluations for ICES Applications-B/A $400,000-Savings: 30 MB/DOE

Cost Sharing: None

Detailed evaluation of individual components and subsystems which may be incorporated into ICES. Provides performance and cost data for Systems Development, Evaluation of Advanced ICES, and computer simulations. Strong interface with technology RD&D efforts in public and private sectors.

- Design Methods and Manuals for ICES B/A $350,000 Savings: 30 MB/DOE

Cost Sharing: None

Develop and disseminate manual and computerized methods for design of ICES. Strong emphasis on user-oriented codes to simulate and optimize central plant, distribution systems, substation layout, and selection of end-use equipment to minimize energy and scarce fuel consumption within economic and environmental constraints.

- System Development for ICES B/A $350,000 Savings: 30 MB/DOE

Cost Sharing: None

Identify and conduct preliminary engineering and economic evaluation of numerous ICES concepts. Performance and economics derived in terms of energy services provided and type of community to be served. Attractive system concepts will be documented in a systems guide with separate versions for community planners and for engineers responsible for system design. Relies on Technology Evaluations and simulation/optimization (Design Methods) for data and methods.

C. Retrofit to ICES

- Power Plant Retrofit B/A $700,000 Savings: 300 MB/DOE

Cost Sharing: ERDA 25%, Contractor 75% of total cost.

The goal of this project is to pave the way towards large-scale application of integrated systems and adoption of the concept as a viable alternative to wasteful power plants by the power companies and the utility industry in general. In FY 1978, a site-specific analysis and design will be performed on an existing power plant and in FY 1979, the implementation of this design will be undertaken with an expected completion in FY 1989.

- Total Energy Plant Retrofit to ICES B/A $500,000 Savings: 100 MB/DOE

Cost Sharing: ERDA 50%, HUD 50%.

The goal is to retrofit an existing total energy system into an ICES that incorporates solid waste utilization and some advance systems and demonstrate the improved economics, energy consumption and operation by such retrofit. In FY 1977 the feasibility analysis was performed and in FY 1978 the detailed design will be completed and the construction will be initiated. The construction is expected to be finished by FY 1980.

Community Design

A. Ekistic Energy Community

- Ekistic Energy Community Model B/A $1,000,000 Savings: 225 MB/DOE

  Cost Sharing: None

  This project will initiate the testing and evaluation of the analytical tool developed for matching and optimization of integrated systems technology with development patterns. 1978 activities will include several applications for specific sites and/or energy system design problems.

- Ekistic Energy Design Methodology B/A $300,000 Savings: 75 MB/DOE

  Cost Sharing: ERDA 75%, Republic of Greece 25% of total cost.

  Continuation of International Cooperative effort to develop and test the methodology for integrating the science of ekistics with energy systems design and planning. Activities will include an international conference, selection of candidate sites, and development of preliminary designs.

- Assistant to the Community Systems Program-B/A $150,000-Savings: no direct savings can be calculated

  Cost Sharing: None

  This project will continue to provide the Community Systems program with technical assistance for development of cooperative programs with the public and private land development professionals. Specific activities include: preparation of user manuals, workshops and information seminars, surveys, assistance with energy master planning project and publication materials. (No direct savings can be calculated.)

- Energy Conservation in Communities with Energy-Related Growth Mercer County, ND B/A $50,000 Savings 50 MB/DOE

  Cost Sharing: ERDA 75%, other Federal and local agencies 25% of total cost.

  This project will include the testing of organization approaches required for community development associated with energy resource development. Activities will focus on establishment of institutional mechanisms for coordination; development of a comprehensive plan for development and identification of energy conservation opportunities for Mercer County. The project will serve as a prototype for other rapid-growth communities and will be coordinated with several divisions within ERDA, HUD, DOI/BLM, DOC and EPA.

B. Energy Master Planning for New Communities

- Site Development - Case Studies B/A $750,000 Savings: 90 MB/DOE

  Cost Sharing: ERDA 90%, Contractors 10% of total cost.

  Three to six project representing diverse climatic conditions and land-use mix will be selected for projects with site size to accommodate 2000 people, approximately 50-200 acres.

The objective of this subelement is to initiate site-specific case studies to demonstrate marketable energy-conserving designs. Under each case study, an energy-conserving design will be compared with conventional site plans. The plans and evaluations will demonstrate energy-conserving options, measures of potential energy savings, evaluate the plans' economic and regulatory feasibility and determine modification to the development guidelines and standards required to implement energy-conserving plans.

- Neighborhood-Subcommunity - Case Studies B/A $150,000 Savings: 65 MB/DOE

Cost Sharing: ERDA 45%, HUD 45%, Contractors 10% of total cost.

Site size to accommodate 5-10,000 people, approximately 250-1,000 acres. Two to three projects to be selected, the sites to be in new communities. The new element to be jointly sponsored with HUD New Communities Administration in cooperation with new town private developers. Objectives are the same as for site development case studies.

- Town and Communities Case Studies B/A $300,000 Savings: 80 MB/DOE

Cost Sharing: ERDA 80%, Local communities 20% of total cost.

Site size to accommodate 25-50,000 people, approximately 15-5000 acres, energy conservation technologies to be integrated into the master plan for Alaska's proposed new State capital. Objectives are the same as for site development case studies.

C. Assessment of Land-Use Design

- Land Use and Energy B/A $300,000 Savings: 25 MB/DOE

Cost Sharing: None

The objective of this project is to develop the energy consumption profiles, from an aggregate planner's perspective, of the most representative land uses of a community, in order to provide an understanding of the role that key social, economic and cultural variables play in determining community energy consumption.

- Land Use - Community Functional Elements - Cast Studies B/A $500,000 Savings: 75 MB/DOE

Cost Sharing: ERDA 50%, other Federal Agencies 30%, local agencies 20%

The objectives of these studies is to investigate and develop guidelines, methods and procedures for the incorporation of community design energy conservation considerations in each of the community functional element planning process. Sponsored jointly with HUD, DOC, EPA and DOT and selected local communities and will develop and demonstrate how energy conservation can be factored into the community development decision-making process.

- Telecommunication Applications B/A $250,000 Savings: 25 MB/DOE

Cost Sharing: To be determined with HEW, DOT, HUD and local organizations.

Several of the telecommunication systems which showed promise for energy management and conservation will be further assessed for application to specific communities, control systems for building and multistructure complexes and communication service substitutions.

Commercialization

Note: No direct savings can be assigned to these subjects. They are proof-of-concept activities and contributed to the savings assigned to Integrated Systems and Community Design above.

A. Institutional Impediments

- Impact of Public Utilities Regulation B/A $400,000

  Cost Sharing: to be negotiated.

  Integrated Energy Systems in most instances involve services that are classified generally as public utilties and, as such, are subject to some form of public control. The existing structure of regulation is geared to individually operated systems classified by form of service provided to the customer. The planned integrated systems will be operated as a unified system and may, therefore, be covered by more than one public regulatory body. This study will develop proposals for adoption by the necessary public regulatory body to provide the public with the best and most energy-conserving service at the least cost.

- Evaluation of ICES Costing and Economic Analysis B/A $200,000

  Cost Sharing: None

  It is necessary to evaluate the process and methods of economic analyses to establish appropriate ground rules for cost allocation and cost comparisons for ICES with reference to traditional utility costing practices. Refined methods of cost projections of energy and improved procedures to evaluate and quantify benefits and costs of ICES will be developed.

- Workshop Conference for ICES B/A $150,000

  Cost Sharing: None

  The successful adoption of the ICES concept of linking community design and operating energy systems requires close cooperation between various players in the development and operating systems arena. The workshop conference best satisfies this need. The proceedings of these sessions will constitute a major method of evaluation and review of Community Systems RD&D.

B. Market Analyses

- Action Plan for Private Sector Adoption of ICES B/A $400,000

  Cost Sharing: ERDA $400,000; other agencies as negotiated.

  This effort is designed to critically review those areas that impact upon the adoption of the ICES concept by private utility/energy companies to outline a coherent plan to open the door to private industry to participate in development and operation of integrated systems.

- ICES Targets of Opportunities: 1980-1985 B/A $250,000

  Cost Sharing: None

  This task is designed to survey the developments planned in the FY 1980-85 timeframe and document the proposed physical, social and economic makeup of these developments. From this data, initial evaluation of the feasibility of providing community energy systems will be determined. The activity will track the planning process, document each stage and recommend and/or coordinate actions to obtain the necessary approvals for implementation.

C. Innovative Mechanisms B/A $400,000

Cost Sharing: None

This is an effort undertaken to develop the mechanisms that will generate the systems and their supportive manpower necessary for the management, operation and maintenance of integrated community systems. A comprehensive plan will be developed for the development of the mechanisms necessary to produce the qualified manpower that will be needed for the successful operation of the new systems.

D. Comprehensive Community Planning (Demonstration PON) B/A $2,000,000

Cost Sharing: to be negotiated.

A Program Opportunity Notice (PON) will be issued to communities to test a methodology for community planning for management and conservation that was developed in FY 1977. The product of this effort will be a ready-to-use and complete set of technical and institutional guidelines and methods, valid and relevant factual information/data, and example inputs, procedures and outputs, constituting an approach adaptable to existing communities of any size or type found in the United States, for development, implementation and management of an energy plan by local governments.

UTILITY REGULATION

Q. You mention an effort to analyze utility regulations and pricing. How does this differ from FEA's public utilities program?

A. Single-service utilities that are presently serving the energy needs of a community are operating on low energy efficiency. Typically a power company operates in the 25% to 30% energy efficiency area with a resulting tremendous energy waste and thermal pollution of the environment. There exists a large opportunity for energy conservation by combining electricity generation and utilization of the usable heat produced during electricity generation. The concept of combined energy generation has been with us for a long time and is known as a Total Energy (TE) System. In general the TE System is not now regulated. The concept of Integrated Community Energy Systems (ICES) is an outgrowth of the classical TE system. These systems will conserve energy and scarce fuels by combining efficient equipment into systems in which various components will be partially or entirely powered by waste heat from other components. The typical system will provide such services as electricity, heating and air conditioning water heating, and possibly waste treatment. Some systems may also provide for inter- and intro-building transportation, material transfer and communication. Since ICES are designed to generate, distribute, and meter sales of energy in a community they will most likely become subject to the jurisdiction of State and local public utility regulatory laws, as well as to Federal laws that regulate the siting of energy-generating facilities. Through this work those Federal, State and local laws, judicial decisions, and regulations that can impede, or prevent, the development of ICES throughout the cities of America will be identified. The information gained will allow strategies to be developed to remove these institutional impediments. These efforts are limited to those regulatory policies that are unique to the (ICES) systems, however, the work is being coordinated with and will utilize all of the FEA work of their Public Utilities Programs.

URBAN WASTE

Q. In your justification you devote one page to the urban waste program. You are proposing a $3 million increase in this area. Why don't you

give us a table listing the projects to be included under this category and the funding for each. Show both FY 1977 and FY 1978 funding levels.

A. The following list shows projects which have in FY 77 or earlier been initiated and will continue in FY 78, as well as projects which we plan to initiate in FY 78:

PROJECT	Funding FY 1977 (Thousands)	Funding FY 1978 (Thousands)
Pompano Beach	1800	1060
NCRR	150	250
High Rate Anaerobic Digestion	117	-
Seattle	80	-
Enzymatic Hydrolysis	900	1200
ANFLOW	250	350
Activated Carbon	200	285
Calorific Value of Waste	23	45
Size Reduction System	50	201
Small Scale Systems	106	394
Feasibility Studies		1150
Sludge Utilization		615
Targets of Opportunity		400
Landfill Pon		500
Program Support		300
RDF Industrial Uses		500
RDF Storage & Transport		50
Fluid Bed Combustion		200
Other Miscellaneous Projects	774	
	4450	7500

The projects shown in FY 1978 are in planning at this time. We plan to encourage development of new technologies through funding feasibility studies, four to five are contemplated. We also are interested in focusing attention on smaller scale systems for the flexibility they offer in all areas of the Nation. Methane gas recovery from landfills is another primary concern; we plan to initiate a program, to define design parameters for optimizing gas recovery and use. Fluids beds have been recognized as a good technique for combusting less than optimum fuels; we are interested in investigating their applicability in pyrolysis and combustion of wastes. We expect to investigate uses of sludges, including possible co-siting of MSW and sewage treatment for synergy and efficiency of energy recovery.

The other programs are contemplated to augment and upgrade the technologies that operate today. While much research is needed to develop new technologies there is a continuing need to increase the effectiveness of known techniques.

TECHNOLOGY AND CONSUMER PRODUCTS

Q. Under technology and consumer products you have several interesting projects. Tell us more about the thermally activated heat pump - how much has been spent to date, your budget for FY 1978, and the progress of the program?

A. Thermally activated heat pumps, of which the gas-fired heat pump is the simplest example, have large potential for improved energy efficiency in space conditioning. For example, direct combustion systems (warm-air furnaces, baseboard hot water, etc.) achieve coefficients of performance (COP) of about 0.6; that is, 40% of the

energy content of the fuel is wasted. An electric heat pump increases this overall COP to about 1.0; that is, since energy is extracted from the air and that energy is considered "free," the electric heat pump can deliver to an occupied space the same amount of heating energy as was contained in the fuel consumed at the powerplant. The energy wasted at the powerplant in the generation of electricity, however, cannot be recovered and used for heating due to the remote location of the powerplant to the end user. In the thermally activated heat pump, the "powerplant" equivalent is in the appliance itself; and instead of using electric-resistance heat to augment the heat pumping of a conventional electrically driven heat pump, the waste heat can be used to augment or replace heat pumping in the thermally activated heat pump and thus COP's of 1.6 are achievable.

The gas-fired heat pump is directed at the retrofit market which would greatly expand the capability of our limited resources. For example, considering relative COP's, installation of a thermally activated heat pump in a residence currently using gas in a warm-air system (a very typical case) would reduce the gas requirement for heating by 62%; or putting it another way, almost three houses could be heated for the same amount of fuel currently needed to heat one house.

Through FY 1977, $1,400,000 of ERDA funds were authorized on our thermally activated heat pumps hardware projects; industry has contributed another $4,600,000 to these projects by virtue of ERDA's cost-sharing arrangement with industry. In addition, $300,000 have been spent for several other projects that are being performed in direct support of the thermally activated, as well as electrically driven, heat pump programs. Three million dollars have been budgeted for thermally activated heat pumps activities in FY 1978.

One hardware development contract has been in effect since February 1976; a second contract was just signed in April 1977. These two thermally activated heat pump hardware projects, that are being cost shared with industry, have produced market studies that have indicated consumers will accept these higher priced products; performance specifications have been developed that the built systems must satisfy in order to be commercially acceptable; and hardware components have been designed, built, and are in the process of being bench tested. So far, the performance of all components has met or exceeded the performance requirements established at the beginning of these projects.

One of these projects is entitled "Demonstration of a High Seasonal Performance Factor (SPF) Heat Pump for the North-Central United States." This project will demonstrate a new gas-fired heat pump for commercial and ultimately residential usage. This system will utilize a regenerative, steam-driven turbine driving a fully modulating Rankine-cycle heat pump system. This heat pump is intended for usage in small commercial-building applications. To date, analytical designs have been completed; a preliminary market study showing that a significant market for this product exists has been completed; fabrication of most of the heat pump's components has been completed; and test stand evaluction of these components has been initiated.

The second hardware heat pump project is entitled "Demonstration of a Stirling/Rankine Gas-Fired Heat Pump." The objective of this project is to demonstrate the commercial viability of this heat pump system which utilizes a free-piston Stirling engine coupled with an inertial-type Rankine-cycle compressor. The market for the heat pump is initially intended to be the residential community and ultimately light commercial applications. Achievements under this project include a feasibility study that has been completed, fabrication of most of the components, and bench testing of these components has been initiated.

Q. Another interesting item is the screw-in flourescent light bulb. What is the status of this project and what potential savings can we expect? When will this new bulb be available to the public? What will it cost?

A. The initial ERDA contract with Lighting Technology Corp. (Litek) to develop an electrodeless flourescent light bulb, which was initiated in February 1976, has been completed. The final reports and ten prototype bulbs, which have been delivered to ERDA, have demonstrated that the Litek principle is technologically sound and that the energy savings potential of the lamp is significant. ERDA is presently negotiating a follow-on development effort to optimize the electronic circuitry required to power the bulb. This development effort, to culminate in January 1978, will produce a highly reliable, reproducible, and stable electronics package and will be followed by a heavily cost shared demonstration project.

Lighting in the United States is estimated to consume 418 billion kilowatt-hours (KwH) a year at present, and the demand is growing. The incandescent portion is estimated to be 178 billion KwH, equivalent to an input of roughly 1 million barrels of heavy fuel oil a day, for both residential and nonresidential uses. Total conversion to Litek lamps, which consume only 30% as much energy as incandescent lamps, would save about 700,000 barrels of oil equivalent a day; however, total conversion will not take place. Considering only the estimated total market opportunity, where mainly lamps that are used long hours would be replaced for quick lamp payoff, a reduction of 87 billion KwH could be expected because of the 70% reduction of the 125 billion KwH used by those lamps. This represents an energy saving of 425,000 barrels per day oil equivalent. Actual savings would be reduced in consumption of oil, gas, coal, nuclear fuel, and water.

Commercialization will take two to three years and, within five years, the company could be producing 12 million units a year. The lamp is estimated to cost $7.50 and last for ten years which is approximately 20,000 on/off cycles.

GAS FIRED HEAT PUMPS

Q. What will the $2 million amendment of the gas fired heat pump allow you to accomplish?

A. A small fraction of the $2 million supplemental will be used to accelerate the two existing thermally activated heat pump projects. The balance of the supplemental will provide for cost-shared research and development projects with industry to develop new components and technologies, testing the reliability

of advanced heat pump designs, rating the efficiency of new heat pump designs in varying climates throughout the United States, and providing this information to the consumer. The ERDA efforts will accelerate commercialization of gas-fired heat pumps approximately 2-3 years.

No conventional development program will allow significant market penetration by 1985-90 of these advanced concepts. The proposed cost sharing between Government, the American Gas Association, and private industry is necessary to accelerate the market entry of these technologies into the early 1980's.

All participants in the project will have a significant commitment to its success. Manufacturers, by receiving "seed money" will be far more inclined to get involved during the early high-risk phase of the program. It is during this high-risk phase that manufacturers ordinarily have little incentive to allocate significant funding to develop a completely new product line which will be competitive with a product they are already making.

Early funding during the high-risk phase will mean that several major manufacturers, perhaps new to the air-conditioning industry, can participate, offering a multiple number of approaches so that more than a single technical solution can be investigated.

A study to identify the areas of opportunities in heat pumps is nearing completion. This study will provide the data from which certain thermally activated heat pump technologies will be selected for RD&D in FY 1978.

Technologies that are being identified in this study and strongly being considered for support with this supplemental funding include advanced absorption systems, miniaturized Brayton-cycle prime-mover driven thermally activated heat pumps, and an Ericsson/Ericsson thermal oscillator. High-efficiency heat pump components, such as heat exchangers, defrost controls, and reversing valves, will be pursued.

In 1985, 4.13 M BPDE will be consumer in the residential and commercial sector for space heating and cooling if no energy conservation action is taken. If these high-efficiency heat pumps penetrate the market by 10% and use one half the amount of fuel normally used, energy savings in 1985 could amount to .21M BPDE.

Q. One of the new projects for FY 1978 under technology and consumer products is an analysis of thermal distribution in buildings. What is budgeted for this effort, and what specifically will you be doing?

A. This project has been budgeted for $100,000 in FY 1978.

The present means of distributing thermal energy in buildings is via air in ducts, water or steam in pipes, or electricity. Other thermal distribution means are available that include, but are not limited to, heat pipes and related devices. Some of these devices can distribute thermal energy without consuming pump or fan motor distribution energy.

In FY 1978 a multiphase contract will be executed. The objective of phase 1 will be to identify the thermal distribution technology (ies), that, when developed, will have the greatest application and energy savings. It is anticipated that the greatest application will be in the area of refiting existing thermal distribution systems build during the era of cheap plentiful energy. In the second phase of this project, hardward will be developed that was identified in the first phase as being energy and cost effective. In addition to hardware development, preliminary market and business studies will be conducted in order to establish the approximate size of the market and the appropriate market entry price for this hardware. The third pahse will be devoted to a demonstration and life testing of the hardware. Commercialization will occur in the last phase.

It is anticipated that this contract will be cost shared with industry and possibility one or more of the heating, ventilating and air conditioning trade industries.

CONSUMER MOTIVATION AND BEHAVIOR

Q. You are proposing a large increase in consumer motivation and behavior activity - up from $395,000 in FY 1977 to $980,000 for FY 1978. I can understand involvement in consumer motivation, but you are getting into market strategy. Shouldn't the industry be doing this type of work?

A. Certainly the industry should do the work of developing specific marketing strategies for products which they sell. We are not doing this. What we are doing is trying to work with the private sector to address some of the major barriers to the purchase of more energy efficient products in general, such as consumer aversion to higher first cost. Consumer lack of awareness and use of life cycle costing is a significant barrier to the introduction and acceptance of many energy efficient products (not just our screw-in fluorescent Litek bulb), since many if not most energy efficient products have a higher initial cost.

In the past, no one retail merchant or manufacturer has been willing to commit the significant resources necessary to position the generic concept of life cycle costing in the marketplace. For this reason, in FY 77 the Consumer Motivation and Behavior Branch is beginning a pilot demonstration in Denver, Colorado, of life cycle costing using specific energy efficient products to define the concept, and involving retail merchants (such as Sears and Montgomery Ward) as important participants. The retail merchants are spending their own advertising dollars to support the program. We are providing primarily the coordination and the funding for the research and evaluation component of the project.

By researching whether or not the generic concept of life cycle costing can be positioned in the marketplace, ERDA can provide important information which can then be further carried forward and implemented by local and national retailers. The cooperation and support of the private sector in the development of this project has been superb. This type of program is essential to the successful introduction of the new technologies and systems being developed by the Division, and is a good example of how we conduct research on ways to work with the private sector to encourage consumers to purchase and use more energy efficient products.

Q. Doesn't the role of motivation and public awareness properly fall under FEA instead of ERDA?

A. The role of public awareness approaches like the "Don't Be Fuelish" campaign and other attempts to provide people with information on the energy crisis and how to save energy, is properly an FEA function. ERDA's Consumer Motivation and Behavior Branch is not doing public awareness programs. What we are doing is conducting research on ways to work with the private sector to encourage consumers to (1) purchase more energy efficient products and (2) adopt and maintain more energy efficient practices.

The overall strategy of the Branch is to identify approaches to overcome non-technological barriers, like consumer aversion to higher first cost, and to conduct research and testing of the approach in a controlled manner to see if it has the potential for significant energy savings and successful implementation by the private sector. In most cases, even the initial research is conducted in close cooperation with the private sector organization, such as retail merchants or utilities, which would be the ultimate implementors. Many of these approaches have not been associated with Federal programs in the past, such as working with the retail merchants (e.g., Sears, Montgomery Ward) to encourage purchase of energy efficient products by consumers in a manner which is beneficial to the retail merchants and to the achievement of significant energy savings. This project was described earlier in more detail.

Another approach we are testing is providing homeowners with immediate and intelligible feedback about their home's energy consumption. Preliminary tests with homeowners in Twin Rivers, N.J., have indicated that this daily feedback can reduce consumption by 10%. In FY 78, we are going to do a demonstration with PEPCO of a dollars and cents display of energy use (which we call a "money meter" even though it is not a meter in the conventional sense). The "money meter" will sit in the kitchen and will essentially say "Your electricity cost for the next hour will be $1.12 if you continue to use electricity at your present rate."

The FEA is not conducting any research of this sort. To date, FEA efforts in the consumer area have been largely limited to consumer surveys gathering attitudinal information and media advertising efforts such as the "Don't Be Fuelish" campaign. In contrast, the ERDA orientation is on applied research geared to clearly involve key private sector groups.

ECONOMIC ANALYSIS AND TECHNOLOGY TRANSFER

Q. **The description of the Economic Analysis and Technology Transfer program under Buildings and Community Services sounds very similar to your consumer motivation activity - essentially they both seek to gain wide public acceptance of energy saving methods. How do they differ?**

A. **The objective of the economic analysis and technology transfer program is to assist in promoting the acceptance of new and existing means of improving the efficiency of energy use. There are a number of reasons for an in-depth involvement in the functions of economic analysis and technology transfer.**

The overall strategy of technology transfer is to disseminate information on energy saving measures to energy consumers through a variety of channels and products. For the Buildings and Community Systems programs, the primary consumers are the professional who builds or manages buildings and community systems, the homeowner and the manufacturer who supplies that sector of the economy. The channels to be used include presently

operational programs, such as the Cooperative Extension Service, state university outreach programs and other existing Federal agency (e.g., FEA, HUD, NBS, Federal Laboratories, and NSF Urban Technology Agents) information transfer programs. Where channels are non-existent, new channels will be developed.

There are several demonstration programs currently underway. One is with the League of Women Voters Educational Fund who will be working with four local chapters of the League to disseminate information on new consumer technologies and new techniques for conserving energy. The second is the Product Planning Team or "New Product Management Team", a small and diversified group of private sector executives experienced in the planning and commercialization of new products. The Team is already working with the program manager of the Thermally Activated Heat Pump. The Team will provide to the ERDA program manager, the type of expertise available to a comparable program manager in private industry. Further, since they have stature in the private sector, they will provide assurance to private industry that the ERDA programs have been guided by the advice of experts in new product management. The third demonstration program underway is to test the Urban Technology System as a means of expediting the use of energy efficient technologies by municipal governments. The Urban Technology System is managed by Public Technology, Inc., a nonprofit organization, organized by the major local government public interest groups and under contract to the Research Applied to National Needs program of the National Science Foundation. The basic role of the Public Technology, Inc./Urban Technology System program is to act on behalf of cities, counties, and states in applying technology to public problems and they focus on specific problems that have been defined as high priority needs by local government officials. The ERDA program will emphasize and focus on the energy efficiency aspect of the total Urban Technology System program.

Through the use of systems analysis and modeling techniques, the efficiency of energy utilization in buildings, community systems and consumer products under varying economic, energy supply and environmental conditions can be determined. That information assists the developer of conservation technology to anticipate changing requirements and to differentiate among competing needs.

Various public policy/issues related to the Buildings and Community Systems programs are researched and analyzed to determine the optimal mix of research and Federal incentives needed to accelerate the onset of energy efficient technology to help us achieve our conservation goals.

The increasing tempo of technology transfer, which requires an increase above FY 1977 expenditures, is a result of the completion or near completion of research projects undertaken in FY 1976 and FY 1977. This work does not conflict with the FEA education program or the Energy Extension Service.

The technology transfer publications are keyed toward publicizing and commercializing ERDA research activities. These publications will also be used by the energy extension service (EES) as part of their literature library. The EES is merely a channel of communication, thus, requiring information and publications developed under this program.

Funding is also required to hold additional workshops and seminars to involve and inform energy consumers, designers/engineers, manufacturers and developers of the energy efficient technologies being developed by ERDA.

Increased funding is also required in the planning and economic analysis area. This additional funding will enable us to expand our threshold analysis methodology to include private sector RD&D decision tools, will provide additional research on policy analysis and options and will enable us to expand our demand modeling capabilities.

The reason for the large increase of funding between 1977 and 1978 is due to the fact that many of the efforts that are now being carried under this line item were previously being funded by the programmatic areas. Clearer identification of responsibilities with the Buildings and Community Systems Divisions demanded a reallocation of responsibilities and funding to the Economic Analysis and Technology Transfer line item.

Typical Systems Analysis projects include:

Project Evaluation

The threshold criteria model is used to provide a quantative evaluation of proposed projects. This effort includes necessary maintenance of the model and the data base and associated programs evaluation efforts necessary for a sound and accurate project selection process.

Market Analysis Studies

Activities will include an analysis of the advantages and disadvantages of various economic incentives and how such incentives would impact on private sector decision making. Quantification of alternative financing mechanisms and the trade-offs in terms of tax revenues will be evaluated.

Demand Modeling

In order to estimate the energy impact implementing conservation projects, it is necessary to improve the modeling and data collection techniques in the residential and commercial sectors. This effort is developing and testing various scenarios for use in planning and developing conservation programs.

Policy Analysis

This work includes studies of strategic planning and cost effectiveness of conservation research and development, case studies to determine if Federal involvement is warranted and the development and analysis of various policy alternatives and objectives.

Secondary Impact Studies

This effort is directed toward quantifying wherever possible the socio-economic impact of Government involvement in conservation programs. Near and long term socio-economic problems are highlighted in various supply and demand scenarios.

In summary of a fuller explanation offered to an earlier question, the Consumer Behavior program conducts research with private sector groups such as retail merchants and utilities on ways to motivate consumers to purchase and use more energy efficient products and to adopt more energy efficient practices. In a sense, the Consumer Behavior programs learn what will motivate the energy consumer to act and the Economic Analysis and Technology Transfer program provides the technical information the consumer needs in order to take action.

Q. In total, regardless of the activity under which it may appear, how much money do you have in the FY 1978 budget for public acceptance of energy saving technologies?

A. The recipients or target audiences of the various technology and information transfer programs include institutional, individual and associations of energy users. Thus, if "public" is defined to include all of these energy consumers, then the Consumer Behavior program should be combined with approximately $600,000 of the Economic Analysis and Technology Transfer request for a total of approximately $1,580,000.

TRANSPORTATION ENERGY CONSERVATION

Q. Has the automobile industry, in your opinion, been doing enough work on their own toward producing energy efficient automobiles?

A. Since model year 1975 the automobile industry has steadily made improvements in the sales weighted average fuel economy and in improving the fuel economy of the small and large cars. Fuel economy levels between 40 and 50 mpg are becoming commonplace figures today and this can be contrasted to between 30 and 40 mpg a few years ago. In addition, the industry is working on nearer term engine modifications such as the diesel, stratified charge, variable displacement, and improvements in transmission. These facts clearly indicate that industry is working diligently to produce energy efficient automobiles for the near term.

Q. You are developing a new area, pipeline research and development. What is the status of your work in this effort, and how far along are you on defining the Federal role in this area?

A. Initial efforts in the area of pipeline energy conservation were begun in FY 1976 with the award of a contract for the study of energy usage and opportunities for conservation in pipeline systems. The study will be completed in FY 1977 and will be the principal vehicle used in defining subsequent year R&D programs. Findings thus far developed under the study are being used to support pipeline activity in FY 1977 such as the pipeline bottoming cycle study.

Q. You make a special effort to mention interrelationships with other Federal agencies in your transportation program. Give us some examples of efforts to avoid duplication with these other agencies.

A. The ERDA TEC is currently working with NASA, DOT, and DOD utilizing Interagency Agreements (IAA's). The IAA's are used to transfer money and project responsibilities to the assigned agency. In the case of DOT where a potential overlap could occur due to their charter in transportation, meetings are held during the fiscal year to review ongoing and new program starts to avoid any duplication of effort.

ACCOMPLISHMENTS IN TRANSPORTATION ENERGY CONSERVATION

Q. In your listing of accomplishments you mention installation of a continuously variable transmission in an automobile which demonstrated a 25 percent fuel savings. Tell us a little more about this program. Is there any effort to get this new transmission into production?

A. Current vehicle transmissions have a limited number of discrete speed ratios. Each ratio is most efficient for only a limited number of vehicle load speed conditions. Therefore, during most of the driving cycle, conventional transmission systems force the engine to operate at some point below its peak efficiency.

In 1974 after reviewing a number of "continuously variable transmissions" a contract was let to Orshansky Transmission Company to develop and test a prototype hydro-mechanical transmission which would supply a continuous variable speed ratio thereby allowing the engine to operate at its most efficient operating point over the vehicle load range. Under ERDA contract Orshansky installed the prototype in a 1975 American Motors Hornet. Testing was performed for approximately one year to determine performance, driveability, reliability and noise characteristics. Both chassis dynamometer testing and coast to coast road tests were performed. The Federal Urban and Highway Driving Cycles were used in performance mapping, and fuel economy figures tabulated. The results of the prototype testing were very successful validating earlier performance estimates.

Phase IV of the program is considered to be the pre-production prototype development stage. The major portion of development will occur in FY 1978. Orshansky has submitted a transmission design to ERDA. The Ford Motor Company will evaluate the design from a production viewpoint. The results of this evaluation and review of similar efforts being performed by Chrysler will determine if the transmission is considered a reasonable production alternative.

HEAT ENGINE SYSTEMS

Q. You have a significant increase in heat engine systems -- up $13 million for a $30 million program for FY 1978. Two of the major thrusts are the gas turbine engine and the Stirling cycle system. What are your specific plans for these systems in FY 1978?

A. FY 1978 will mark the start of an improved gas turbine and Stirling engine program. This program reflects a five year effort to improve the technology so that a significant improvement in fuel economy (approximately 30 percent) could be demonstrated along with multi-fuel capability and the potential for low cost production. These programs will be cost shared with the automobile industry where

possible and required the industry to make a decision in 1983 to determine the feasibility to proceed into Production Engineering. The additional funds in FY 1978 will be used to develop a major industry team working towards the above goals.

Q. When do you estimate we will see these engines introduced by the industry? Do you think that at the time of introduction they will achieve the estimated 50 percent savings in fuel economy?

A. Assuming a successful development program, ERDA's and the automobile industry's marketing strategies indicate that the earliest possible time of introduction would be in model year 1987. Initial introduction would be accomplished on a limited basis 500,000 to 1,000,000 units to determine users acceptance and in-use characteristics.

The technology gains over the next five years in the gas turbine and Stirling engine program are projected to achieve 30 percent in fuel economy. Longer lead technology gains are expected to reach the 50 percent fuel economy gains. However, due to the manufacturing lead times the industry would have to freeze on the 30 percent fuel economy technology for 1987 production. The remaining technology gains leading towards 50 percent is considered to be the growth potential remaining in these concepts that could be introduced without major disturbance to mass production during the following ten years.

REGENERATIVE BRAKING SYSTEMS

Q. As a past accomplishment you mention that a regenerative braking system was developed, and you plan to test it in a vehicle in FY 1978. Exactly what is a regenerative braking system, and what is the potential energy savings?

A. Regenerative braking is the process of extracting and storing a vehicle's excess energy normally dissipated as heat during the braking phase, followed by some controlled release of that energy during the acceleration and steady state driving phase. The storage of the energy can be accomplished in a number of ways -- flywheel, electric battery, compression of a gas or hydraulic.

Values of energy savings vary dependent upon the storage capacity and efficiency of the energy release. Also, the driving cycle is extremely important. Under normal highway service with few acceleration and decelerations, little energy is available. Conversely, postal trucks, taxies, and urban buses operating in stop and go cycles will have more energy available for storage. Statistically, approximately 8 percent of the total transportation sector operates on the above cycle. Under these conditions, an approximate 4-6 percent savings in fuel could be gained by incorporation of reasonably efficient regenerative braking systems.

Various studies of efficiently supplying accessory power, including regenerative braking accessory drives, are continuing in FY 1978. As a result of these studies, select systems will be tested.

ELECTRIC/HYBRID VEHICLE SYSTEMS

Q. For implementation of the Electric and Hybrid Vehicle Act you have $46.9 million in your FY 1978 request. If funded at this level, where will we stand at the end of the fiscal year? What accomplishments can we anticipate?

A. As required by P.L. 94-413, contracts will be entered for up to 2,500 vehicles for the demonstration program; loan guarantee funding will be set aside; research and development programs on electric vehicles and hybrid vehicles will be continued; component and subsystems, such as transmissions, motors, controls, and hybrid power system research and development will continue; engineering support and studies will continue; and storage systems research and development will continue. With this funding level, the requirements of P.L. 94-413 will be supported, and some additional research and development continued.

Q. The Act authorizes $40 million for implementation. Where is the authority for the additional $6.9 million contained?

A. The additional $6.9 million is that base research and development program in support of electric and hybrid vehicle technology which was initiated in FY 1976. This additional research and development support is mandatory to assist in obtaining advanced technology vehicles in the second demonstration phase of P.L. 94-413, and to provide for more advanced technologies which can be made available beyond the time frame of P.L. 94-413.

Q. What role is the industry playing in this effort? Do you have any estimate as to the funding from outside government directed to this type of program?

A. The electric vehicle industry today consists mainly of small entrepreneurs who do not have the resources to strongly promote commercialization, or to support large research and development programs. There is commercial activity on the part of battery, electric motor and control manufacturers. The big three auto manufacturers have modest programs in the area. It is very difficult to accurately estimate the commercial funding total due to the diverse type of participation; but the total can only be a very small fraction of that annual expenditure in support of improving conventional piston engine technology.

Q. To read the narratives in your justification you would think this is an entirely new effort. Haven't you in fact been doing this work for quite a while now - research into batteries and electric power plants for example?

A. FY 1976 was the first year funding was provided to support electric and hybrid vehicles, and was at the modest level of $1.5 million. P.L. 94-413 caused a very large increase in both scope and magnitude of the program, and therefore, much of the narrative does indicate new activities. Research in batteries has been underway since the inception of ERDA, but the effort applicable to electric vehicles was at a rate less than half that now requested, and was mostly directed towards a longer term, more advanced technology than suitable for P.L. 94-413.

Q. There has been some indication that you did not favor demonstration of electric vehicles since those presently available are marginal, at best. What caused you to change your mind?

A. Earlier versions of the Electric and Hybrid Vehicle Research, Development, and Demonstration Bill contained demonstration requirements more stringent than those included in the final Act. ERDA did testify against the earlier version primarily because of its too-much, too-soon demonstration, but also testified in favor of the intentions of the Bill. In view of the fact that Congress had responded to ERDA's expressed concern about the timeliness and magnitude of the demonstration program, ERDA moderately restated its concern over the resulting schedule and recommended signature of the Bill in recognition of the contribution electric vehicles can make in reducing dependence on foreign petroleum supplies.

Q. Included in the request is $2 million for loan guarantees. How important are these guarantees? For that matter, are they really necessary?

A. Section 10 of Public Law 94-413 authorizes a program of loan guarantees to assure that the small business and other qualified concerns have a realistic and adequate opportunity to participate in the electric and hybrid vehicle program. It is considered vital to the financial capability of many small firms in the emerging electrical and hybrid vehicle industry that the Government reduce the risks of lending institutions by providing federal guarantees for loans to companies which the lenders would not otherwise consider. Testimony before the House Science and Technology Committee on HR 8800 during 1976 from organizations representing the electric and hybrid vehicle industry supported the necessity of a loan guarantee program.

Q What do you envision as the cost for this program down the road, say five or ten years from now?

A. It is believed that the full authorized amount of P.L. 94-413 is required through the time period 1977-1982 covered by the Law. The cost of the demonstration program leaves a modest level for research and development for advancing technology to the point of real commercial attractiveness, and a supporting base research

and development program is necessary. At some future time period, it is not expected that there will be Government supported programs for electric and hybrid research and development, because market demand should make the business profitable for industry. ERDA is now actively engaged in the longer range planning which will allow us to reach this point, but cannot estimate the costs accurately at this time.

NON-HIGHWAY TRANSPORTATION SYSTEMS

Q. Under your non-highway transportation program you mention the completion of a coal transportation study in FY 1977. When will that be completed?

A. The Coal Transportation Study which is examining the relative energy efficiencies and economic characteristics of competing transportation modes, is scheduled for completion in September 1977.

Q. Another program mentioned is "analysis of futuristic concepts and technologies applicable to non-highway systems." Exactly what does that mean?

A. The category of futuristic concepts and technologies is intended to support innovative ideas for non-highway transportation systems offering the potential for energy conservation. Concepts such as capsule freight pipelines, guided personal transport systems and other novel schemes may be candidates for support. It is expected that work in this category will most likely be awarded to individuals, small companies and universities.

THE ROLE OF INDUSTRY IN IMPROVING CONVERSION EFFICIENCY

Q. You point out in your justifications that the return on conversion efficiency investments is too low for industry to support such efforts. Are your programs geared to making conversion economically feasible?

A. A broad base of supporting energy conversion technology with a wide range of potential applications is required to attain the objectives. It will also be necessary to accelerate development of improved conversion efficiency equipment. The potential energy saving value in both areas is large. But industry is not vigorously pursuing the necessary R&D, largely because it is risky, not easily captured by a private firm, and because the potential products serve a splintered market. Thus, federal assistance will help to ensure that basic research is accomplished, and that promising technologies will be made available at a faster rate. Governmental activities cannot be limited merely to reducing the technological uncertainties and making this information available to whomever is interested. Federal activities also must facilitate the establishment of a "critical level" of the technology used by the private sectors.

For example, ERDA is in the process of developing a comprehensive commercialization plan for a new Rankine-cycle waste heat recovery system for significantly increasing the overall system efficiencies of large fixed-diesel and fixed-gas-turbine power generating equipment. As part of this plan, ERDA has concluded

the first joint participation market development agreement for the development and manufacture of Rankine-cycle system prototypes and their demonstration in actual commercial use.

Similar cost-shared arrangements are under way in the fuel cell program area. A major effort to commercialize a 4.8 mw fuel cell generator is jointly funded by ERDA, the Electric Power Research Institute (EPRI) and private industry. In combustion, specific research areas identified by the private sector as appropriate government roles are being addressed. Combustion work on internal combustion engines (ICEs) is being conducted in close coordination with the automotive industry and a cooperative project involving ERDA, university, and industry participants is now under way.

In summary, the answer is "yes" and it is one of our major goals.

FUEL CELLS

Q. The budget request for fuel cells is currently $28.3 million, which does not include the $3 million amendment. You state that the overall program is geared to (1) commercialize first generation systems, (2) generate a strong technology base, and (3) develop a capability for a broad range of fuels. Using that breakdown, how much funding is directed to each effort?

A. At the level of $28.2M, $22.9M is aimed at the development, design, and manufacture of first generation fuel cell prototypes. This includes the 4.8 mw demonstrations and the development of smaller units in the 40 kw to 120 kw range with three potential manufacturers. All of these programs are cost shared.

$4.4M is aimed at a strong technology base including the development of second generation, molten carbonate, coal-fueled fuel cell systems. The remaining $900K will go to contracts examining the broadening of fuel processor capability to accept a broader range of fuels.

Q. You have plans to get the 4.8 megawatt fuel cell system into the demonstration phase by the end of FY 1978. Do you know at this point where this demonstration will take place?

A. The host utility RFP is "on the street" with proposals due by May 20, 1977. Since fuel cell systems are modular and truckable, we expect site preparation to be minimal.

Q. When will the 4.8 megawatt demonstration be completed?

A. Our completion milestone is for December 31, 1979. At this time, testing and evaluation will have been completed.

Q. What is the next step for the 4.8 megawatt fuel cell after demonstration, and how will ERDA be involved?

A. We are in the process of examining the precise role that Conservation should take between the demonstration of the 4.8 MW module and fuel module and full commercialization. We feel that the commercialization role is properly that of industry and not of the federal government. However, after the first prototype demonstration, there will probably have to be a government role to ensure that full commercialization would occur.

Our present thinking is that we would participate in the funding of some additional technology advancement for lower cost, more reliable units leading to a final, advanced demonstration of a number of units, in a number of applications. This final demonstration would be the precursor to industry moving into full commercialization.

Q. What are the specific goals to be attained by the $3 million amendment for fuel cells? Will this allow any additional demonstration projects?

A. The FY 1978 Amendment will accelerate research and development leading to the manufacture and test of fuel cell demonstration units and subsequent commercialization of fuel cell technology. Fuel cells, with their environmental acceptability, modularity, reliability and ease of waste heat capture provide significant advantages over conventional powerplants in total energy system applications. When fuel cells combined with heat pumps are retrofitted into buildings presently heated with natural gas, an average of 30 percent of the gas presently used could be saved. Industrial and residential applications project similar savings. The FY 1978 increased funding level will accelerate the effort to implement fuel cell total energy systems in these applications. This cost-shared program to develop fuel cell powerplants for total energy systems was initiated in FY 1977. The program is cost-shared with a fuel cell manufacturer and a consortium of gas utilities. The combined business of these gas utilities represents 65 percent of U.S. natural gas distribution. The program involves technology development to improve powerplant performance reliability and cost, and it will lead to fabrication and demonstration of several fuel cell powered total energy systems.

OPEN CYCLE BRAYTON ENGINE

Q. The justification mentions that significant funding commitments will be required for the open cycle Brayton engine in FY 1978 and continuing on to FY 1982. Where does this effort currently stand, and why the need for "significant funding commitments" now and in the future?

A. A variety of applications are being investigated by ERDA's Office of Conservation where highly efficient, fuel flexible stationary engines could offer promising payoffs in terms of reduced U.S. energy consumption. These include integrated electric power and process heat production by industry or cogeneration as it's more commonly known, advanced total energy systems for buildings and community applications, dispersed power generation for rural and remote areas having unique fuel resources, intermediate load and peaking generation for utilities, and energy intensive mechanical drive applications such as pipeline pumping. Considered collectively, a potential energy savings equivalent to around a million barrels of oil per day would be possible by the 1990's if sufficiently advanced industrial conversion equipment were available.

Gas turbines appear to be the nearest-term prime mover for achieving both increased efficiency and a significant degree of fuel flexibility. Todays major problems with gas turbines in these applications involve: reliability, fuels flexibility, and emissions. Industry's commitment to resolving operational reliability problems appears to be making considerable headway. However, there remains the problem that gas turbines need clean light distillate petroleum fuel or natural gas to achieve acceptable durability at their design firing temperatures, and moreover, even with these high quality fuels, almost none can meet the EPA new source performance standards at design firing temperatures without substantial H_2O injection and its associated efficiency penalaties. Because of the gas turbines reliance on critical gas and distillate fuel, it could well be eliminated by evolving energy policy as a viable near term stationary engine option for use in these many application areas.

The Improved Conversion Efficiency Open Cycle Brayton Project is designed to help the gas turbine meet the requirements of improved efficiency and fuel flexibility in the near-term frame.

The near-term objectives of the gas turbine technology development plan are two fold. First is to develop the critical components necessary to demonstrate by 1980, technology readiness for high efficiency, low cost, multi-fuel industrial gas turbines in the 5 to 25 MW size range for integrated energy systems, pipeline pumping, marine and railway propulsion and dispersed power generation. The second is the development of technology necessary to achieve mid-1980 commercialization of highly efficient, heavy-fuel tolerant gas turbines in the large 25-100 MW size range for industrial cogeneration powerplants and utility intermediate load power generation.

The overall goal is to insure that the next generation of industrial gas turbines will be consistent with energy policy by virtue of features that will permit their field conversion to coal or oil shale derived liquid fuels as they become available in the future.

A modest effort was previously initiated toward accomplishing the first objective but "significant funding commitments" are needed to achieve the overall program goal in the near-term time frame. The FY 78 budget request will provide the necessary momentum for a meaningful start and significant funding commitments over the next five years will assure that the R&D indeed produces meaningful results by the early 1980's.

Q. When can we expect to see results from this work?

A. This activity is planned as a five year program. With "significant funding commitments" we would expect to see production ready technology being commercialized before 1985 in the larger 25-100 MW utility class turbines. Also, technology readiness for smaller gas turbines in the 5 to 25MW size range could be demonstrated by 1980. Technology readiness here means that advancements in efficiency and multi-fuel capabilities would be proven to the extent that industry could incorporate these improvements into new engine products for energy intensive applications.

HEAT UTILIZATION AND COMBUSTION PROGRAMS

Q. Both your heat utilization program and the combustion program are filled with narrative descriptions indicating "further analysis," "continued study," and "accelerated development." What are we really accomplishing in these programs in terms of saving energy? To be a little more specific let's talk about the coalbed methane program. How much have you spent to date on this effort and what have you accomplished?

A. Heat Utilization: "Further Analysis," "Accelerated Development," etc., are consistent with the fact that in the second year of our existence, "studies" and near-term payoff programs were initiated in parallel and study results have not yet been fully reflected in "fine-tuning" of the near-term hardware programs or in the higher risk longer term programs.

Several of the major accomplishments achieved in the past twenty months are:

°Initiated two highly accelerated efforts to have industry place 1400 production prototype "waste heat to shaft horsepower" organic Rankine bottoming cycles into consumer installations by 1985 with a savings of at least 10,000,000 bbl light distillate per year.

°Developed and implemented advanced procurement methods (cooperative agreement) to stimulate the manufacturers and recoup federal investment.

°Completed phase one of a study by Drexel University to identify by quantity, quality and composition the fuel input and waste heat streams for the industrial sector by SIC classification and by state.

°Initiated a program to recover and utilize the waste heat at ERDA nuclear production facilities equivalent to the heating value of 30,000,000 bbls of oil per year.

Total expenditures to date are $2.705M.

Combustion Program: The Combustion Program is achieving energy savings through development of improved technology and utilization of this technology by manufacturing industries. Technologies being developed include combustion equipment with increased efficiency and alternate fuel utilization capability. The program has been allocated approximately $2,000,000 through FY 1977 and specific accomplishments to date include:

1. Initiation of a cooperative project involving industry, university, and government laboratories to develop combustion components for more efficient automotive engines. This project is developing improved fuel and air injection technology for stratified charge engines.

2. Initiation of the development of air-assisted fuel injectors for automotive diesel engines.

3. Initiation of the development of improved fuel injection components for gas turbines.

4. Conceptual development of acoustic instruments for control of furnace combustion.

5. Assessment of the economic feasibility of direct combustion of biomass and waste fuels for electric power, space heating, and industrial processes.

6. Initial development of design guidelines for firing boilers and furnaces with wood wastes.

Coalbed Methane Program: The methane from coalbeds program was allocated $250,000 through FY 1977 in the Division of Conservation Research and Technology. Speicific accomplishments to date include:

1. Completion of a study through a competitive procurement to assess the technical and economic viability of several recovery and utilization options. The recovery options considered were: vertical wells drilled into the "gob"; stimulated vertical wells into virgin coal, directionally drilled holes into the virgin coal; and horizontal holes drilled from a ventilation shaft prior to coal mining operations. The utilization options considered were: on-site power generation with gas turbines and fuel cells; LNG production, pipeline injection; ammonia production; on-site coal drying; and on-site space and process heat. The capital return on investment for each of the combinations of recovery and utilization options were calculated.

2. A detailed study was completed to compare on-site power generation using fuel cell powerplants and gas turbines.

3. A contract was let to develop a down-hole turbine drill to be used in directional drilling systems.

4. An RFP is being released asking for proposals to demonstrate recovery and utilization systems on a cost-share basis.

5. A study has been completed to identify the modifications required to permit operation of a fuel cell powerplant on a methane/air coalbed "gob" gas mixture.

6. Efforts are underway to assess advanced coalbed stimulation techniques.

Q. How does this effort differ from the $500,000 earmarked under Fossil Fuels for deriving methane from coal and the work conducted in this area by the Bureau of Mines?

A. Within ERDA, the Office of the Assistant Administrator for Conservation is responsible for the overall coordination of the methane from coalbeds program. This includes management of technology assessment studies related to utilization, near-term exploitation/utilization projects and technology development of equipment for more efficient coalbed methane utilization. The Office of Fossil Energy is responsible for technology assessment studies related to unminable coal resources and for development and demonstration of all technologies required for recovery of methane from coal.

The differences between the ERDA program and the Bureau's can be identified at a programmatic level. There are two aspects of the ERDA work which distinguish it from the Bureau's. One is that ERDA's work treats methane from coalbeds as yet another non-conventional source of gas and concentrates largely on the extraction of methane from coalbeds which are not likely to be mined in the near future, for example, from western coals under more than 3000 feet of cover. The second is the heavy emphasis given to the utilization of wasted methane in the ERDA program, for example, the use of "gob" gas methane in fuel cells or for use in turbines or LNG production.

The Bureau's program focuses on the extraction of methane much closer to the mining process. Generally the Bureau's research goals relate to the removal or control of the methane for mine safety reasons per se and/or to the economic extraction of methane from the mine workings or from the coalbeds prior to mining to improve the efficiency of the mining operation.

Both agencies have the responsibility for developing the technology necessary for their particular areas of interest. ERDA's technologic development effort is principally in the utilization area with some effort in the field of drilling and stimulation of gas flows. The Bureau's work concentrates on drilling and the techniques for gas removal from mining areas.

While there are possibilities for duplication of work where the areas of interest overlap, the probability of this occurring is minimized by continuing discussions between the respective program offices on the future project-level activities of the two agencies. In addition, the draft agreement between ERDA and the Department of the Interior provides an additional, more formalized method for assuring coordination of work.

Q. Why isn't this methane work properly under Fossil Fuel? Please tell us why it should not be transferred there.

A. The Office of the Assistant Administrator for Conservation became involved in the methane from coalbeds program because of the potential for recovering and utilizing 250 million cubic feet of methane daily which is being vented to the atmosphere during coal mining operations. The techniques for recovering methane from coalbeds such as directional drilling and stimulating vertical wells is the responsibility of Fossil Energy. Because of the conservation aspects associated with utilizing the presently wasted resource, the program has remained in Conservation. Devices such as fuel cells and highly efficient small gas turbines for pipeline pumping which can utilize this recovered methane are currently being developed in the Conservation Program. As the program grew to encompass the recovery of methane from unminable coalbeds (estimated 300 trillion cubic feet of methane), Fossil Energy was requested to become involved in these recovery aspects.

Q. Isn't this work conducted at Fossil's Morgantown ERC anyhow?

A. Yes. Morgantown Energy Research Center is responsible for the implementation and field management of the development and demonstration projects.

SUPPORTING TECHNOLOGIES

Q. Your program for supporting technologies for end use applications would go up from $1.5 million to $8 million in FY 1978. The justification lists some new efforts, but it is difficult to see the need for such a large increase. Please explain the need.

A. The Division of Conservation Research and Technology (CONRT) has been given the responsibility, as stated in the attached Information Memorandum, to conduct a broad-based program in applied research and technology development in the conversion area with application to the engineering development and demonstration projects of all involved ERDA offices. Supporting Technologies for End Use Applications is an essential effort to achieve these critical ERDA program goals. Both the attached Table 1 and Figure 3 show CONRT's program relevency and technology support requested by Conservation and other ERDA programs.

Specific projects in this category have scored very highly in the CONRT appraisal methodology which evaluates energy savings, commercialization potential, uniqueness, federal cost, and other factors including institutional and environmental impacts. Especially important are those technologies that offer considerable energy savings at very low federal expenditures.

Insulation for Homes and Industry Project: Potential energy savings are projected at 2.5 quads per year for buildings and 1.5 quads per year for industry by 2000 (1.5 quads/year for buildings and .8 quads/year for industry by 1985). This project consists of investigating existing commercial insulation as to specifications, thermal performance, testing techniques, new materials, health and safety aspects of these materials, and cooperation with industry, as well as other federal agencies. The pay back in energy savings is enormous compared to the amount of money needed for R & D. This work is essential to the success of the national program for industrial energy conservation and the proposed tax credit program for building insulation.

High Temperature Materials Project: The success of advanced automotive engines such as the Stirling and gas turbine engine is directly related to development of materials which can withstand very high temperatures (2500°F.) and corrosive environments from diesel and other fuels. We do not have the materials data necessary to design or produce these advanced engines at the present time. The high temperature ceramics program will provide that data in a timely manner only if the requested finding levels are obtained. In a similar manner, development of advanced industrial gas turbines and other high temperature energy savings devices is critically dependent on materials R & D. The state-of-the-art of these materials is not sufficiently advanced to allow design or use of the heat engines required in the future.

Light Weight Materials Project: It is estimated by the automotive industry that automobile weight can be reduced by at least 30% by substituting light weight, high strength materials such as reinforced plastics. This would result in comparable full savings. In addition, the success of the electric vehicle program is directly dependent on the development of light weight body and accessory materials. Research is essential in such areas as materials properties, fabricability, and resistance to the long and short-term effects of the environment as well as safety considerations.

Heat Exchanger Project: Almost invariably, the most expensive components in waste heat recovery and utilization systems are the heat exchangers. Until fuel prices rise steeply, there will be no significant market penetration, and hence energy savings of organic rankine bottoming cycles that use diesel engine waste heat. With present technology, the required heat exchangers for using the waste heat from the ERDA gaseous diffusion plants will be unaffordable. Numerous techniques have been demonstrated either by theory or in the laboratory that increase heat transfer effectiveness. To date, no one has been willing to undertake the technical or financial risks required to demonstrate these

techniques in full scale heat exchangers. Yet if they can be made to work, heat exchangers can be made smaller and cheaper. Once the system price can be brought down to levels where a reasonable payback can be obtained with respect to prevailing fuel prices, we anticipate a sizeable market penetration and consequent energy savings.

Heat Pump Project: We have been requested by BCS to assist in heat pump research and development. Calculations indicate that using fluidized bed heat exchangers can reduce electricity consumption by 25%. This savings must be verified in the laboratory. Heat pump performance is degraded by frosting of the evaporator coils which cuts down the heat transfer rate. Yet little is known of the mechanisms of frost formation and how it can be minimized. Current heat pumps use fluorocarbon working fluids that have adverse effects on the ozone layer. Although current concern is primarily with aerosols, every ounce of fluorocarbon charged to a heat pump, air conditioning, or refrigeration system eventually winds up in the atmosphere. With the current emphasis on electric heat pumps based on their performance advantage over electric radiant heating and their relative independence from scarce fuel and natural gas supplies, we anticipate a vast increase in the number of heat pumps put into service. A research program is needed to develop alternate fluids that are ecologically acceptable.

Tribology and Fluid Mechanics for Automotive Applications Project: An energy savings of 0.6 Quads(300,000)barrels of oil per day) by 1985 is available by reducing (a) piston-cylinder friction by 25 per cent, (b) rolling losses in tires and suspensions by 20 per cent, and (c) aerodynamic drag by 20 percent. These savings will be possible without any significant capital expenditures or increased costs to the consumer by developing engineering design techniques and advanced lubricants. By the year 2000, the reductions in aerodynamic drag and rolling resistance may double. In addition, this project will develop the specifications and design technology for advanced lubricants and components required for the successful development of continuously variable transmissions which have a potential savings of 3.0 Quads per year by 2000. Industry, universities, and consumer organization have participated in planning the applied research required to achieve these savings under auspices of the American Society of Mechanical Engineers and the Society of Automotive Engineers. Industry resources for R&D will be working together under government and public cognizance with government resources applied to critical research tasks. These results cannot be achieved industry wide, at the same early date, without placing the combined R&D results in the public domain.

To fulfill a supporting technology role, requires a growth pattern which is at least comparable with the end use program growth and in many cases must exceed it, in that the "front-end" technology is often a prerequisite to advanced and engineering development. Supporting Technologies for End Use Applications is essentially a new program within Conservation and its growth pattern is matched to achieve its responsibilities and stated requirements from within ERDA.

CONRT PROGRAM RELEVANCY

END USE DIVISIONS ARE SHOWN IN APPROPRIATE BOXES - TECHNOLOGY WILL BE TRANSFERRED WHEN CRITICAL MILESTONES ARE REACHED

	ELECTRIC UTILITIES - INCREASE EFFICIENCY	ELECTRIC UTILITIES - MEETING PEAK POWER REQUIREMENTS	TRANSPORTATION - IMPROVED VEHICLE PROPULSION	INDUSTRY - WASTE HEAT RECOVERY	CONSUMER PRODUCTS - INCREASED EFFICIENCY, HVAC	NEW ENERGY SOURCES - FACILITATE USE OF SOLAR/ GEOTHERMAL	NEW ENERGY SOURCES - ALTERNATE FUELS	NEW ENERGY SOURCES - MUNICIPAL/ INDUSTRIAL WASTE	OPTIMIZED RESOURCE ALLOCATION	ELECTROCHEMICAL STORAGE-ADVANCED BATTERIES
HEAT CYCLES										
HEAT ENGINES	EES	EES	TEC		INDUS BCS					
HEAT UTILIZATION	EES	EES		INDUS BCS	INDUS	SE		INDUS BCS		
COMBUSTION	EES	EES	TEC	INDUS BCS	BCS		TEC INDUS BCS	INDUS BCS		
FUEL CELLS	EES	EES		INDUS	INDUS BCS		EES INDUS BCS	INDUS BCS		
SUPPORTING TECHNOLOGIES										
MATERIALS AND FABRICATION TECHNOLOGY	EES		TEC					INDUS BCS		STOR
THERMODYNAMICS AND HEAT TRANSFER	EES		TEC	INDUS BCS		SE				
CONTROLS AND PROCESSES	EES		TEC	INDUS	BCS					
PLANNING AND ANALYSIS	EES		TEC	INDUS BCS					CONRT	

FIGURE 3
CONRT Program Relevancy

TABLE I
Technology Support Requested By Other Conservation Programs

	INDUSTRY CONSERVATION	BUILDINGS CONSERVATION	TRANSPORTATION ENERGY CONSERVATION	ELECTRIC ENERGY SYSTEMS	ENERGY STORAGE SYSTEMS
COMBUSTION & FUELS TECHNOLOGY	1) HIGH TEMPERATURE BURNERS USING PRE-HEATED AIR	1) FUEL MODIFICATIONS 2) PRE-VAPORIZATION 3) INJECTION & MIXING	1) COMBINED TECHNOLOGY FOR ICE INCLUDING DIESELS & SC 2) ALTERNATIVE FUELS		
MATERIALS & FABRICATION TECHNOLOGY			1) LIGHT WEIGHT MATERIALS 2) HIGH TEMPERATURE MATERIALS	1) DIELECTRIC MATERIALS	1) ELECTROCHEMICAL MATERIALS
THERMODYNAMICS & HEAT TRANSFER	1) HIGH EFFICIENCY HEAT EXCHANGERS 2) HIGH TEMPERATURE HEAT PIPES	1) ALTERNATIVE HEAT PUMP FLUIDS	1) WORKING FLUIDS 2) HEAT PIPES FOR AUTO AC 3) HEAT EXCHANGERS	1) HEAT TRANSFER TECHNOLOGY	
CONTROLS & PROCESS EFFICIENCY	1) UNIT OPERATIONS MODELING 2) ABSORPTION-DESORPTION		1) LOW FRICTION BEARINGS 2) SYNTHETIC LUBRICANTS 3) ENERGY SAVING TIRE PROCESSES 4) ELASTOHYDRODYNAMICS 5) CONTROLS INSTRUMENTATION	1) HELIUM EXTRACTION	
FUEL CELLS	1) INDUSTRIAL FUEL CELLS	1) INTEGRATED ENERGY SYSTEMS		1) ELECTRICITY GENERATION	
HEAT UTILIZATION	1) RANKINE BOTTOMING CYCLES 2) BRAYTON CYCLES	1) RANKINE BOTTOMING CYCLES	1) RANKINE BOTTOMING CYCLES 2) WASTE HEAT RECOVERY	1) WASTE HEAT UTILIZATION TECHNOLOGY	
COMPONENTS & HEAT ENGINES	1) STIRLING CYCLES	1) LARGE STIRLING ENGINE 2) HEAT PUMP TECHNOLOGY	1) SEALS, BEARINGS & SHAFT RESEARCH 2) SMALL COMPRESSOR EFFICIENCY 3) SMALL TURBINE EFFICIENCY		

3092

SUBCOMMITTEE RECESS

Senator BELLMON. The subcommittee will then stand in recess until 8 a.m. on Tuesday, May 3, when we will resume the budget hearings on the Smithsonian Institution.

Gentlemen, thank you, very much.

[Whereupon, at 4:25 p.m., Thursday, April 28, the subcommittee was recessed, to reconvene on May 3, 1977.]

DEPARTMENT OF THE INTERIOR AND RELATED AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1978

TUESDAY, MAY 3, 1977

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, D.C.

The subcommittee met at 8 a.m., in room 1114, Everett McKinley Dirksen Office Building, Hon. Mark Hatfield presiding.

Present: Senators Hatfield and Stevens.

SMITHSONIAN INSTITUTION

STATEMENT OF S. DILLON RIPLEY, SECRETARY

ACCOMPANIED BY:

JOHN F. JAMESON, ASSISTANT SECRETARY FOR ADMINISTRATION
CHARLES BLITZER, ASSISTANT SECRETARY FOR HISTORY AND ART
DAVID CHALLINOR, ASSISTANT SECRETARY FOR SCIENCE
JULIAN T. EUELL, ASSISTANT SECRETARY FOR PUBLIC SERVICE
PAUL N. PERROT, ASSISTANT SECRETARY FOR MUSEUM PROGRAMS
T. AMES WHEELER, TREASURER
RICHARD L. AULT, DIRECTOR OF SUPPORT ACTIVITIES
BROOKE HINDLE, DIRECTOR, NATIONAL MUSEUM OF HISTORY AND TECHNOLOGY
PETER G. POWERS, GENERAL COUNSEL
THEODORE H. REED, DIRECTOR, NATIONAL ZOOLOGICAL PARK
JON E. YELLIN, DIRECTOR, OFFICE OF PROGRAMING AND BUDGET

HEARING RESUMED

Senator HATFIELD. We will now resume our hearings on the fiscal 1978 budget estimates of the Smithsonian Institution. The preliminary hearing was on April 18. We have some questions today. We hope to concentrate on the major parts of the 1978 budget submission.

FOLKLIFE PROGRAM

Last year this subcommittee expressed concern about the future of folklife programs and we were anxious that folk culture in this country have a proper attention place in the Institution. I believe that the Smithsonian, serving as a depository and promulgator of American culture, has to have a commitment to all forms of American expression of life.

Therefore, I am pleased to see from your budget, Dr. Ripley, that a Folklife Council has been created to authorize and supervise all folklife programs in the Smithsonian and that the folklife studies have been moved into the American Studies Division. I believe American Studies is an appropriate place for the folklife program where it is likely to receive the necessary attention, but I am still hopeful that a separate, permanent home for folklife can be created in the Institution.

Those of us who have worked to insure that folk culture take its appropriate place in studies that are devoted to high culture and popular culture have been gratified by these developments. And on the informal side, may I say that your presence at the inaugural square dance demonstrated your personal commitment and concern for this aspect of American life.

So I want to congratulate you on the progress that has been made and thank you for your efforts.

My questions today are not meant to criticize but to explore further where the Smithsonian is headed and perhaps find ways in which we in the Congress can be of help.

I see that your combined request for both American and folklife studies is $233,000. Yet last year we appropriated $167,000 for the Bicentennial folklife program alone. Therefore, the question is do you feel that this request is sufficient?

FOLKLIFE PLANNING

Dr. RIPLEY. Thank you very much, Mr. Chairman.

I have with me today two associates who have been deeply involved both in the origins of this festival, going back now almost 11 years, and also with the plans for reorientation. I would like to ask Mr. Julian Euell and Mr. Charles Blitzer, Assistant Secretary for Public Service and Assistant Secretary for History and Art, respectively, to join me at this point.

Senator HATFIELD. We are happy to welcome each of your colleagues here this morning.

Dr. RIPLEY. Now, Mr. Blitzer, would you have any comments on this?

Mr. BLITZER. Yes. Senator Hatfield, I also am grateful to you for your words. We took very seriously what we heard from you in the past, and under Secretary Ripley's direction, we now have set up a new organization of folklife.

The council to which you referred is, among other things, a planning body within the Smithsonian. As you know, with the new interest in the Folklife Center in the Library of Congress, at the Arts Endowment, and now in the Smithsonian, some time, I think, has to be devoted to figuring out a general strategy and deciding who will do what in the area of folklife.

PROPOSED INCREASE FOR FOLKLIFE

The $100,000 increase that we are expecting in fiscal 1978 is to allow, among other things, a tripartite project involving three organizations, the Folklife Center of the Library, the Arts Endowment, and the Smithsonian, in a kind of pilot project of outreach folklife festivals around the country. The attempt here is primarily for these three organizations to work with local and community organizations in helping them and showing them how to develop their own folklife festivals.

Another, roughly one-third of the increase we are requesting, is for the continuing of festivals of American folklife at the Smithsonian, which we will be doing on the Mall in Washington.

And the final third of the $100,000 increase is for documentation of what we have done in the past and planning what we should do in the future. I may say, sir, that I would hope that when this planning process is done with, the Smithsonian will come back and request funds for a larger program.

Senator HATFIELD. But you feel that this is sufficient for this particular phase of the program?

Mr. BLITZER. Yes, sir. I think we really wouldn't know exactly what to do with a very large amount now.

PERSONNEL FOR FOLKLIFE ACTIVITIES

Senator HATFIELD. Let's go back for a moment into each of these divisions of the program that you have outlined. As you know, a problem that plagued us all last year was personnel. The festival last summer relied heavily on contractual and volunteer assistance. On building a permanent program stature, however, it would seem to me that permanent positions would be needed. And yet I noticed in the budget that only four permanent positions are requested for the American and folklife studies.

Do you feel that as of this moment that more slots are needed? And, if so, would these slots need congressional approval, authorization? Or can you shift within the Smithsonian budget to meet these particular needs?

Mr. BLITZER. Mr. Chairman, I would say one of the things that we have discovered, as a result I think of your interest and the interest of others, or that we have become more aware of, is that there are lots of people around the Smithsonian, and have been since the beginning, who are engaged in folklife studies and activities.

They exist in the Museum of History and Technology, in the National Collection of Fine Arts, the Department of Anthropology. So among the membership of the Folklife Council are a dozen or so people from within the Smithsonian, all of whom have very direct connections with the study of folklife.

Senator HATFIELD. So you think that it is a correlation of existing personnel to a greater degree?

Mr. BLITZER. Precisely, yes. This is not to say that in the future we may not come back to you for more people. Again, one of the responsibilities of this Folklife Council is to survey what we are doing and make recommendations to the Secretary which may then ultimately come to you for expanded programs.

If they decide, for example, that we desperately need an ethnomusicologist someplace, this would be a recommendation to the Secretary. It might well be reflected in a future budget request.

Senator HATFIELD. Do you have a general estimate as to how many within the existing Smithsonian family could be correlated into this particular area?

Mr. BLITZER. It is very difficult.

Senator HATFIELD. Could you provide that at some point for the record as far as a general assessment? I don't have to have a precise figure, but a ball park figure.

Mr. BLITZER. Yes. I might say that it is partly a matter of definition, I am afraid.

Senator HATFIELD. I think that it would be very important to be able to identify those people within that context, both skills and experience.

Mr. BLITZER. Certainly.

[The information follows:]

FOLKLIFE ACTIVITY THROUGHOUT THE INSTITUTION

As reported at last year's hearing, staff members of several of the Smithsonian's offices and bureaus—particularly the National Museum of Natural History's Anthropology Department, the National Museum of History and Technology, the Division of Performing Arts, and the Center for the Study of Man—conduct research, collect objects, publish, and prepare exhibitions in subject areas with close ties to folklife. In addition, other bureaus of the Smithsonian such as the Research Institute for Immigration and Ethnic Studies, the Office of American Studies, the Smithsonian Institution Traveling Exhibition Service, the National Collection of Fine Arts and its Renwick Gallery are similarly involved to greater or lesser degrees. The number of professional staff throughout the Smithsonian whose responsibilities or interests at least in part coincided with the field of folklife would most likely be in the range of 25 to 30.

PLANS FOR FOLKLIFE PUBLICATIONS

Senator HATFIELD. As you recall, last year I expressed a great interest in publications and particularly what might be published as a result of the festival of American folklife, and I notice here that you have a pamphlet called Family Folklore published by the Smithsonian as of October, from last year's festival.

What is your general projection for publications, both in the near and distant future?

Mr. BLITZER. Senator, in addition to setting up the Folklife Advisory Council, there was a kind of internal administrative reorganization that led to this new American and folklife studies program in our budget. Two people who had been associated directly with the festival and were within the Division of Performing Arts were moved from the Division of Performing Arts to this new unit, namely, Mr. Rinzler, who has been the architect of our folklife festival and his associate, Mr. Byington. One of their major responsibilities given by the Secretary when this change was made was during this year in particular to document past festivals and plans for the publication of the results of the past festivals.

So I think that we will have something quite impressive to show you when we are back next year.

Dr. RIPLEY. Mr. Chairman, I would like to ask Mr. Euell, the Assistant Secretary for Public Service and under whose jurisdiction is the Division of Performing Arts, which has a segment of the folklife budget in its base, some $70,000, to offer further explanation.

Senator HATFIELD. Fine. Happy to hear him.

1977 FESTIVAL

Mr. EUELL. Yes. In terms, Mr. Chairman, of what we planned this year, as you know, we are not doing the summer festival. We are doing the festival in October this year.

And in the Division of Performing Arts' budget, after the transfer of the two positions and some support, there is still about $70,000 in the Division of Performing Arts' budget that will be devoted to this fall festival coming up in October.

NATIVE AMERICAN PROJECTS

Senator HATFIELD. Could you give me any specific program that relates to the folklife and anthropology of the native American?

Mr. BLITZER. Well, the largest of all projects, Senator, is our Bicentennial project, the Encyclopedia of North American Indians which, when completed, will be a definitive 20-volume work on every aspect of the Indians of North America.

In addition, I think everyone at this table, and some of my colleagues elsewhere in the room, could tell you of a particular program, including, for example, a museum training program for native Americans, to help them run their museums around the country.

We recently have added to the staff of the Museum of Natural History an absolutely first-rate linguist who specializes in languages of native Americans. Native American projects really exist very broadly throughout the Institution.

For example, I am not exactly sure how you would define this, but there was a very exciting small exhibition that opened a couple of weeks ago in the Museum of History and Technology called "Perfect Likenesses" which is a fascinating account of how popular printed portraits of American Indians came into being based on the Charles Bird King paintings. Native Americana is very pervasive in the Institution.

ENCYCLOPEDIA OF NORTH AMERICAN INDIANS

Senator HATFIELD. What is the status of the publication? Are you ready for publication? Is it going to the printer? Or where is it?

Mr. BLITZER. The Encyclopedia of North American Indians?

Senator HATFIELD. Is that the same as the handbook?

Mr. BLITZER. I cannot bring myself to call a 20-volume thing a handbook.

Senator HATFIELD. All right. An encyclopedia.

Mr. BLITZER. You are correct. It is technically a handbook.

Senator HATFIELD. Encyclopedia. What is the status?

Mr. BLITZER. The first volume is now ready for printing and will be out sometime this summer or early fall. Then there is a regular publication schedule. It stretches on considerably into the future since there are 20 volumes.

Senator HATFIELD. What is your estimated cost of that? Do you know?

Mr. BLITZER. No, sir.

Senator HATFIELD. Could you provide it for the record?

Mr. BLITZER. Yes, sir.

[The information follows:]

COST OF ENCYCLOPEDIA OF NORTH AMERICAN INDIANS

We estimate that the total cost of the completed Encyclopedia will be approximately $4.0 million.

PUBLICATION SCHEDULE

Senator HATFIELD. Is it on schedule, as you predicted it originally?

Mr. BLITZER. No, sir.

Senator HATFIELD. How late?

Mr. BLITZER. Considerably late, but I think things have recently been very much tightened up and we have much better management.

Senator HATFIELD. Is this a federally-funded project or is it a joint funding?

Mr. BLITZER. The encyclopedia is federally funded and will be published by the Government Printing Office.

Senator HATFIELD. I see, and you don't have a final date of the final volume projected?

Mr. BLITZER. Final volume? No, sir.

FINANCING OF 1977 FESTIVAL

Senator HATFIELD. One last question I have, and that has to do with the folklife festival which you are projecting for October. I notice in a Washington Post article on April 16 that you plan to raise outside funds again to finance this festival. Yet, as I recognize, we had 10 years of successful festivals or, at least, a program.

Why do you find it necessary to raise outside moneys? Is it a matter of just enriching the program or bringing in more participation for the program? Why don't you request the full funding through the budget?

Mr. EUELL. Well, Senator, if I may answer that question. For the last 10 years we have always raised additional funds. It may be a little misunderstood when we say we intend to raise additional money.

I think what we mean by that is that a lot of agencies, Departments of Labor and Commerce, have participated with us over the years, particularly the Department of Labor—we have always had a featured area in labor. We get additional funds from those departments, as well as from the AFL–CIO and other unions.

As you recall, over the last 2 years, American Airlines and General Foods were supporting cosponsors of the festival on a very large scale and they have expressed a continued interest in our festivals.

So at the time we made that statement, we were debating on whether to have the festival in the summer or in the fall. If we had had it in the summer, we would have proceeded with fundraising to enrich the program, to expand it. It is just a kind of tradition, if you will; we have always done this, and I think largely to fill out and to enrich the program.

FEDERAL AGENCY COMMITMENT

Senator HATFIELD. We did run into difficulty last year as far as other agencies' obligations in terms of the Bicentennial. They felt that they had not made such commitments—you felt they had. And

it seemed to me it raised a questionable—at least in my mind—a questionable procedure.

Mr. EUELL. Well, the procedure may have appeared questionable, sir, but I think it was necessary considering the tremendous scale of the festival last year. I don't think that we will ever have a festival of that magnitude again.

You know what we are talking about now is going back to a format that is much more manageable, small, short-term. I don't think that we will have that kind of problem.

Senator HATFIELD. You have commitments from the agencies that they will be responsible?

Mr. EUELL. I don't know whether we are going to outside agencies for the October festival. I am not sure of that at this time. I don't think that we will necessarily have to.

Senator HATFIELD. Well, then are you resting your whole program on the foundation of an unknown factor at this time as to whether the agencies will respond in contributing to the programs of the festival?

Mr. EUELL. No. Through our newly created advisory council, we have determined that we are going to give the festival in October. We have to determine the length of the festival and there is still discussion and planning in terms of the number of participants.

There is just a kind of a ball park figure now in terms of how much the festival will cost and we have a rough estimate of around $150,000.

Senator HATFIELD. But how do those other agencies know how to provide within their own budgets sufficient moneys to make their contributions? When will they know this expectation figure?

Mr. EUELL. I am not sure, Senator, whether the other agencies will be involved with this fall's festival. I don't think we are going to produce a festival on that scale. You asked me the question why we are raising the money.

Senator HATFIELD. Yes.

Mr. EUELL. If we were continuing the large scale summer festivals, other agencies would probably wish to participate, and insofar as I know—the festival is under Mr. Blitzer's office this year—the agencies haven't asked to participate in the fall festival which only will be 2, 3, or 4 days, at the outside.

Senator HATFIELD. Well, I am going back to the original question again, so I will make sure that I understand it. The article at least indicated that you had planned or you were expecting to raise moneys for these programs outside. And I am just wondering what that plan is and what the general figure is and if it does involve agencies, how soon are you going to contact them and make known to them what you are expecting from them or what they will expect to give to you?

Mr. BLITZER. Might I add just a word, Senator?

I am relatively new to this, but I have had an impression similar to what you have been inferring: that there have been problems in the past on the financing of these festivals.

Senator HATFIELD. We had a lot of problems. I was on the phone personally with a number of agencies trying to overcome some of these problems.

DIMENSION OF 1977 FESTIVAL

Mr. BLITZER. Another way of putting what Mr. Euell said is this: What we have decided to do is to plan a kind of basic festival with money that we know we have so that we will not get in the position of go and no-go and scurrying around in a crisis.

That is what we have now done. Then what I hope will develop is what I think the architects call "add alternates." If we can raise money from various sources, we will then enrich the festival. We would not, I think, lengthen it. I think it will be 5 days in October. But I think that we could have more activities going on if more money is forthcoming.

Senator HATFIELD. May I urge you to get your plan quickly because agencies just don't have money lying around, at least I hope not, that they can come up with new programs without some kind of notification, and if you are planning for October, having had that experience last year relating to the Bicentennial, I wouldn't want to see the festival ride on that point and be gambled with because I think it is a gamble unless you know how much you need and who is going to make the contributions.

Here is the time to make that known to the Government if it is to be financed by the Government. If you are depending on outside moneys, then you ought to have that plan pretty well in mind shortly and know who is going to make those contributions from such outside sources.

Mr. BLITZER. Right. I agree. I would just add I think we have removed a lot of the element of gamble, though, by planning the basic one that we know right now that we can afford.

Senator HATFIELD. Well, I want to thank all of you for your responses and I want to thank particularly our hearing chairman, Senator Stevens, for permitting me to venture off here in the folklife area.

FISCAL YEAR 1978 BUDGET REQUEST

Senator STEVENS [presiding]. Let's go now to the budget request which features an operating increase of some $7 million over the fiscal year 1977 appropriation to date and an $11 million request in the construction program.

Your construction request involves some priority changes. So let's try to discuss those first. Your construction account totals slightly over $11 million, an increase of $1.5 million over appropriations in fiscal year 1977.

On the zoo construction, you ask for $1 million for continued construction at the zoo and the Front Royal Center. Will any of that amount be used to consolidate the work of the master plan?

ZOO CONSTRUCTION REQUEST

Dr. RIPLEY. I have asked Dr. Reed to be here this morning, Mr. Chairman, and I know that he will be happy to answer these questions. Dr. Reed.

Dr. REED. Thank you, sir.

The question, sir?

Dr. RIPLEY. The question has to do with whether we would be able to use the requested $1 million increase to consolidate the work of the master plan.

Dr. REED. We are doing that already, sir. With funds in hand. Mainly, this depends upon the effect of Front Royal, Va., the 3,000 acres that we have for a breeding farm. We are studying what effect it will have on the aspect of what is done at the National Zoological Park in Rock Creek.

Senator STEVENS. It looks like you have a pause in construction of the zoo; is that right?

Dr. REED. We do have a pause in construction of the zoo during which time we hope to strengthen and enlarge our support capacity for that which we already have constructed. We need these new positions to maintain and properly service the facilities that have already been built.

Senator STEVENS. Last year you told us that under the master plan for this year you would be working on the central area, the parking facility and graphics.

Dr. REED. Yes, sir.

Senator STEVENS. That is not in this year's budget.

Dr. REED. We are building the service building, which is a basic floor of the parking facility. It is under construction now, and it will probably be completed late this fall. We are working on graphics continuously and we are designing the central area for the great apes, remodeling of the small mammal house, remodeling of the reptile house and the monkey island.

We are presently constructing exhibits for the seals, sea lions, otters, beavers—and we are finishing up on the bear exhibits at the present time.

Senator STEVENS. The budget for future years shows that you will request $7.2 million next year, $7.5 million the next and then you jump to $14.2 million. Is there any reason for this up and down on construction? Couldn't there have been a more even schedule for requests?

Dr. REED. Well, unfortunately, the large jump that we project in fiscal year 1982 is the completion of the parking facility which cannot be done in smaller stages. There are three floors of parking for the public which have to be built at one time, although we probably would not be using all of the money in that year. It could be spread out by contract authority.

We are also expecting to have in fiscal year 1981 the aquatic habitats building which will be the last major building in the construction program. It will be quite a large, rather elaborate building with a good deal of mechanical support. That is, an air filtration and chilling system for the penguins and some other of the Arctic animals that need cold and a water filtration system for the platypus and other animals that need a good deal of life support systems which are rather expensive.

PAUSE IN ZOO CONSTRUCTION

Senator STEVENS. Dr. Ripley, is there any relationship between the so-called penthouse construction and putting off the zoo construction for a year?

Dr. RIPLEY. No.

Senator STEVENS. It is about the same amount of money.

Dr. RIPLEY. The sixth floor addition?

Senator STEVENS. Yes.

Dr. RIPLEY. There is no relationship.

Senator STEVENS. Were there any OMB restrictions put on the zoo construction?

Dr. RIPLEY. No, not that I am aware of.

Senator STEVENS. Was this your request to defer the zoo construction for a year?

Dr. RIPLEY. I conferred with Dr. Reed and Dr. Challinor about this, of course, Mr. Chairman. We noticed that on the completion of the lion and tiger facility, there was quite an upsurge in maintenance requirements, as well as special personnel needs, for the undertaking of the day-to-day care of this facility.

It seemed to us that we would be well advised to consolidate our plans so that we would be able to assess more definitively the impact of this new sophisticated construction.

Now it has become quite obvious to me that when you take on a specialized new facility for animals, with the new sources of technologies involved in climate control and various kinds of devices for shifting animals back and forth, very sophisticated systems are required.

Therefore, this requires an addition to the normal maintenance budget which was, to me, very surprising, and I asked Dr. Reed to assess the impact of this addition. How are we going to come back to the Congress for appropriated funds when we don't really have the advance knowledge of how many people and what kind of sophisticated machinery we are involved in maintaining? So I said that I thought that it would be very useful to have a consolidation year before proceeding with the master plan.

MHT LIBRARY AND STUDY CENTER

Now, the planning for the Museum of History and Technology Library and Study Center for which some $275,000 have been provided by the Congress is now largely complete. And, as you know, Mr. Chairman, we have been studying this sixth floor addition for approximately 10 years, as I recall, with planning, and architectural details and so on.

So that what we are doing now is simply coming to a point of fruition where we are asking you for the funds. This, then, is a coincidence in that sense in regard to your question about the relationship between zoo construction and the sixth floor addition.

Senator STEVENS. Under restoration and renovation you are asking for $9.7 million, of which $7.1 is for that addition to the History and Technology building.

Dr. RIPLEY. That is true.

Senator STEVENS. How large is that addition? How many square feet?

Dr. RIPLEY. I would like to ask Mr. Hindle, the Director of the Museum of History and Technology, if he would be kind enough to join us at this point. We have a model showing the proposed construction which, as I say, we have been working on for many years, and if you would allow Dr. Hindle to speak to this, he has the details, including the assignable square footage, the total square footage required. Dr. Hindle.

Dr. HINDLE. The answer to the chairman's specific question is some 62,000 square feet.

Now, Mr. Chairman, might I show on the model what the plan is in general.

COST PER SQUARE FOOT

Senator STEVENS. How does that compare with the Air and Space Museum in terms of square footage?

Dr. HINDLE. I can respond to the cost of this museum. Perhaps someone else here can give the cost of the Air and Space Museum.

The cost per gross square foot here is $115. This is an expensive cost. There are causes for this, I might add, but I think the more important point is that the actual building standing here cost, when it was built, $46.50 per square foot; and using two different inflation scales, we came to the average of $109 per square foot for the present building as it stands now in terms of today's dollar.

So that the cost per square foot of $109 for the present building compares with $115 for this addition. The addition is expensive because it is an unusual space. If I might show it to you. It is on the sixth floor. It is an angular space. This is the addition to the present building. You will see that it changes the building hardly at all.

One of the requirements was to have the National Capital Planning Commission and the Commission of Fine Arts of the Capital approve any addition which would be made. Other thoughts and other approaches for other additions had been rejected.

This addition does harmonize well with the existing building. But it is six floors up. It has to be tailor fitted into the present building. It has to be faced with the same kind of stone and I think because of the peculiar requirements, the cost is probably understandable.

Dr. RIPLEY. Referring to your original question, Mr. Chairman, in this regard, I can say that there is little comparison between adding a sixth floor to the Museum of History and Technology and constructing at one blow, as it were, a National Air and Space Museum. We are dealing here with a rather sophisticated, dense add-on to an existing building which even in its initial construction during the late fifties and early sixties was more expensive per square foot to build because of its construction requirements.

The Air and Space Museum with its fairly large underground parking area is largely an enclosed space. So that even in today's dollars the cost per square foot for building it amounts to about $60 per square foot.

PURPOSE OF SIXTH FLOOR ADDITION

Senator STEVENS. This addition is for a library?

Dr. HINDLE. Yes. May I explain that, Mr. Chairman?

This is intended as a working library for the museum. It will provide space for practically all of our collection, the working area of the library, the study area to house the Eisenhower Institute for Historical Research which was assigned to this museum under congressional legislation; and it will house in a small part of the area the rare book library of the Smithsonian Institution, the core of which is the

recently acquired Dibner Library of the History of Science and Technology.

Senator STEVENS. This will house the whole Dibner collection?

Dr. HINDLE. This will have the whole Dibner collection.

Senator STEVENS. How much space will that require?

Dr. HINDLE. The Dibner collection currently amounts to something less than 10,000 volumes. The shelving space projected on the sixth floor is 215,000 volumes, and you may note on this chart our total holdings at this point are 146,000 volumes.

The reason this addition has been projected over a long period of time is that when the building was constructed it was 30 percent smaller than the originally projected space. There was a deficiency in the library space, as well as in other spaces, from the very beginning resulting in a distribution of our library in the 63 different locations, 2 of which are sites off the Mall.

The intention here is to concenter all of them at one point. The Dibner collection of rare books constitutes but a very small part of this library, although it contains the most valuable books and the ones which give this collection a special value.

Senator STEVENS. How much space on the sixth floor is given to library use?

Mr. HINDLE. Of the assignable space on the sixth floor, some 77 percent, or approximately 33,000 square feet is assigned to the library, including two stacks, librarians' working space and offices, and reading and reference areas. Eight percent, or 3,400 square feet is assigned to the study center; that is, the Eisenhower Institute, offices for visiting scholars, and the dual purpose conference room. The remaining 15 percent, or 6,000 square feet, is given over to restrooms, utility rooms, and the like.

SERVICE TO THE GENERAL PUBLIC

Senator STEVENS. The purpose of the new addition appears to be restricted to certain scholarly studies. To what extent would this facility serve the general public?

Mr. HINDLE. The library is fundamentally a working library for the National Museum of History and Technology. It is a specialized reference and research library related to the collections and to the subject expertise of staff members and of visiting scholars. The library is essential to the museum in developing its collections, its exhibits, and its responses to public inquiries and other forms of public service.

The new addition will be open to any members of the public who demonstrate genuine interest in consulting the books and journals in the library. Collectors, the casually interested, and historians make use of the present library which holds less than a third of our present collections. The balance of our library collections now are not easily available to the public because they are stored in such a variety of places and under the care of staff members who often are not free to serve the visiting public in this way. A new library will concenter nearly all of our books in the same area and under the care of professional librarians. Our whole collection will, therefore, be much more accessible for public use.

Of course, the rare book component of the library will be subject to greater restrictions in its use; however, our rare book library constitutes less than 10,000 out of our 146,000 volume collection.

In addition, the move to the sixth floor will free space that will be applied to public use. The exhibit space on the first floor in which journals and books are now stored will be freed for its intended use; and the temporary Dibner housing space will be freed for public presentation of historical experiments in science and for related movies. Moreover, the freeing of the present fifth floor library space will permit the location there of a central facility for the museum's documentary holdings, thereby increasing their accessibility to the interested public. Most are now held in reference and vault areas where access is necessarily limited.

Senator STEVENS. Well, will there be a conference area in this addition?

Dr. HINDLE. I didn't understand you.

Senator STEVENS. Conference facilities in this new addition?

Dr. HINDLE. Yes, there will be. There will be a conference room at the east end of the building and associated offices adjoining the Eisenhower Institute. The intention is to provide facilities for meetings that would be appropriate in this space.

We had from the beginning projected study and conference opportunities extending those existing already in the building and particularly tailored to the library focus.

PHASED FUNDING ALTERNATIVE

Dr. RIPLEY. I can point out, Mr. Chairman, that the $7.1 million we are requesting is not all required in 1 year. It could be phased over 3 fiscal years.

Senator STEVENS. Would that increase the cost?

Dr. RIPLEY. No, sir. We have a firm figure for the construction.

Dr. HINDLE. The cost is $7.1 million and the first year would be $1.5 million. The next year would be $4.1 million and the final year, $1.5 million.

USE OF FREED-UP SPACE

Senator STEVENS. What are you going to do with all of the space that is currently being used for the library if it is to be moved to this addition?

Dr. HINDLE. If I may respond to that, Mr. Chairman. Space is very short in every category in the museum. The present Dibner library has been located in exhibit space. Many of our journals are located on the first floor in undeveloped exhibit spaces. Those areas would be freed to be applied to their proper function.

The present largest part of our documentary collection, that is, printed materials that function in part as objects and in part as research material, is located in the basement in a vault room intended as a staging area for exhibits and a receiving area for valuable objects. That would be freed for its proper uses.

The present library, which is exceedingly small, and holds only some 45,000 of our books, would be available then to be properly developed as a documentary center where we could bring the scattered documentary holdings we have.

We could service them for staff and scholars and the public. These materials should be available to all people who are qualified to use them and interested in them. But currently because they are scattered in many curatorial offices and elsewhere, it is impossible really to make them accessible to the people who have every reason to use them.

So that the building of the sixth floor library would have a linkage effect freeing up space and permitting the museum to function in a way that it has not been able to before.

If I might add, Mr. Chairman, our museum is a museum of objects. It is the national museum of American history. It is unique because of the staff experts present here in conjunction with what are the greatest collections in the world in many of our areas of responsibility.

The staff experts, the objects, and the books and documentary holdings are what give us our great strength. The exhibits we show, our collecting policy and leadership throughout the country in the areas that we are concerned with depend on, almost as much as anything else, a well functioning library.

Our fine professional staff cannot function as well in the present circumstances as they would be able to with a properly functioning library.

REMAINING MALL SITE AS AN ALTERNATIVE

Senator STEVENS. Did you consider using the remaining construction site on the Mall in lieu of adding another level to the existing building?

Dr. HINDLE. Mr. Chairman, I think that there are two points that might be raised in response to that question.

The library has to be adjacent to and easily accessible to the people in our building. We have the great resource of the Library of Congress which we make good use of. But that is not equivalent to a working library in which our staff and associated visiting scholars and the public can work in conjunction with the objects. So a building located that far away would not serve us in the way that we need.

I think the second answer from the viewpoint of the Congress, the public, and the Smithsonian is that the last site on the Mall almost necessarily has to serve a larger public on a more continuing basis, whatever its function is, than a working library of one museum of the Smithsonian.

And that, I think, Mr. Ripley and the Executive Committee would not feel is the best use for the public of that final space, and I doubt that the Congress would feel that it was.

Senator STEVENS. Has the Fine Arts Commission given its approval of this addition?

Dr. HINDLE. Yes, it has. It has been enthusiastic about our design.

NEED FOR CONFERENCE FACILITY

Senator STEVENS. Why don't you give us a statement for the record of the need for a conference facility in the new addition with particular reference to the Elk Ridge, Md., conference center. The committee would like to know in that statement why the existing facilities in other Smithsonian buildings could not serve the purpose of the conference facility.

Dr. RIPLEY. We will do that, Mr. Chairman.

Senator STEVENS. Would you also include for the record in that other request the cost of housing the Dibner collection to date and the details of the Dibner collection?

Dr. RIPLEY. Yes, we will, Mr. Chairman.

[The information follows:]

SIXTH FLOOR CONFERENCE ROOM

It is somewhat of a misnomer to describe the facilities projected for the Sixth Floor as a Conference Center. One conference room (20 feet by 30 feet), basically a seminar room with a single table in it, is projected for the east end of the floor. This conference room is located immediately adjacent to the study area intended to be occupied by the Eisenhower Institute for Historical Research and by offices of visiting scholars. As an integral part of the Eisenhower Institute program, this room will be used for seminars and meetings involving resident and visiting scholars and outside historians. At the same time, it will be available for small meetings directly related to the library or to other programs carried out in this Museum.

Existing facilities within the Museum of History and Technology for accommodating meetings and conferences include one auditorium, holding 271; a dual use space available for separate exhibits or for classroom use, holding 80; and two conference rooms, one holding 35 and the other, 18. Virtually in constant use, this very limited space must accommodate events such as Smithsonian Associate activities, docent and tour group activities, and meetings of groups from Living Historical Farms, to stamp enthusiasts, to military history groups. Moreover, alternative use of conference facilities, such as the Belmont Conference Center in Elk Ridge, Maryland, or those in other Smithsonian buildings, to house on a regular basis meetings and seminars integral to the work of the Museum of History and Technology would be inefficient and impractical.

HOUSING OF THE DIBNER LIBARY

Temporary housing for the Dibner library specifically has cost $131,153.

Design	$27,000
Construction	95,818
Lighting, ADT, Smoke Detection	8,335
Total	131,153

The space constructed out of exhibit areas for the temporary housing of the Dibner library is designed to be used after the library's removal for the demonstration of historical experiments in the history of science, for movies related to the history of science, and for related public service functions. Minor construction will be needed to adapt the space to this use.

The relocation of exhibits in the area of the Dibner library cost $28,181. This is a permanent change and represents an improvement in our exhibit presentation. The furnishings for the library and reference books required for maintaining it cost $79,228. All of the furnishings were purchased with the intention of moving them to the Sixth Floor. The stacks, the tables, and other items will be permanently useful. Similarly the books are a permanent need. In addition to this, Smithsonian Libraries paid for packing and moving the donated books from Norwalk, Connecticut to Washington and for acquiring certain key book needs, $30,500. The total of these sums is $269,062.

MOUNT HOPKINS DORMITORY

Senator STEVENS. On the Mount Hopkins dormitory, you have the cost listed at $240,000. Is that the total cost of that construction?

Dr. RIPLEY. I would like to ask Dr. Challinor to answer this, if I may, Mr. Chairman.

Dr. CHALLINOR. Mr. Chairman, the $240,000 we are requesting for this dormitory is the total estimated cost. That figure is for a dormitory that will sleep 16 individuals.

Senator STEVENS. How far is this observatory from the proposed dormitory?

Dr. CHALLINOR. The dormitory that we are proposing would be a 10 minute walk from the new telescope. It is at the 8,000 foot level on the top of a mountain, 40 miles south of Tucson.

Senator STEVENS. You don't have to drive? It is in walking distance?

Dr. CHALLINOR. It is within walking distance. There is a road that goes up to the telescope itself on the summit of the mountain. It would be a 10 minute walk roughly from the dormitory site to the summit of the mountain where the telescope is being built.

Senator STEVENS. How long do you think that it will take to finish it?

Dr. CHALLINOR. Roughly a year and a half or possibly less. A great deal depends on the weather at the top of the mountain.

MUSEUM SUPPORT CENTER AUTHORIZATION

Senator STEVENS. For the museum support center at Silver Hill, you are requesting $325,000. Your total overall projected cost is $21.5 million. Is there authorization for that construction?

Dr. RIPLEY. I would like to ask Mr. Perrot to join us at this point, Mr. Chairman.

Mr. PERROT. Yes, we have authorization. This was signed into law in September 1975.

Senator STEVENS. For the facility itself?

Dr. RIPLEY. For the planning.

Senator STEVENS. But is the construction authorized yet?

Dr. RIPLEY. No, sir. Not at this time.

Mr. PERROT. Mr. Chairman, if I might add, construction authority is being requested by two bills that have been introduced and which I expect will be presented to the Congress by midsummer. At least this is information that we have received from staff members of the committees.

FUNCTIONS OF MUSEUM SUPPORT CENTER

Senator STEVENS. Will it have conference facilities?

Mr. PERROT. No, sir. It will not.

Senator STEVENS. What is its real function going to be?

Mr. PERROT. It is a multiple function, Mr. Chairman. One to house the national collections which are now no longer adequately taken care of in the existing storage facilities of our museums and particularly, at the Museum of Natural History where over the last decades, halls that were originally intended for public display have been taken over by storage and research laboratories.

The facility is meant to consolidate a large number of the collections which are now occupying public spaces and, as well, it is intended to be a major research center where the scientific departments of the Museum of Natural History, and Federal agencies which use the museum, can have prompt and easy access to the collection for study, and the necessary laboratories so that this study can be of lasting value.

REVISION OF FISCAL YEAR 1977 REQUEST

Senator STEVENS. Is this the same facility that was requested last year for which the Congress did not provide the money?

Mr. PERROT. Mr. Chairman, it is essentially the same facility scaled-down, reviewed, pruned. What we had originally suggested was a facility that would be comfortable for the next decade. What we are proposing now is a facility which will meet the essential needs of the next decades.

Senator STEVENS. So it is scaled-down from some $40 million to $21.5 million?

Mr. PERROT. That is correct, Mr. Chairman.

The major result of this reduction is the elimination of a sizable growth factor space which had been included in the original proposal. We expect, however, that the facility that we propose will meet the needs of the Museum of Natural History over the next decades, as well as relieve pressure for storage and exhibit facilities in other parts of the institution.

CONSERVATION COST

Senator STEVENS. In addition to housing materials, you indicate the facility will contain areas for research on conservation. Do you have any details on how much those programs will add to your operating budget?

Mr. PERROT. Mr. Chairman, one of the major purposes of the support center is to adequately take care of the collections. We expect to have a conservation laboratory with training facilities for members of our staff, as well as for others who are interested in conservation and who, by learning with our staff, can also contribute valuable work to the institution's collections.

Senator STEVENS. By how much will the availability of this facility increase your program in dollars? That is what I would like to know.

Mr. PERROT. The ultimate figure for conservation will be in the order of approximately $374,000 a year as we foresee it now. We have factored this beyond 1982. The cost of operating the building in its totality, with salaries and maintenance, is estimated at $1,700,000 a year as of 1982.

Senator STEVENS. Well, specifically, how much will it cost to run this conservation school? Can you give us the details for the record on the increased cost of your program and the cost of running the school?

Mr. PERROT. I will be glad to provide that, Mr. Chairman.

[The information follows:]

COSTS ASSOCIATED WITH CONSERVATION LABORATORY IN MUSEUM SUPPORT CENTER

The development of a major conservation laboratory and training facility is a multiyear project. It is anticipated, if the Museum Support Center is completed by 1982, that workshops and training laboratory will be in operation, shortly thereafter. However, in view of the national paucity of highly trained staff, it is unlikely that this laboratory will be able to be in full gear before the mid-80's. A similar experience has been encountered in the development of virtually all museum conservation and training programs in this country or abroad: they have had to start on a small scale primarily because adequately trained faculty were not available in sufficient number to man a full program.

It is expected that the Conservation-Analytical Laboratory and the workshops and training programs at Silver Hill will eventually employ approximately 20 persons of which one-third may be highly trained scientists and the balance, technicians and support staff.

The cost of this personnel has been estimated at approximately $374,000 a year. It should be noted, however, that in the first years of occupancy it is unlikely that

more than half of this could be easily expended. The conservation profession, and particularly its teaching components, is, at the present time, barely maintaining its numbers, and those new conservators that come into the profession are insufficient to meet the growing demands of museums and other fields of historic preservation which include monuments and archaeological sites. This is not only a national problem but one which affects all parts of the world. Hence, by developing laboratories and providing training the Institution would be not only developing means to better preserve the National Collections but also would be providing a national and international service.

AVAILABILITY TO SCHOLARLY COMMUNITY AND GENERAL PUBLIC

Senator STEVENS. Is that going to be open to the general public or only employees of the Smithsonian?

Mr. PERROT. It will be open to scholars from this country and abroad and there will be very small reception areas, with small exhibits which will be available for the community. Since the land on which we plan to build is, in part, not developable, but constitutes, in a sense, a nature preserve, we expect to have some trails and interpretive programs for the community of Prince Georges County.

But it is not meant to be a public museum. It is meant to be a research/conservation/storage facility. And, if I might say, Mr. Chairman, it is extremely important that this facility be developed if the Museum of Natural History, particularly, is going to be able to continue the important programs that it has in research and public display in a way that is worthy of its history.

LAND ACQUISITION

Senator STEVENS. I understand that you have already acquired 61 acres and you are negotiating for an additional 21 acres.

Mr. PERROT. The 21 acres have been excessed by the Department of the Army, and we expect that they will be transferred to us by the GSA within the coming months.

Senator STEVENS. Where did you get the 61 acres?

Mr. PERROT. If I might show the plan, Mr. Chairman.

This area marked A, shows the current facility which the Smithsonian has occupied since 1951 and was transferred to us in 1959. These areas marked C and B have been excessed by the General Services Administration and have already been transferred to us.

Area G has been excessed by the Department of Army as of last year. And area F is in the process of being excessed and transferred.

This entire section here, leading to Suitland Parkway, is not developable. It consists of ravines and wooded areas and we would like to maintain it as a buffer separating the support center from the highway, but also as an area for public teaching. This can be done inexpensively with our existing staff.

The area where we plan to construct is located here, partly on track C, partly on track F with a very small part on track G. This acreage, to the best of my knowledge, Mr. Chairman, will be ready to be constructed upon within the year.

Senator STEVENS. Did you have to buy any part of the site?

Mr. PERROT. No, sir.

Senator STEVENS. Where are you going to get D and E?

Mr. PERROT. D is an Army communications tower which is going to be retained by the Department of Defense. Section E is under the control of the National Park Service.

SALARIES AND EXPENSES

FORT PIERCE BUREAU

Senator STEVENS. Your request under salaries and expenses for fiscal year 1978 is just over $89 million, which is an increase of $7 million over appropriations to date. Under your program for the Assistant Secretary for Science you list the Fort Pierce Bureau—what is that?

Dr. RIPLEY. Dr. Challinor.

Dr. CHALLINOR. The Fort Pierce Bureau, Mr. Chairman, is a small operation consisting of a marine laboratory that was built by the Harbor Branch Foundation. The foundation allows us to use their marine facility to conduct research. No Federal dollars are being used in this bureau for salaries and expenses. It is financed completely from the income of a gift from Mr. Seward Johnson. The gift now produces an income of around $700,000 a year.

Senator STEVENS. Would you give us a brief history of the Fort Pierce Bureau—whether there has been any Federal funding for the construction or salaries?

Dr. RIPLEY. Yes, we would be happy to. There has been virtually no Federal funding of any sort for the bureau.

Senator STEVENS. What is the annual private funding?

Dr. CHALLINOR. The $700,000, Mr. Chairman.

Senator STEVENS. Again, we would like to have a brief history for the record.

Dr. RIPLEY. We will do so, Mr. Chairman.

[The information follows:]

FORT PIERCE BUREAU ACTIVITIES

The Fort Pierce Bureau, located on the Inland Waterway between Vero Beach and Fort Pierce, Florida, was established in October, 1971. Initially the Bureau assisted in the development and operation of the research submersible, Johnson-Sealink, for scientific investigations of shallow marine waters. Life histories of marine animals were among the first studies begun by the Bureau to stress reproductive biology and larval developmental patterns. In September, 1973, the Bureau initiated the Indian River Study, a long-term environmental program to obtain baseline information on the diversity of organisms in the Indian River lagoon and quality of their environment, and the sources of pollution and its effects on the organisms. These two latter programs are currently in progress.

A Federal employee was detailed to direct the Bureau's operations through March, 1977. Other than the salary of this employee, there has been no other Federal funding for construction or salaries at the Fort Pierce Bureau.

PROPOSED INCREASE FOR MUSEUM OF NATURAL HISTORY

Senator STEVENS. In the Museum of Natural History, you are seeking $55,000 to fund six additional positions, but you only list three additional permanent positions in the request.

Now, what is the reason for that? Are there three existing unfunded positions?

Dr. RIPLEY. Dr. Challinor.

Dr. CHALLINOR. Although six positions are listed here, Mr. Chairman, only three of these positions are new positions. The other three are already in our total allotment, but there are not funds to pay the salaries. The three new positions that we are asking for are three new technicians and $30,000 to pay them.

Senator STEVENS. Were they funded in the past? Any one of the six funded in the past?

Dr. CHALLINOR. No; not with funds available to the Natural History Museum. They were paid for out of the contingency fund.

Senator STEVENS. What are you going to use the three additional positions for?

Dr. CHALLINOR. The three technicians mentioned in the justification are to support the existing staff and to move toward our immediate goal of achieving a ratio of two technicians to each practicing scientist. With the addition of these three technicians, we will then have a 1.79-to-1 ratio.

The other three positions which are already in our base, but which are not funded, are one scientist and two technicians for the study of rare and endangered island bird populations. There is a fourth unfunded position as well, a linguist that we need very badly to continue our study of Indian languages. This scientist will work both in the Department of Anthropology and with the Handbook of North American Indians.

POSITIONS FINANCED BY CONTINGENCY FUND

Senator STEVENS. You have not funded those in the past with any other funds, private or otherwise?

Dr. CHALLINOR. The linguist is there now, but he is there only on a temporary appointment.

Senator STEVENS. But I mean those three slots that you anticipate using, they have not been funded in the past?

Dr. CHALLINOR. Yes, Mr.Chairman. We are now asking for permanent salary for them.

Senator STEVENS. Where did you get the money to pay for them in the past?

Dr. CHALLINOR. I will have to refer to the Treasurer there, Mr. Chairman, to answer that question, or the Assistant Secretary for Administration.

Dr. RIPLEY. Mr. Jameson.

Mr. JAMESON. Mr. Chairman, the $55,000 justified under the heading of research on island birds are for three jobs which were funded for a couple of years out of the Secretary's contingency fund. These are jobs that we had tried on at least two occasions, I believe, to get funded through the OMB process and were not successful. When we halted the contingency fund, we tried again and we were successful and these are, in effect, funds to sustain the employment of these people.

NEW COMPUTER FOR SMITHSONIAN ASTROPHYSICAL OBSERVATORY

Senator STEVENS. You have $325,000 for the computer. Where is that located? The actual physical location.

Dr. RIPLEY. This is at the Astrophysical Observatory. Dr. Challinor.

Dr. CHALLINOR. This computer is located in Cambridge, Mass., which is the headquarters of the Smithsonian Astrophysical Observatory.

Senator STEVENS. What is the problem with the existing computer?

Dr. CHALLINOR. The existing computer is now starting its 10th year of operation and its main problem is that it is obsolete and thus increases the danger of having a breakdown during its operation.

In other words, after 10 years of around-the-clock use, 24 hours a day, 7 days a week, parts are literally beginning to wear out.

Senator STEVENS. You indicate that you are going to supplement the $325,000 with $175,000 of available funds.

Dr. CHALLINOR. These are funds within the Astrophysical Observatory S. & E. research funds that will be assigned to supplement the $325,000 to carry out research problems using the computer.

Senator STEVENS. Is the cost going to be half a million dollars, or are you going to expend $325,000 and add on $175,000 for use?

Dr. CHALLINOR. What we plan to do here, Mr. Chairman, is either to lease or lease/purchase, whichever is the more economical, a new computer which will be operated through our computer cost center. The cost center principle implies that all costs incurred by the cost center have to be recovered from the users by means of an hourly rate. It is estimated that the requested $325,000 which we sought to purchase the needed additional computer time will be sufficient together with funds available in the SAO base and income produced from all other users to pay for the incremental costs associated with the lease or lease purchase of the new computer.

LANGLEY-ABBOT PROGRAM

Senator STEVENS. On the Langley-Abbot program, you have a $50,000 increase for solar research. What would be the total funding for that program if we add the $50,000?

Dr. CHALLINOR. We have received from a foundation about $30,000 in private funds for this program. We are now asking for an additional $50,000. If the foundation awards a continuation of the present grant, the total funding on the Langley-Abbot program would then be $80,000.

Senator STEVENS. Is that an ongoing program at that level?

Dr. CHALLINOR. We would anticipate it being ongoing at that level. As long as we are successful in raising private funds from foundations.

MULTIPLE MIRROR TELESCOPE

Senator STEVENS. At Mount Hopkins, how much have you spent so far on the multimirror telescope?

Dr. CHALLINOR. I can give you the exact figure here, Mr. Chairman.

Senator STEVENS. Are you using Federal funds out there?

Dr. CHALLINOR. Those are all Federal funds which we have been reporting each year since 1972 when we started this program. Let me get the exact amount here. The total cost is $8.4 million. That is our latest estimate. This is a joint project with the University of Arizona which is also furnishing money for this particular project.

I will have to dig here a minute to see exactly what we have spent to date. I would estimate that we have spent somewhere in the vicinity of between $4½ and $5½ million. I can get that figure for you precisely.

Senator STEVENS. Has there been any cost overrun there?

Dr. CHALLINOR. It has been more expensive than we had originally planned mainly due to the delays in starting construction, to a relatively conservative initial estimate of what it was going to cost, and to the stretch-out or the extra time that has been spent to complete

this facility. Inflation has been an enormous factor in increasing the cost.

I might point out, however, in its defense that this telescope, which will be the third largest in the world, will cost, when fully operational, perhaps around $8.4 million. It is probably less than half as expensive as the smaller telescope, the 156-inch one which is now the third largest. The latter was built at Kitt Peak, and probably ran somewhere between $15 and $18 million.

Senator STEVENS. I seem to recall a discussion several years ago of whether this telescope was really necessary. It was not only one of my questions, but one of my colleague's questions. Would you give us a listing of the requests that you have made and the actual cost that has been involved in the construction of the telescope and include any contributions that have been received from other sources, specifically the university, to see whether they have been contributing proportionately to the Federal funds?

Dr. CHALLINOR. I will be happy to furnish that, Mr. Chairman.

Senator STEVENS. Thank you.

[The information follows:]

Funding of Multiple Mirror Telescope

When first estimated in 1970, the Multiple Mirror Telescope (MMT) Program was expected to cost $3,000,000 and take 45 months to complete (from early FY 1971 through FY 1974).

Initially the program cost was to be shared equally by the Smithsonian and the University of Arizona (U of A); the Smithsonian share was to come from annual appropriations, and the U of A share was expected to come in the form of Research and Development contract(s) from the Department of Defense (DOD). In response to budget requests in FY 1972 and FY 1973, a total of $750,000 was added to the base of the Smithsonian Astrophysical Observatory for this project. However, probably as a result of the Mansfield Amendment, U of A was unable to qualify for the DOD support because the program was not DOD-mission oriented. Also, the initial U of A request for NSF support was unsuccessful (more recently, NSF is funding part of U of A's program effort). These developments notwithstanding, U of A remained committed to the program and contributed to it eight 72-inch mirror blanks, six of which will be used as the MMT primary mirrors, as well as university funds and expertise.

These funding related developments are, by and large, responsible for the significant program schedule delays and the inherent cost growth. It is now estimated that the following major milestones will be accomplished as follows:

March 1978: First light received by MMT
Summer 1979: Facility to be routinely operational
March 1981: Interior of housing structure complete

It is currently estimated that the program cost at March 1978 and at March 1981, respectively, will be as follows:

	At March 1978			At March 1981		
Item	SAO Cost	U of A Cost	Total	SAO Cost	U of A Cost	Total
Optics	$203	$1,241	$1,444	$203	$1,241	$1,444
Optical Support Structure	714	-	714	714	-	714
Mount & Controls	1,336	-	1,336	1,336	-	1,336
Housing Structure	2,600	-	2,600	3,370	-	3,370
System Engineering, Integration, Test	797	423	1,220	1,030	533	1,563
	$5,650	$1,664	$7,314	$6,653	$1,774	$8,427

The difference between the original and current estimates is a result of the following major factors: schedule delays, inflation, and increased design sophistication.

PROPOSED INCREASE FOR SMITHSONIAN TROPICAL RESEARCH INSTITUTE

Senator STEVENS. On the Tropical Research Institute, why do you need an extra person there? You have 19 scientists onboard. Is there any other assistance used in that research project—any other funding used?

Dr. CHALLINOR. At the Tropical Research Institute, Mr. Chairman, our total grant and contract amount, at least for fiscal 1977, came to $53,000. Of this amount $18,000 was from the National Science Foundation and $35,000 was from private foundations and corporations.

Senator STEVENS. Why do you need another person there?

Dr. CHALLINOR. This particular person, Mr. Chairman, is a mammologist and we feel it is very important to have him there to continue research that we have initiated over the years on the mammals of Central America, in particular, on those mammals that are vectors of yellow fever and encephalitis.

It turns out that many of the animals that live in the tropical forest are carriers of tropical diseases that infect human beings. We have, over the last few years, been working with the Gorgas Memorial Laboratory in Panama. It is primarily concerned with tropical diseases and their vectors and we hope to learn more about the role of the animals in the spread of these diseases.

In this particular case, a mammologist is being sought to help us study the sloth, an animal that lives in the trees and which we believe is also a vector of yellow fever.

TRAVEL REQUEST FOR RADIATION BIOLOGY LABORATORY

Senator STEVENS. All right.

On the Radiation Biology Laboratory, you have a $9,000 increase in travel which would almost double the amount that is currently available. Your justification states that you want to send four staff members to the International Congress on Solar Energy Research in India. Is that the total amount of the request? Is that what the $9,000 is for?

Dr. CHALLINOR. It is in addition to the modest travel budget they now have, Mr. Chairman. I might point out that the president of the International Solar Energy Group is on the staff of the Smithsonian Radiation Biology Laboratory and we feel it very important for him to be at this international conference.

Three other people on the staff of the Solar Radiation Biology Laboratory have been invited to deliver papers at this conference and we feel that it is very important that they be there to represent the Institution and pick up whatever knowledge they can at a meeting, such as this.

Senator STEVENS. Is Federal funding the only source of money for this conference?

Dr. CHALLINOR. This Federal money being sought would be the only source of travel funds for these people to go to it.

Senator STEVENS. Are any private moneys involved in supporting that conference?

Dr. CHALLINOR. That I could not answer, sir. I would have to furnish that for the record. I do not know.

Senator STEVENS. All right.

[The information follows:]

TRAVEL TO CONFERENCE ON SOLAR ENERGY RESEARCH

There are no private funds available for support of travel to the international congress on solar energy research.

REDUCTION IN EXHIBITS BASE OF AIR AND SPACE MUSEUM

Senator STEVENS. On the Air and Space Museum, there is a decrease.

Dr. RIPLEY. I would like to ask Mr. Yellin to speak to that.

Senator STEVENS. Are you just delaying the replacement of exhibits, or is this a permanent decrease?

Mr. YELLIN. This is a permanent decrease, Mr. Chairman. When the museum first opened, we thought that certain exhibits would be temporary in nature. They have been so successful and so popular, as certain studies have shown, we have decided to maintain these exhibits, such as World War II aviation, rocketry and space flight and others, on a more permanent basis. And, therefore, our exhibit base for the museum has been reduced by $525,000 which consists of the $395,000 explained in this budget and $130,000 reprogramed from NASM earlier this year, with the approval of the Congress. I might add that Mr. Collins is fully supportive of this decrease in the exhibit base.

Senator STEVENS. That has been very successful, I understand.

Mr. YELLIN. Yes, sir.

SILVER HILL EXHIBITS

Senator STEVENS. At Silver Hill, you want to open another building to the public? Is that right?

Dr. RIPLEY. Yes, we do, Mr. Chairman.

This is in connection with the aircraft facilities which are there and which are available now because of the maintenance and care they have been given by the staff at Silver Hill.

Senator STEVENS. Will you have adequate funds to maintain that and the other building, the Air and Space Museum if you have this decrease of $395,000?

Mr. YELLIN. Yes, we would, sir.

Senator STEVENS. Where did that cut come from? Did OMB make that cut?

Mr. YELLIN. In the Air and Space Museum, this was a decision made by the Institution.

Senator STEVENS. We earlier reprogramed funds from the Air and Space Museum and now you want to have a reduction of the museum budget. Are you sure that you are going to have enough money to keep that going as you originally planned?

Mr. YELLIN. Yes, sir. We are quite sure that the total reduction which would be $525,000—$130,000 which we earlier reprogramed and this $395,000—would leave an adequate base to keep the museum going just as it has been.

Senator STEVENS. This doesn't imply an intent, now, to downgrade the Air and Space Museum in the Smithsonian in any way?

Mr. YELLIN. In no way, sir.

Dr. RIPLEY. We are very proud of the Air and Space Museum.

ZOO INCREASE

Senator STEVENS. At the zoo, you are requesting an increase of 19 positions and $798,000 which seems to be divided between the zoo itself and the Front Royal Center. There are 13 people at Rock Creek, approximately $600,000. What is the need for additional funding and additional people at Front Royal?

Mr. REED. Sir, the additional people needed at Front Royal are keepers to care for the animals that are now being transferred to the facilities and those being born there.

We need four keepers there to take care of the animals we have and the animals projected and two additional maintenance mechanics to take care of the facilities, such as the machinery, the electrical systems, and the plumbing; work that needs to be done on the buildings that are already in place.

Senator STEVENS. One of the purposes of the Front Royal Center is breeding of species for the zoo. Do you conduct breeding work anywhere other than the Front Royal Center and the zoo proper?

Mr. REED. Yes, we have animals on loan to other zoos and breeders under breeding agreements. For example, orangutans owned by the National Zoo are on loan to such zoos as Fort Worth, Seneca Park, Kansas City, Topeka, and Omaha's Henry Doorly Zoo and Seattle's Woodland Park. Also we have loans to specialists in breeding. In all, we have 166 animals on loan to other zoos and breeding farms. Of course, we also have many animals on loan to us for breeding purposes as well.

HEALTH CONDITIONS AT FRONT ROYAL

Senator STEVENS. I read some articles about animal management and the safety of the employees. Most of these were in the Federal Times, which we will adopt for the record, by reference, and you may make any comments you wish for the record, but let me ask you a few questions about them now.

There is an allegation in one of them that prior to acquiring the Front Royal site you were warned by the Department of Agriculture that tuberculosis organisms were in the soil and that breeding animals there would be dangerous. Is that right?

Mr. REED. Before acquiring the site, we had lengthy discussions with the veterinary services of the Department of Agriculture, both the doctors at Beltsville in the Research Division and the men who had been working at the Beef Cattle Research Station. We discussed all of the diseases that had been present in the herds of cattle there over the years.

We tried to find out the problems that the Army had had when they had maintained horses and the canine corps there. We also investigated and discussed with the then occupiers of the land the grasses, the soil condition, and the toxic plants that were there. So we had as good an idea as we could have of what was there.

We were made aware of the fact that there were certain more or less standard cattle diseases that were in the area. We are more concerned with black leg, than we are with the diseases mentioned in the newspaper article. This is called Johnnes disease. It is distantly related to tuberculosis and sometimes it is referred to as paratuberculosis. However, it is not tuberculosis.

The Agriculture Department had had, a few years prior to the closing down of the station, some difficulty with this disease. However, at the time that we acquired Front Royal, the disease had been under control for several years.

They sold or moved all their animals. They moved their beef cattle off of the station a full year before we occupied it with any animals. At the time their animals left, they were tested as they had been routinely tested and were certified as being clean.

Senator STEVENS. Has any problem developed there? The article seems to indicate that you were warned of the situation before acquiring the site. Is that right?

Mr. REED. I would not say that we were warned. We were advised and we studied the total situation. We were given the full understanding of what the problems were there, which we considered no worse than any place else on the east coast. You know, the east coast has been occupied by man and animals since well before the Revolution. There have been a lot of animals and people occupying this land, so it could be contaminated.

I don't think that we were warned. We were advised of previous problems and we assessed that we would be able to handle it. We have had no problem with any of these conditions that the Agriculture Department talked about except with some toxic plants.

We have had some problems with that. We are making further studies on the wild plant life, as it affects our animals. We, of course, have a vaccination and testing program where applicable.

NEWSPAPER ARTICLES ON ZOO

Senator STEVENS. These articles make many allegations. Again, if you have any comments to make about them so that we can have a record that shows any steps that you have taken to correct any of the situations in which the articles are right, or if they are wrong, we would be happy to have you respond, so we have a record on them.

[The information follows:]

Response to Newspaper Articles

Recently there has been a series of articles alleging mismanagement at the National Zoological Park. Several of the items have been covered in testimony elsewhere. Most of the allegations are based on incomplete understanding, misrepresentation, and conjecture. While I do not believe it would serve any useful purpose to include all allegations in this record, I maintain in my office a complete file on this matter with all questions minutely discussed no matter how trivial. I have submitted this documentation to the committee staff for their review.

Several of these allegations perhaps do need clarification.

First, the death rate at the National Zoological Park is alleged to be "alarmingly high." The newspaper articles claim about 30 percent a year. Apparently, they arrived at his figure by dividing the number of animals at the Zoo at the end of the year by the number that died during the year. In arriving at the crude mortality rate, all animals that were in the collection any time during the year are counted and that figure is divided by the number of animals that died during the year. The National Zoo's inventory (counts) includes every animal that is born or hatched in contrast to some zoos that wait as long as sixty days after birth, hatching, or acquisition before entering them on the inventory. By using our method of inventory every animal that is alive at any time during the year and under our care divided by the total number of animals that died during the year, our crude mortality rate for 1976 is 18 percent. Six other major zoos of comparable stature and collection size using the same method of inventorying and figuring their crude death rate fall within 3 percent plus or minus that of the National Zoological Park. The crude death rate will fluctuate from year to year depending on a variety of circumstances, but primarily it is in relation to the number of young born or hatched, particularly ducklings.

A second allegation is that there is tuberculosis of "perhaps pandemic proportions" at the Zoo. We admit that we have had problems in the past four years with tuberculosis in the birds. The highest rate of infection is 4 percent of the total collection. So far in calendar year 1977 the rate is less than 1 percent. This is certainly no pandemic or even epidemic although we are concerned. We have devoted much time and effort to developing reliable new methods of diagnosis, treatment, immunization, and prevention. We did host a conference on this subject which has resulted in much talk and effort here at the Zoo. Perhaps the newspapers are exaggerating the problem because we ourselves are devoting more time and effort in trying to understand and control this condition than is any other Zoo. Once again the National Zoological Park is taking leadership in a problem which has faced zoos for many, many years.

In the same vein, the newspapers assert that there is danger to the human visitors and that two keepers had become infected from the animals. This is totally false. Avian tuberculosis is only minimally infective to humans, and visitors are perfectly safe. Six years ago, one keeper did have tuberculosis and was absent from the Zoo for many months and did have a lung removed. However, he was not suffering from avian tuberculosis, and the doctors at the Veterans Administration Hospital where he was treated assured him his condition was not

job-related and further that they could not tell him how long he had had the condition, but it certainly appears to have been present prior to his employment at the National Zoo. This keeper has returned to duty and is working normally. The second keeper had a skin reaction to the standard tuberculosis test but does not have tuberculosis.

A third allegation that has recently appeared in the national press is that the National Zoological Park along with several other major zoos of this country acquired reptiles illegally and that indictments would be forthcoming. I emphatically deny that at any time did the National Zoological Park knowingly and willfully acquire animals that had illicitly entered the country.

Another question which has been raised concerns the propriety of the exchange of birds between the National Zoo and Mr. Ripley. Secretary Ripley has maintained an exceptional waterfowl collection for thirty years. I designated him as a Research Associate of the National Zoo several years ago. He also has interchanged birds with the Philadelphia and Bronx Zoos for many years. He is one of several collaborators of serious purpose and excellent facilities who help the National Zoo. Dr. Ripley's breeding facilities are registered with the international zoo yearbook and do admit the public.

Mr. Ripley's facilities and ornithological reputation are so highly regarded that my peers would chastise me if the National Zoo were not taking advantage of his efforts and assistance. Over the years, the National Zoo has received 50 birds for its collection from Mr. Ripley. We have loaned him about the same number for his Paddling Ponds facility to give the birds the privacy so essential to successful breeding.

This exchange is to the National Zoo's benefit. Loans to other zoos and recognized breeding specialists are of invaluable, perhaps crucial, assistance in insuring a future population of exotic animals.

OUTSIDE SERVICES OF ZOO VETERINARIANS

Senator STEVENS. One of the allegations is that the Federal employees of the zoo have been conducting private veterinary business using federal supplies and facilities. Did you look into that allegation?

Mr. REED. Yes, sir.

Senator STEVENS. Was it right?

Mr. REED. It is right in part. Our veterinarians are probably the most qualified exotic animal specialists on the east coast. Certainly you would have to go as far as Philadelphia or New York to find anybody who was as qualified as our men.

They have on their own time done services for the Largo wild animal park which is now closed. They have done work at the Kings Dominion on the exotic animals there. And I believe when the circus comes to town they have consulted and have worked for them.

Sometimes they have used our drugs. These have been replaced with a 10 percent addition for the Government. The drugs have been replaced.

However, our men have been paid for their services, which they did on their own time. I have known about this. I have been aware of the practice. I approve of it because it gives them more experience. Every time that they can handle a new or different or another exotic animal, that adds to their store of experience which benefits our animals at the zoo.

Senator STEVENS. You are satisfied that there is no danger to the zoo in the first instance or the animals there?

Mr. REED. No. Seldom has treatment been done in the zoo. There are one or two cases—I think we did have to do a caesarean section or a cataract operation on a lion that was brought in for her surgery. But there was no danger there. We are well aware of possible danger and take proper protective steps.

We do not routinely bring in out-patients or patients outside the collection to the zoo.

I think that it is an obligation on our part to the animals. A sick exotic animal needs the best care he can get and the best care that he can get is ours. I think that we owe the animals an obligation.

Senator STEVENS. I don't think that the committee would argue with that, but the allegation is that these people are using Federal facilities and supplies to maintain a private practice, you might say.

Mr. REED. No, I am satisfied that they are not maintaining a private practice based upon us. And, in fact, I don't think that they are doing much in the way of private practice. It is more of a service to the animals and of an interest to them in continuing their own professional development.

STATUS OF ZOO MASTER PLAN

Senator STEVENS. What about the zoo conditions now, Dr. Reed? There have been some reports that the facilities may be becoming inadequate for the animals. Can you tell us, what is the status of the project to upgrade the condition of the zoo?

Mr. REED. Well, with the help of Congress and many, many other people, certainly the senior staff of the Smithsonian Institution, we have been upgrading the zoo since 1961 and in particular since the

end of the Vietnam War when there has been a spurt in the construction.

We have spent almost $26 million in improving the zoo. Now, I admit there are areas that still need work and this will be done in time in a logically phased program. Animals will be taken care of as they always have been until we have a completely modern and adequate facility for every animal in the zoo.

I am satisfied—in fact, I am very heartened with the progress that has been made realizing that it would be impossible to do everything all at once. It would be nice, but——

ANIMAL ACQUISITION FUNDS

Senator STEVENS. For animals, you have a list of $29,000 for new acquisitions this year. Is that all the money you have or do you have private money, too?

Mr. REED. We have what is referred to as the private or the Chrysler Fund. This is an account that was started in 1926 from money left over from the Chrysler-Smithsonian expedition to East Africa. We add to that fund from the sale of animals and other gifts and bequests that we have received. We do use that primarily to purchase other animals for the zoo.

Senator STEVENS. You purchase all your animals from that fund?

Mr. REED. No, sir. We have the Federal appropriation as well as the Chrysler fund which we use. However, every animal that is purchased with either fund or acquired through a gift or capture, donations, trade, or both immediately becomes a Federal animal. There are no such things as "private" animals. They are all Federal animals.

Senator STEVENS. When you sell them, what do you do with the money?

Mr. REED. This money goes into the Chrysler fund. I think there is about $40,000 in the fund right now. However, I have committed about $25,000 of that for future purposes. That is, it is not in the form of a regular Government commitment. I know where the money is going to go, when the animals become available. We have tentatively committed the money knowing what we are getting in the next year.

Primarily, these will be for the new acquisitions in the new exhibit areas.

Senator STEVENS. Do you use that fund for anything else?

Mr. REED. We have, from time to time, used a small amount for other things. Most recently the gift that we gave to the ranger that brought the baby elephant from Sri Lanka that was presented to the children of America. Ms. Amy Carter received it for all the children. We gave the ranger a watch as a gift for coming over and staying with us to help care for little Shanti for 6 weeks.

There have been very minor things of that nature. But the bulk of it is for the acquisition of animals. This might include such things as the customs fees or brokerage fees, when an animal is brought in. It might include the transportation of the animal, which would be sometimes above the purchase price, depending upon how the animal arrived.

We use the term acquisition to mean all aspects of getting an animal for the zoo.

NEED FOR FEDERAL ACQUISITIONS FUND

Senator STEVENS. How do you figure out how much Federal money you need? You have animals there, you sell some, you buy some, you have money from the Chrysler fund, money from gifts, I take it, and other sources.

Mr. REED. The amount of money that we need from the federal appropriation has been based on a rather long historical evaluation of our general needs through the years.

[The following statement was later offered for the record:]

USE OF ACQUISITION FUNDS

We use the Federal funds for our essential purchases and as a continuing fund upon which we can count in good years and bad.

On the other hand, the Chrysler fund is difficult to estimate in any one year. Its amount depends on sales of animals and contributions. Sales are problematical because of the shortage of funds experienced by American zoos, so they cannot buy so many animals. And, we cannot sell animals to zoos or operations that do not have the veterinary staff or facilities to handle them. For those reasons, we can never count on a particular level of sales proceeds each year. We count on the Federal money to make necessary purchases and use the Chrysler fund to supplement those funds to the extent possible. Presently the Chrysler fund is at its highest level ever because we have not been buying animals until after the construction is finished. As I mentioned, we have a large portion of this fund tentatively committed to purchase animals for the seal and sea lion exhibit. By this time next year, I anticipate that the Chrysler fund will be greatly reduced.

SALE OF ANIMALS

Senator STEVENS. When you sell these animals, do you sell them to zoos or to individuals? What do you do with them?

Mr. REED. We generally sell them to other zoos. We have sold to some game farms. We are very careful about trying to find out where the animals go and how they will be treated when they arrive. After all, these are our children and we would like to know where they are going and what their future is.

Senator STEVENS. That fund has been in being since when?

Mr. REED. Since 1926 when the Chrysler Corp. sponsored an expedition to East Africa. Dr. Mann was then zoo director and when he returned, it has always been my suspicion that he returned after the close of the company's fiscal year, the expedition money had already been accounted for and the company told him to keep the left-over money and use it at the zoo as he wished. He put it into this fund for the purchase, acquisition and care of animals.

Senator STEVENS. How many animals are you talking about buying and selling a year? How many do you buy and how many would you sell?

Mr. REED. This would vary from year to year depending upon how many animals are born. It has in the past few years varied somewhat erratically due to the construction programs. Certainly when the birdhouse was under construction there were no birds being bought; During the year and a half, almost 2 years, that we were constructing the feline facility, there were no cats acquired. And then, when we did get our new lions in, they were on loan from the zoo at Morocco.

DOLLAR VOLUME OF TRANSACTIONS

Senator STEVENS. What would you say is the dollar volume of transactions in that fund annually? How much do you pay out and how much do you get in?

You are selling some animals and buying some animals. What is the volume of business that you are doing? You want $29,000 in addition.

Mr. REED. This $29,000 has been our base appropriation for years.

Senator STEVENS. You have about $40,000 in there now?

Mr. REED. Yes, in the Chrysler fund.

Senator STEVENS. And you have some animals you are going to sell now during the year, so you will have some acquisition money and you are going to spend money.

Mr. REED. Yes.

Senator STEVENS. How much do we end up with at the end of the year if we give you $29,000?

Mr. REED. I believe last year we spent about $18,000, I think it was, from the Chrysler fund. May I furnish that for the record, sir, so I may be accurate?

Senator STEVENS. Yes.

[The information follows:]

USE OF THE CHRYSLER FUND

The Chrysler Fund is the means we use to facilitate the exchange of animals between zoos as envisioned by our enabling legislation—20 U.S.C. 81. The Fund has been fully explained to earlier Congresses, including in 1968 when Senator Byrd chaired the District of Columbia Appropriations Subcommittee to which the Zoo then reported.

In fiscal year 1976, we spent a total of $18,700 from the Chrysler Fund. About $10,000 went for acquisitions and $8,700 for shipping, registration on international animal listings, and other expenses involved with acquiring or shipping animals. Although we usually have a little money left over at the end of the year in the Chrysler Fund, the amount is normally not large. However, due to continuing breeding success adding to the fund and the construction program which has reduced our acquisitions, the current balance of $40,000 is an anomaly.

USE OF FEDERAL VERSUS CHRYSLER FUND

Senator STEVENS. I just wonder if there is a real necessity to maintain a balance in the fund. That is the point. If you are going to put $29,000 in and have $50,000 left at the end of the year——

Mr. REED. This $29,000 will be in the Federal appropriation which must be expended during the year where the Chrysler fund is a no-year expense. This can go over from year to year.

Senator STEVENS. I know, but you have $29,000 to spend and you also have a bunch of Federal animals out there, some of which you are selling.

Mr. REED. They are all zoo animals. Yes, sir.

Senator STEVENS. When you sell them, you put the money in the fund, don't you?

Mr. REED. Yes, sir.

Senator STEVENS. And then you spend the fund without regard to the $29,000, right?

Mr. REED. We balance between where it should come from, where we think it should come from. We normally spend practically all of the funds, Federal and Chrysler, each year.

Senator STEVENS. That is what I am trying to find out. How do you decide where it is going to come from, Federal dollars or the fund? What makes the difference?

Mr. REED. We——

Senator STEVENS. Am I confusing you?

Mr. REED. I am afraid so, sir.

Senator STEVENS. You have asked us for $29,000 to buy animals. But you have a trade out there. You are selling animals and buying animals without regard to this $29,000. Now, how do you decide when you are going to use the Chrysler fund, how do you decide when you are going to use the Federal dollars?

Mr. REED. That would depend upon the condition of the sale and trade. There are times when it is easier and more convenient to use the Chrysler fund than it is the Federal money because of the restrictions on how we handle the Federal money. I mean it is easier to spend the Chrysler money than it is the Federal money and since sometimes some of our deals are very involved, they must go that way. Rather, the people do not want to wait for the Federal purchase orders to come through and then the final payment.

There are some dealers throughout the world who will not deal with us federally because they do not want to have anything to do with Federal purchase orders. It just takes too much time. Their capital is tied up for too long a period of time.

So I think that each case is on a separate judgment. I would rather answer the question by saying that each case is based on a separate, individual judgment. Of course, when there are big expenses coming up in the purchase of a pair of very expensive animals, there have been times in the past when we have used the Federal appropriation to purchase one and the Chrysler fund for the other.

But, again, I say once they come to the zoo and are acquisitioned into the zoo, they are Federal animals no matter how they were acquired.

Senator STEVENS. But once you sell them, whenever you sell them, you put all the money back into the fund; is that right?

Mr. REED. That is right.

CHRYSLER FUND BALANCE

Senator STEVENS. What do you want to try to maintain in the fund? Have you some level?

Mr. REED. No, sir. We have never had a level that we wanted to maintain in there. The fact that we have so much money right now is because we do not have space to put the animals in and as soon as we have the space, when it is completed, then we will spend money as rapidly as we can. I don't believe in maintaining a big balance in that fund.

Senator STEVENS. That looks like a workable arrangement, if they are Federal animals and you sell them and put the money in the Chrysler fund and then come back and ask for more Federal dollars. It seems that you ought to have some target as to what level of money you are going to have in the Chrysler fund.

It is a strange thing if you use Federal dollars to buy Federal animals and you sell them to another zoo and put the money in this private fund.

Mr. REED. Well, this has never been the practice. We have never purchased animals for resale. You could almost say we were trying to wash Federal money if we did that. This would be evil. [Laughter.]

We buy animals for the zoo.

Senator STEVENS. I am not saying that it is evil. I am just wondering why you need more money if you have money in the fund. Now, why don't you just use it? You could wipe out the Chyrsler fund and then fund it from Federal dollars in the future.

Mr. REED. Certainly.

RISING ANIMAL PRICES

Senator STEVENS. But you would want the Chrysler fund for a purpose, as I understand it, for quick purchase items.

Mr. REED. That is right, and to supplement the Federal funds. After all, the animal prices have gone up tremendously.

For instance, we are going to have the new seal and sea lion exhibit and we are going to maintain the California sea lions. The price of these animals is high. The first one I bought some 20 years ago was between $75 and $150 depending on what the age and sex was.

They are now up to $1,000 apiece. The price on giraffes has gone from $4,000 to $15,000. The price of rhinoceros, if you can get the animals at all, is astronomical. An Indian rhinoceros would at this time be worth about $50,000. We have bongos at the zoo which we purchased for about $15,000 apiece. They are now, if they are available, about $30,000 each.

The price on birds has gone sky-high since the quarantine has been put on the importing of birds and made it much more difficult to bring birds into the country. I saw a pair of cranes offered for $4,000 apiece. This is ridiculous. Six or seven years ago I could have gotten them for maybe $900 apiece.

ANIMAL SMUGGLING

Senator STEVENS. I saw an interesting program about the worldwide trade in birds and about how the price is going up. There is some bootlegging involved in there. You are not dealing with bootlegging now, are you, Doctor?

Mr. REED. Well, I hope not. To the best of my knowledge, I am not consorting or dealing with bootleggers.

Senator STEVENS. They had a picture of this man with a bunch of curlers, women's curlers, inside his coat. He put the little birds in each curler and got onboard the airplane. It was very interesting. It is said in the trade that how they can get them out of some of these countries into our country is a fantastic——

Mr. REED. Yes. They are bringing them in in hollowed out gasoline tanks across the Mexican border. It is a serious problem in Australia.

Senator STEVENS. Well, you really do try to deal with reputable dealers in terms of your acquisitions?

Mr. REED. We try to deal with reputable dealers. We are doing more looking into whom we are dealing with and I suspect that in the future we are going to have to send more expeditions into the field to do our own collecting. The present restrictions on importa-

tions set by the Endangered Species Act, both in this country and companion acts in other countries, are making it more difficult, so we may have to do more and more collecting personally, that is, the zoo sending expeditions out.

Senator STEVENS. Why don't you give us a listing of the acquisitions you have made for fiscal year 1976 and 1977 to date. Include the source and the price of each animal. Then for the same timeframe, give us a list of animals sold, whom they were sold to, and the prices, and whether originally acquired with Federal or private funds.

Mr. REED. Certainly. I will submit that information for the record.

[The information follows:]

Acquisition or Sale of Animals During Fiscal 1976 and 1977

In fiscal year 1976, the National Zoo purchased the following animals:

Mammals:	FEDERAL FUNDS	CHRYSLER FUND	PURCHASED FROM
Cheetah	$5,000		Lion Country Safari
Hairy Armadillo (4)	715		Ravensden Zoo
Slow Loris	100		Charles Chase Co.
Tamandua	100		Blue Ribbon Pet Farm
Geoffrey's Marmoset	65		Gary Renfrow
Naked-Tailed Armadillo (2)	305		Blue Ribbon Pet Farm
Zorilla (2)	310		Metro Toronto Zoo
Tree Shrew	50		Oklahoma City Zoo
Black-Tailed Prairie Dog (4)	60		Otto Martin Locke
Hedgehog Tenrec	105		Frankfurt Zoo
African Crested Porcupine	300		Charles Chase Co.
Fishers (2)	400		Frank Webb
Red Brocket (2)		$1,748	Gladys Porter Zoo
Rat Kangaroo (4)		508	National Park & Wildlife, Australia
Birds:			
Darwin's Rheas (6)	$3,000		San Diego Zoo
White-Winged Trumpeter	300		Gladys Porter Zoo
Red-Legged Honeycreeper (6)	300		Shon Ross
Hooded Mergansers (3)	225		Winston Guest
Pukeko	200		Portland Zoo
Red-Breasted Geese (8)		$6,400	Philadelphia Zoo
Moloccan Cockatoo		750	Zoe C. Gleysteen
Reptiles/Amphibians:			
Aldabra Tortoises (3)	$4,700		Int'l. Animal Exchange
Boa Constrictor	250		Sheffield Edwards
Puff Adder (3)	90		Sheffield Edwards
Vine Snakes (2)	30		East Bay Vivarium
Mexican Treefrogs (4)	40		East Bay Vivarium
Asiatic Stripe-Tailed Rat Snake	60		Friendly Beasties
Cuban Anoles (3)	30		Charles Chase Co.
Leopard Tortoises (2)	325		Sheffield Edwards
Brazilian Rainbow Boa		$215	The Shed

Thus far in fiscal year 1977, the National Zoo has purchased the following:

Mammals:			
Palm Civet	$ 50		Val Peterson
Blesbok (2)	6,600		Jurgen Schulz
Zorilla	167		Wilhelmina Zoo
Markor (2)		$6,295	Southwick Birds
Sable Antelope		7,500	Jurgen Schulz

Birds:	FEDERAL FUNDS	CHRYSLER FUND	PURCHASED FROM
Plumed Pigeon (4)	$ 400		A.W. Steinbeck
Mountain Witches (6)	400		A.W. Steinbeck
Serpent Eagle	450		Jacksonville Zoo
Tinamou (4)	240		Bronx Zoo
Rufous Hornbill (4)	1,400		Los Angeles Zoo
Magellan Goose	150		Jacksonville Zoo

In fiscal years 1976 and 1977, the following animals were sold:

ANIMAL	SOLD TO	PRICE	ACQUIRED ORIGINALLY
Mammals:			
Burmese Thamin	San Diego Zoo	$ 2,750	Born NZP
Greater Galago (2)	Cathedral Pines	50	Born NZP
Lesser Oriental Civet	Cathedral Pines	50	By Trade
Cape Buffalo	Baltimore Zoo	2,800	Born NZP
Greater Kudu (2)	Baltimore Zoo	4,000	Born NZP
Gelada Baboon (5)	F.J. Zeehandelarr, Inc.	1,150	2 Born NZP; 3 Private (1962)
Masai Giraffe	Franklin Park Zoo	13,200	Born NZP
Cape Buffalo (5)	Southwick Birds	2,850 & (Spectacled Bear)	3 Born NZP; 2 Private (1960)
Racoon Dog (2)	Rare Feline Breeding	100	Born NZP
Kinkajou (3)	Big 3 Zoo Farm	100	2 Donated; 1 Born NZP
Dorcas Gazelle (2)	Sacramento Zoo	1,700	Born NZP
Masai Giraffe	Vivo Animales, Inc.	10,000	Born NZP
Axis Deer	Cleveland Zoo	75	Born NZP
Spiny Mouse (4)	Beardsley Zoo	10	Born NZP
Greater Galago	Int'l. Animal Exchange	50	Born NZP
Pygmy Hippopotamus	Trefflich's	3,500	Born NZP
Spiny Mouse (4)	Cheniere Lake Park	10	Born NZP
Reindeer	Busch Gardens	600	Born NZP
Scimitar-Horned Oryx	Dickerson Park Zoo	500	Born NZP
Sable Antelope	Dickerson Park Zoo	500	Born NZP
Reeves' Muntjac	Pet-A-Pet Zoo	450	Born NZP
Paca	Rare Feline Breeding	50	Born NZP
Crab-Eating Fox (2)	Los Angeles Zoo	300	Born NZP
Raccoon Dog (3)	Los Angeles Zoo	150	Born NZP
Pere David's Deer (2)	Irving Game Farm	600	Born NZP
Birds:			
Vulterine Guinea Fowl (4)	San Antonio Zoo	600	Born NZP
Vulterine Guinea Fowl (2)	Ft. Wayne Children's Zoo	300	Born NZP
Crested Green Wood Partridge	Shon Ross	75	Born NZP
Crested Green Wood Partridge (4)	William Perantino	300	Born NZP

ANIMAL	SOLD TO	PRICE	ACQUIRED ORIGINALLY
Birds (continued):			
Cape Shelduck	Jackson Zoo	$ 40	Born NZP
Radjah Shelduck	Jackson Zoo	75	Born NZP
Barn Owl (4)	Cathedral Pines	160	Born NZP
Crested Green Wood Partridge (2)	Cathedral Pines	150	Born NZP
Crested Green Wood Partridge (4)	Shon Ross	300	Born NZP
Rothschild's Mynah (4)	Harold Yanik	500	Born NZP
Vulterine Guinea Fowl (2)	Busch Bird Park	300	Born NZP
Vulterine Guinea Fowl (4)	Ft. Wayne Children's Zoo	600	Born NZP
Vulterine Guinea Fowl (4)	Oklahoma City Zoo	600	Born NZP
Vulterine Guinea Fowl (2)	Brookfield Zoo	300	Born NZP
Vulterine Guinea Fowl (4)	Baltimore Zoo	400	Born NZP
Cape Shelduck	Baltimore Zoo	40	Born NZP
Lady Amherst Pheasant (2)	Lion Country Safari	20	Born NZP
Lady Amherst Pheasant (2)	Lincoln Park Zoo	20	Born NZP
Mandarin Duck (2)	Roy Arnold	35	Born NZP
Wood Duck	Roy Arnold	10	Born NZP
Wood Duck (15)	John Steen	225	Born NZP
Mandarin Duck (4)	Lincoln Children's Zoo	70	Born NZP
Mandarin Duck (4)	Gladys Porter Zoo	70	Born NZP
Wood Duck (3)	Gladys Porter Zoo	38	Born NZP
Common Rhea (19)	Wild Animals Int'l.	1,000	Born NZP
Nicobar Pigeon (2)	Walt Disney World	200	Born NZP
Common Rhea	Robinson Children's Zoo	50	Born NZP
Common Rhea (3)	Bramble Park Zoo	150	Born NZP
Common Rhea (3)	Wm. Szigeti	150	Born NZP
Black Swan	Wild Animals Int'l.	125	Born NZP
Radjah Shelduck (2)	Vivo Animales, Inc.	300	Born NZP
Stanley's Crane	Warner Nartel	1,000	Trade
Chinese Necklace Doves (4)	Robert James	80	Born NZP
Reptiles/Amphibians:			
Bengal Monitor Lizard	Central Florida Zoo	30	Public Donation
Bengal Monitor Lizard	Dickerson Park Zoo	20	Public Donation

PEKING ZOO

Senator STEVENS. Thank you very much.

Mr. REED. I appreciate the opportunity to add these comments to the record.

Senator STEVENS. I went to the zoo in China, by the way, to see how the musk oxen were doing when I was in Peking and we could only find the male. We couldn't find anyone who would tell us what happened to the female. You don't happen to know that, do you?

Mr. REED. I think that that was the female you saw. I think that was Matilda.

Senator STEVENS. We were told it was the other way around.

Mr. REED. Well, I have been told that Milton died of traumatic pericarditis—you know, it is where he swallowed a piece of hardware and like on all cattle, it probably went into his heart and caused his death.

Senator STEVENS. I see. We were a little bit disturbed in Alaska because, as the translation said, these were animals from "somewhere on the North American Continent," and we thought we should have gotten a little credit for having provided the zoo animals.

Do they want a replacement? Do you know?

Mr. REED. I have not received any communication from the Peking zoo of this nature. However, I must admit that the correspondence is very, very slow.

Senator STEVENS. That is understandable. They seem to be doing a job in trying to upgrade their zoo.

Mr. REED. I think that they are and apparently it is well received by the people.

Senator STEVENS. We were there on a Sunday morning. There were a fantastic number of people there just wandering through.

Well, thank you very much. Dr. Reed, I appreciate, your comments. I think your zoo is a wonderful national center.

Mr. REED. Thank you very much.

CENTER FOR THE STUDY OF MAN—CSM

Senator STEVENS. On the Center for the Study of Man, we have a request for $95,000 and to increase five term appointments for the National Anthropological Film Center. That Center was created with funding from outside sources as the Ethnographic Film Center. In 1976 you requested $20,000 to hire a Director. In the current year you have an additional $20,000 and now you want $95,000 more.

Could you tell us why such a large Federal funding is necessary in view of the original funding levels of that Center?

Dr. RIPLEY. Dr. Challinor.

Dr. CHALLINOR. Mr. Chairman, this Center was primarily funded when it came to the Smithsonian with grants from the National Endowments and the National Institutes of Health. The Center is primarily concerned with photographing the day-to-day behavior and living patterns of those communities which are disappearing culturally.

The main problem that the Smithsonian has had is developing a Federal base to maintain a core staff to service the bequests, grants and gifts that have come to the Center to photograph these people.

I might point out that during fiscal 1976 and the transition quarter, the Center received from Federal sources, both the NIH and the NEH, a total of $243,000 and from private donations and individuals, some $50,000.

We have requested during fiscal 1977 some $550,000 from the NIH and the NEH and estimate perhaps another $20,000 or more in donations from private individuals. The problem has been to attract increasing donations, especially from foundations. The permanent staff needed to maintain these facilities has not been there.

Therefore, foundations that would normally support us are unwilling to give money for administrative expenses. They feel that that is the obligation of the Institution to furnish the core administrative staff.

We are asking for $95,000 in fiscal 1978 and five term appointments to maintain a core operating staff in the Center.

Senator STEVENS. Well, give us the details of that for the record. And a comparison on your fiscal 1976 and what your sources will be in 1977.

[The information follows:]

PROPOSED FISCAL YEAR 1978 FEDERAL BUDGET OF THE NATIONAL ANTHROPOLOGICAL FILM CENTER COMPARED WITH FISCAL YEAR 1976 AND FISCAL YEAR 1977

The fiscal year 1978 budget request of the National Anthropological Film Center totals $139,000. These funds are designated as follows:

	[*In thousands of dollars*]
Personnel compensation and benefits	[1] $113
Travel	2
Other services	13
Supplies and materials	5
Equipment	3
All other	3
Total	139

[1] Funds will provide for the Director and five term employees.

In fiscal year 1976, Federal base resources for the Film Center total $20,600. In fiscal year 1977 Federal base resources total $43,000.

ANTHROPOLOGICAL FILM CENTER

Senator STEVENS. Dr. Margaret Mead appeared before the committee and testified on the need for documenting vanishing cultures on film before their characteristics are eroded by other cultures of our mainstream life.

Will this budget allow for that purpose?

Dr. CHALLINOR. This budget will allow it at a very minimum level. We feel the Smithsonian's obligation is to keep this particular organization fully functional from an administrative end. If we are successful in doing this, we believe that we can attract the necessary support from foundations who support this kind of research.

Senator STEVENS. Have you a commitment from the National Endowments on Arts and Humanities for this coming fiscal year?

Dr. CHALLINOR. We currently have a request in for a grant of $183,000 to the National Endowment for the Humanities. This is

a 2-year grant. The present grant of $118,000 expired on April 1, 1977.

We have submitted another series of grants for a 2-year period totaling $183,000. We have not yet heard from the National Endowment whether these grants have been approved.

They have approved them in the past and if they are authorized to continue these grants, they will be an important component in supporting this facility.

COUNTRIES INVOLVED WITH FILM CENTER

Senator STEVENS. What other countries are involved in the film center?

Dr. CHALLINOR. We have secured permission from a series of countries throughout the world to photograph their remote tribal cultures. These include Indonesia, Nepal, Sudan, Afghanistan, Iran. I could furnish all the list, but those are the kinds of countries that we are now working in.

Senator STEVENS. Are you doing any work with organizations like the National Geographic to determine what film records they have of those cultures to begin with?

Dr. CHALLINOR. The films that belong to National Geographic, as I understand, remain the property of the National Geographic and sometimes it is very difficult to get them from that institution. Mr. Ripley maybe can answer that better than I.

Senator STEVENS. Well, are we duplicating the film records of the cultures involved that are in the National Geographic archives?

Dr. RIPLEY. Well, I think two things could be said here. First of all, the Geographic maintains its own records and does not release the film, and second, it is taken for other purposes. That is essentially as travel film and thus is distinct from anthropologically oriented films.

Senator STEVENS. Does the host country contribute anything to the support of the activities involved?

Mr. CHALLINOR. This depends on the country, Mr. Chairman. Oftentimes, they do indeed furnish support, mostly logistical support, such as travel and transportation expenses, and contacts. Guides to get into these remote areas are very often supported directly by the host country.

Senator STEVENS. The committee has received some mail that indicates that the Film Center expects to suffer losses as a result of the National Endowment's failure to meet your grant request, and that funding of $426,000 over the budget request is needed to take advantage of these filming opportunities.

What is the validity of that mail and the assertions made? I am sure you are aware of these letters.

SUPPORTERS OF FILM CENTER

Dr. CHALLINOR. I am aware of these letters and with respect to the first part and the role of the National Endowment I would like to refer this to Mr. Jameson.

Mr. JAMESON. We believe that there is no firm policy, Mr. Chairman. Our proposal is pending before the National Endowments and

I believe we have heard nothing to indicate that there is a firm policy that they cannot support work of this kind.

Senator STEVENS. Where did the $426,000 come from? All these letters indicate that that is the amount you need to offset the grant losses.

Now, you mentioned a $180,000 some-odd. Where is the $426,000 coming from? You must have a group of supporters out there that think they need more money, obviously.

Dr. CHALLINOR. Mr. Chairman, I feel that there is an enthusiastic group of citizens who support this operation. I do want to say that the consideration for this budget item was made very carefully within the Smithsonian's total priorities—we have an existing base, as you pointed out, of $43,000. Now, for the Film Center we are requesting an addition of $95,000, as well as an amount of $1,000 under necessary pay, which will give us a base of $139,000 should this increase be approved.

GRANTS FROM FEDERAL AGENCIES

Senator STEVENS. This committee also funds the National Endowment for the Humanities. They have had problems. They have not been able to get the matching grants that they thought they would get. And the question was in a supplemental whether we would increase them anymore. And we did give them $9 million more, as a matter of fact.

But, I have two questions. One, if it is a valid Federal purpose, why don't you just directly ask us for the money and not go to another group that comes in and asks for the money? And, second, have you been cut somewhere along the line?

Obviously, you have a group of supporters out there who believe you are going to suffer some loss in the program level. Now what is the basis for that fear?

Dr. CHALLINOR. I think the basis for their fear, Mr. Chairman, is that they believe—although we have no precise evidence—that the National Endowment will no longer be willing to support this particular project which they have been doing for the last 2 years and, therefore, these supporters feel that this money should be added onto our existing appropriation.

Senator STEVENS. Well, I happen to share that feeling. I don't know why we should have the National Endowment for the Humanities come in and justify to us that they need Federal dollars to make grants and then turn around and make a grant to the Smithsonian, which could come in and justify it directly.

Why don't you justify the full amount that you need?

Mr. JAMESON. Well, I guess one question that might be asked, Mr. Chairman, is how much is enough on this particular subject matter.

Senator STEVENS. Well, if you ask us for so much——

Mr. JAMESON. We have a small base, as you pointed out and we certainly have seen in the past on other budget items that it is prudent both from our standpoint and no doubt from the committee's standpoint to allow that base to grow as we could continue to justify the need in measured increments.

Senator STEVENS. You asked us for $130,000. You are asking them for $183,000. And the people on the outside say you absolutely need $426,000 to meet the grant losses.

Have you got other sources of grant losses?

Mr. JAMESON. Well, there is a difference. I think that to a very large extent the directly appropriated money is for the basic core activity of the program.

Senator STEVENS. In other words, you have asked for enough? You think you can keep the program going even if the National Endowment turns you down?

Mr. JAMESON. We believe so. Much of the money from outside sources is aimed at supporting special aspects of the program, special projects, which, by and large, the people outside are inclined to support. They have very little taste over the long term to support the administrative core functioning. We need to work with you, your committee, and the Congress to develop that basic core capability.

Senator STEVENS. Will you give us a statement for the record of what you would use the $426,000 for if you had it?

Mr. JAMESON. We would be pleased to.

[The information follows:]

EXPANDED FILM CENTER BUDGET

The Institution's fiscal year 1978 budget request for the National Anthropological Film Center (NAFC) totals $139,000. This request is the result of a careful assessment by Smithsonian management of the immediate needs of the Film Center balanced against the overall requirements of the Institution. If additional funds of $426,000 were available to the NAFC in fiscal year 1978, they would be applied as follows:

Research and Collections Management ($115,000)

To provide research, administrative, and secretarial staff, five additional term appointments are requested. These five term positions fill out the core facility from which field research may be conducted and where research film material may be accessioned, catalogued, and made available for scholarly research. The following positions are requested: a Research Aide to obtain, assemble and prepare research data in relation to film studies; a secretary to provide the full range of secretarial and clerical assistance typical in an active center; a Coordinator of Research Film Projects to develop and coordinate research fieldwork and to maintain established procedures for the preparation of research film documents obtained in ongoing field projects; a Research Film Cataloguer to prepare reel-by-reel identification of the visual data contained in the research film records, and to prepare abstracts, catalogues and indexes of the film studies; and an Executive Administrator to manage expenditures and accounts, to coordinate the staff and programs, to supervise logistic support and supply for the operation of the Center's projects, and to develop sources of private support for further documentary projects.

In addition to these five positions, two Visual Anthropologists, on a temporary basis, are requested to conduct field research, and to provide the necessary annotation, assembly, and analysis of the film records. An Ethnocinematographer and an Assistant Ethnocinematographer are proposed on a temporary basis to prepare visual records of selected vanishing ways of life and cultures.

Travel and Transportation of Persons ($70,000)

The National Anthropological Film Center organizes and undertakes collaborative and field research; it also documents and analyzes research film records. In order to conduct salvage fieldwork in Third World nations and other bastions of independently evolved ways of life, round-trip transportation is required to and from the field locations. So that project participants may assemble, annotate, and analyze the research film records, domestic and foreign travel is necessary. Domestic travel funds are requested so that Center staff may accession already existing film documents into the National Collection, and attend professional meetings for the purpose of scholarly exchange related to visual data projects, to present findings to colleagues and for obtaining information about existing films for possible accessioning.

Services, Supplies, and Equipment ($241,000)

In order to conduct the necessary field expeditions, the required visual data recording equipment must be transported to and from field locations. Whenever necessary, additional pieces of film equipment must be purchased. Equipment must be maintained and modified for specialized research filming which frequently takes place in areas with rugged terrain and severe weather conditions. 16 mm film stock and recording tape must be purchased, and the exposed film must subsequently be shipped from the field, processed, printed and duplicated for preservation. 35 mm and 16 mm film review equipment is required to effectively analyze the research footage. Vault cans are required to house the increasing film records. Finally, in order to make these film records available to researchers as permanent scholarly resources, an indexing and visual data retrieval capability is needed. This could require consultants for the necessary research and development of video indexing and retrieval systems, development of computer programs, and use of computer time.

SMITHSONIAN REQUEST FOR FILM CENTER

Senator STEVENS. They must have gotten that figure from somewhere.

Dr. CHALLINOR. This is not our figure, as you realize, Mr. Chairman. This is a figure made up by the enthusiastic supporters of the program.

Senator STEVENS. Well, what is the total figure that you want—$130,000 from us and $180,000 from the National Endowment?

Dr. CHALLINOR. Yes, Mr. Chairman.

Senator STEVENS. How much are you seeking from private sources?

Dr. CHALLINOR. From $70,000 to $100,000 through private foundations.

Senator STEVENS. That is $426,000. Do you expect to get the money from the private foundations? Do you have any reasons to fear you won't get it?

Dr. CHALLINOR. If we are able to develop this core of support staff, we think we have a very good chance of getting most of that money from private foundations.

Senator STEVENS. If we give you the $95,000 you will have the program level, if the National Endowment gives you the amount of your request?

Dr. CHALLINOR. Yes, Mr. Chairman.

FREER GALLERY

Senator STEVENS. Now, in the Freer Gallery, you are seeking $10,000 and one new position to supplement the existing eight-person staff. Last year, according to our staff, you indicated there were six people in that area, maintenance people. Did you shift two people over?

And while you are looking, we submitted a question on that and it was answered in writing. We asked that you show the need for temporary maintenance help, and we asked if you anticipated requesting a new position in the near future and the answer was, no, you didn't. This was temporary maintenance help and this kind of need does not call for a new full-time staff.

Now we find that two are needed and you are adding another one. What made you change your mind in regard to maintenance staff at Freer.

Mr. BLITZER. Mr. Chairman, I think we will have to look that up and supply it to you.

Senator STEVENS. Do you know where you got the other people?

Mr. BLITZER. No, sir.

Senator STEVENS. Your answer last year was you had six people there and the justification showed you started with a base of eight this year.

Mr. BLITZER. I will have to look that up, also.

Senator STEVENS. We would be pleased to have it for the record, if you would.

Mr. BLITZER. Yes, sir.

[The information follows:]

CUSTODIAL SUPPORT AT THE FREER GALLERY OF ART

The Freer Gallery's eight-person janitorial staff referenced on page A–43 of the Smithsonian's Budget Justifications for fiscal year 1978 includes the two part-time custodians which the $5,000 increase appropriated to the Freer for fiscal year 1977 permitted us to hire.

Last year when we requested an additional $5,000 for custodial services at the Freer, we had every expectation that the two part-time janitors that the increase would permit us to hire would be able to meet expected workload demands. Fiscal year 1976, however, found the Freer attended by over 10,000 more visitors than the previous year, a 5 percent increase. Furthermore, attendance figures during the Transition Quarter showed that this visitation level continued to rise at an annual rate of some 5 percent. These statistics, coupled with the increased public interest in the art and culture of the Near and Far East, as witnessed by the overwhelming response to the National Gallery of Art's two recent exhibitions on archeological treasures from China and objects from the tomb of King Tutankhamun, led us to conclude that further custodial support for the Freer Gallery of Art was both a necessary and prudent request.

AREA DIRECTOR FOR ARCHIVES OF AMERICAN ART

Senator STEVENS. You are seeking a new Washington area Director for the new Archives of American Art. That was not approved last year. It seems to be the same request. Would you provide us with any information you would have that would indicate an additional justification for that position this year, and indicate what regional offices you intend to put under that Washington office.

We assume that it would be Maryland, Virginia, West Virginia, Delaware, and North Carolina; is that wrong?

Mr. BLITZER. Mr. Chairman, it really would be all of the United States south of New York and east of some arbitrary point. The regional offices now exist in San Francisco, Detroit, Boston, and New York.

Senator STEVENS. Well, tell us what are the areas that you would cover and whether there is some increased necessity this year. We would also like to know what additional justification you have this year.

Mr. BLITZER. Yes, sir.

[The information follows:]

AREA DIRECTOR FOR THE ARCHIVES OF AMERICAN ART

The area director position requested for the Archives of American Art would serve to collect and provide for the preservation of art historical documents to be found throughout the southeastern part of the United States. It is indeed true that this request is identical to last year's, which was denied. The collection of these papers, essential to the understanding of American art history in the Southeast, was and remains the highest priority goal for further program development at the Archives of American Art. As we are now one year later, there is a greater feeling of urgency to get on with the task of seeking out these documentary resources and making provision for their preservation and microfilming before they are lost or destroyed.

ADMINISTRATION OF CUSTODIAL STAFF

Dr. RIPLEY. Mr. Chairman, could Mr. Jameson say something to the point of the Freer Gallery?

Senator STEVENS. Surely.

Mr. JAMESON. I think things that are said personally at the hearing are really much more useful for us and the committee than the material that goes into the record later.

I think we have been describing for you for 2 or 3 years the Smithsonian decision with regard to its custodial staff, who, for I suppose 130 years, have been serving the museums, the art galleries, and the research laboratories. For most of those years, as far as I know, for the entire period, this staff was administered centrally out of a unit that used to be called the buildings management department. Since they worked in the bureaus and, in fact, were really under the day-to-day supervision of a museum director, it made sense to us to give that museum director responsibility for their pay, administration, and other aspects of their supervision.

So we made a decision, that, except for a small group of people who are retained centrally to maintain some of the outbuildings, the Museum of Natural History, the National Collection of Fine Arts and so forth would have their own staffs. I don't remember the reason for the difference between six and eight. We will put that in the record, but I suspect that this is a reflection of the workload situation in the Freer Gallery of Art. Despite this apparent augmentation, there is still a small problem that needs to be corrected through the 1978 budget cycle.

Senator STEVENS. We are not challenging your inconsistency, but we do want to try to see that we have some continuity as far as the base we are dealing with each year. You seem to have two more people in the base than you had last year. Your answer last year was that you didn't need additional permanent people with a base of six. Now you need an additional permanent person with a permanent base of eight.

It is a little problem, not a major one. But I hope that you can straighten it out for the record, of course.

Mr. JAMESON. We would be pleased to.

REMAINING MALL SITE

Senator STEVENS. Now, you want $50,000 to plan for the remaining Mall site. Would that include any initial building plan?

Dr. RIPLEY. No, sir.

Senator STEVENS. Is there any private funding to be used as part of this effort?

Dr. RIPLEY. We are now spending a small amount of trust funds for the development of concepts that might be applicable to site development. No additional trust funds or grants will be involved.

Senator STEVENS. Why can't that work be done by the Office of Facilities Planning and Engineering Services?

Dr. RIPLEY. Mr. Perrot, would you like to describe this project?

Mr. PERROT. Mr. Chairman, in the first place, this amount is to do some experimentation, to do some preplanning and developing the concepts for the kind of exhibits that could be shown in this new facility when and if it is established.

We feel it inappropriate to start planning a structure without having a clear notion of what that structure is to do and how it will do it.

Senator STEVENS. Well, why not use your own internal Office of Facilities Planning and Engineering Services?

Mr. PERROT. We are not considering this, Mr. Chairman, as construction preplanning, but rather as program preplanning.

Senator STEVENS. So it would not include any building plans?

Mr. PERROT. No, sir.

Senator STEVENS. Thank you.

RESEARCH AWARDS PROGRAM

You want $60,000 for the research awards program to restore it to the funding level of 1976. Why? Isn't this budgeted for the individual units of the Smithsonian? This seems to be a special fund. Is that right?

Dr. RIPLEY. Mr. Chairman, as you know, the initiation of this fund came in 1966 to finance new research as a substitute for the funds which were no longer available in accordance with appropriation language in the Independent Offices Appropriation Act for 1964, recommended by the Subcommittee on Independent Offices under Congressman Thomas. These were grants that had been received by scientists on the staff throughout the Institution from the National Science Foundation.

Senator STEVENS. Are you saying that the House committee required you to maintain an institutionwide research awards program fund?

Dr. RIPLEY. No. What I am saying is that in 1963 in testimony Congressman Thomas urged that the National Science Foundation should not give an award to an individual scientist anywhere in the Government who was working in an agency which had a direct Federal appropriation. As a result during subsequent testimony we defended the concept that the Institution should therefore receive substitute funds of some sort as a direct Federal appropriation. This was approved by the then Bureau of the Budget, as well as the Congress itself.

Of course, we never seem to be able to achieve the level of substitute funds that we were able to when we were able to apply for them in the open market.

Senator STEVENS. Why aren't they budgeted from the individual units of the Smithsonian?

Dr. RIPLEY. Because the research awards program is an institutionwide competition and we still believe that the best way for our scientists to receive grants should be under the same procedures as those administered by the National Science Foundation. In other words, with peer review, with outside committees, to make sure that the small amount of funds would be competed for at a level of excellence within the Institution as a whole.

ADMINISTRATION OF RESEARCH GRANTS

Senator STEVENS. Do you pay that money to the foundation?

Dr. RIPLEY. Yes.

Senator STEVENS. And it is then administered by the foundation?

Dr. RIPLEY. The grant has to be administered centrally because you have to organize the peer review process, the outside committees and the entire method of attempting to award these grants on a competitive basis throughout the Institution to any scientist who has applied. Such a procedure approximates the awarding of a grant for research in the private sector.

INCREASE FOR PROTECTION

Senator STEVENS. Under protection services, you have a $120,000 adjustment in base resources. Does that really mean that you are asking for 12 more positions to be funded with $120,000?

What does that mean, "an adjustment in base resources," $120,000? Are you adding 12 new positions?

Dr. RIPLEY. Mr. Ault.

Mr. AULT. We have, sir, approximately 12 authorized guard positions we have been unable to fill because——

Senator STEVENS. That is our understanding. You have 527 and you filled 515. Due to budget constraints, you have 12 left. Is that right?

Mr. AULT. That is correct.

Senator STEVENS. Why did that shortfall occur? In 1977 we gave you the increase for protection services and yet you were unable to fund the same number of positions you had in 1976. Why did that happen after we gave you an increase in 1977?

Mr. AULT. We have had rising costs in other items, sir, that are enumerated here; uniforms, supplies, things of this sort that have been required items, as well. And we have had to use money for those purposes.

Senator STEVENS. Well, if we give you this $120,000, will you be able to fund all 547 guard positions and meet those incidental costs?

Mr. AULT. Not all 547, sir. We are also asking for 20 additional new positions.

Senator STEVENS. Well, that to us means that you have 527. You ask for 20 new ones. That would be 547.

Mr. AULT. That will bring us to 547, right, with the 20 new ones, as well as the $120,000.

Senator STEVENS. Will you be able to fund the 20 new ones, plus the 12 you didn't fund last year?

Mr. AULT. That is correct, sir.

DEPUTY DIRECTOR FOR OFFICE OF PLANT SERVICES

Senator STEVENS. All right. Thank you.

Under Office of Plant Services, you want $30,000 to fund a Deputy Director. Would you give us the justification for the record as to why you need a new Deputy Director in that area. Of the 327 positions in the Office of Plant Services how many are managerial positions?

Mr. AULT. I would be happy to supply that, sir.

Senator STEVENS. Would you indicate the relationship between that new Deputy Director and the existing managerial staff as to why that managerial staff cannot continue to handle the function?

Mr. AULT. I would be happy to, sir.

I will say, if I might, I am blessed with a very fine Director of Plant Services, who is responsible for the operations of this, which is my second largest directorate, with 327 people responsible for maintaining all of our buildings, the heating, ventilating and air-conditioning systems in those buildings. He has four division chiefs, and this new position that I am asking for would enable him to be able to get out more and personally observe the operations of these plant services offices and would help him in the supervision of these four division chiefs.

Senator STEVENS. All right. But again, since it is a new item, I think we had better have a statement as to why you feel this is necessary.

Mr. AULT. We would be happy to supply it.

[The information follows:]

DEPUTY DIRECTOR POSITION FOR THE OFFICE OF PLANT SERVICES

The Office of Plant Services was established in 1974 when the former Buildings Management Department was reorganized. The current organization is headed by a director and is subdivided into four distinct operating divisions, each of which is further divided into separate branches. The director, division chiefs, and branch chiefs constitute 16 managerial positions out of the total ceiling of 327.

Since inception, the responsibilities of OPLANTS have continued to grow and we have now reached the point where additional overall managerial attention is necessary if we are to insure an effective and efficient operation of the organization. A deputy director position will enable the director to spend more time providing guidance to his entire operation by removing the need to become so personally involved in the day-to-day operations and problems of the organization. A deputy director would also remove the need for division chiefs to act in the absence of the director or be assigned to special projects thereby increasing the time they have to spend in the direct supervision of their divisions.

In short, the deputy director position would improve the overall supervision of OPLANTS by providing a more direct control over the operations of the subordinate divisions and allowing time for the director to get out and personally observe the operations of the organization.

The approval of this position would also insure the orderly transition of control when the current director retires. Since the day-to-day services provided by OPLANTS are critical to the successful operation of our museums, preplanning for a successor to head this operation is imperative.

Senator STEVENS. In terms of allocation charges, the staff requested that you submit two statements detailing the changes in the 1977 program—changes since the enactment of the appropriation.

We will put those statements in the record at this point.

[The statements follow:]

FY 1977 Object Class Distribution

Obj. Class	FY 1977 Est. in FY 1977 Request	Prog. and Travel Reduction	Pay Suppl. Request	Internal Adjustments /1	FY 1977 Est. in FY 1978 Request
11	52,999	-487	+3,035	+568	56,115
12	5,061	-44	+291	+141	5,449
21	661	-66	-	+5	600
22	386	-	-	+45	431
23	9,389	-215	-	-630	8,544
24	1,066	-7	-	-140	919
25	7,475	-266	-	-1,464	5,745
26	3,362	-8	-	+393	3,747
31	3,353	-18	-	-581	2,754
32	-	-	-	-	-
41	1,346	-200	-	-21	1,125
42	2	-	-	+1	3
TOTAL	85,100	-1,311	+3,326	-1,683	85,432

/1 This column reflects internal adjustments as well as application of the contingency reduction of $1,683,000 directed by Congress. The application of this reduction was left to the discretion of each bureau in order that essential programs and Institution-wide responsibilities would not be curtailed.

Object class information for FY 1977 was developed in January, 1976. This information was based on the increases requested of the Congress added to the FY 1976 base which was still an estimate. The FY 1977 column in the FY 1978 estimates was developed in January, 1977. This column was based on known needs at that time. Differences can be attributed to Congressional changes to the estimates, new prices, and changes in the way certain jobs will be carried out. Specifics by object class follow:

Object Class 11 -- Personnel Compensation +$568,000

1. In computing the cost of personnel compensation for the FY 1978 submission, we assumed less lapse than in the previous year based on our analysis of recent employment trends. This had the effect in the FY 1978 submission of increasing funds in Object Classes 11 and 12 with a corresponding decrease in funds available in other object classes.

2. Higher salary costs are also attributable to the effects of promotions granted since preparation of the original FY 1977 budget estimates.

Object Class 12 -- Personnel Benefits +$141,000

1. Recent rate increases by nearly all the health insurance carriers which serve Smithsonian Federal employees have resulted in higher costs to the Institution in FY 1977.

2. Based on the assumption of higher staff year delivery, the estimated costs of health benefits have increased in proportion to the increase in personnel compensation.

Object Class 22 -- Travel & Transportation of Things +$45,000

1. Originally the Smithsonian Astrophysical Observatory (SAO) had intended to contract for shipment of parts related to construction of the multi-mirror telescope (MMT). It has since been determined that it would be cost effective for SAO to handle the shipment through a Government Bill of Lading.

2. FY 1977 amounts reflected in the FY 1978 submission depict more accurately the increased costs associated with the transporting of specimens.

Object Class 23 -- Rent, Communications, and Utilities -$630,000

1. The decrease in estimated expenditures in Object Class 23 reflects application of the contingency reduction and generally lower estimates of utilities costs at the time the FY 1978 budget was prepared. In view of the exceptionally cold weather experienced in January and February, however, our actual expenditures may sharply exceed the revised estimate.

Object Class 24 -- Printing and Reproduction -$140,000

1. The decrease in estimated expenditures in Object Class 24 reflects application of the contingency reduction.

Object Class 25 -- Other Services -$1,464,000

1. A major portion of the contingency reduction was applied to expenditures in this object class.

2. SAO originally planned to contract for the purchase of certain supplies and equipment associated with the multi-mirror telescope. It has since been determined to be cost effective for these purchases to be made directly by SAO.

Object Class 26 -- Supplies and Materials +$393,000

1. SAO originally planned to contract for the purchase of certain supplies and equipment associated with the multi-mirror telescope. It has since been determined to be cost effective for these purchases to be made directly by SAO.

2. The increased estimate also reflects the effects of inflation on the purchase of supplies and materials integral to the day-to-day operations of the Institution.

Object Class 31 -- Equipment -$581,000

1. SAO originally planned to contract for the purchase of certain supplies and equipment associated with the multi-mirror telescope. It has since been determined to be cost effective for these purchases to be made directly by SAO.

2. Application of the contingency reduction has also lowered estimated expenditures in this object class.

Smithsonian Institution
Salaries and Expenses

Explanation of Difference Between Committee Markup
and FY 1977 Column (without Supplemental) in FY 1978 Estimates

	Committee	Committee Adjusted by Travel and Contingency	FY 1977 in FY 1978 Estimates	Difference/1
Science	$32,492	$31,807	$31,858	+$51
History and Art	13,522	13,241	13,195	-46
Public Service	2,452	2,402	2,295	-107
Museum Programs	6,265	6,136	6,537	+401
Special Programs	1,847	1,805	1,933	+128
Other	27,272	26,715	26,288	-427
Travel	-61			
Contingency	-1,683			
Total	$82,106	$82,106	$82,106	$0

/1 After receipt of the appropriation, certain reorganizations took place which resulted in the movement of minor amounts of funds between units. Workmen's Compensation had been centrally budgeted in the Office of the Treasurer which distorted this Office's costs, therefore, the budget was distributed to the units. The Committees approved reprogramming funds from the National Air and Space Museum, Assistant Secretary for History and Art, and Assistant Secretary for Public Service to the Office of Protection Services. Funds for utilities and telephone costs for additional units were relocated to the Office of Plant Services. The Office of Horticulture was moved from the Office of Plant Services to the Assistant Secretary for Museum Programs. (See Page A-56 of justifications.) A new line item, the Office of American and Folklife Studies was created with funds formerly in the Assistant Secretary for History and Art and the Division of Performing Arts. (See Page A-74 of justifications.) The final distribution of Office of the Registrar resources was made. Further minor changes were made in the distribution of exhibits capabilities. These reorganizations result in the following changes:

Science

Workmen's Compensation	+$65
NASM/Protection	-130
NZP/OPLANTS	-32
Registrar/NMNH	+98
Exhibits/NMNH	+50
	+$51

History & Art

Workmen's Compensation	+$8
Registrar/NMHT	+25
American Studies/Folklife	-53
Assistant Secretary/Protection	-25
	-$46*

Public Service

Workmen's Compensation	+$1
Anacostia/Exhibits	-4
Division of Performing Arts/Folklife	-74
Assistant Secretary/ Protection	-15
Anacostia/OPLANTS	-15
	-$107

Museum Programs

Workmen's Compensation	+$3
Horticulture	+566
Registrar/NMNH	-98
Registrar/NMHT	-25
Exhibits/Anacostia	+4
Exhibits/NMNH	-50
	+$401*

Special Programs

Workmen's Compensation	+$1
Folklife/American Studies	+53
Folklife/Division of Performing Arts	+74
	+$128

Administration

Workmen's Compensation	-$78
Protection/NASM	+130
Protection/Assistant Secretary for History and Art	+25
Protection/Assistant Secretary for Public Service	+15
OPLANTS/Horticulture	-566
OPLANTS/NZP	+32
OPLANTS/Anacostia	+15
	-$427

* Does not add due to rounding.

FISCAL YEAR 1977 INTERNAL ADJUSTMENTS

Senator STEVENS. As regards the $568,000 increase in the personnel compensation listed under the internal adjustments, we would like to have you break down the application of those funds by position or man-years. It seems that most of the decrease associated with the congressional reduction in the contingency fund has been applied to contractual services. Is that right?

Dr. RIPLEY. Mr. Yellin.

Mr. YELLIN. That is correct, Mr. Chairman.

In addition, there is one other factor involved. At one point we thought we would contract for certain items having to do with the MMT. Rather than do that, we are going to do the shipping and purchasing ourselves, and, therefore, the amount in the object class for contractual services shows a decrease.

Senator STEVENS. Will you tell us, just for the record, what contracts were dropped in the original program?

Mr. YELLIN. Yes, sir.

[The information follows:]

FISCAL YEAR 1977 INCREASE IN PERSONNEL COMPENSATION

The $568,000 increase in personnel compensation from the fiscal year 1977 estimates in the Institution's fiscal year 1977 budget request to those in the fiscal year 1978 request was based on an analysis of the Institution's lapse rate undertaken prior to the development of the fiscal year 1978 budget. This analysis projected that a trend toward reduced time in filling vacant positions would enable the Institution to realize some 38 more staff-years in fiscal year 1977 than originally anticipated. The current hiring restrictions and potential Executive Branch personnel ceiling reduction, however, will likely reverse this projection.

Contract reductions associated with multiple mirror telescope

Contractor	Purpose of contract	Contract reduced by estimated amount of
Philco Ford	Fabrication, testing and installation of optical support system.	$156,000
Do	Housing for multiple mirror telescope	32,000

TRAVEL AND PERSONNEL LIMITATIONS

Senator STEVENS. There seems to be a $5,000 increase in travel in excess of the limitation established by congressional reduction; is that true?

Mr. YELLIN. No, sir. Our travel limitation is $600,000 and this is the amount that we have allocated this year.

Senator STEVENS. What about the $5,000 increase?

Mr. YELLIN. We are within the congressional allocation with the $600,000 and we have established internal controls to assure that the Institution will remain within that limitation.

Senator STEVENS. Were any of the personnel compensation funds used to fund any employment in excess of the congressional provision for permanent positions or the Smithsonian's own temporary employment estimates for last year?

Mr. YELLIN. No, sir.

REORGANIZATIONS

Senator STEVENS. Did you find it necessary to shift any of the units, such as horticulture, folklife or performing arts between activities within the midyear of this fiscal year? Have you shifted the funds back and forth?

Mr. YELLIN. Yes, sir. The funds, however, are being used specifically for the purposes that we justified them in last year's budget.

However, certain reorganizations have taken place. The most notable is horticulture and that is fully explained in this year's budget submission.

Senator STEVENS. Is it reflected in the 1978 program budget?

Mr. YELLIN. It certainly is, sir. And explained in detail.

Senator STEVENS. You don't feel that it was a reprograming?

Mr. YELLIN. Not at all, sir, because the money is being used precisely for the purposes for which it was justified in the past, only now it is located under the Assistant Secretary for Museum Programs where in the past it was in the Office of Plant Services.

FOREIGN CURRENCY GRANTS TO SMITHSONIAN EMPLOYEES

Senator STEVENS. With regard to grants to the Smithsonian employees, we asked about the number of foreign currency grants that were going to the Smithsonian employees last year, and your report for 1976 and the transition quarter indicates that 7 of the 8 grants for museum programs went to Smithsonian employees and an overall 14 of the 37 grants listed went to Smithsonian employees.

In view of that number going to your own agency, why don't you just ask for a direct special foreign currency program for Smithsonian employees and not have Smithsonian employees participating in grant programs?

Dr. CHALLINOR. Mr. Chairman, if I may answer that. We feel that the grants that go to Smithsonian employees are indeed competitive grants and that the Smithsonian employees should compete with their peers in universities and elsewhere for these grants.

Senator STEVENS. Don't you think that you are deterring other people from asking if seven out of eight grants go to your own employees and yet you insist on peer review and competition from outside people?

Dr. CHALLINOR. The grants on the Museum Programs to which you refer, I believe are those that were involved primarily with the folklife festival involving small grants of about $3,000 each to send Smithsonian staff abroad, to Egypt and to Poland and perhaps elsewhere to negotiate with the local authorities for people, folk artists and craftsmen to come to America for the Bicentennial programs that we had on the Mall.

Senator STEVENS. Well, 14 of the 37 total grants that were made went to Smithsonian employees.

Each year I am told that the reason that we go through this funding process is we want peer review and competition. Well, if that is so, there are a lot of people out there submitting a lot of applications that are not getting any grants because we still have a substantial number of them going to the Smithsonian employees.

Now, why can't we establish a grant program, somehow or another, where you administer foreign currency funds for your own employees and have the nonemployees compete with each other?

Could you give us a list of the people who competed with the Smithsonian employees and where they are from?

Dr. CHALLINOR. We certainly can, Mr. Chairman.

As I say, all these grants that you are referring to are usually in the $2,000 to $3,000 bracket and we have the list and exactly what they were referring to. Numerically they seem to be disproportionate, although in actual dollar amounts or dollar equivalents, the totals are very small.

Senator STEVENS. I am not quarreling with the grants. I am just asking if they really did compete with somebody. Did somebody compete with them in the application for those grants?

Dr. CHALLINOR. I will get that for you and explain that in detail.

Senator STEVENS. And if they didn't, again, my request to you is to consider asking for the money directly and not go through this device of setting up money into a separate foundation in order to——

Dr. RIPLEY. We would be happy to submit that.

Senator STEVENS. I don't recall that we have ever denied that.

[The information follows:]

SMITHSONIAN FOREIGN CURRENCY PROGRAM

Smithsonian Scholars Should Compete With Their Peers at Other Institutions for Research Grants

The Smithsonian feels strongly that Smithsonian employees should compete with their peers for use of funds under the Smithsonian Foreign Currency Program. The Smithsonian, as a consequence, does not seek a special foreign currency fund which would have the effect of protecting its scholars from the rigorous discipline of competition.

Smithsonian scholars are not provided funds from the budgets of their departments to cover their individual professional research. Grants to Smithsonian scholars like those to scholars at other research institutions, support field work undertaken with the permission of department chairman. Smithsonian employees must carry on such research to maintain their professional standing. In doing so, they also make substantial contributions to the collections and the public services of the United States National Museum.

Smithsonian employees receive no personal compensation from such grants, but receive funds to pay for travel and essential field expenses only. Most expend some of their personal resources in the process of bringing to publication the results of their research.

The process of making decisions to award foreign currency grants is the same for Smithsonian applicants as it is for those outside the Institution. This process, called "peer review", is practiced by the Smithsonian as it is practiced by other federal research grants programs. It involves the review of scholarly proposal by experts intimately familiar with the problems proposed for study and by advisory councils of scholars chosen from institutions across the country for their own achievements in the disciplines concerned. Each reviewer prepares a written critique of each proposal and rates each numerically, recommending for or against funding. Panel discussions seek a resolution of differences among reviewers and result in a summary recommendation to the Program. The Program seeks to fund each proposal receiving a favorable recommendation but when funds are insufficient supports projects in the order of the average of Council members' numerical ratings.

The record of Foreign Currency Program awards for FY 1976 and the Transition Quarter shows that some 63 awards totalling $1,108,626 equivalent were made to institutions other than the Smithsonian and that only 13 awards totalling $263,374 were made to the Smithsonian. Three of those Smithsonian awards under Museum Programs (nos. 33, 34 and 37 in the FY 1978 Foreign Currency Program Budget Justification) supported one project, the Festival of American Folklife. They were tabulated separately in the budget supplement because they concerned three separate foreign countries. These Folklife awards, supported the work of five scholars only one of whom was a Smithsonian employee; four other institutions were involved. Awards to the Smithsonian, like those to other grantees, frequently support teams composed of scholars from many institutions and not from the grantee institution alone.

In Fiscal Year 1977 thus far, 73 awards totalling almost $2,148,000 equivalent have been made for research to United States institutions other than the Smithsonian. Twelve awards for research totalling $279,000 equivalent have been made to the Smithsonian itself.

SMITHSONIAN FOREIGN CURRENCY PROGRAM

Non-Smithsonian Competitors for Research Funds
FY 1976 and Transition Quarter

ARCHEOLOGY AND RELATED DISCIPLINES

American Institute of Indian Studies, Chicago IL - Martha Ashton
American Institute of Indian Studies, Chicago IL- Edward Dimock (2 proposals)
American Institute of Indian Studies, Princeton NJ - Frank Bennett
American Museum of Natural History, New York NY - Walter Fairservis Jr. (2 proposals)
American Research Center in Egypt, Princeton NJ - Paul Walker
American University, Washington DC - Geoffrey Burkhart (AIIS)
Boston University, Boston MA - Gouri Banerjee (AIIS)
Brandeis University, Waltham MA - Marguerite Robinson (AIIS)
Brooklyn College, NY - Edward Ochsenschlager (ARCE)
Brooklyn Museum, NY - Bernard Bothmer (ARCE)
Brooklyn Museum, NY - Michael Botwinich (ARCE)
Brown University, Providence RI - Amy Catlin (AIIS)
California State College, Sonoma CA - Laxmi Tewari (AIIS)
Carleton College, Northfield MI - Russell Langworthy (AIIS)
Claremont Graduate School, CA - James Robinson (ARCE)
Colgate University, Hamilton NY - Warren Ramshaw (AIIS)
Columbia University, New York NY - David Gitomer (AIIS)
Columbia University, New York NY - Nathaniel Wander (AIIS)
Columbia University, New York NY - Alex Wayman (AIIS)
Dartmouth College, Hanover NH - Daniel Neuman (AIIS)
Dumbarton Oaks Center for Byzantine Studies - Margaret Alexander
Eastern Michigan University, Ann Arbor MI - John Hurd (AIIS)
Goerge Mason University, Annandale VA - Doris Srinivasan (AIIS)
Harvard University, Cambridge MA - Muhsin Mahdi and Dimitri Gutas (ARCE)
Harvard University, Cambridge MA - Sidney Schuler (AIIS)
Harvard University, Cambridge MA - William Smith (AIIS)
Harvard University, Cambridge MA - Gary Tubb (AIIS)
Kansas State University, Manhattan KA - Janet Benson (AIIS)
Kansas State University, Manhattan KA - Jeffrey Greenhut (AIIS)
Kansas State University, Manhattan KA - William Richter (AIIS)
Massachusetts Institute of Technology, Cambridge MA - Paul Kiparsky (AIIS)
New York University, NY - Donald P. Hansen (ARCE)
North Texas State University, Denton TX - T. R. Hays
Oakland University, Rochester MI - Carlo Coppola III (AIIS)
Ohio State University, Columbus OH - Constance Conway (AIIS)
Queens College, Flushing NY - Suzanne Hanchett (AIIS)
Southern Illinois University, Carbondale IL - Jananabrota Bhattacharyya (AIIS)
Southern Methodist University, Dallas TX - Angela Close
State University of New York, Binghamton NY - Gail Mirza (AIIS)
State University of New York, Binghamton NY - Edward J. Vander Velde Jr. (AIIS)
University of Alabama, University AL - Dattatreya Kulkarni (AIIS)
University of Arizona, Tucson AZ - Edwin Allen Richardson (AIIS)
University of California, Berkeley CA - Harold Arnold (AIIS)
University of California, Berkeley CA - George Dales
University of California, Berkeley CA - Richard Frasca (AIIS)
University of California, Berkeley CA - Lynne Hansen-Bede (AIIS)
University of California, Berkeley CA - Richard S. Kennedy (AIIS)
University of California, Davis CA - Faith Boucher (AIIS)
University of California, Los Angeles CA - Speros Vryonis (ARCE)
University of California, Los Angeles CA - Hemalata Weisblat (AIIS)
University of California, Santa Barbara CA - Gerald Larson (AIIS)
University of Chicago, IL - John Engler (AIIS)
University of Chicago, IL - Joan Erdman (AIIS)
University of Chicago, IL - Richard Herrell (AIIS)
University of Chicago, IL - Charles Lenth (AIIS)
University of Chicago, IL - James Lindholm (AIIS)
University of Chicago, IL - Choudri Naim (AIIS)
University of Chicago, IL - Whabiz Merchant (AIIS)
University of Chicago, IL - Donald Nelson (AIIS)
University of Chicago, IL - Carol Prindle (AIIS)
University of Chicago, IL - Frances Pritchett (AIIS)
University of Chicago, IL - Kathi L. Rose (AIIS)

SMITHSONIAN FOREIGN CURRENCY PROGRAM

Non-Smithsonian Competitors for Research Funds
FY 1976 and Transition Quarter

University of Chicago, IL - Kanika Sircar (AIIS)
University of Chicago, IL - Douglas Twells (AIIS)
University of Chicago, IL - Kent Weeks (ARCE)
University of Cincinnati, OH - Samuel Noe, Jr. (AIIS)
University of Cincinnati, OH - Barbara Ramusack (AIIS)
University of Denver, CO - Stephan Levitt (AIIS)
University of Floridan Gainesville FL - Gene R. Thursby (AIIS)
University of Kentucky, Lexington KY - W.Y. Adams (AIIS)
University of Louisville, KY - Stephanie Jernigan (AIIS)
University of Maryland, College Park MD - Charles Butterworth (ARCE)
University of Michigan, Ann Arbor MI - John H. Broomfield (AIIS)
University of Michigan, Ann Arbor MI - Kari Gluski (AIIS)
University of Minnesota, Minneapolis MN - Philip Engblom (AIIS)
University of Minnesota, Minneapolis MN - David Nelson (AIIS)
University of Minnesota, Minneapolis MN - Jennifer C. Post (AIIS)
University of Pennsylvania, Philadelphia PA - George Cardona (AIIS)
University of Pennsylvania, Philadelphia PA - Clifford Jones (AIIS)
University of Pennsylvania, Philadelphia PA - Richard Lariviere (AIIS)
University of Pennsylvania, Philadelphia PA - David O'Connor (AIIS)
University of Pennsylvania, Philadelphia PA - Donald Redford (ARCE)
University of Texas, Austin TX - Rex Edwards (AIIS)
University of Texas, Austin TX - Sandra Eveland (AIIS)
University of Texas, Austin TX - Gail Minault (AIIS)
University of Texas, Austin TX - Raymond Owens (AIIS)
University of Texas, Austin TX - Colleen Valenzuela (AIIS)
University of Utah, Salt Lake City UT - Bam Dev Sharda (AIIS)
University of Virginia, Charlottesville VA - Ruth Gabriel (AIIS)
University of Virginia, Charlottesville VA - Peter Hackett (AIIS)
University of Washington, Seattle WA - Margaret Nowak (AIIS)
University of Wisconsin, Madison WI - Joseph Brennig (AIIS)
Washington State University, Pullman WA - Fekri Hassan

SYSTEMATIC AND ENVIRONMENTAL BIOLOGY

Academy of Natural Sciences, Philadelphia PA - Thomas Uzzell and Chris Spolsky
Conservation Foundation, Washington DC - Phyllis Meyers
Duke University, Durham NC - William Culberson
Hawaii Institute of Marine Biology, Kaneohoe HI - Albert and Dora Banner
Southern Methodist University, Dallas TX - Bob Slaughter
Texas Tech University, Lubbock TX - Dilford Carter and J. Knox Jones
University of California, Berkely CA - Robert Ornduff
University of California, Riverside CA - John A. Moore
University of California, Santa Cruz CA - Kenneth Thimann
University of Maryland, College Park MD - Rita Colwell
University of Maryland, College Park MD - John Corliss
University of Michigan, Ann Arbor MI - J.B. Burch
University of Michigan, Ann Arbor MI - Philip Gingerich
Utah State University, Logan UT - Frederick Wagner

ASTROPHYSICS AND EARTH SCIENCES

Duke University, Durham NC - Orrin Pilkey
University of Chicago IL - David Schramm
University of Pennsylvania, Philadelphia PA - Henry Faul
University of Pennsylvania, Philadelphia PA - Robert Weeks

MUSEUM PROGRAMS

American Association of Museums, Washington DC - Grace Morley
Carnegie Museum of Natural History, Pittsburgh PA - James Swauger
Maryland Institute College of Art, Baltimore MD - Joseph Czestochowski

SMITHSONIAN FOREIGN CURRENCY PROGRAM

Non-Smithsonian Competitors for Research Funds
FY 1977 1/

ARCHEOLOGY AND RELATED DISCIPLINES

Amherst College, Amherst MA - Susan Lewandowski (AIIS)
American Institute for Indian Studies, Chicago IL - Barbara Aziz
American Institute for Indian Studies, Chicago IL - Frederick Asher
American Institute for Indian Studies, Chicago IL - Edward C. Dimock, Jr.
American Institute for Indian Studies, Chicago IL - Judith Gutman
American Museum of Natural History, New York, NY - Ruth and Stanley Freed
American Research Center in Egypt, Princeton NJ - Paul Walker
American Schools of Oriental Research, Cambridge MA - Philip King and Thomas Newman
American Schools of Oriental Research, Cambridge MA - Frank Cross and John Pedley
Brandeis University, Waltham MA - Marvin Davis (AIIS)
Brandeis University, Waltham MA - David Zilberman (AIIS)
Brown University, Providence RI - Ricardo Caminos
Brooklyn College, NY - Leonard Gordon (AIIS)
Brooklyn College, NY - Edward Ochsenschlager (ARCE)
Brooklyn Museum, NY - Bernard Bothmer (ARCE)
Claremont Graduate School, CA - James Robinson (ARCE)
Cleveland Museum of Art, OH - John Cooney and Arielle Kozloff
College of the Holy Cross, Worcester MA - Judith Blank (2 proposals-one AIIS)
Cornell University, Ithaca NY - Mary Katzenstein (AIIS)
Cornell University, Ithaca NY - Gerald Kelly (AIIS)
Davidson College, NC - Robert Kaylor (AIIS)
Dumbarton Oaks Center for Byzantine Studies, Washington DC - Margaret Alexander
Harvard University, Cambridge MA - Randall Michael (AIIS)
Indo-U.S Subcommission on Education and Culture, New York NY - Marshall Bouton
Johns Hopkins University, Baltimore MD - Hans Goedicke
Lebanon Valley College, Annville PA - Perry Troutman (AIIS)
New York University, NY - Donald P. Hansen (ARCE)
New York University, NY - Carol Radcliffe (AIIS)
Northern Michigan University, Marquette MI - Zacharias Thundy (AIIS)
Ohio State University, Columbus OH - Susan Buchanan (AIIS)
Oakland University, Rochester MI - Richard Tucker (AIIS)
Rutgers, the State University, New Brunswick NJ - Mary Carras (AIIS)
Rutgers, the State Univeristy, New Brunswick NJ - Rhoda Goldstein (AIIS)
Southern Methodist University, Dallas TX - Fred Wendorf
Temple University, Philadelphia PA - A. Sarma
University of Arizona, Tucson AZ - Robert Varady (AIIS)
University of Arizona, Tucson AZ - Evelyn Varady (AIIS)
University of California, Berkeley CA - Stuart Blackburn (AIIS)
University of California, Berkeley CA - James Ebin (AIIS)
University of California, Berkeley CA - George Hart (AIIS)
University of California, Berkeley CA - Mary-Ann Lutzker (AIIS)
University of California, Berkeley CA - Kent Weeks (ARCE)
University of California, Davis CA - Faith Boucher (AIIS)
University of California, Los Angeles CA - Jill Cogen (AIIS)
University of California, Los Angeles CA - Cynthia Dubin (AIIS)
University of California, Los Angeles CA - Speros Vryonis (ARCE)
University of California, San Diego CA - Frederick Bailey (AIIS)
University of Chicago, IL - Norman Cutler (AIIS)
University of Chicago, IL - Daniel Ehnbom (AIIS)
University of Chicago, IL - Pierce Gardner (AIIS)
University of Chicago, IL - Janet Johnson and Donald Whitcomb
University of Chicago, IL - Cynthia Livermore (AIIS)
University of Chicago, IL - Rekha Morris (AIIS)
University of Chicago, IL - Gloria Raheja (AIIS)
University of Chicago, IL - Kristine Rogers (AIIS)
University of Chicago, IL - Marsha Tajima (AIIS)
University of Chicago, IL - Douglas Twells (AIIS)
University of Chicago, IL - Louis Zabkar

1/ Estimated as of May 20, 1977

SMITHSONIAN FOREIGN CURRENCY PROGRAM

Non-Smithsonian Competitors for Research Funds
FY 1977 1/

University of Hawaii, Honolulu HI - Gerald Reardon (AIIS)
University of Hawaii, Honolulu HI - Lynette Wageman (AIIS)
University of Louisville, KY - Stephanie Jernigan
University of Maryland, College Park MD - Charles Butterworth (ARCE)
University of Michigan, Ann Arbor MI - Peter Granda (AIIS)
University of Michigan, Ann Arbor MI - Vishakha Walker (AIIS)
University of Minnesota, Minneapolis MN - Frederick Asher (AIIS)
University of Minnesota, Minneapolis MN - George Hoynacki (AIIS)
University of Minnesota, Minneapolis MN - Indira Junghare (AIIS)
University of Minnesota, Minneapolis MN - Rocky Miranda (AIIS)
University of Minnesota, Minneapolis MN - Ram Dayal Munda (AIIS)
University of Misaouri, Columbia MO - William Noble
University of Pennsylvania, Philadelphia PA - Helen Baig (AIIS)
University of Pennsylvania, Philadelphia PA - James Moore (AIIS)
University of Pennsylvania, Philadelphia PA - Eliot Stern (AIIS)
University of Pennsylvania, Philadelphia PA - Donald B. Redford (ARCE)
University of Pennsylvania, Philadelphia PA - Lise Vail (AIIS)
University of Pennsylvania, Philadelphia PA - Richard Young (AIIS)
University of Southern California, Los Angeles CA - Catherine Glynn (AIIS)
University of Texas, Austin TX - David Iglehart (AIIS)
University of Virginia, Charlottesville VA - Richard Barnett (AIIS)
University of Virginia, Charlottesville VA - Ruth Gabriel (AIIS)
University of Virginia, Charlottesville VA - Catherine Howell (AIIS)
University of Virginia, Charlottesville VA - Murray Milner (AIIS)
University of Washington, Seattle WA - Theodore Adams (AIIS)
University of Washington, Seattle WA - Frank Conlon (AIIS)
University of Washington, Seattle WA - Karen Lang (AIIS)
University of Wisconsin, Madison WI - Edward Bastian (AIIS)
University of Wisconsin, Madison WI - Joseph Elder
University of Wisconsin, Madison WI - Donald Johnson (AIIS)
University of Wisconsin, Madison WI - Robert and Beatrice Miller (AIIS)
University of Wisconsin, Madison WI - Leonard Zwilling (AIIS)
Vassar College, Poughkeepsie, NY - Walter Fairservis, Jr. (ARCE)
Washington State University, Pullman WA - Fekri Hassan
Yale University, New Haven CT - Susan Bean (AIIS)

SYSTEMATIC AND ENVIRONMENTAL BIOLOGY

Academy of Natural Sciences, Philadelphia PA - Thomas Uzzell
California Academy of Sciences, San Francisco CA - William Eschmeyer
California State University, Fullerton CA - James Dale Smith
Chicago Zoological Society, IL - Dale Osborn
Fort Hays Kansas State College, KN - Richard Zakrzewski
Howard University, Washington DC - S. Taseer Hussain
Los Angeles Natural History Museum, CA - Camm C. Swift
Texas Tech University, Lubbock TX - J. R. Goodin and David Northington
University of California, Berkeley CA - Donald Savage
University of Michigan, Ann Arbor MI - J. B. Burch
University of Michigan, Ann Arbor MI - Philip Gingerich
University of South Carolina, Columbia SC - Wade Batson
University of Toledo, OH - Harold Allen
University of Washington, Pullman WA - Donald Farner
Utah State University, Logan UT - Frederick Wagner
Yale University, New Haven CT - David Pilbeam
Yale University, New Haven CT - Elwyn Simons

ASTROPHYSICS AND EARTH SCIENCES

Ohio State University, Columbus OH - R. R. Wing
University of Chicago, IL - David Schramm and W. D. Arnett
University of Colorado, Boulder CO - John Van Couvering
University of Pennsylvania, Philadelphia PA - Henry Faul
University of Pennsylvania, Philadelphia PA - H. N. Kritikos

MUSEUM PROGRAMS

American Research Center in Egypt, Princeton NJ - Paul Walker
Association of Living Historical Farms and Agricultural Museums, Washington DC - G. Terry Sharrer
Brooklyn Museum, NY - Bernard Bothmer (ARCE)
Carnegie Museum of Natural History, Pittsburgh PA - James Swauger
Franklin Institute Science Museum, Philadelphia PA - James Harrington
Maryland Institute College of Art, Baltimore MD - Joseph Czestochowski
Southern Methodist University, Dallas TX - Bob H. Slaughter

1/ Estimated as of May 20, 1977

LOANS OF SMITHSONIAN OBJECTS

Senator STEVENS. Well, I have to go to another meeting, Dr. Ripley. We have some additional questions that we are putting off with regard to the matters that were discussed at the first hearing pending an opportunity to review them with the chairman and with Senator Jackson. I am sure that you are familiar with Senator Jackson's letter.

Let me ask you one question, though, about that. The Smithsonian does loan items to Members of Congress, I know, to put in their offices. It seems to me that I have seen some.

Do you have a loan program for items to private individuals or any private museums?

Dr. RIPLEY. No, not to private individuals. We do make loans for exhibitions and that sort of thing.

Senator STEVENS. I mean personal loans. Are any of these things in personal homes out in Washington or anywhere else?

Dr. RIPLEY. Not that I have ever been aware of. It has been traditional that the National Collection, for example, would loan objects to the White House, to the immediate surrounding executives of the White House and, from time to time, to the Supreme Court or Members of Congress.

Senator STEVENS. Yes. I have seen some from time to time. And it seems that I had something myself at one time, something that was related to Alaska and I have seen some things in the White House, too.

Dr. RIPLEY. These, of course, may come back and forth because we have the right under the law to act as the recipient of objects which are in the White House which may become——

Senator STEVENS. Well, the question asked me was whether you loaned them out to private individuals for use in their homes or to private corporations just for the purpose of exhibiting and not on the basis of loaning to another museum or to another institution. Are there any of these that are loaned? For instance, to Cabinet officers for their homes that they acquire here or any personal homes outside of the White House? I don't consider the White House a personal home.

Dr. RIPLEY. I am not sure whether or not we loaned an object in the past to the new home of the Vice President, Mr. Mondale.

Senator STEVENS. I would consider that to be a national home, too.

The statement was made to me that some individuals thought there were items from the Smithsonian in personal homes of employees here in this area.

Dr. RIPLEY. We would be very glad to know about it, Senator.

Senator STEVENS. I didn't know about it, but I don't think that is the policy, but I thought that I would ask you.

Dr. RIPLEY. It is not the policy.

ADDITIONAL QUESTIONS

Senator STEVENS. Thank you. We will submit additional questions.

[The following questions were not asked at the hearing, but were submitted to the department for responses subsequent to the hearing:]

Joseph Henry Papers

Question. Your justification mentions completion of the third volume of the Joseph Henry Papers, and supplemental work on a microfilm publication. How far are we from seeing the end of this project? Will there be additional requests in future years?

Answer. As currently planned, the Joseph Henry Papers project will entail a series of 15 scholarly volumes. Inasmuch as it has taken an average of approximately 16 months to prepare the first several volumes, one can safely say that this project will continue for a number of years yet. We would not foresee significant requests for further program increases unless the level of support we have been fortunate enough to enjoy from outside sources should cease--something we do not now anticipate.

Question. Will you reach a point in this effort where you can be supported solely by outside sources? I note that you currently have grants from the Humanities Endowment, the National Academy of Sciences and the National Historic Publications and Records Commission.

Answer. That is a goal that would be marvelous to achieve, but considering the question realistically, the answer would have to be no.

Museum of History and Technology

Question. Under the Museum of History and Technology you propose an increase of 5 positions and $211,000 for new space both at the museum proper and at the Arts and Industries building. Since you plan to keep these exhibits open and make use of the new space available, can we assume that this is a permanent increase?

Answer. Yes, this would be a permanent, as opposed to a one-time, increase.

Question. And the new positions and funding will give you all that is required? You will be up to full force?

Answer. Yes, this increase would give us the wherewithal to maintain these new exhibition spaces in an appropriate manner.

Archives of American Art Printing

Question. You are asking for $20,000 for printing of Archives publications. This would be in addition to the $25,000 available from trust fund sources, is that correct?

Answer. That is correct.

Question. Why can't you increase the amount from trust funds?

Answer. The trust funds of the Archives of American Art are raised largely through the untiring efforts of its Board of Trustees.

Unfortunately, however, fund raising has not kept pace with the rate of inflation. While it is anticipated that the Archives will be successful in raising a quarter of a million dollars again in fiscal year 1978, it has become clear that new projects, to the extent the Congress finds them as important and worthwhile as we do, will have to rely upon appropriated funds for their financing. This request for $20,000 for printing costs represents such a case.

Anacostia Neighborhood Museum

Question. You are proposing a new exhibit at the Anacostia Museum on Ancient African Kingdoms. Have you sought any private funding for this exhibit?

Answer. No, the Museum has not sought any private funding nor does it plan to seek such assistance. The $60,000 requested will enable us to cover all costs associated with the Ancient African Kingdoms exhibit.

Collections Management Study

Question. Under your Assistant Secretary for Museum Programs you are seeking an additional $40,000 for management study work related to the Museum Support Facility. If the study will be available in early fall, why do you need FY 1978 funding?

Answer. The Collections Policy and Management Study to be completed early this fall will gather and analyze a large quantity of information about existing practices and procedures of collections management, and will contain recommendations for consolidation, coordination, and refinement of these practices. It will not be possible during the time allocated for the study to develop all of the procedures needed to implement all of the recommendations to be contained in the final report. On the basis of the data already gathered, it is clear that continued effort will be required in the future to expand upon the information assembled and to develop methods to implement the recommendations as they apply to specific conditions in the Museum Support Center, and in the museums on the Mall. The $40,000 will be used in the coming fiscal year to support activities that will be necessary in this regard.

Question. You indicate that the $40,000 will also be used for printing and assembling the report. I thought that the $125,000 we gave you last year was the total cost for the study. What happened to cause an increase in your original estimate?

Answer. A portion of the existing budget of $125,000 for the Collections Policy and Management Study will be used for the developing and printing of the report. Even allowing for these expenditures, however, it does not appear at this moment that all of the $125,000 will be spent or obligated by the end of this fiscal year, and the unused portion cannot be carried over into FY 1978. Therefore, funds are requested for FY 1978 to permit continuity in the effort to refine and implement the report, as has been explained. A portion of the $40,000 request will be used to assemble additional and specialized data and to prepare supplementary reports.

Office of Horticulture

Question. Why did you move your horticultural services division from Plant Services to Museum Programs?

Answer. Horticultural activities at the Institution have come to play an increasingly important role in the exhibition programs of the Institution. Horticulture is an historic discipline with close ties to decorative and fine arts studies as well as to the botanical sciences which are centered in the National Museum of Natural History. Examples of these interrelationships and ties can be seen in the horticultural component of the 1876 Centennial Exhibit in the Arts and Industries Building and in the recently developed Victorian Garden adjacent to the Smithsonian Castle. As a discipline, horticulture possesses great potential for research and educational activities. Special tours and training programs centered on horticultural exhibits have been established as part of our services to the visiting public.

Although the Office of Horticulture will continue to maintain the grounds of the Institution, its exhibit, research and educational activities can be better developed and executed in close cooperation with other units of the Institution specializing in similar activities which are under the purview of the Office of Museum Programs.

Question. You already have a horticultural staff of 26 positions--what specific workload increases justify the 3 additional gardeners and the secretary contained in your request?

Answer. To maintain the horticultural exhibits in the Victorian Garden, and the interior plant and floral arrangements for a large number of exhibitions in the many galleries of the Institution, it is necessary that the Office of Horticulture propagate and transplant large quantities of flowers, create floral arrangements and provide necessary daily attention to all plant materials to assure proper growth and prevent loss. Assistance is needed in the greenhouse operations to assure the timely production of these plants, and assistance is needed on the grounds to enable the floral beds to be maintained properly. Clerical assistance is needed to support the office staff and to meet the increased typing requirements associated with the research, tour, and education activities undertaken by the Office of Horticulture.

Smithsonian Libraries

Question. For your libraries you are requesting 1 new position and $105,000 to improve cataloging, availability and acquisition of materials. With all the planned system improvements, why do you need another position?

Answer. The planned system improvements, while enhancing the Libraries' acquisition operations and reducing the cataloguing backlog are, in themselves, insufficient to eliminate completely the annual growth in uncatalogued volumes. Of approximately 14,000 volumes acquired each year which require cataloguing some 6,000 have not been catalogued by any other American library and therefore must have an original cataloguing performed by the senior professional library staff. Since the present staff is able to catalogue only approximately half of these

volumes, the uncatalogued backlog is increasing each year by 3,000. The position requested for FY 1978 would participate in the more routine cataloguing work, thereby freeing the professional staff to concentrate on the intellectual, time-consuming efforts required for full, original cataloguing.

Question. $10,000 of this amount is to upgrade your automated acquisitions system. Is the current system really that inadequate?

Answer. The present automated acquisition system was initiated in the mid-1960's. Currently, it cannot provide a number of management tools nor a number of products and data listings which would substantially enhance its service to users. Benefits and products which could be realized with the proposed system improvements include: a listing of current acquisitions, machine-produced notices to dealers and publishers of materials not received as well as automatic notices of material completed and ready for binding, computer printouts of the Libraries' serial holdings, full listing of free materials requested to monitor their receipt, the elimination of duplicate book orders and a purchasing cycle that can respond in a timely fashion to the needs of library users.

Traveling Exhibition Service

Question. For your traveling exhibit program you are proposing nearly a 100 percent increase in funding--from $104,000 to $206,000--and two additional permanent positions. Can't some of this increase be covered by rental charges?

Answer. Imposition of higher rental charges on SITES exhibits would defeat efforts to make at least 50 percent of these shows available to smaller museums for $200 or less. The increased Federal support requested will make it possible for SITES to increase the proportion of new shows which can be rented for under $200. A major goal of this program is to achieve the widest possible distribution of exhibitions. This cannot be accomplished without keeping rental costs within the reach of the hundreds of smaller institutions which make enthusiastic use of them. This increase will also make it possible for SITES to produce more new shows based on Smithsonian collections.

Question. What do you fund with rental fees and gifts? Does that money pay for any positions?

Answer. All income derived from rental fees and all income from grant sources is applied to the development of new exhibits or to refurbishing established exhibits for continued circulation. Such income pays not only for positions, but for other production costs including design and material expenses associated with the production of new shows. Fourteen permanent positions are supported by rental income.

Question. Why don't you give us a breakdown for the record showing the private and federal support for the traveling exhibit program, and detail the uses of these funds. Include positions funded from both sources.

Answer. The following information details the private and federal support of the Traveling Exhibition Service in FY 1977.

Federal Base FY 1977--$104,000

Funds available to SITES in its federal base are used to support personnel charged with central core functions for management of all SITES operations and for development of exhibitions initiated by SITES and drawn from Smithsonian collections.

Six positions are supported by the federal base at a cost of $93,000, an amount of $9,000 is used primarily to cover initial shipping and insurance costs, and some $2,000 is applied to necessary travel associated with the program. In addition to SITES federal base, in FY 1977 some $18,000 in Smithsonian Bicentennial funds has been made available for costs associated in closing down special Bicentennial activity.

Personnel Funded from Federal Base (as of May 1, 1977)
Full-time Permanent (6)
- Administrative Officer GS-12
- Registrar GS-7
- Shipping Coordinator GS-6
- Education Coordinator GS-9
- Exhibits Specialist GS-7
- Exhibits Specialist GS-5

Grants and Contracts--$512,000 to date

Funds received through grants and contracts are used to design, produce, package, and insure new exhibitions.

Personnel Funded from Grants and Contracts--ARBA (as of May 1, 1977)
Full-time Permanent (2)
- International Program Coordinator IS-13
- Exhibits/Public Relations Coordinator IS-9

Temporary (1): Clerk-typist IS-4

The following list itemizes the grants and contracts received by SITES during FY 1977, with the source, amount, and exhibits developed or to be developed with these funds.

Source	Year	Exhibitions
American Revolution Bicentennial Administration	1977 $154,000	Personnel costs, $55,000; production costs, $49,000; and shipping and insurance costs, $50,000 for: Folk Woodcuts from Brazil's Northeast Belgian Gunmaking and American History (Belgium) Twenty-two Polish Textile Artists Silverworks from Rio de la Plata (Argentina) The Human Form (Wotruba)(Austria) Hungarian Art Nouveau Salzberg Festspiele! (Austria)

Source	Year	Exhibitions
National Science Foundation	1977 $28,000	Production costs only, for the following exhibits: Pollution Energy Ecology
Office of Coastal Zone Management	1977 $315,000	Production costs only, for "It's Your Coast". Four Exhibitions: 1-N.E. Coast 2-Mid-Atlantic & S.E. Coasts 3-Gulf Coast 4-Great Lakes
National Endowment for the Arts	1977 $15,000	Production costs only for: America's Architectural Heritage (3 copies)

Rental Income--$430,000 (estimated)

This income is used for the support of 14 positions at a cost of $248,000. These positions coordinate and develop new exhibits, prepare related educational material, and coordinate and monitor tours of existing shows currently on the road. The balance of rental income is used for contracts for design, research, photography, editing, and graphics services; for travel; for preparation of the catalogue and newsletter to promote and advertise the shows; and for insurance and shipping.

Personnel Funded from Rental Income as of May 1, 1977)

Full-time permanent (14)

- Director IS-15
- Program Officer IS-12
- History Coordinator IS-11
- Exhibit Coordinator IS-11
- Science Coordinator IS-9
- Science Coordinator IS-7
- Scheduling Coordinator IS-5
- Accountant IS-7
- 2 Clerk Receptionists IS-4
- 2 Exhibit Coordinator IS-9
- Educational Coordinator IS-9
- Exhibits Coordinator IS-7

Temporary (2)

- Editorial Assistant IS-7
- Clerk IS-4

Folklife Studies

Question. Under American and Folklife Studies you are proposing a large increase--from $133,000 currently available to $233,000. We will require additional information on this increase. For example, with no increase in positions why should travel jump from $1,000 to $4,000?

Answer. Approximately one-third of the requested increase of $100,000 would finance the Smithsonian's share of a proposed tri-partite outreach program the outlines of which have been agreed to by the new American

Folklife Center of the Library of Congress, the National Endowment for the Arts, and the Smithsonian. In brief, the three organizations will cooperate in establishing a program to involve a local community within the United States in the creation of a folklife festival program modelled on the Smithsonian's annual Festival of American Folklife. The requested increase in travel authority will help fund the travel costs associated with this program.

Question. The justification is not very specific in other areas. Please provide a detailed breakdown of the $30,000 increase for contracing as well as the large increases in supplies, equipment, and printing, and submit that breakdown for the record.

Answer. We currently plan that the Folklife Unit will have three principal tasks in Fiscal Year 1978: folklife festival preparation, continued research and publication, and cooperative work toward the joint outreach program described above. A breakdown of the requested increase for contracting, supplies, equipment, and printing between these activities would be as follows:

	Folklife Festival	Research & Publication	Outreach Program	Total
Contracting	--	$11,000	$19,000	$30,000
Supplies	$20,000	1,000	1,000	22,000
Equipment	--	5,000	5,000	10,000
Printing	10,000	13,000	2,000	25,000

Principal contracting activities would be for processing and editing film, preparation of recordings and, for the Outreach Program, securing the services of field research specialists. Supplies, almost entirely for the Folklife Festival, would include all the production materials necessary for mounting of the Festival, from lumber and canvas to the materials needed by the practicing craftsmen to demonstrate their skills. Equipment costs, divided evenly between the research and publication activity and the proposed outreach program, would be for tape recording and playback equipment required for proper audio documentation and subsequent research. And the requested printing funds would support the publication of festival brochures, monographs, and research findings.

Office of the General Counsel

Question. Under the General Counsel's Office you have $15,000 earmarked for several things--supplies, law library maintenance, seminar attendance. I wonder if you could provide us with a more specific breakdown for the record.

Answer. The Office of the General Counsel is requesting an increase of $15,000 in Fiscal Year 1978 for the following "other object" classes:

Rent, Communications & Utilities (including the lease of a copying machine used extensively in the daily operations of the OGC and as an adjunct to the law library facility; messenger service for the daily delivery of the Congressional Record and urgent intracity deliveries; telegrams, cables, and international calls).....$3,000

Other Services (including staff attendance of legal seminars on such matters as administrative procedures, employee-management relations, contracts, civil rights; and repair of typewriters and other office equipment).....$4,000

Supplies and Materials (including subscriptions for such periodicals as U.S. Law Week, Fair Labor Practice Manual, Congressional Index, Congressional Quarterly; as well as office supplies and materials necessary in the daily operations of the OGC)..... 5,000

Equipment (including purchase of books for the permanent law library collection; and replacement of worn-out equipment)..... 3,000
$15,000

Treasurer's Office

Question. You have $30,000 under the Treasurer's Office for additional computer time to keep pace with expanding accounting needs. With a new system to modernize the accounting process we wonder why you need ever-increasing computer time. How much in total will be spent on computer usage by the Treasurer's office?

Answer. Computer time includes the cost of data processing, paper, and microfilming. While the new system has improved the accounting process, the product (monthly financial and statistical reports to all levels of management) is more in demand. The cost of computer useage for FY 1978 is projected to be $100,000.

Question. Have you compared the cost of the new system with the old way of doing things?

Answer. The new system is a part of an accounting improvement program initiated several years ago. Heretofore, the accounting system consisted of an automated allotment ledger and manually maintained general ledger and other records. Through increased computer use the Treasurer's Office, which includes the Accounting Division and the Office of Programming and Budget, has been able to meet the demands of a growing Institution while holding down increases in its own staff. For example, since Fiscal Year 1973 while the federal operating budget has increased by almost 75 percent and the number of employees has increased by 25 percent, the staff of the Treasurer's Office has increased by only one, from 35 to 36 employees.

Question. Is the new method cost-saving?

Answer. We believe the new system will produce cost savings by enabling us to hold the line on employment within the Treasurer's Office and to provide better financial management within the Institution.

Personnel Administration

Question. You are asking for $45,000 under Personnel Administration, and again you provide a list of things you propose to accomplish with the increased funding. How much will go for employee training?

Answer. Of the requested increase of $45,000, $4,000 will be used for additional employee training.

Question. Why don't you give us a detailed breakdown of the full $45,000 increase requested for the record.

Answer. The $45,000 increase breaks down as follows:

Employee training	$4,000
Rental of larger capacity photocopier	1,000
Purchase of reprints of Civil Service Commission standards and regulations	2,000
Supplies and materials and computer useage	16,000
Salary costs of existing staff	22,000
	$45,000

Management Analysis Office

Question. You want $28,000 and one new position for the Management Analysis Office. How many people are already in this Office?

Answer. The Office currently has 10 federal and 2 trust fund employees.

Question. The additional funding, some $8,000, is to provide supplies and a duplicating machine for the Office since it has moved. Where are your management people located if not on the Mall?

Answer. Our Management Analysis Office is located in space at L'Enfant Plaza, a distance of two city blocks from the Mall. Several of our central support units, such as the Office of Supply Services and the Accounting Division, are also located in space at L'Enfant Plaza.

Security System

Question. You are asking for another $100,000 to continue conversion to a Smithsonian-owned security system. You mention an additional $400,000 will be required to complete the conversion. When do you plan to request the remaining funding?

Answer. A request for additional funding will not be necessary. If the $100,000 request is approved for FY 1978, the base for Protection Services will then contain adequate funding for conversion to a Smithsonian-owned security system by FY 1982.

Question. How many buildings will be covered by the system by the end of FY 1978?

Answer. If the additional $100,000 is approved, by the end of FY 1978, we expect to have 5 buildings covered, including the Arts and Industries Building, the Smithsonian Institution Building, the Freer Gallery of Art, the History and Technology Building, and the Natural History Building. While certain components of the system will be installed in our other buildings, we will still be dependent upon ADT and its computer for notification of problems in those buildings. The remaining buildings will be phased into our system each year with our total Smithsonian-owned security system completed by FY 1982.

Space Requirements

Question. I notice from your statement that you are asking for an increase of $78,000 to pay for higher rental rates at L'Enfant Plaza and 1111 North Capital Street. How much in total do you pay for rent at buildings other than those on the Mall?

Answer. Currently, the Institution's total space rental program costs $2,172,766. This includes $1,568,076 of Federal appropriated funds and $604,690 of contract and grant and other trust funds. These rentals include among others the Smithsonian Astrophysical Observatory at Cambridge, Massachusetts and Mt. Hopkins, Arizona and the Smithsonian Magazine and the Archives of American Art in New York City.

Question. What offices or bureaus are located at these sites?

Answer. The following offices and bureaus are located at sites off the Mall:

Oceanographic Sorting Center
Navy Yard, Washington, D.C.
Archives of American Art
41 East 65th Street, New York, New York
87 Mt. Vernon Street, Boston, Massachusetts
Radiation Biology Laboratory
Rockville, Maryland
Anacostia Neighborhood Museum
Anacostia, Washington, D.C.
Smithsonian (various administrative activities)
L'Enfant Plaza, Washington, D.C.
Smithsonian Service Center (various program, storage, and distribution activities)
1111 North Capital Street
Washington, D.C.
Smithsonian Astrophysical Observatory
60 Garden Street, Cambridge, Massachusetts
New England Storage Co., Boston, Massachusetts
185 Alewife Parkway, Cambridge, Massachusetts
Summerville, Massachusetts (storage)
Mt. Hopkins, Arizona
Smithsonian Magazine
Graybar Building, New York, New York
Science Information Exchange
Madison Bank Building, Washington, D.C.
Interdisciplinary Communications Program
1717 Massachusetts Avenue, NW, Washington, D.C.
Smithsonian Tropical Research Institute
Ancan Building, Canal Zone
National Portrait Gallery
1525 S. Andrews Avenue, Fort Lauderdale, Florida
Fort Pierce Bureau
St. Lucie County, Florida
Horticultural Services, Old Soldiers Home, Washington, D.C.

Question. With all the building in the Smithsonian, why is it that you require additional space in private buildings?

Answer. The Smithsonian presently occupies approximately 2,956,000 net useable square feet of space in museums, galleries, and other owned facilities in the Washington metropolitan area. This includes about 2,131,000 square feet of exhibits and collections storage space

and 825,000 square feet of office, laboratory, and other work space.

Over the years, the growth of collections, exhibitions, and other educational programs has steadily reduced the space originally available in our public buildings for office and laboratory purposes. The Institution has long relied upon rental space to alleviate this situation and in the past four years has completed a consolidation of rental space and created an administrative focus for better management of these resources.

Question. Give us a breakdown for the record showing what offices are located in private buildings in the Washington area, and how much space they occupy, and what functions they perform. Provide the annual rental rates in each case.

Answer. The following information breaks down offices located in private buildings in the Washington area:

Location	Space Occupied (sq.ft.)	Function	FY 1977 Annual Rent
Navy Yard, Washington, D.C.	42,000	Oceanographic Sorting Center	$229,668
Rockville, Maryland	40,000	Radiation Biology Laboratory	254,000
Anacostia, Washington, D.C.	15,000	Anacostia Neighborhood Museum	18,600
Madison Bank Bldg Washington, D.C.	16,300	Science Information Exchange	120,800
1717 Mass. Ave., Washington, D.C.	5,150	Interdisciplinary Communications Program	4,500
L'Enfant Plaza Washington, D.C.	50,000	Facilities Planning & Engineering Office of Supply (procurement) Svcs Grants & Insurance Administration Office of Audits Office of International Activities Smithsonian Research Foundation Accounting Division Natl Anthropological Film Center Institute on Immigration & Ethnic Studies Division of Performing Arts Folklife Program Management Analysis Office Reading is Fundamental	404,000
Smithsonian Service Center 1111 North Capital Street Washington, D.C.	160,000	Office of Plant Services Office of Supply Services	397,600

Location	Space Occupied (sq.ft.)	Function	FY 1977 Annual Rent
Service Center (cont'd)		GPO Print Shop Duplicating Services Fulfillment Center Museum Shops Inventory Center Internatl Exchange Service Office of Exhibits Central Smithsonian Press Archives of American Art Natl Collection of Fine Arts Office of Protection Services Smithsonian Archives Collections Storage Other Storage	
Old Soldiers Home Washington, D.C. (greenhouses)	30,000	Horticultural Services	13,000
TOTALS	358,450		$1,442,168

Elevator Contract

Question. The Committee has received a letter from the Comptroller General concerning sole source procurement of elevator and escalator repair and maintenance contracts. How much of your federal contracting money is awarded on a negotiated basis rather than on competitive bid basis?

Answer. In FY 1976, all federal procurement actions totaled $38,649,506. Of this amount $1,121,780 (3 percent) were negotiated sole source under authority 41 U.S.C. 252 (c)(10)(1), and $24,051,796 (62 percent) were competitively negotiated under authority 41 U.S.C. 252 (c)(3), P.L. 93-356. The remaining amount of $13,475,930 (35 percent) was formally advertised.

Special Foreign Currency Program

Temples of Philae

Question. You indicate that $1 million is for the last of four payments to preserve the Temples of Philae in Egypt. Do you anticipate any further funding requests in this area?

Answer. No. Current estimates are that the total cost of the project will be met with 1) the completion in FY 1978 of a United States contribution of $4,000,000, 2) contributions from other nations now totalling about $11,000,000, and 3) a contribution from the Egyptians who have pledged up to one-third of the total cost now estimated to be about $21,000,000.

Multi-year Concept

Question. Of the remaining $3.5 million, you state that $1 million will be for new initiatives and $2.5 million will be to continue ongoing work. Will that $1 million for new programs eventually fall into the "continuing" category?

Answer. Some part of the $1 million for new initiatives might well support programs which would eventually fall into the continuing category depending on a number of factors. The principal ones are the advice of the advisory councils concerning support for both new and ongoing projects and the amount of money available to the Program.

The FY 1978 request includes funds sufficient to permit some multi-year funding of demonstrably well-managed projects. Multi-year funding would remove such projects from the "continuing category"; and, as a rule, funds would not be requested in subsequent years to support such projects.

The mix of projects supported by the Program changes from year to year. For example, it is currently estimated that 10 new multi-year projects known to be in the planning stage will be submitted for funding from the FY 1978 appropriation. On the other hand, four ongoing, multi-year projects are expected to terminate with final awards made from those funds, while 19 current multi-year projects will continue. In addition, 12 one-year projects are currently expected to seek funding next year. Of course, there are always a number of meritorious proposals that are not anticipated as well as a varying number of first-rate fellowship applications.

Question. Most of this funding, then, will be directed to continuing ongoing work. What happens if the request is not granted? Would you divert some of the funds to new efforts or merely continue the ongoing work?

Answer. Ongoing work, determined by the Program's annual scholarly review to be progressing satisfactorily, would normally take priority over new projects in the allocation of the excess foreign currency appropriation. In FY 1977, however, because of the lively demand, project budgets, both ongoing and new, have been reduced proportionately across the board in order that particularly meritorious new projects might receive support. Some of these projects have been postponed for lack of funds the previous year.

Cooper-Hewitt

Question. Please supply for the record the total federal funding going to the Cooper-Hewitt in 1977 and in your 1978 program. We want figures comparable to those in the GAO report.

Answer. The total federal funding for Cooper-Hewitt in 1977 and in 1978 is as follows:

Cooper-Hewitt Museum
Appropriated Funds

($ thousands)

Fiscal Year	Operating Funds/1	Bldg. Renovation
1977 (Est.)	$ 608.0	$80.0
1978 (Est.)	636.0	-
Total	$1,244.0	$80.0

/1 Includes amounts from Smithsonian centralized units (Libraries and Protection) which will be obligated on behalf of the Cooper-Hewitt Museum.

Chesapeake Bay Center

Question. What is the total of all federal funding programmed for the bay center in 1978?

Answer. The total of all federal funding is as follows:

Chesapeake Bay Center for
Environmental Studies
Fiscal Year 1978 (Est.)

Object Class	Appropriated Funds/1	Federal Research Grants
Salaries and benefits	$520,500	$388,900
Travel	8,000	6,500
Transportation of things	-	-
Rent, communication, utilities	44,100	-
Printing	5,000	-
Other services	35,000	177,90(
Supplies and materials	44,800	79,0(
Equipment	43,000	67,700
Construction	-	-
	$700,400	$720,000

/1 Includes funds requested for the International Environmental Science Program which will be used to carry out studies at the Chesapeake Bay Center.

Question. We noted a news story last year that the Smithsonian is considering taking measures to prevent the further erosion and disappearance of Poplar Island. Where does that stand?

Answer. The Smithsonian has been considering measures to prevent further erosion of Poplar Island for the past five years. We have not solicited proposals or suggestions, yet many companies have approached us with ideas. The latest proposal includes making use of bailing wire tied around tires to stop erosion. In all cases the proposals have been in our opinion too costly. We continue to have discussions on how to meet this problem economically.

Question. Can we assume the Smithsonian will seek advance approval of the Committee before undertaking any significant preservation program on this island that might involve a federal commitment?

Answer. Yes, we would certainly seek the Committee's advance approval before undertaking such a program.

Question. How much did Smithsonian pay in total for the sailboat that was later sold for $3,750, and why was it acquired in the first place?

Answer. In 1965, the Smithsonian purchased for $124,000 a remainder interest in 17.5 acres of land known as Corn Island. This property was considered essential to the CBCES land acquisition program since it separated two larger parcels already being acquired and also fronted on the extensive marsh area of the Rhode River. The owners at the time were unwilling to sell the property outright, which was appraised at $315,000 by a professional appraiser, but wished to retain the right to live on the Island for the balance of their lives. The consideration paid by the Smithsonian for this interest was $25,000 to the owners, as well as the assumption of a $68,000 mortgage on the house and a $30,300 chattel mortgage on a 36 foot yawl, the "Ellida." The assumption of this latter mortgage, and therefore the acquisition of the yawl, was a necessary condition of the land transaction, required by the owner; this total arrangement was extremely advantageous to the Institution, which obtained control over this key portion of land at relatively low cost.

Question. Were any federal funds used in the Chesapeake Bay Center acquisition?

Answer. No federal funds have been used in the acquisition of land at the Chesapeake Bay Center; purchase moneys have come from foundation grants as well as unrestricted trust funds.

Question. Also on Chesapeake Bay, there has been some adverse attention given recently to the methods used by the Smithsonian to acquire and manage its bay research center lands on the Rhode River. The Committee is aware of a recent press release issued by the Smithsonian on the subject and invites you to include that in the hearing record.

Answer. The news release has been supplied for the record.

THE FACTS BEHIND SMITHSONIAN'S LAND ACQUISITIONS IN BAY AREA

"Residents of Maryland Bay Area Subsidized by Smithsonian," exclaimed the two column, front-page headline in the Washington Post for Monday, February 28.

There followed a lengthy article by Charles A. Krause, a Post reporter, centered about the Smithsonian Institution's efforts to assemble 2,600 acres of land for the Chesapeake Bay Center for Environmental Studies, one of the world's leading ecological research centers.

The article charged that the Smithsonian has in effect "created a vast subsidized housing and farming preserve" along the shores of the Chesapeake Bay in the "name of land conservation, science and the environment."

This conclusion is untrue, exaggerated and misleading. We believe it necessary to provide the facts in considerable detail to set the record straight. The truth is that the "vast subsidized housing and farming preserve" discovered by the Post involves only a few rural homes and certain related occupancy rights retained by the owners in the conditions of sale to the Smithsonian.

The Smithsonian is not subsidizing any former owners of land purchased to establish the Center. In two cases, involving only 93.5 acres, the sellers offered only to sell to the Institution what are known in real estate terms as "remainder interests" under which they received life tenancy agreements. Long range, full-title will be held by the Smithsonian. Generally, the Smithsonian paid less than market value for the lands acquired to set up the Center.

A considerable portion of the article concerns the 17.5 acre property purchased by the Smithsonian in 1965 from Ernest N. Cory, Jr., known as Corn Island. Missing from the article is the fact, given to the Post reporter, that the Cory property, including a large modern house, had been valued at $314,000 by a professional appraiser. The price paid by the Smithsonian for the remainder interest, which was all that Mr. Cory would sell at the time, was $124,000, or nearly $200,000 less than the appraised value. Instead of applauding the Smithsonian for acquiring land at relatively low-cost for conservation and research purposes, the article suggests that the Institution "lost" approximately $26,000 on the deal when a yawl acquired from Mr. Cory as a condition of sale, was sold

two years after it was purchased. Incidentally, the 60-year old, 36-foot long, wooden yawl was not a 100 foot yacht as reported. This boat was later sold for $3,750.

The article goes on to state that the Smithsonian, in acquiring properties for the Chesapeake Bay Center for Environmental Studies, has "allowed former owners to farm for free," and in two cases agreed to "let former owners live free of charge in their former manor houses until their deaths."

It should be stressed that these arrangements were both legal and to the continuing advantage of the Smithsonian. The Smithsonian was fortunate to obtain the property since the owners at the time wanted to assure the preservation of Corn Island in its natural state, which tied in with the plans for the newly-developing Chesapeake Bay Center. This property separated two larger parcels that the Smithsonian already was acquiring. In addition, because the Cory property fronts on the extensive marsh area of the Rhode River, it was thus considered essential that Corn Island be acquired both for preservation as a part of the Chesapeake Bay Center and to insure the integrity of that particular land unit. However, the Corys also wished to continue to live on the island for the balance of their lives. So, the owners offered to sell to the Smithsonian only the right to ownership of the island upon the death of the survivor of either Mr. or Mrs. Cory.

For the benefit of their children, they also required that the Smithsonian could not assume full ownership until after a fixed period of 20 years (1985) even if both Mr. and Mrs. Cory died before the expiration of 20 years.

Mr. and Mrs. Cory wished to make a gift to the Smithsonian of a significant portion of the property; however, they could not afford to make a gift of the total remainder interest. The Corys agreed to accept $25,000, and the assumption by the Smithsonian of two mortgages: one for $68,000 covering the house; and the other for approximately $30,000 for the yawl, the "Ellida."

The Smithsonian's other purchase of the right to ownership after

the owner's death was from Mr. Eric Steinlein, then in his 60's, in 1971. Mr. Steinlein held ownership of approximately 76 acres that also bordered the Rhode River and was between two properties already a part of the Chesapeake Bay Center. Mr. Steinlein would only offer to sell ownership rights commencing three years after his death or the death of his wife, Margaret Steinlein, (now deceased). Mr. Steinlein was not in a position to make any gift to the Smithsonian, and the lowest price he would agree to was $120,000. The frame house occupied by Mr. Steinlein was appraised at $12,000 in 1970; the price for the remainder interest in the land was approximately $1,500 per acre.

The article states that the Smithsonian has permitted former owners to farm free of charge on properties of the Chesapeake Bay Center. No former owners of property acquired by the Smithsonian at the Center are farming on the Center's property. At present, three individuals farm approximately 270 acres of the Center's 1,700-acre land holdings. It has been the Smithsonian's intent to maintain this acreage in an active agricultural state so such land uses may be contrasted with old fields, mature forests and residential areas. Arrangements were made with these three farmers so the Smithsonian would not have to employ staff or purchase equipment required for farming.

The Smithsonian Institution's Chesapeake Bay Center for Environmental Studies is one of the nation's leading scientific and educational research facilities in ecological management and understanding.

The Smithsonian has worked closely with the University of Maryland, Johns Hopkins University, and the Virginia Institute of Marine Sciences in developing this regional and national center. Funding for activities at the Center has been received from 10 major philanthropic foundations which have provided approximately $1.5 million towards this endeavor. Also, such government agencies concerned with the environment as the National Science Foundation and the Environmental Protection Agency have provided grants for various research projects at the Center. In virtually every case, site committees appointed by these agencies or foundations reviewed the relevant activities at the Center and found them to be worthy

of support. In addition, programs at the Center have been reviewed periodically by the Smithsonian's administration and have been found to be consistent with the Institution's scientific research policy.

Through the years, the appropriate committees of the U.S. Congress have been advised on a regular basis of the programs and plans for the Chesapeake Bay Center. The Smithsonian's proposed budget for Fiscal Year 1978, on which hearings will be held during the month of March before House and Senate subcommittees, requests an appropriation of approximately $600,000 for operating expenses at the Chesapeake Bay Center.

As an institution concerned with the increase and diffusion of knowledge among mankind, the Smithsonian, of course, also is conscious of the need for accuracy and responsibility in reports of its activities in many and diverse academic disciplines.

I believe that a careful analysis of all of the facts by media representatives would clearly demonstrate a continuing record of legal and business-like steps to acquire property for the significant scientific research and educational purposes at the Chesapeake Bay Center.

CONCLUSION OF HEARINGS

Senator STEVENS. And we may get back to you after we have had the discussion with the chairman concerning Senator Jackson's letter.

The subcommittee will recess subject to the call of the chairman. Thank you.

[Whereupon, at 10:25 a.m., Tuesday, May 3, the hearings were concluded and the subcommittee was recessed to reconvene at the call of the Chair.]

LIST OF WITNESSES AND PREPARED STATEMENTS

A

Page

Anderson, Leon H., Director, Human Resource Programs, Forest Service 2517
Ault, Richard L., Director of Support Activities, Smithsonian Institution 3095, 3143

B

Blitzer, Charles, Assistant Secretary for History and Art, Smithsonian Institution 3905, 3906, 3139
Buckman, Robert E., Deputy Chief, Research, Forest Service. 2517, 2556

C

Christie, John D., Assistant Administrator, Energy Information and Analysis, Federal Energy Administration 2627
Challinor, David, Assistant Secretary for Science, Smithsonisn Institution 3095, 3109, 3113
Cutler, M. Rupert, Assistant Secretary for Conservation, Research and Education, Department of Agriculture 2517
Comments 2566
Statement 2525

D

Dewhurst, Stephen B., Deputy Director for Budget, Forest Service. 2517

E

Euell, Julian T., Assistant Secretary for Public Service, Smithsonian Institution 3095, 3099

F

Fri, Robert W., Acting Administrator, Energy Research and Development Administration 2801
Prepared statement 2803

G

Greer, M. C., Controller, Energy Research and Development Administration 2801, 2943

H

Page

Hanfling, Robert I., Acting Assistant Administrator, Energy Resource Development, Federal Energy Administration 2627
Harvey, Gordon W., Acting Assistant Deputy Assistant Administrator, Compliance, Regulatory Programs, Federal Energy Administration 2627
Hindle, Brooke, Director, National Museum of History and Technology, Smithsonian Institution 3095, 3105
House, Barton R., Acting Deputy Administrator, Regulatory Programs, Federal Energy Administration 2627
Howell, Martin D., Associate Administrator, Management, Federal Energy Administration 2627, 3719

J

Jameson, John F., Assistant Secretary for Administration, Smithsonian Institution 3095, 3114, 3137

L

Luedtke, Peter, Acting Deputy General Counsel, Federal Energy Administration 2627

Mc

McGuire, John R., Chief, Forest Service 2517
Statement 2526

M

Manella, Gene G., Acting Assistant Administrator for Conservation, Energy Research and Development Administration 2801, 2883, 2943

N

Nelson, Thomas C., Deputy Chief, National Forest System, Forest Service 2517, 2547
Noel, Thomas E., Assistant Administrator, Strategic Petroleum Reserve, Federal Energy Administration 2627, 2729

O

O'Leary, John F., Administrator, Federal Energy Administration .. 2627
Justification and prepared statement 2629

P

Perrot, Paul N., Assistant Secretary for Museum Programs, Smithsonian Institution 3095, 3110
Peterson, R. Max, Deputy Chief, Programs and Legislation, Forest Service 2517
Powers, Peter G., General Counsel, Smithsonian Institution 3095

R

Page

Resler, Rexford A., Associate Chief, Forest Service . 2517, 2547, 2564
Reed, Theodore H., Director, National Zoological Park 3095, 3102, 3120
Ripley, S. Dillon, Secretary, Smithsonian Institution 3095
Seneca, Martin, Jr., Acting Assistant Administrator, Energy Conservation and Environment, Federal Energy Administration 2627, 2754

T

Thornton, Philip L., Deputy Chief, State and Private Forestry, Forest Service 2517, 2549

W

Wheller, T. Ames, Treasurer, Smithsonian Institution 3095
White, Dr. Philip C., Assistant Administrator for Fossil Energy, Energy Research and Development Administration 2801, 2882
Willis, Dr. Eric, Assistant Administrator for Institutional Relations, Energy Research and Development Administration 2801

Y

Yellin, Jon E., Director, Office of Programing and Budget, Smithsonian Institution 3095, 3119

SUBJECT INDEX

A

Page

Alpine Lakes 2581

E

ERD (Office of Energy Resource Development, FEA)
ERDA (Energy Research and Development Administration)
Energy Research and Development Administration 2801
  Alternative fuels 2928
  Authorizations 2900
  Biomass combustion studies 2880
  Biomass priorities 2880
  Biomass program specifics 2881
  Budget:
    Amendments and reprograming 2853
    Conservation 2949
    Energy plans demands 2945
    New proposals 2868
    Presidential goals, relating to 2950
    Priorities 2922
    Request 2801, 2850
  Budget Reform Act, compliance with 2909
  Coal:
    Conversion 2948
    Gasification:
      First-generation 2893
      Future role 2888
      High-Btu 2887, 2890
      Potential commercialization 2891
      Prospects 2892
    Impact of prices 2915
    Liquification plants 2914
    Prices of oil and gas products from 2915
    Process pilot plants 2911
    Program priorities 2948
    Pyrolysis 2893
    Reliance on 2943
  Conservation:
    Budget 2949
    Educational facilities 2884
    Highlights 2851
    Major achievements 2957

Energy Research and Development Administration -- continued: Page
Savings through technology 2949
Synthetic fuel 2873
Demand growth and import projections 2942
Demonstration plant schedule 2912
Devonian Shale 2938
Donor solvent liquefaction process 2896
ERDA fluidized bed programs 2897
Economjc stimulation 2940
Educational facilities, conservation in 2884
Electric motor, new energy efficient 2958
Energy:
Department of 2900
Economics of goals 2873
Growth reduced 2873
Pricing structure proposed 2894
Unemployment implications of the plan 2874
Enhanced gas recovery 2931
Enhanced oil recovery 2930
Enhanced recovery, experience in 2936
Environmental considerations 2926
Enviromnental constraints 2935
Feasibility of meeting 1985 goals 2944
Field achievements, specific 2936
Fiscal year 1977 obligation estimates 2907
Fluidized bed combustion 2896
Fossil:
Commercialization of technologies 2891
Demonstration plants 2912
Energy forecast for 1985 2941
Energy highlights 2852
Energy programs, urgency of 2921
Funds, deferral of 2908
Funds, obligation of 2902
Gasifiers in industry 2913
Hearing procedure 2852
Hygas:
Demonstration project 2889
Pilot plant 2890
Process 2888
LNG facilities 2898
Liquefaction and gasification processes, estimated costs of .. 2895
Liquefaction commercialization, progress toward 2918
Load management program 2883
Magnetohydrodynamics (MHD) 2881
Marketplace penetration, estimates of 2869
Obligation backlog 2906
Obligation estimates, need for revised 2908
Oil and natural gas 2938
Oil consumption projected by 1985 2944
Oil prices, impact of 2934

Energy Research and Development Administration -- continued: *Page*
Oil shale:
Accomplishments 2929
Commercialization 2922, 2927
Development 2922, 2924
Production 2923, 2925
Surface retorting 2927
Peakload pricing 2883
Pilot plant operations 2912
President Carter's national energy plan 2850, 2868, 2945
Priorities 2946
Questions, additional 2959
Scrubber utilization, economic impact of 2901
Scrubbers on SRC units, use of 2886
Second-generation technologies 2916
Secondary and tertiary recovery, near-term potential 2932
Small grants program 2884
Solvent refined coal 2885
Synthetic fuels 2919
Conservation 2873
Goal, 1985 2919
Production 2873, 2942
Prospects 2917
Technologies, discarding 2949
Technology demonstration, lack of 2914
Technology transfer 2920
University programs 2884
Wood combustion, direct 2874

F

FEA (Federal Energy Administration)
Federal Energy Administration 2627
Administrative costs 2760
Alaskan pipeline routes, role in 2764
Amoco meeting 2764
Appliances 2769
Authorization 2714
Budget estimates, revised 2627
Carter energy program 2713
Coal conversion funding 2726
Coal conversion program 2724
Compliance 2784
Conservation loan guarantee program 2756
Conservation programs 2713, 2721
Consumer services 2767
Contract expenses 2719
Contracts program, administrative expenses of 2721
Conversion orders 2727
Costs, administrative and contracting 2736
Dual burning capacity 2762
ERD programs 2728, 2771
Electric power 2776
Energy information and analysis 2788

Federal Energy Administration -- continued: *Page*
Energy reserves data base 2737
Executive direction and administration 2789
Executive level positions 2717
Extension 2717
Federal energy management program 2753, 2755
Financial planning and incentives 2780
Firms used in data gathering 2738
Foreign investments 2737
General Counsel requirements 2797
General Counsel support of conservation and enviromnent 2798
International energy affairs 2793
Legal status on continued operations 2717
Loan guarantee contracts 2757
Loan guarantee supplemental request 2756
Marketing 2770
Oil and gas 2774
Pipeline construction problems 2763
Printing and reproduction increase 2739
Private grievances and redress 2790
Product price and allocation controls 2783
Program evelopment 2792
Program duplication 2724
Promotion rates 2761
Questions, additional 2767
Siting 2781
Solar commercialization 2772
State conservation grants, goals of 2734
State grant program, admi istrative expenses 2733
Status of 1977 grants 2735
Strategic petroleum reserve 2712
Acceleration, impact of 2740
Budget proposal, original 2749
Capacity to meet goal 2740
Cargo Preference Act 2750
Constraints 2741
Costs of maintaining reserve 2746
Defense Department agreement 2749
Entitlements program, changes in the 2748
Imports versus domestic production 2745
Obligations 2741, 2742
Oil purchase prices 2747
Questions submitted 2753
Request 2739
Salt dome sites, selection of 2729
Storage:
Facilities 2730, 2745, 2747
Loss, possibility of 2747
Sites 2741
Supplemental action 2710
Synfuels and geothermal 2775
Travel increase 2738
Underground coal mine loan guarantees 2728
Utility conservation contracts 2763

Federal Energy Administration -- continued: Page
Utility rate reform 2758, 2759
Volume rate reduction 2760
Voluntary programs 2767
Waste in Federal buildings 2754
Weatherization program 2714, 2731, 2733
Forest Service 2517
Allowable cut 2561
Arkansas timber management research 2569
Construction account 2581
Contingency fund 2557
Contracting work accomplishment 2565
Drought situation 2542
Environmental assessment costs 2560
Environmental protection 2571
Fire control 2560, 2595
Fire management, cooperative 2549
Forest:
Economics and marketing research 2578
Inventory 2560
Products research 2577
Research priorities 2576
Roads 2550, 2583, 2584
General land management 2574
Housing starts 2537
Insect and disease management 2556
Manpower needs 2532
Mortality of timber 2563
Mountain pine beetle 2557
Non-declining evenflow 2563
Noxious weed program 2558
Nursery production 2547
Object classification 2576
Personnel ceilings 2568
Program reductions 2584
Public service jobs 2537
Questions submitted 2570
Rangeland improvements 2579
Receipts 2546
Recreation 2541, 2572, 2579
Reforestation and timber stand improvement 2543, 2575
Resource evaluations 2577
Resource Planning Act:
Ability to reach goals 2541
Compared to fiscal year 1978 budget request 2550
Initiative 2577
New public laws, priorities 2555
Priorities 2554
Sale preparation goals 2537
Road construction 2559
Sikes Act implementation 2573
Special use administration 2575
State and private cooperative programs 2558
Summary of request 2530

Forest Service -- continued: Page
Timber sales:
Budget, 1977 2531
Preparation 2538, 2544
Salvage 2547
Shortfall 2530
Timber utilization 2564
Unobligated balances 2582
Wildlife and fish habitat management 2572

G

Geometrics Service Center 2574

L

LNG (Liquified natural gas)

S

SPR (Strategic Petroleum Reserve, FEA)
SRC (Solvent Refined Coal)
Smithsonian Institution 2095
Anacostia Neighborhood Museum 3159
Archives of American Art 3140, 3158
Budget request, fiscal year 1978 3102
Chesapeake Bay Center 3171
Cooper-Hewitt 3171
Elevator contract 3169
Folklife:
Encyclopedia of North American Indians 3099, 3100
Federal agency commitment 3100
Festival, 1977 ..... 3099, 3100, 3102
Increase, proposed 3097
Native American projects 3099
Personnel for activities 3097
Planning 3096
Program 3096
Publications, plans for 3098
Horticulture, Office of 3160
Joseph Henry Papers 3158
Land acquisition 3112, 3173
Mount Hopkins Dormitory 3109
Multi-year concept 3170
Museum of History and Technology Library and Study Center 3104
Conference facility, need for 3108
Cost per square foot 3105
Dibner Library 3109
Freed-up space, use of 3107
Funding alternative, phased 3107
General public, service to 3106
Mall site as an alternative, remaining 3108, 3141
Sixth floor addition, purpose of 3105

Smithsonian Institution -- continued: Page

Museum Support Center:
Authorization 3110
Collections management study 3159
Conservation cost 3111
Fiscal year 1977 request, revision of 3110
Functions 3110
Scholarly community and general public, availability 3112
Questions, additional 3147
Salaries and expenses 3113
Air and Space Museum, reduction in exhibits base of 3119
Anthropological film center 3135
Budget expanded 3138
Countries involved 3136
Grants from Federal agencies 3137
Smithsonian request 3139
Supporters 3136
Archives of American Art, area director 3140
Center for the Study of Man - CSM 3134
Contingency fund, positions financed by 3114
Folklife studies 3163
Foreign currency grants to Smithsonian employees 3150
Fort Pierce Bureau 3113
Freer Gallery 3139, 3141
Front Royal, health condition at 3120
General Counsel, Office of 3164
Internal adjustments, fiscal year 1977 3149
Langley-Abbot program 3115
Libraries 3160
Management Analysis Office 3166
Multiple mirror telescope 3115
Museum of History and Technology 3158
Museum of Natural History, proposed increase for 3113
Personnel administration 3166
Plant Services, Deputy Director for Office of 3143
Protection, increase for 3143
Radiation Biology Laboratory, travel request for 3118
Research awards program 142
Research grants, administration of 3142
Reorganization 3150
Security system 3166
Silver Hill exhibits 3119
Smithsonian Astrophysical Observatory, new computer for 3114
Smithsonian Tropical Research Institute, proposed increase .. 3118
Space requirements 3167
Travel and personnel limitations 3149
Traveling exhibition service 3161
Treasurer s Office 3165
Smithsonian objects, loans of 3157
Special foreign currency program 3169

Smithsonian Institution -- continued:
Zoo:
Animals: Page
Acquisition funds 3125
Rising prices 3129
Sale of 3126
Smuggling 3129
Chrysler fund balance 3128
Chrysler fund, use of Federal versus 3127
Construction request 3102
Dollar volume of transactions 3127
Federal acquisitions fund, need for 3126
Increase 3120
Newspaper articles on 3121
Peking zoo 3134
Status of master plan 3124
Veterinarians, outside services of 3124