

Congressional Budget Request

Energy Supply Research and Development

Volume 3

FY 1987



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Assistant Secretary,
Management and Administration
Office of the Controller
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DEPARTMENT OF ENERGY
FISCAL YEAR 1987 CONGRESSIONAL BUDGET REQUEST
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
VOLUME 3
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DEPARTMENT OF ENERGY
FISCAL YEAR 1987 CONGRESSIONAL BUDGET REQUEST

SUMMARY OF ESTIMATES BY APPROPRIATIONS

(in thousands of dollars)

	<u>FY 1985 Actual BA</u>	<u>FY 1986 Estimate BA</u>	<u>FY 1987 Request BA</u>
Appropriations Before The Energy and Water Development Subcommittees:			
Energy Supply Research and Development	1,967,490	1,696,298	1,254,162
Uranium Enrichment	237,956	190,512	---
General Science and Research	724,860	655,928	773,400
Atomic Energy Defense Activities ..	7,322,321	7,231,664	8,230,000
Departmental Administration	128,602	150,319	151,082
Alaska Power Administration	3,233	3,245	2,881
Bonneville Power Administration ...	284,771	330,000	276,100
Southeastern Power Administration .	35,744	---	19,647
Southwestern Power Administration .	31,208	29,191	25,337
Western Area Power Administration .	218,230	195,910	240,309
Western Area Power Emergency Fund .	---	---	---
Federal Energy Regulatory Commission	54,543	41,989	20,325
Nuclear Waste Fund	327,669	499,037	769,349
Geothermal Resources Development Fund	<u>121</u>	<u>69</u>	<u>72</u>
Subtotal, Appropriations Before the Energy and Water Development Subcommittees	<u>\$11,336,748</u>	<u>\$11,024,162</u>	<u>\$11,762,664</u>

DEPARTMENT OF ENERGY
FISCAL YEAR 1987 CONGRESSIONAL BUDGET REQUEST

SUMMARY OF ESTIMATES BY APPROPRIATIONS

(in thousands of dollars)

	<u>FY 1985</u> <u>Actual</u> <u>BA</u>	<u>FY 1986</u> <u>Estimate</u> <u>BA</u>	<u>FY 1987</u> <u>Request</u> <u>BA</u>
Appropriations Before Interior and Related Agencies Subcommittees:			
Alternative Fuels Production	\$ 1,169,895	\$ ---	\$ ---
Clean Coal Technology	---	---	---
Fossil Energy Research and Development	289,048	311,954	82,767
Naval Petroleum and Oil Shale Reserves	156,874	13,002	127,108
Energy Conservation	457,436	427,512	39,433
Energy Regulation	27,139	23,423	21,850
Emergency Preparedness	6,045	5,750	6,044
Strategic Petroleum Reserve	2,049,550	107,533	---
Energy Information Activities	<u>60,919</u>	<u>57,724</u>	<u>59,651</u>
Subtotal, Interior and Related Agencies Subcommittees	4,216,906	946,898	336,853
Subtotal, Energy and Water Development Subcommittees	<u>11,336,748</u>	<u>11,024,162</u>	<u>11,762,664</u>
Subtotal, Department of Energy	15,553,654	11,971,060	12,099,517
Permanent - Indefinite Appropriations:			
Payments to States	<u>1,052</u>	<u>570</u>	<u>570</u>
Total, Department of Energy	<u>\$15,554,706</u>	<u>\$11,971,630</u>	<u>\$12,100,087</u>

DEPARTMENT OF ENERGY
 FY 1987 CONGRESSIONAL STAFFING REQUEST
 TOTAL WORK FORCE

	FY1985 FTE USAGE	FY1986 CONGR REQ	FY1987 -FY86	FY1987 CONGR REQ
ENERGY & WATER SUBCOMMITTEE				
HEADQUARTERS	4,865	4,965	-10	4,947
FIELD	9,133	9,185	111	9,296
SUBCOMMITTEE TOTAL	13,998	14,150	93	14,243
INTERIOR SUBCOMMITTEE				
HEADQUARTERS	1,353	1,304	-166	1,138
FIELD	907	896	-226	670
SUBCOMMITTEE TOTAL	2,260	2,200	-392	1,808
GRAND TOTAL	16,258	16,350	-299	16,051
ADJUSTMENT		-132	-198	-330
ADJUSTED TOTAL	16,258	16,218	-497	15,721

DEPARTMENT OF ENERGY
 FY 1987 CONGRESSIONAL STAFFING REQUEST
 TOTAL WORK FORCE

	FY1985 FTE USAGE	FY1986 CONGR REQ	FY1987 -FY86	FY1987 CONGR REQ
10: ENERGY SUPPLY RESEARCH AND DEV	937	934	-34	900
HEADQUARTERS	811	820	-28	792
FIELD	126	114	-4	108
15: URANIUM ENRICHMENT	69	66	1	67
HEADQUARTERS	58	55	1	56
FIELD	11	11	0	11
20: GENERAL SCIENCE AND RESEARCH	37	39	0	39
HEADQUARTERS	37	39	0	39
25: ATOMIC ENERGY DEFENSE ACTIVITI	2,618	2,702	131	2,833
HEADQUARTERS	456	918	9	927
FIELD	2,122	2,184	122	2,306
30: DEPARTMENTAL ADMINISTRATION	3,307	3,352	-9	3,327
HEADQUARTERS	1,721	1,726	0	1,726
FIELD	1,586	1,604	-5	1,601
34: ALASKA POWER ADMINISTRATION	37	38	0	38
FIELD	37	38	0	38
36: BONNEVILLE POWER ADMIN	3,910	3,480	0	3,480
FIELD	3,510	3,480	0	3,480
38: SOUTHEASTERN POWER ADMIN	38	40	0	40
FIELD	38	40	0	40
42: SOUTHWESTERN POWER ADMIN	186	186	0	186
FIELD	186	186	0	186
46: WESTERN AREA POWER ADMIN	1,181	1,160	0	1,160
FIELD	1,181	1,160	0	1,160
50: WAPA - COLDRADO RIVER BASIN	219	219	0	219
FIELD	219	219	0	219
52: FEDERAL ENERGY REGULATORY COMM	1,617	1,659	0	1,659
HEADQUARTERS	1,617	1,659	0	1,659
54: NUCLEAR WASTE FUND	238	292	0	292
HEADQUARTERS	123	147	0	147
FIELD	115	145	0	145
56: GEOTHERMAL RESOURCES DEV FUND	2	1	0	1
HEADQUARTERS	2	1	0	1
65: POSSIL ENERGY RESEARCH AND DEV	714	700	-161	539
HEADQUARTERS	151	135	-26	100
FIELD	563	565	-135	430
70: NAVAL PETROL & OIL SHALE RES	104	104	-9	95
HEADQUARTERS	23	23	0	23
FIELD	81	81	-9	72
75: ENERGY CONSERVATION	333	352	-134	218
HEADQUARTERS	208	227	-79	148
FIELD	125	129	-55	70
80: EMERGENCY PREPAREDNESS	74	71	0	71
HEADQUARTERS	74	71	0	71
81: ECONOMIC REGULATION	377	340	-50	290
HEADQUARTERS	377	340	-50	290
85: STRATEGIC PETROLEUM RESERVE	178	152	-32	120
HEADQUARTERS	40	27	-5	22
FIELD	138	125	-27	98
90: ENERGY INFORMATION ACTIVITIES	480	481	-6	475
HEADQUARTERS	480	481	-6	475
94: ADVANCES FOR CO-OP WORK	2	2	0	2
FIELD	2	2	0	2
GRAND TOTAL	16,258	16,350	-299	16,051
ADJUSTMENT		-132	-198	-330
ADJUSTED TOTAL	16,258	16,218	-497	15,721

DEPARTMENT OF ENERGY
Proposed Appropriation Language
Energy Supply, Research and Development Activities
(Including Transfer of Funds)

For expenses of the Department of Energy activities including the purchase, construction and acquisition of plant and capital equipment and other expenses incidental thereto necessary for energy supply, research and development activities, and other activities in carrying out the purposes of the Department of Energy Organization Act (Public Law 95-91), including the acquisition or condemnation of any real property or any facility or for plant or facility acquisition, construction or expansion; purchase of passenger motor vehicles (not to exceed [17] 18 for replacement only), [\$1,989,671,000] \$1,254,162, to remain available until expended [of which \$200,000,000]; in addition, \$584,158,000 shall be derived by transfer from Uranium Supply and Enrichment Activities provided in prior years[, and of which \$17,400,000 shall be derived by transfer from Operation and Maintenance, Southeastern Power Administration; and of which \$25,000,000 shall be available only for construction of]: Provided, That funds available under this head in Public Law 99-141 for the Advanced Science Center, the Center for Science and Technology, the Center for Energy and Biomedical Technology, the Energy and Mineral Research Center, and the Demonstration Center for Information Technologies [as described in the report accompanying this Act; together with not to exceed \$6,000,000, to be derived from revenues from activities of the Technical Information Services, which shall be credited to this account and used for necessary expenses and shall remain available until expended], shall be available for other expenses of energy supply, research and development activities. (Public Law 99-141, making appropriations for energy and water development, 1986.)

DEPARTMENT OF ENERGY
 FISCAL YEAR 1987 CONGRESSIONAL BUDGET REQUEST
 SUMMARY OF ESTIMATES BY APPROPRIATION BY MAJOR ACTIVITY
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT
 (Budget Authority in Thousands of Dollars)

	FY 1985 Actual	FY 1986 Estimate	FY 1987 Request
Solar Energy	\$ 171,587	\$ 144,624	\$ 72,292
Geothermal	29,698	26,681	17,930
Hydropower	447	481	---
Electric Energy Systems	19,717	11,548	7,619
Energy Storage Systems	18,642	17,292	8,008
Nuclear Energy R&D	432,612	374,684	330,900
Remedial Action & Waste Technology ..	170,365	230,047	294,100
Civilian Waste R&D	25,806	16,064	6,500
Environmental, Safety and Health ...	38,053	46,921	76,098
Biological and Environmental Research	187,746	179,950	196,565
Liquified Gaseous Spill Test Facility	4,289	1,732	1,200
Magnetic Fusion	429,553	365,469	333,000
Basic Energy Sciences	410,888	433,770	441,378
Energy Research Analysis	2,970	2,598	3,550
University Research Instrumentation.	4,950	6,254	5,000
University Research Support	10,059	10,296	10,075
Advisory and Oversight Program Direction	2,900	2,674	2,900
Multi-Program Laboratories Facilities Support	33,200	39,824	60,190
Small Business Innovation Research Program	24,724	---	---
In-House Energy Management	14,821	11,709	16,500
Technical Information and Management	13,442	12,413	10,775
Policy and Management	3,380	3,497	3,887
Subtotal, Energy Supply R&D ...	<u>2,029,690</u>	<u>1,939,528</u>	<u>1,899,951</u>
Less Use of Prior Year Balances and Other Adjustments	<u>-62,400</u>	<u>-243,230</u>	<u>-645,789</u>
Total, Energy Supply R&D	<u>\$1,967,490</u>	<u>\$1,696,298</u>	<u>\$1,254,162</u>

SUPPORTING RESEARCH AND TECHNICAL ANALYSIS

DEPARTMENT OF ENERGY
FISCAL YEAR 1987 CONGRESSIONAL BUDGET REQUEST
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
VOLUME 3
SUPPORTING RESEARCH AND TECHNICAL ANALYSIS
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DEPARTMENT OF ENERGY
FY 1987 CONGRESSIONAL BUDGET REQUEST
LEAD TABLE
ADVISORY AND OVERSIGHT - PROGRAM DIRECTION
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
SUPPORTING RESEARCH AND TECHNICAL ANALYSIS
 (Tabular dollars in thousands. Narrative material in whole dollars.)

	<u>FY 1985</u> <u>Appropriation</u>	<u>FY 1986</u> <u>Appropriation</u>	<u>FY 1987</u> <u>Base</u>	<u>FY 1987</u> <u>Request</u>	<u>Request</u> <u>vs Base</u>
Energy Oversight, Research Analysis and University Support Advisory and Oversight Program Direction Operating Expenses....	\$2,900	\$2,674	\$2,674	\$2,900	\$+ 226
Total.....	\$2,900 ^{a/}	\$2,674 ^{a/b/}	2,674	2,900 ^{a/}	+ 226
Staffing Total FTE's.....	44	44	44	44	

^{a/} Totals reflect a reduction of \$15,000 in FY 1985, \$30,000 in FY 1986 and \$55,000 in FY 1987 for management initiative savings.

^{b/} Total reduced by \$106,000 in accordance with P.L. 99-177, the Balanced Budget and Emergency Deficit Control Act of 1985 (Gramm/Rudman/Hollings).

Authorization: Section 209, P.L. 95-91.

DEPARTMENT OF ENERGY
1987 CONGRESSIONAL BUDGET REQUEST
SUMMARY OF CHANGES
ADVISORY AND OVERSIGHT PROGRAM DIRECTION
 (In thousands of dollars)

1986 Appropriation enacted.....	\$ 2,780
1986 Gramm-Rudman reduction.....	- 106
1986 adjusted.....	2,674
Program increases and decreases:	
o Funding required to maintain FTE level.....	+ 226
1987 budget request.....	\$ 2,900

Department of Energy
 FY 1987 Congressional Budget Request
 Adjustments to FY 1986 Appropriations

	<u>FY 1986</u> <u>Confer.</u> <u>(1)</u>	<u>General</u> <u>Reduction</u> <u>(2)</u>	<u>Management</u> <u>Initiatives</u> <u>(3)</u>	<u>Pay Cost</u> <u>Restoration</u> <u>(4)</u>	<u>FTE</u> <u>General</u> <u>Reduction</u> <u>(5)</u>	<u>Gram-</u> <u>Rudren-</u> <u>Billings</u> <u>(6)</u>	<u>ES&H</u> <u>Transfer/</u> <u>Reprogramming</u> <u>(7)</u>	<u>Subtotal</u> <u>(8)</u>	<u>Comparability</u> <u>Adjustments</u> <u>(9)</u>	<u>Total</u> <u>(10)</u>
<u>Advisory and Oversight Program</u>										
<u>Direction</u>										
Operating Expenses	2,900	-87			-33	-106		2,674		2,674
Subtotal, Advisory and Oversight Program Direction..	2,900	-87			-33	-106		2,674		2,674
General Reduction	-87	87								
Management Initiatives										
Pay Restoration										
Use of Prior Year Balances (AFB)										
Use of Prior Year Balances (Other Energy Supply)										
Total, Advisory and Oversight Program Direction..	2,813	-			-33	-106		2,674		2,674

Advisory and Oversight Program Direction

The FY 1987 request for Advisory and Oversight Program Direction is \$2,900,000. These funds are required to provide for the personnel and other costs associated with continuation of 44 full-time equivalents. These funds support the staff in the Office of Field Operations Management, the Office of Program Analysis, the Science and Technology Affairs Staff, and associated program and administrative support staff.

This program provides the personnel resources required by the Director of Energy Research to carry out his responsibilities under legislation (P.L. 95-91) and as mandated by the Secretary in areas beyond the scope of the other assigned Energy Research programs. This staff performs and supports in-house and external analyses and studies to meet ER's responsibilities for monitoring the Department's research and development programs and to advise the Secretary with respect to the well-being and management of the multiprogram laboratories. These responsibilities include advising on research activities carried out by any of the Assistant Secretaries; providing support for the Energy Research Advisory Board; operating the Department's multiprogram laboratory institutional planning process; supporting the Under Secretary in addressing laboratory management issues; and providing program management of the Energy Research Analysis, University Research Support, Multiprogram Energy Laboratories-Facilities Support (MEL-FS), R&D Laboratory Technology Transfer, and University Research Instrumentation programs.

The FY 1987 request supports the following staff activities:

1. The Office of Program Analysis will continue to support the Director, Office of Energy Research, in his role as the principal science advisor to the Secretary by providing technical assessments, independent peer reviews and program evaluations, and interagency coordination of research assessments. The Office will also continue to represent DOE on the Interagency Task Force on Acid Precipitation providing assistance as required by the National Acid Precipitation Assessment Plan.
2. The Office of Field Operations Management (FOM) will provide continued support to the Director, OER, in carrying out his oversight, assessment and program responsibilities relating to DOE-university relationships and support. Staff will continue to implement Secretarial guidelines on improved and expanded DOE-university relationships and enhanced information exchange between DOE and the university community. Additional staff workload has resulted from continuing increases in research and manpower development programs within the University Research Support (URS) program. Specifically, increased workload has resulted from expansion of support for the University Laboratory Cooperative (Lab Coop) program, which emphasizes the development of direct links between the DOE laboratories and the university community through support for faculty and student research appointments at the laboratories. Furthermore, the University Reactor Fuel Assistance program, which involves ensuring the maintenance of strong university-based capabilities in nuclear research and training through support for university nuclear research reactors, will require increased activity in FY 1986 in order to be responsive to NRC and congressional mandates on the conversion of university reactors to low enriched uranium (LEU) fuel.
3. FOM is responsible for the University Research Instrumentation program where staff effort is required in preparing an annual program solicitation, analyzing and reviewing proposals, selecting awards, and monitoring projects. The number of proposals received has increased from 150 to 210, and the number of awards has risen from 17 to 24. In addition, the staff is responsible for coordinating this

program with other Federal agencies participating in the overall interagency instrumentation support initiative.

4. Department-wide laboratory management activities of FOM will continue to increase. Specific workload includes provision of laboratory policy and management improvement recommendations and operation of the Department's institutional planning process, analytical support for the Under Secretary's and ER Director's reviews of issues relating to the laboratories, and interaction with the field to ensure implementation of a more effective laboratory appraisal process by the operations offices. Participation in internal working groups and external Government-wide groups will continue to place a significant demand on staff time. Recommendations from these working groups will require increased FOM attention and oversight of Work for Others programs at the laboratories and implementation of new patent legislation by the laboratories. The staff is responsible for ER institutional planning and overview of site plans and related facility issues at the five national multiprogram energy laboratories, as well as management of the MEL-FS construction program, which rehabilitates, upgrades, and replaces, as appropriate, support facilities at the national laboratories. The MEL-FS program has eight new starts proposed in FY 1987. In addition, the program is responsible for the ORNL environmental upgrade program and significant interaction and coordination with the new ES&H assessment program. The staff also manages the Department's R&D Laboratory Technology Transfer program and oversees the new Technology Exchange Research program (under Lab Coop) to provide industry scientists with visiting appointments at the laboratories to strengthen the Nation's industrial competitiveness. There is an increasing staff workload due to significantly increased technology transfer activities at the laboratories.
5. The Science and Technology Affairs Staff will continue to support the Energy Research Advisory Board whose average number of panels doubled in FY 1985 requiring substantial increases in support services; this workload will continue. In addition, three new Departmental awards, similar to the Lawrence and Fermi Awards, have been approved in the areas of conservation, fossil energy and renewable energy. A panel will be established for each of these new awards and the Science and Technology Affairs Staff will provide administrative support to the panels and will coordinate the entire awards process.
6. Program and management support in the areas of budget and finance, personnel administration, policy and coordination, and construction, environment and safety support will continue to be required.

DEPARTMENT OF ENERGY
1987 CONGRESSIONAL BUDGET REQUEST
MAJOR ACTIVITY OVERVIEW

Multiprogram Energy Laboratories - Facilities Support Program

The goal of the Multiprogram Energy Laboratories - Facilities Support (MEL-FS) Program is to provide for the rehabilitation, upgrade, and replacement of multiprogram general purpose facilities at the five multiprogram energy laboratories: Argonne National Laboratory (ANL), Brookhaven National Laboratory (BNL), Lawrence Berkeley Laboratory (LBL), Oak Ridge National Laboratory (ORNL), and Pacific Northwest Laboratory (PNL). These Government-owned sites are complete research reservations with unique research facilities and all necessary support facilities. These include laboratory and office space, craft shops, warehouses, security facilities, fire houses, cafeterias, and all required utility distribution systems plus steam generation plants, sewage and other waste treatment facilities, roads, parking lots, and related structure and facilities, etc. These laboratories have performed national research programs for the Department and its predecessor agencies for nearly 40 years. They received over \$1,000,000,000 in FY 1985 to perform national research programs primarily in the areas of energy supply and general sciences (i.e., nuclear energy, fusion energy, basic energy sciences, nuclear physics, high energy physics, life sciences, and other energy-related areas). Over 17,000 scientists, engineers and other support staff are engaged in these activities. The productivity of the work force is greatly affected by the adequacy and reliability of the facilities at the national laboratories.

The replacement costs of the existing facilities at the multiprogram energy laboratories exceed \$2,800,000,000. Through continuous use, aging as well as changing technology, these facilities and related support systems deteriorate (both physically and in performance) to a point where they are no longer appropriate for their intended functions, economically justifiable to maintain, or adequate to meet security, environmental, safety, and health requirements. The MEL-FS program is responsible for maintaining existing capabilities and capacities consistent with approved utilization levels. This program will help ensure that the capital base is preserved for continued effective accomplishment of the Department's R&D missions today and in the future. The MEL-FS program is an appropriate Federal role reflecting the responsible management of the Government's real property.

This program consists of two subprograms. The first subprogram, Multiprogram Energy Laboratories - General Purpose Facilities (MEL-GPF), is directed at the goals of the overall program except for Environmental Compliance Upgrade at ORNL which is a separate subprogram. Each subprogram is discussed in detail below.

Multiprogram Energy Laboratories - General Purpose Facilities

The MEL-GPF program originated in FY 1981 as a broad program for rehabilitation, upgrade or replacement of deficient buildings, utilities, roads, railroads and other facilities at all the multiprogram laboratories. From FY 1981 to FY 1986, a total of \$188,000,000 has been used for these purposes. Over one third of these funds went to defense multiprogram laboratories (Idaho National Engineering Laboratory, Sandia National Laboratories, Los Alamos National Laboratory, and Lawrence Livermore National Laboratory). Beginning with the FY 1987 budget, the program will be limited to only the Multiprogram Energy Laboratories with Defense Programs assuming responsibility for general purpose facilities projects at the defense multiprogram laboratories.

There exists a large backlog of deficiencies at the Multiprogram Energy Laboratories (recently estimated at over \$700,000,000). The purpose of the program is to reduce this backlog in a prioritized and systematic manner. Highest priority is assigned to those projects that address urgent environmental, safety, health and security deficiencies and those that can significantly hamper or interrupt operations. The latter is primarily concerned with utilities - electrical, heating and cooling, compressed air, etc. Next highest priority are those projects that concern efficiency and productivity of operations, including adequate office and laboratory space, warehouse and shop facilities. Facility upgrade plans and all proposed projects and subprojects are consistent with the Institutional plans and Site Development plans for these laboratories.

Environmental Compliance Upgrade at ORNL

Over the years, ORNL has generated a variety of radioactive and nonradioactive wastes and has handled them consistent with the applicable Departmental policies. However, under environmental laws and regulations passed in recent years including the Resource Conservation and Recovery Act (RCRA), the Safe Drinking Water Act, the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the Hazardous Materials Transportation Act, long established procedures and approaches to handling hazardous wastes are no longer acceptable. In addition, the new regulatory requirements have resulted in the application of more stringent environmental criteria to ORNL operations. Consequently, ORNL is in violation of a number of these laws. The violations were verified in part during a recent Evaluation Inspection of ORNL conducted by the State of Tennessee and the Environmental Protection Agency. The Department is continuing to work with these agencies to determine the actions and time schedule necessary to come into compliance. The actions fall into two major categories: those that relate to the modification, replacement or upgrade of existing processes for handling wastes and those that relate to the cleanup of inactive contaminated facilities and sites. While the Department is addressing both areas, correction of ongoing waste processing systems has the highest priority.

The ORNL Environmental Compliance Upgrade Subprogram originated in FY 1985 to address those deficiencies that relate to non-defense activities at ORNL. Defense Waste Management has responsibility for defense related processes and wastes. A multiyear effort will be needed to bring ORNL's active and inactive systems into compliance with existing applicable environmental regulations.