

# Congressional Budget Request

Energy Supply Research and Development  
Nuclear Waste Fund

Volume 2

**FY 1988**



U.S. Department of Energy  
Assistant Secretary,  
Management and Administration  
Office of the Controller

January 1987

DEPARTMENT OF ENERGY  
FISCAL YEAR 1988 CONGRESSIONAL BUDGET REQUEST

SUMMARY OF ESTIMATES BY APPROPRIATIONS

BUDGET AUTHORITY IN THOUSANDS OF DOLLARS

	<u>FY 1986</u> <u>Actual</u> <u>BA</u>	<u>FY 1987</u> <u>Estimate</u> <u>BA</u>	<u>FY 1988</u> <u>Request</u> <u>BA</u>
Appropriations Before The Energy and Water Development Subcommittees:			
Energy Supply Research and Development .....	\$ 1,701,351	\$ 1,254,131	\$ 1,914,710
Uranium Enrichment .....	1,549,015	1,210,400	1,070,000
General Science and Research .....	659,059	719,517	814,498
Atomic Energy Defense Activities ..	7,292,405	7,481,852	8,050,000
Departmental Administration .....	235,676	139,509	166,133
Alaska Power Administration .....	3,245	2,881	3,026
Bonneville Power Administration ...	404,329	327,659	205,800
Southeastern Power Administration .	---	19,647	27,400
Southeastern - Continuing Fund ....	4,028	---	---
Southwestern Power Administration .	29,180	25,337	16,648
Western Area Power Administration .	195,842	240,309	295,515
Western Area Power Emergency Fund .	147	225	---
Federal Energy Regulatory Commission .....	45,107	-3,465	-900
Nuclear Waste Fund .....	499,037	499,000	500,000
Geothermal Resources Development Fund .....	<u>69</u>	<u>72</u>	<u>72</u>
Subtotal, Appropriations Before the Energy and Water Development Subcommittees .....	<u>\$12,618,490</u>	<u>\$11,917,074</u>	<u>\$13,062,902</u>

DEPARTMENT OF ENERGY  
 FISCAL YEAR 1988 CONGRESSIONAL BUDGET REQUEST  
 SUMMARY OF ESTIMATES BY APPROPRIATIONS  
 BUDGET AUTHORITY IN THOUSANDS OF DOLLAR

	<u>FY 1986</u> Actual <u>BA</u>	<u>FY 1987</u> Estimate <u>BA</u>	<u>FY 1988</u> Request <u>BA</u>
Appropriations Before Interior and Related Agencies Subcommittees:			
Alternative Fuels Production .....	\$ 2,775	\$ ---	\$ ---
Clean Coal Technology .....	---	---	50,000
Fossil Energy Research and Development .....	309,389	251,402	168,900
Naval Petroleum and Oil Shale Reserves .....	13,002	122,177	159,700
Energy Conservation .....	426,187	149,679	86,090
Energy Regulation .....	23,423	23,400	21,680
Emergency Preparedness .....	5,750	6,044	6,206
Strategic Petroleum Reserve .....	107,533	147,433	270,181
Energy Information Activities .....	<u>57,724</u>	<u>60,301</u>	<u>61,599</u>
Subtotal, Interior and Related Agencies Subcommittees .....	945,783	760,436	824,356
Subtotal, Energy and Water Development Subcommittees .....	<u>12,618,490</u>	<u>11,917,074</u>	<u>13,062,902</u>
Subtotal, Department of Energy .....	13,564,273	12,677,510	13,887,258
Permanent - Indefinite Appropriations:			
Payments to States .....	<u>629</u>	<u>705</u>	<u>727</u>
Total, Department of Energy .....	<u>\$13,564,902</u>	<u>\$12,678,215</u>	<u>\$13,887,985</u>

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL STAFFING REQUEST  
 TOTAL WORK FORCE

	FY1986 FTE USAGE	FY1987 -FY86	FY1987 CONGR REQ	FY1988 -FY87	FY1988 CONGR REQ
ENERGY & WATER SUBCOMMITTEE					
HEADQUARTERS	4,663	170	4,833	47	4,880
FIELD	9,393	62	9,455	-4	9,451
SUBCOMMITTEE TOTAL	14,056	232	14,288	43	14,331
INTERIOR SUBCOMMITTEE					
HEADQUARTERS	1,254	-13	1,241	-104	1,137
FIELD	883	5	888	-143	745
SUBCOMMITTEE TOTAL	2,137	-8	2,129	-247	1,882
GRAND TOTAL	16,193	224	16,417	-204	16,213
ADJUSTMENT		-317	-317	54	-263
ADJUSTED TOTAL	16,193	-93	16,100	-150	15,950

DEPARTMENT OF ENERGY  
FY 1988 CONGRESSIONAL STAFFING REQUEST  
TOTAL WORK FORCE

	FY1986 FTE USAGE	FY1987 -FY86	FY1987 CONGR REQ	FY1988 -FY87	FY1988 CONGR REQ
10 ENERGY SUPPLY RESEARCH AND DEV	918	0	926	0	926
HEADQUARTERS	635	4	639	0	639
FIELD	283	4	287	0	287
18 URANIUM ENRICHMENT	65	2	67	0	67
HEADQUARTERS	54	2	56	0	56
FIELD	11	0	11	0	11
20 GENERAL SCIENCE AND RESEARCH	38	1	39	0	39
HEADQUARTERS	38	1	39	0	39
23 ATOMIC ENERGY DEFENSE ACTIVITI	2,718	142	2,860	30	2,890
HEADQUARTERS	491	52	543	19	562
FIELD	2,227	90	2,317	11	2,328
30 DEPARTMENTAL ADMINISTRATION	3,273	77	3,350	20	3,370
HEADQUARTERS	1,493	46	1,539	5	1,544
FIELD	1,500	31	1,611	15	1,626
34 ALASKA POWER ADMINISTRATION	36	2	38	-3	35
FIELD	36	2	38	-3	35
36 DONNEVILLE POWER ADMIN	3,491	-41	3,430	-50	3,380
FIELD	3,491	-41	3,430	-50	3,380
38 SOUTHEASTERN POWER ADMIN	38	2	40	0	40
FIELD	38	2	40	0	40
42 SOUTHWESTERN POWER ADMIN	193	-7	186	0	186
FIELD	193	-7	186	0	186
46 WAPA - POWER MARKETING	1,176	-14	1,160	0	1,160
FIELD	1,176	-14	1,160	0	1,160
50 WAPA - COLORADO RIVER BASIN	219	0	219	0	219
FIELD	219	0	219	0	219
52 FEDERAL ENERGY REGULATORY COMM	1,897	62	1,959	0	1,959
HEADQUARTERS	1,897	62	1,959	0	1,959
54 NUCLEAR WASTE FUND	291	20	311	44	357
HEADQUARTERS	154	3	157	23	180
FIELD	137	17	154	23	177
56 GEOTHERMAL RESOURCES DEV FUND	1	0	1	0	1
HEADQUARTERS	1	0	1	0	1
65 FOSSIL ENERGY RESEARCH AND DEV	706	-3	703	-113	590
HEADQUARTERS	141	-3	138	0	138
FIELD	565	0	565	-113	452
70 MINNAPL PETROL & OIL SHALE RES	99	-4	95	0	95
HEADQUARTERS	20	2	22	0	22
FIELD	79	-4	73	0	73
75 ENERGY CONSERVATION	322	30	352	-109	243
HEADQUARTERS	201	24	227	-84	143
FIELD	121	4	125	-25	100
80 EMERGENCY PREPAREDNESS	64	7	71	0	71
HEADQUARTERS	64	7	71	0	71
81 ECONOMIC REGULATION	348	-53	295	-20	275
HEADQUARTERS	348	-53	295	-20	275
85 STRATEGIC PETROLEUM RESERVE	152	-0	147	-5	142
HEADQUARTERS	34	-12	22	0	22
FIELD	118	7	125	-5	120
90 ENERGY INFORMATION ACTIVITIES	446	20	466	0	466
HEADQUARTERS	446	20	466	0	466
94 ADVANCES FOR CO-OP WORK	2	0	2	0	2
FIELD	2	0	2	0	2
GRAND TOTAL	16,193	274	16,417	-204	16,213
ADJUSTMENT		-317	-317	54	-263
ADJUSTED TOTAL	16,193	-93	16,100	-150	15,950

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 [18] 21 for replacement only), [\$1,347,048,000,] \$1,909,710,000, to remain available until expended; [in addition \$684,158,000 shall be derived by transfer from Uranium Supply and Enrichment Activities provided in prior years and shall be available until expended; and of which \$84,100,000 which shall be available only for the Center for New Industrial Materials; the Center for New Industrial Materials; the Center for Nuclear Imaging Research; the Energy Research Complex; Saint Christopher's Hospital for Children - Energy Demonstration Project; Center for Excellence in Education - Energy Utilization Performance Project; the Institute of Nuclear Medicine; the Advanced Science Center; the Center for Science and Engineering; and funds provided for byproducts utilization activities shall be available only for the following regional projects: Florida Department of Agriculture and Consumer Services; Hawaii Department of Planning and Economic Development; Iowa State University; Oklahoma, Red-Ark Development Authority; Washington, Port of Pasco; State of Alaska.] (Energy and Water Development Appropriations Act, 1987 as included in Public Laws 99-500 and 99-591, section 101(e),) and in addition, as authorities by section 201 of Public Law 95-238 and notwithstanding 31 U.S.C. 3302, revenues received as user fees for use of the Liquefied Gaseous Fuels Spill Test Facility in Fiscal Year 1988 shall be retained and used to provide toxic and flammable spill test facilities and activities.

Explanation of Change

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Deletes Language contained in Public Laws 99-500 and 99-591 which had specific application to fiscal year 1987.

Proposed Language provides fees from non-Federal users of the Liquefied Gaseous Fuels Spill Test Facility in Nevada to be received into the account as reimbursable expenses to be retained and used to operate, manage and maintain the facility.

DEPARTMENT OF ENERGY  
 FISCAL YEAR 1988 CONGRESSIONAL BUDGET REQUEST  
 SUMMARY OF ESTIMATES BY APPROPRIATION BY MAJOR ACTIVITY  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 BUDGET AUTHORITY IN THOUSANDS OF DOLLARS

	FY 1986 Actual	FY 1987 Estimate	FY 1988 Request
Solar Energy .....	\$ 143,464	\$ 123,532	\$ 71,175
Cooperative Venture R&D Pools .....	---	---	5,000
Geothermal .....	26,495	20,830	15,935
Hydropower .....	481	450	---
Electric Energy Systems .....	11,387	11,276	6,500
Energy Storage Systems .....	17,142	16,589	7,500
Nuclear Energy R&D .....	372,037	327,474	334,170
Remedial Action & Waste Technology .	229,915	276,870	251,500
Civilian Waste R&D .....	15,991	6,500	5,000
Environmental, Safety and Health ...	44,004	62,014	70,000
Biological and Environmental Research .....	178,000	193,992	217,500
Liquified Gaseous Spill Test Facility .....	1,732	2,000	500
Magnetic Fusion .....	361,480	345,313	345,600
Basic Energy Sciences .....	419,850	525,450	479,075
Energy Research Analysis .....	2,567	2,000	3,700

DEPARTMENT OF ENERGY  
 FISCAL YEAR 1988 CONGRESSIONAL BUDGET REQUEST  
 SUMMARY OF ESTIMATES BY APPROPRIATION BY MAJOR ACTIVITY  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT (CONTINUED)

BUDGET AUTHORITY IN THOUSANDS OF DOLLARS

	<u>FY 1986 Actual</u>	<u>FY 1987 Estimate</u>	<u>FY 1988 Request</u>
University Research Instrumentation.	6,176	5,000	5,000
University Research Support .....	10,168	15,775	13,400
Advisory and Oversight Program Direction .....	2,674	2,490	3,200
Multi-Program Laboratories Facilities Support .....	39,908	56,695	56,600
Small Business Innovation Research Program .....	29,137	---	---
In-House Energy Management .....	11,715	16,500	18,800
Strategic Facilities Utilization Program .....	---	---	2,175
Technical Information and Management .....	12,407	14,698	14,000
Policy and Management .....	<u>3,497</u>	<u>3,874</u>	<u>4,300</u>
Subtotal, Energy Supply R&D ...	1,940,227	2,029,322	1,930,710
Less Use of Prior Year Balances and Other Adjustment .....	<u>-238,876</u>	<u>-775,191</u>	<u>-16,000</u>
Total, Energy Supply R&D.....	<u>\$1,701,351</u>	<u>\$1,254,131</u>	<u>\$1,914,710</u>



DEPARTMENT OF ENERGY  
FY 1988 CONGRESSIONAL BUDGET REQUEST  
ENERGY SUPPLY RESEARCH AND DEVELOPMENT

OVERVIEW

Multiprogram Energy Laboratories-Facilities Support

Attainment of the energy R&D goals articulated in the National Energy Policy Plan (NEPP) involves significant use of the five DOE national laboratories supported by Energy Research. These are: Argonne National Laboratory (ANL), Brookhaven National Laboratory (BNL), Lawrence Berkeley Laboratory (LBL), Oak Ridge National Laboratory (ORNL), and Pacific Northwest Laboratory (PNL). DOE has a statutory responsibility to maintain the well-being of the extraordinary national resource which these five laboratories represent. The replacement value of the facilities at these laboratories is \$2.8 billion and they perform over \$1 billion per year of mission R&D for the Department.

The MEL-FS program objective is to maintain the capabilities of these laboratories. This is accomplished by supporting activities and projects which counter the problems of (1) aging and obsolescence of facilities, and (2) environmental noncompliance. The program is fully integrated with the Department's institutional planning process which overviews the overall management and utilization of the multiprogram laboratories.

The strategy of the program is to select and support projects necessary to (1) maintain operations of the laboratories in a safe, cost effective, and productive manner, and (2) reduce the backlog of facilities deficiencies. Budgetary constraints, being experienced throughout the entire Federal government, have necessitated the selection and support of projects critical to safe operation and necessary to ensure continued laboratory viability, e.g., utility replacements and upgrades.

The benefits to be gained by supporting the levels in this budget request are: uninterrupted operation of the laboratories; decreased operating costs; improved safety, security, health and environmental compliance levels; and improved productivity.

The program consists of two subprograms. The General Purpose Facilities subprogram originated in FY 1981 as a broad program for rehabilitation, upgrade or replacement of deficient buildings, utilities, roads, railroads and other facilities at the laboratories. The ORNL Environmental Compliance subprogram originated in FY 1985 to address non-defense environmental deficiencies at ORNL.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

LEAD TABLE

Multiprogram Energy Laboratories - Facilities Support

	FY 1986 Actual	FY 1987 Appropriation	FY 1988 Base	FY 1988 Request	% Change from FY 1987 Approp.
General Purpose Facilities					
Construction.....	\$22,819	\$31,440	\$31,440	\$30,500	- 3%
Subtotal	22,819	31,440	31,440	30,500	- 3%
Environmental Compliance					
Operating.....	9,391	14,255	14,255	12,900	-10%
Capital Equipment.....	962	1,000	1,000	400	-60%
Construction.....	6,736	10,000	10,000	12,800	+28%
Subtotal.....	17,089	25,255	25,255	26,100	+ 3%
Total.....	39,908 a/	56,695	56,695	56,600	---
Operating.....	(9,391)	(14,255)	(14,255)	(12,900)	-10%
Capital Equipment.....	(962)	(1,000)	(1,000)	(400)	-60%
Construction.....	(29,555)	(41,440)	(41,440)	(43,300)	+ 5%
Total Program.....	(\$39,908)a/	(\$56,695)	(\$56,695)	(\$56,600)	---

Authorization: Section 647, P.L. 95-91.

a/ Total has been reduced by \$1,591,000 in accordance with P.L. 99-177, the Balanced Budget and Emergency Deficit Control Act of 1985 (Gramm/Rudman/Hollings). Total reduced by \$616,000 for proposed reprogramming to the Environmental Safety and Health (ES&H) Program.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

Multiprogram Energy Laboratories - Facilities Support

SUMMARY OF CHANGES

FY 1987 Appropriation enacted.....	\$ 56,695
Program increases and decreases:	
- New construction starts at various locations for General Purpose Facilities (GPF) subprogram.....	+ 6,101
- Continue and/or complete ongoing GPF projects.....	- 7,041
- Curtail Environmental Compliance operating expenses to correct environmental deficiencies at ORNL.....	- 1,355
- Reduce capital equipment and forego general plant projects for Environmental Compliance subprogram.....	- 3,600
- Continue project 86-R-801 for non-radiological process waste treatment at ORNL.....	+ 1,000
- Initiate new project 88-R-830 for liquid low level waste collection and transfer system upgrade.....	+ 4,800
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FY 1988 Congressional Budget Request.....	\$ 56,600

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY SUMMARY

OFFICE OF ENERGY RESEARCH

I. Preface: Multiprogram Energy Laboratories - Facilities Support  
 General Purpose Facilities

This subprogram originated in FY 1981 as a broad program for rehabilitation, upgrade or replacement of deficient buildings, utilities, roads, railroads and other facilities at the laboratories. The backlog of deficiencies is currently estimated at \$700 million at the five multiprogram energy laboratories. These Government-owned sites are complete research reservations with skilled investigators, advanced major scientific instrumentation and exceptional, often unique, research facilities with all necessary support facilities. 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 1986 to perform national research and development programs. 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 of the laboratories facilities.

The replacement costs of the existing government owned support facilities at the multiprogram energy laboratories exceed \$2,800,000,000. Through continuous use, and aging as well as changing technology, these facilities 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 program addresses the backlog of facilities needs 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 hamper or interrupt operations. The latter is primarily concerned with utilities - electrical, heating and cooling, water supply, waste disposal, 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.

This program will help ensure the continued effective accomplishment of the Department's R&D missions today and in the future. The Multiprogram Energy Laboratories-Facilities Support program is an appropriate Federal role reflecting the responsible management of the Government's real property.

II. A. Summary Table

Program Activity	FY 1986	FY 1987	FY 1988	% Change
General Purpose Facilities.....	\$22,819	\$31,440	\$30,500	- 3%

II. B. Major Laboratory and Facility Funding

Argonne National Laboratory.....	\$ 3,945	\$ 8,393	\$ 9,925	+ 18%
Brookhaven National Laboratory.....	7,313	7,380	1,779	- 76%
Hanford Engineering Development Laboratory.....	2,959	892	617	- 31%
Idaho National Engineering Laboratory.....	2,444	1,807	500	- 72%
Lawrence Berkeley Laboratory.....	0	1,215	6,650	+447%
Lawrence Livermore National Laboratory.....	2,694	3,600	162	- 95%
Oak Ridge National Laboratory.....	3,464	6,053	9,867	+ 63%
Pacific Northwest Laboratory.....	0	2,100	1,000	- 52%
Total.....	\$22,819	\$31,440	\$30,500	- 3%

### III. Activity Descriptions

Program Activity	FY 1986	FY 1987	FY 1988
Construction	Continued ten ongoing projects. (\$22,338) One new start at RNL for Fire Protection Improvements. (\$481)	Continue nine ongoing projects for \$23,671, and eight new starts for \$7,769 (three building utilities rehabilitation and five general utilities projects).	Continues fifteen previously started projects consistent with planned schedules (\$24,399). Allows for nine new starts, including five environmental related projects, one fire safety project, two utility upgrade projects, and one building rehabilitation project. Project summaries are provided in Section III below. (\$6,101)
Total General Purpose Facilities	\$22,819	\$31,440	\$30,500

#### I. Preface: Environmental Compliance (ORNL)

The ORNL Environmental Compliance subprogram originated in FY 1985 to address environmental deficiencies at ORNL. These deficiencies relate to: (1) the systems for collecting, processing and disposing of currently generated liquid, gaseous and solid hazardous wastes, and (2) the past disposal of previously generated wastes which are not in compliance with current environmental regulations. The program will bring all operational systems up to current and expected environmental standards and will perform remedial actions necessary to clean up environmentally contaminated areas at the ORNL site that are related to past Energy Research program activities.

The total estimated cost to ensure environmental compliance of the operational systems is between \$170 and \$200 million with most of this being capital funds. The bulk of these costs (\$125 million) relate to the liquid waste systems. These include the low-level radioactive waste system, the process waste system, the sewer system, and the storm sewer system. All operational systems are 40 or more years old and in need of extensive rehabilitation and partial replacement. This FY 1988 budget will provide funds for two high priority construction projects related to the liquid waste systems. It will continue funding the Non-Radiological Process Waste Treatment System (R6-R-R01, TEC \$18,000,000) and will request start of the Low-Level Waste Collection and Transfer System Upgrade (R8-R-R30, TEC \$35,000,000).

The remedial actions needed to ensure compliance with applicable environmental regulations for historically contaminated areas of the site are estimated to cost nearly \$1 billion in total. This figure could vary significantly depending on further detailed assessments of the contaminated areas, changes in the applicable laws and development of new cost effective clean-up technologies. Further, the required pace of the clean-up activities is not yet resolved. This budget will provide for continued conduct of remedial investigations and feasibility studies of those waste management areas or portions thereof that relate to past Energy Research activities, and continued development of a groundwater monitoring system.

II. A. Summary Table

Program Activity	FY 1986	FY 1987	FY 1988	% Change
<b>Operating</b>				
Upgrade Operational Systems.....	\$ 4,207	\$ 6,055	\$ 4,600	- 24%
ORNL Remedial Action.....	5,184	8,200	8,300	+ 1%
<b>Total Operating.....</b>	<b>9,391</b>	<b>14,255</b>	<b>12,900</b>	<b>- 10%</b>
Capital Equipment.....	962	1,000	400	- 60%
<b>Construction</b>				
Upgrade Operational Systems.....	2,007	7,000	12,000	+ 83%
General Plant Projects.....	3,849	3,000	0	-100%
<b>Total Construction.....</b>	<b>6,736</b>	<b>10,000</b>	<b>12,000</b>	<b>+ 28%</b>
<b>Total Environmental Compliance.....</b>	<b>\$17,089</b>	<b>\$25,255</b>	<b>\$26,100</b>	<b>+ 3%</b>

II. B. Major Laboratory and Facility Funding

Oak Ridge National Laboratory.....	\$17,089	\$25,255	\$26,100	+ 3%
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III. Activity Descriptions

Program Activity	FY 1986	FY 1987	FY 1988
<b>Operating</b>			
Upgrade Operational Systems	Perform studies to assess condition of operating systems and plan for needed upgrades. (\$4,207)	Perform studies to assess condition of operating systems and plan for needed upgrades. (\$6,055)	Perform studies to assess condition of operating systems and plan for needed upgrades. (\$4,600)
ORNL Remedial Actions	Continue remedial investigations and feasibility studies on previously contaminated sites, and begin development of a groundwater monitoring system. (\$5,184)	Continue remedial investigations and feasibility studies on previously contaminated sites, and continue development of a groundwater monitoring system. (\$8,200)	Continue remedial investigations and feasibility studies on previously contaminated sites, and continue development of a groundwater monitoring system. (\$8,300)
<b>Subtotal Operating Expenses</b>	<b>\$9,391</b>	<b>\$14,255</b>	<b>\$12,900</b>

III. Environmental Compliance (Cont'd.)

Program Activity	FY 1986	FY 1987	FY 1988
<b>Capital Equipment</b>			
ORNL Remedial Actions	Provides equipment needed to support clean-up studies and activities. (\$962)	Provides equipment needed to support clean-up studies and activities. (\$1,000)	Provides equipment needed to support clean-up studies and activities. (\$400)
Subtotal Capital Equipment	\$ 962	\$1,000	\$ 400
<b>Construction</b>			
Upgrade Operational Systems	Started the Non-Radiological Process Waste Treatment Facilities Project (R6-R-801). (\$2,887)  No activity.	Continue the Non-Radiological Process Waste Treatment Facilities Project (R6-R-801). (\$7,000)  No activity.	Continue the Non-Radiological Process Waste Treatment Facilities Project (R6-R-801). (\$8,000)  Start the Low-Level Waste Collection and Transfer Systems Upgrade (R8-R-830). (\$4,800)
General Plant Projects	General Plant Projects (R6-R-800) to correct deficiencies in operating systems. (\$3,849)  See Construction Project Summaries for description details.	General Plant Projects (R7-R-770) to correct deficiencies in operating systems. (\$3,000)	No activity.
Subtotal Environmental Compliance (ORNL) Construction	\$ 6,736	\$10,000	\$12,800
Total Environmental Compliance	\$17,089	\$25,255	\$26,100
Total Multiprogram Energy Laboratories-Facilities Support	\$39,908	\$56,695	\$56,600

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY SUMMARY

CONSTRUCTION PROJECTS

Multiprogram Energy Laboratories - Facilities Support

IV. A. Construction Project Summary

<u>Project No.</u>	<u>Project Title</u>	<u>Total Prior Year Obligations</u>	<u>FY 1987 Appropriated</u>	<u>FY 1988 Request</u>	<u>Remaining Balance</u>	<u>TEC</u>
<b>Multiprogram Energy Laboratories - General Purpose Facilities (MEL-GPF)</b>						
88-R-817	Upgrade Fire Protection (ORNL)	\$ 0	\$ 0	\$ 800	\$ 950	\$ 1,750
88-R-814	Sanitary Sewage Treatment Facility (PNL)	0	0	1,000	2,000	3,000
88-R-812	Hazardous Waste Handling Facility (LRL)	0	0	500	4,150	4,650
88-R-809	Plant Modifications to Comply with EPA Requirement (ANL)	0	0	820	1,000	1,820
88-R-807	Electrical System Rehabilitation (ANL)	0	0	500	4,560	5,060
88-R-806	Environmental Health and Safety Project (LRL)	0	0	850	9,475	10,325
88-R-805	Environmental Improvements (BNL)	0	0	611	3,389	4,000
88-R-804	Piping Systems Upgrade (ORNL)	0	0	520	1,330	1,850
88-R-802	Laboratory Building Rehabilitation (BNL)	0	0	500	1,400	1,900
87-R-759	Upgrade Steam Distribution System (ORNL)	0	1,328	5,472	0	6,800
87-R-758	Rehabilitate Mechanical Utilities (LRL)	0	915	3,000	1,585	5,500
87-R-757	Electric System Rehabilitation (LRL)	0	300	2,300	0	2,600
87-R-756	Water Line Replacement (ANL)	0	566	2,000	2,634	5,200
87-R-755	Mechanical Systems Rehabilitation (ANL)	0	600	2,100	500	3,200
87-R-753	Rehabilitate Laboratory Space (ANL)	0	1,235	3,600	7,200	12,035
87-R-752	Piping System Restoration (ORNL)	0	725	3,075	0	3,800
87-R-751	Laboratory Restoration, (PNL)	0	2,100	0	0	2,100
86-R-726	Fire Protection Improvements (ANL)	481	1,680	400	439	3,000



<u>Project No.</u>	<u>Project Title</u>	<u>Total Prior Year Obligations</u>	<u>FY 1987 Appropriated</u>	<u>FY 1988 Request</u>	<u>Remaining Balance</u>	<u>TEC</u>
<u>General Purpose Facilities (continued)</u>						
85-R-712	Central Chilled Water System Restoration (ORNL)	2,058	2,600	0	0	4,658
85-R-709	Central Chilled Water Plant (ANL)	962	3,600	638	0	5,200
85-R-707	Hanford Site Fire Alarm System Upgrade (RL)	3,008	892	617	333	4,850
85-R-706	Medical Facilities (LLNL)	3,194	3,600	162	344	7,300
85-R-703	Primary Electrical Distribution System Restoration (ORNL)	800	1,400	0	0	2,200
85-R-702	Replace Laboratory Roofs (ANL)	6,291	2,392	267	0	8,950
85-R-701	Central Chilled Water Facility (RNL)	9,032	5,700	268	0	15,000
84-ER-103	Road Repairs (INEL, LRL, RL, ANL)	<u>14,432</u>	<u>1,807</u>	<u>500</u>	<u>1,038</u>	<u>17,777</u>
Subtotal, General Purpose Facilities		40,258	31,440	30,500	42,327	XXX
<u>Environmental Compliance (ORNL)</u>						
88-R-830	Liquid Low-Level Collection and Transfer System Upgrade (ORNL)	0	0	4,800	30,200	35,000
87-R-770	General Plant Projects (ORNL)	0	3,000	0	0	3,000
86-R-801	Non-Radiological Process Waste Treatment Project (ORNL)	<u>2,887</u>	<u>7,000</u>	<u>8,000</u>	<u>113</u>	<u>18,000</u>
Subtotal, Environmental Compliance		<u>2,887</u>	<u>10,000</u>	<u>12,800</u>	<u>30,313</u>	XXX
Total, MEL-FS		<u>\$ 43,145</u>	<u>\$ 41,440</u>	<u>\$ 43,300</u>	<u>\$ 72,640</u>	XXX

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

- |   |  |
|---|--|
| 1. Project title and location: RR-R-817 Upgrade Fire Protection<br>Oak Ridge National Laboratory (ORNL)<br>Oak Ridge, Tennessee | Project TEC: \$ 1,750<br>Start Date: 1st Qtr. FY 1988<br>Completion Date: 4th Qtr. FY 1990 |
|---|--|

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 800	\$ 800	\$ 280
1989	950	950	855
1990	0	0	615

3. Narrative:

- (a) This project will provide new or updated fire protection systems throughout the Y-12 Plant site. The work will include the installation of sprinkler systems, early warning devices, and improved systems to facilitate efficient firefighting efforts in the ORNL research facilities at Y-12.
- (b) The purpose of this project is to correct deficiencies that have been identified by the operating contractor fire protection audits and DOE audits. Correction of these deficiencies will help bring the ORNL Facilities at Y-12 into compliance with DOE Order 5480.1.
- (c) \$800,000 is requested for FY 1988 funding. During FY 1988 detailed design (by a negotiated Architect/Engineering contractor) will be completed.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: RR-R-814 Sanitary Sewage Treatment Facility  
 Pacific Northwest Laboratory  
 Richland, Washington

Project TEC: \$ 3,000  
 Start Date: 2nd Qtr. FY 1988  
 Completion Date: 4th Qtr. FY 1990

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 1,000	\$ 1,000	\$ 420
1989	2,000	2,000	1,800
1990	0	0	780

3. Narrative:

- (a) This project will provide a new sanitary sewage treatment facility (300,000 gallons/day capacity). Construction will include a 700 sq. ft. building, ponds, diversion systems and 1300 ft. of water line.
- (b) The existing sanitary sewage system is in marginal compliance with the State of Washington regulations and will not be in compliance with the state of Washington proposed guidelines. Sanitary sewage is presently processed through septic tanks, which are overloaded.
- (c) \$1,000,000 is requested for FY 1988 funding. The Architect/Engineering contract will be negotiated and detailed design will be completed. Construction will start late in FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: 88-R-012 Hazardous Waste Handling Facility  
 Lawrence Berkeley Laboratory (LRL)  
 Berkeley, California
- Project TEC: \$ 4,650  
 Start Date: 2nd Qtr. FY 1988  
 Completion Date: 1st Qtr. FY 1991

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 500	\$ 500	\$ 350
1989	4,150	4,150	1,660
1990	0	0	2,115
1991	0	0	525

3. Narrative:

- (a) This project will provide a remote site for hazardous waste (i.e. radioactive transuranic elements, toxic liquid chemicals and toxic gases) handling. Construction will include a 12,300 gross sq. ft. building and an adjacent handling area.
- (b) The existing facility was constructed as a temporary handling area with the expectation that a permanent facility would be constructed at a later date. In its current location, the facility is in close proximity to large laboratory and off-site personnel as well as main traffic routes. Relocating the facility to a remote site would minimize health and safety effects from a potential release.
- (c) \$500,000 is requested for FY 1988 funding. The Architect/Engineer subcontract will be negotiated and detail design completed in FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: RR-R-809 Plant Modifications to Comply with EPA Requirements      Project TEC: \$ 1,820  
 Argonne National Laboratory (ANL)      Start Date: 1st Qtr. FY 1988  
 Argonne, Illinois      Completion Date: 2nd Qtr. FY 1990

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 820	\$ 820	\$ 600
1989	1,000	1,000	880
1990	0	0	340

3. Narrative:

- (a) This project is in two parts: (1) a new treatment facility will collect and neutralize coal pile run-off before discharging to a local creek and (2) rerouting rainwater runoff to the existing lime sludge pond to prevent reflooding of the pond and subsequent effluent discharge.
- (b) Currently coal pile run-off entering local creeks exceeds Environmental Protection Agency (EPA) effluent limitations for sulfuric acid and other metals. Continuous effluent discharges from the sludge pond (lime) are polluting neighboring creeks; this situation has been cited by EPA and the Illinois Environmental Protection Agency (IEPA). This project is needed to comply with regulatory requirements.
- (c) \$820,000 is requested for FY 1988 funding. Detailed design will be completed and construction will be started in FY 1988.

DEPARTMENT OF ENERGY  
FY 1988 CONGRESSIONAL BUDGET REQUEST  
ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
(dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: BR-R-007 Electrical System Rehabilitation, Phase I  
Argonne National Laboratory (ANL)  
Argonne, Illinois
- Project TEC: \$ 5,060  
Start Date: 1st Qtr. FY 1988  
Completion Date: 4th Qtr. FY 1991

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 500	\$ 500	\$ 400
1989	2,000	2,000	1,600
1990	2,560	2,560	3,060

3. Narrative:

- (a) This project provides for the replacement of components of the main electrical distribution system including transformers, voltage regulators, circuit breakers, metering and relaying equipment, poles, cross arms, insulators, down-guys and related hardware. The project also provides oil containment structures for oil transformers in accordance with current federal/state EPA regulations.
- (b) Electrical reliability is essential to continuity of laboratory operations. This project will help ensure uninterrupted operations by replacing transformers and other critical electrical equipment which are beyond their predicted life expectancy. Replacing them before failure will avoid costly and disruptive emergency repairs. Oil containment structures will bring existing operations into compliance with environmental regulations.
- (c) \$500,000 is requested for FY 1988 funding. The funding will be used for procurement of a contract consultant to complete design and engineering work. Procurement of equipment requiring long-lead time (i.e. 12 months or more) will be initiated.

DEPARTMENT OF ENERGY  
FY 1988 CONGRESSIONAL BUDGET REQUEST  
ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
(dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: RR-R-806 Environmental Health & Safety Project  
Lawrence Berkeley Laboratory  
Berkeley, California
- Project TEC: \$10,325  
Start Date: 2nd Qtr. FY 1988  
Completion Date: 4th Qtr. FY 1991

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 850	\$ 850	\$ 500
1989	3,448	3,448	3,334
1990	3,020	3,020	3,038
1991	3,007	3,007	3,453

3. Narrative:

- (a) This project will consist of several subprojects in the following areas: 1) upgrading and/or installing environmental monitoring equipment (air sampling/monitoring and underground fuel tank monitoring); 2) replacing existing deteriorated safety and health equipment (ventilation improvements and replacing drum storage racks); and 3) installing additional health and safety equipment, facilities and systems (area lighting and chemical storage facility).
- (b) Ensuring healthy, safe and environmentally sound operations is a major goal at LRL. This project is needed to comply with state and national environmental requirements and safety and health standards.
- (c) \$850,000 is requested for FY 1988 funding. Architect/engineer procurement will be negotiated. Design and engineering will be initiated.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: RR-R-805 Environmental Improvements  
 Brookhaven National Laboratory (BNL)  
 Upton, New York
- Project TEC: \$ 4,000  
 Start Date: 2nd Qtr. FY 1988  
 Completion Date: 4th Qtr. FY 1991

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 611	\$ 611	\$ 560
1989	1,900	1,900	1,800
1990	1,489	1,489	1,000
1991	0	0	640

3. Narrative:

- (a) Twelve buildings will be connected to the central sanitary sewage system. Construction will include new piping and lift stations. Four buildings will have asbestos insulation removed from duct, piping and equipment and then disposed in a safe and environmentally approved manner. All exposed areas will be re-insulated.
- (b) This project is needed to comply with existing and expected Environmental Protection Agency, Occupational, Safety and Health Act and State Agency regulations and requirements.
- (c) \$611,000 is requested for FY 1988 funding. The Architect/Engineer contract will be negotiated and detailed design completed.



DEPARTMENT OF ENERGY  
FY 1988 CONGRESSIONAL BUDGET REQUEST  
ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
(dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: RB-R-804 Building Piping Systems Upgrade  
Oak Ridge National Laboratory  
Oak Ridge, Tennessee
- Project TEC: \$ 1,850  
Start Date: 1st Qtr. FY 1988  
Completion Date: 2nd Qtr. FY 1990

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 520	\$ 520	\$ 265
1989	1,330	1,330	1,170
1990	0	0	415

3. Narrative:

- (a) This project upgrades or replaces piping and major system components of several critical piping systems including, steam supply, condensate return, process and potable water, cooling tower water, demineralized water, instrument air and natural gas. Existing cooling towers will also be replaced.
- (b) Most of the existing piping systems were constructed during World War II, with no systematic upgrading since. The existing systems have become inefficient, unreliable and in some cases only partially operable. Pipe ruptures have become more frequent, interrupting operations and causing delays.
- (c) \$520,000 is requested for FY 1988 funding. Procurement of an Architect/Engineer to complete detailed design and materials will be initiated in FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: RR-R-802 Multiprogram Laboratory Building Rehabilitation  
 Brookhaven National Laboratory (BNL)  
 Upton, New York
- Project TEC: \$ 1,900  
 Start Date: 1st Qtr. FY 1988  
 Completion Date: 3rd Qtr. FY 1989

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 500	\$ 500	\$ 500
1989	1,400	1,400	1,400

3. Narrative:

- (a) This project will rehabilitate portions of a late 1940's vintage multiprogram laboratory building. The roof will be replaced with a state-of-the-art insulation-roof membrane system. Offices will be rehabilitated to include suspended acoustic ceilings, lighting, floor finishes and environmental systems. Window units will be replaced with energy efficient ones that use double paned glass. Four bathrooms will be rehabilitated to conform to current standards. Two major greenhouses, attached to the building, will be reglazed.
- (b) The current building flat roof floods and then leaks during rains and snows. The building is uninsulated. The existing offices and bathrooms are substandard. The existing condition of the greenhouse glazing is unsatisfactory for adequate research due to air and water leakage.
- (c) \$500,000 is requested for FY 1988 funding. The FY 1988 Architect/Engineering contract will be negotiated. Construction and procurement will be started.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. R. Plant Funded Construction Project

- |   |                                   |
|---|-----------------------------------|
| 1. Project title and location: 87-R-759 Upgrade Steam Distribution System | Project TEC: \$ 6,800             |
| Oak Ridge National Laboratory (ORNL)                                      | Start Date: 1st Qtr. FY 1987      |
| Oak Ridge, Tennessee  | Completion Date: 4th Qtr. FY 1990 |

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1987	\$ 1,328	\$ 1,328	\$ 1,128
1988	5,472	5,472	2,979
1989	0	0	1,900
1990	0	0	793

3. Narrative:

- (a) This project will replace deteriorated portions of the ORNL steam distribution system. Condensate return lines, looping and isolation valves will be provided as appropriate.
- (b) The ORNL steam distribution system was originally built in the early 1940's. The underground piping has been in service for more than 30 years and is approaching the end of its expected life. Recent emergency repairs have been costly. The new system will help ensure continuity of operation.
- (c) \$5,472,000 is requested for FY 1988 funding. Major project procurement and construction will be on-going in FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

- |   |  |
|---|--|
| 1. Project title and location: 87-R-75R Rehabilitate Mechanical Utilities<br>Lawrence Berkeley Laboratory (LBL)<br>Berkeley, California | Project TEC: \$ 5,500<br>Start Date: 2nd Qtr. FY 1987<br>Completion Date: 4th Qtr. FY 1990 |
|---|--|

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1987	\$ 915	\$ 915	\$ 260
1988	3,000	3,000	1,100
1989	1,585	1,585	2,580
1990	0	0	1,560

3. Narrative:

- (a) This project will upgrade the most deficient sections of key mechanical utilities including domestic water mains, central compressed air plant, natural gas mains and cooling towers.
- (b) The portions of the utility systems that will be replaced are approximately 40 years old. Maintenance costs have become excessive and service interruptions frequent. Most systems do not meet applicable codes and standards.
- (c) \$3,000,000 is requested for FY 1988 funding. Major project construction and procurement will be started during FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: 87-R-757 Electrical System Rehabilitation  
 Lawrence Berkeley Laboratory (LBL)  
 Berkeley, California

Project TEC: \$ 2,600  
 Start Date: 2nd Qtr. FY 1987  
 Completion Date: 4th Qtr. FY 1989

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1987	\$ 300	\$ 300	\$ 140
1988	2,300	2,300	1,780
1989	0	0	680

3. Narrative:

- (a) This project will rehabilitate the 12kV main substation of LBL's power distribution system. Rehabilitation will include replacing six existing air circuit breakers, adding incoming line breakers, replacing one existing tie switch, adding feeder breakers and installing a data acquisition system for monitoring energy usage.
- (b) The existing 12kV main substation does not meet current National Electrical Code safety requirements. This project will correct the existing deficiencies.
- (c) \$2,300,000 is requested for FY 1988 funding. Construction and inspection will be completed in FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: R7-R-756 Water Line Replacement  
 Argonne National Laboratory (ANL)  
 Argonne, Illinois
- Project TEC: \$ 5,200  
 Start Date: 1st Qtr. FY 1987  
 Completion Date: 4th Qtr. FY 1989

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1987	\$ 566	\$ 566	\$ 400
1988	2,000	2,000	2,100
1989	2,634	2,634	2,700

3. Narrative:

- (a) This project will rehabilitate deteriorated water lines in three water distribution systems which serve permanent building areas at ANL. The three systems are: 1) domestic/fire water, 2) laboratory water, and 3) canal water. Approximately 18 miles of cast iron water lines will be replaced with polyvinyl chloride (PVC) pipe and reinforced concrete pipe (RCP).
- (b) Existing domestic/fire water system lines are becoming unreliable for fire protection purposes due to soil-side corrossions of the pipes. Pipe breaks are becoming more frequent and are very disruptive to operations. Canal water and laboratory water system lines are co-located with domestic/fire water lines and are heavily scaled reducing their rated flow significantly.
- (c) \$2,000,000 is requested for FY 1988 funding. Major project construction and procurement will continue during FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: A7-R-755 Mechanical System Rehabilitation  
 Argonne National Laboratory (ANL)  
 Argonne, Illinois
- Project TEC: \$ 3,200  
 Start Date: 1st Qtr, FY 1987  
 Completion Date: 1st Qtr, FY 1989

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1987	\$ 600	\$ 600	\$ 575
1988	2,100	2,100	1,590
1989	500	500	1,035

3. Narrative:

- (a) This project will restore worn parts of the central heating, ventilation and air conditioning systems in three large office and laboratory buildings. Restored parts will include chilled water coils, preheat coils, filters and packaged air handling units.
- (b) The existing units are 25 to 35 years old and have reached the end of their expected life. The systems are no longer reliable and maintenance has become costly and time consuming.
- (c) \$2,100,000 is for FY 1988 funding. Major construction will be ongoing during FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: R7-R-753 Rehabilitate Laboratory Space  
 Argonne National Laboratory (ANL)  
 Argonne, Illinois

Project TEC: \$12,035  
 Start Date: 1st Qtr. FY 1987  
 Completion Date: 3rd Qtr. FY 1990

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1987	\$ 1,235	\$ 1,235	\$ 1,235
1988	3,600	3,600	2,000
1989	3,600	3,600	4,100
1990	3,600	3,600	4,700

3. Narrative:

- (a) This project will renovate six laboratory/office wings (166,000 gross square feet) of Building 200, a multipurpose laboratory and office building in the central part of the ANL site. The project will: 1) replace or upgrade the electrical distribution and lighting systems, the heating, ventilation and air conditioning systems and the plumbing and piping systems; and 2) repair and upgrade the building envelope (especially windows) and building interiors (ceiling, walls and doors).
- (b) Building 200 has been in continuous use since its construction in 1951. There has been no renovating or reconditioning of this space since its construction so building systems have deteriorated and are not fully reliable or effective. The facility does not meet current construction codes and safety standards.
- (c) \$3,600,000 is requested for FY 1988 funding. Major project construction will begin this fiscal year.





DEPARTMENT OF ENERGY  
FY 1988 CONGRESSIONAL BUDGET REQUEST  
ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
(dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: B6-R-726 Fire Protection Improvements (Phase II)  
Brookhaven National Laboratory (BNL)  
Upton, New York
- Project TEC: \$ 3,000  
Start Date: 2nd Qtr. FY 1986  
Completion Date: 4th Qtr. FY 1988

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1986	\$ 481	\$ 481	\$ 127
1987	1,680	1,680	1,299
1988	400	400	1,119
1989	439	439	455

3. Narrative:

- (a) This project provides for the design, fabrication and installation of fire improvements including automatic sprinklers, transferring the existing fire alarm panels to a multiplexed central alarm station and installing localized fire extinguishing systems.
- (b) The purpose of this project is to reduce the risk of loss due to fire at BNL. The project will bring BNL into compliance with DOE requirements.
- (c) \$400,000 is requested for FY 1988 funding. Construction will be ongoing during FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: BS-R-709 Central Chilled Water Plant  
 Argonne National Laboratory (ANL)  
 Argonne, Illinois

Project TEC: \$ 5,200  
 Start Date: 1st Qtr. FY 1986  
 Completion Date: 4th Qtr. FY 1988

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1986	\$ 962	\$ 962	\$ 62
1987	3,600	3,600	3,650
1988	638	638	1,488

3. Narrative:

- (a) This project provides a central chilled water plant to serve all the principle buildings in the central research area. New chillers and connecting distribution lines and pumps will be installed. Existing cooling towers, pumps, piping and electrical power that once served the Zero Gradient Synchrotron will be reutilized.
- (b) The project offers an integrated, cost-saving alternative to piecemeal replacing and repairing of existing steam-driven chillers that are beyond their normal life expectancy. The central facility will provide lower initial cost, better control and more economical and reliable operation.
- (c) \$638,000 is requested for FY 1988 funding. FY 1988 is the final funding year. Project construction and inspection will be completed during the year.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: 85-R-707 Hanford Site Fire Alarm System Upgrade  
 Richland, Washington

Project TEC: \$ 4,850  
 Start Date: 1st Qtr. FY 1985  
 Completion Date: 4th Qtr. FY 1988

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1985	\$ 1,300	\$ 1,300	\$ 91
1986	1,708	1,708	707
1987	892	892	2,885
1988	617	617	687
1989	333	333	480

3. Narrative:

- (a) This project will provide an upgraded fire alarm system for the Hanford site. The project will replace all existing master alarm boxes and street boxes with radio boxes, replace alarm receiving equipment, replace/upgrade existing auxiliary fire protection system, and provide a computer aided dispatch system.
- (b) The purpose of this project is to update the existing fire alarm system with a more reliable and efficient system. The existing system is 30 to 40 years old. Due to deterioration the system is malfunctioning (false and nuisance alarms).
- (c) \$617,000 is requested for FY 1988 funding. Construction and inspection will be completed during FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

- |  |                                   |
|--|-----------------------------------|
| 1. Project title and location: 85-R-706 Medical Facility | Project TEC: \$ 7,300             |
| Lawrence Livermore National Laboratory (LLNL)            | Start Date: 1st Qtr. FY 1985      |
| Livermore, California                                    | Completion Date: 1st Qtr. FY 1988 |

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1985	\$ 500	\$ 500	\$ 196
1986	2,694	2,694	338
1987	3,600	3,600	4,404
1988	162	162	1,662
1989	344	344	700

3. Narrative:

- (a) This project will provide a 25,600 gross square foot building for a new and expanded facility for health services and will house all of the 32 medical staff and support personnel. The new facility will have special facilities for isolation and treatment of casualties from accidents involving hazardous materials.
- (b) The current health facility is housed in a 40 year old building (originally a World War II barracks) that is inadequate for housing medical staff and equipment necessary to serve a laboratory staff of 7600 employees. The existing facility does not meet code standards nor is it generally capable of handling a large variety of emergency situations.
- (c) \$162,000 is requested for FY 1988 funding. Project construction will be ongoing during the year.

DEPARTMENT OF ENERGY  
FY 1988 CONGRESSIONAL BUDGET REQUEST  
ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
(dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: R5-R-702 Replace Laboratory Roofs  
Argonne National Laboratory (ANL)  
Argonne, Illinois

Project TEC: \$ 8,950  
Start Date: 1st Qtr. FY 1985  
Completion Date: 4th Qtr. FY 1988

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1985	\$ 3,308	\$ 3,308	\$ 2,110
1986	2,983	2,983	3,312
1987	2,392	2,392	3,261
1988	267	267	267

3. Narrative:

- (a) This project will replace buildup membrane roofs on principal general purpose laboratory buildings. Approximately 880,000 square feet of roof will be replaced and insulation will be added as appropriate.
- (b) The purpose of this project is to restore weather tightness of roofs on laboratory buildings; and to bring insulation up to current Federal energy use standards. Most roofs are 25 years old or older.
- (c) \$267,000 is requested for FY 1988 funding. Construction and inspection will be completed in FY 1988.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: 85-R-701 Central Chilled Water Facility  
 Brookhaven National Laboratory (BNL)  
 Upton, New York
- Project TEC: \$15,000  
 Start Date: 1st Qtr. FY 1985  
 Completion Date: 3rd Qtr. FY 1988

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1985	\$ 2,200	\$ 2,200	\$ 425
1986	6,832	6,832	473
1987	5,700	5,700	7,714
1988	268	268	6,388

3. Narrative:

- (a) This project will construct a central chilled water and compressed air facility, providing 5,100 tons of refrigeration and 1,500 standard cubic feet per minute of compressed air. The project includes installation of underground piping and erection of a cooling tower and two buildings.
- (b) This project is the most cost effective method for replacing existing major refrigeration and compressed air equipment that has become obsolete and beyond economical repair. Existing equipment is decentralized and difficult to maintain and operate. A central chilled water facility will provide lower initial construction cost, better control and more economical operation.
- (c) \$268,000 is requested for FY 1988 funding. FY 1988 is the final funding year. Project construction and inspection will be completed during the year.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Multiprogram Energy Laboratories - General Purpose Facilities

IV. B. Plant Funded Construction Project

1. Project title and location: R4-ER-103 Road Repairs  
 Various locations  
 (ANL, INEL, LRL, RL)

Project TEC: \$17,777  
 Start Date: 2nd Qtr. FY 1984  
 Completion Date: 4th Qtr. FY 1990

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1984	\$ 6,500	\$ 6,500	\$ 737
1985	3,750	3,750	7,098
1986	2,973	2,977	3,999
1987	1,807	3,016	1,845
1988	500	500	900
1989	500	500	2,394
1990	538	538	808

3. Narrative:

- (a) This project is for restoration, widening and improvement of portions of the roads at four sites - - Richland, INEL, ANL and LRL. Repair methods will vary from solely applying new asphalt covering to demolishing and reconstructing the road base and then resurfacing. In some cases, roads will also be widened, straightened or leveled to meet accepted standards for highway safety.
- (b) This project is needed to bring site roads into conformance with current standards and practices in construction and traffic safety. Accident rates and severity due to poor pavement condition and geometries will decrease. Expensive annual road repairs due to deteriorated road base will be greatly reduced.
- (c) \$500,000 is requested for FY 1988 funding. Construction will be ongoing.



DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Environmental Compliance

IV. B. Plant Funded Construction Project

1. Project title and location: 88-R-830 Liquid Low-Level Waste Collection and Transfer System Upgrade  
 Oak Ridge National Laboratory  
 Oak Ridge, Tennessee
- Project TEC: \$35,000  
 Start Date: 1st Qtr. FY 1988  
 Completion Date: 4th Qtr. FY 1991

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1988	\$ 4,800	\$ 4,800	\$ 2,400
1989	11,700	11,700	8,100
1990	13,300	13,300	17,600
1991	5,200	5,200	6,900

3. Narrative:

- (a) This project will upgrade a portion of the existing Bethel Valley liquid low-level waste collection and transfer system. The project includes approximately one mile of doubly contained stainless steel piping and five stainless steel tanks (to be underground in stainless-steel lined concrete vaults). The pipelines will be equipped with an active leak detection and monitoring system and will be tied in with an overall operational central control system. The project will also include a new (4000 sq. ft.) central facility for receiving and discharging to the pipeline system liquid low-level waste which will be transported by truck in tanks and small bottles (in lieu of piping). Appropriately equipped new trucks will be provided to transport waste.
- (b) The purpose of this project is to upgrade a significant portion of liquid low-level waste collection and transfer system to protect personnel and public safety and health and the environment and to meet all applicable regulations. The majority of the existing system was constructed in the 1940's using materials and approaches considered applicable at the time. The original pipes are rapidly deteriorating and leaks are expected to occur at an increasing rate.
- (c) \$4,800,000 is requested for FY 1988 funding. This will be the first year of funding. Design criteria and advance procurement reporting will be complete. The Architect/Engineering contract will be negotiated with detailed design initiated. Long-lead procurement (i.e., 12 months or more) will be underway.

DEPARTMENT OF ENERGY  
 FY 1988 CONGRESSIONAL BUDGET REQUEST  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 (dollars in thousands)

KEY ACTIVITY CONSTRUCTION PROJECT SUMMARY

Multiprogram Energy Laboratories - Facilities Support  
 Environmental Compliance

IV. B. Plant Funded Construction Project

1. Project title and location: 86-R-801 Non-Radiological Process Waste Treatment      Project TEC: \$18,000  
 Oak Ridge National Laboratory      Start Date: 1st Qtr. FY 1986  
 Oak Ridge, Tennessee      Completion Date: 4th Qtr. FY 1989

2. Financial schedule:

<u>Fiscal Year</u>	<u>Appropriated</u>	<u>Obligations</u>	<u>Costs</u>
1986	\$ 2,887	\$ 2,887	\$ 1,552
1987	7,000	7,000	5,000
1988	8,000	8,000	7,148
1989	113	113	4,300

3. Narrative:

- (a) This project will bring the existing non-radiological process waste system into compliance with environmental regulations. It includes tonage to replace surface impoundments, pumps and piping to transfer wastewater and, improved processes for removing wastes from process waste water streams and for handling resultant solid wastes. In some instances, process wastes will be treated where they are generated rather than piping them to a central location.
- (b) This project is needed to resolve the major Clean Water Act concerns at ORNL with respect to the discharge of non-radiological process wastewater and to eliminate the discharge of hazardous wastewater into surface impoundments by November 8, 1988, in compliance with provisions of the Reauthorized Resource Conservation and Recovery Act (RCRA).
- (c) \$8,000,000 is requested for FY 1988 funding. FY 1988 is the third year of 4 years of funding. Construction will be ongoing and inspection will be initiated.

# Congressional Budget Request

Construction Project Data Sheets:  
Energy Supply Research and Development  
General Science  
Uranium Enrichment  
Naval Petroleum & Oil Shale Reserves

FY 1988



U.S. Department of Energy  
Assistant Secretary,  
Management and Administration  
Office of the Controller  
Washington, D.C. 20585  
January 1987

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Upgrade fire protection facilities at Y-12 Oak Ridge National Laboratory (ORNL) Oak Ridge, Tennessee	2. Project No.: 88-R-817
3. Date A-E work initiated: 1st Qtr. FY 1988 3a. Date physical construction starts: 4th Qtr. FY 1988 4. Date construction ends: 4th Qtr. FY 1990	5. Previous cost estimate: none Date: none 6. Current cost estimate: \$ 1,750 Less amount for PE&D: 0 Net cost estimate: \$ 1,750 Date: June 1986

7. <u>Financial Schedule</u>	<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1988	\$1,750	\$ 800	\$ 800	\$ 280
	1989	0	950	950	855
	1990	0	0	0	615

8. Brief Physical Description of Project

Upgrade fire protection facilities at Y-12 is the ORNL segment of a program to provide new or updated fire protection systems throughout the Y-12 Plant site. This project, along with a related similar project submitted by Y-12, will correct deficiencies that have been identified in fire protection audits of the Y-12 Plant conducted by DOE, the Operating Contractor (OC) Fire Protection Engineering Staff, and an independent contractor.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Upgrade fire protection facilities at Y-12 Oak Ridge National Laboratory (ORNL) Oak Ridge, Tennessee	2. Project No.: 88-R-817
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8. Brief Physical Description of Project (continued)

The work will include the installation of sprinkler systems, early warning devices, and improved systems to facilitate efficient firefighting efforts in the ORNL Research Facilities housed within buildings at the Y-12 Plant. The work will be performed in buildings housing the Biology, Operations, Engineering Technology, and Fusion Energy Divisions of ORNL. Wet or dry sprinkler systems, or Halon systems, will be provided for office areas, storage areas, and laboratories in certain buildings as required. Early warning systems such as heat and/or smoke detection devices and temperature or pressure alarms will be provided for certain areas. Centralized master box and by-pass switch locations, as well as improved firewater distribution systems and fire dampers, will be provided to improve the efficiency of firefighting efforts in certain buildings. Improved facilities for the safe handling of flammable/hazardous materials, including one new flammable liquid storage building, will be provided in certain areas.

9. Purpose, Justification of Need for, and Scope of Project

The purpose of this project is to correct deficiencies that have been identified by the OC Fire Protection Audits and DOE Audits conducted by an independent contractor. Correction of these deficiencies will help bring the ORNL Facilities at Y-12 into compliance with DOE Order 5480.1, Chapter 7, "Fire Protection." This, in turn, will aid ORNL in maintaining the "improved risk" concept of fire protection which includes life, safety, and property conservation.

As a result of these fire protection deficiencies, research programs such as Impurities Study Experiment, Thermal Hydraulic Out of Reactor Safety, Elmo Bumpy Torus, Large Coil Test Facility, Core Flow Test Loop, Isotope Enrichment Production, and Prestressed Concrete Reactor Vessel are subject to incurring financial and operational losses in the event of a fire. Several office areas, laboratories, and workshops in the Engineering Technology, Fusion Energy, Operations, and Biology Divisions must have sprinkler protection installed to minimize potential personal injury and property loss in the event of a fire. Low firewater pressure on the upper floors of the Biology Facility reduces firefighting effectiveness in this building which houses many of the Biology Division's animal research facilities.

CONSTRUCTION PROJECT DATA SHEETS

<b>I. Title and location of project:</b> Upgrade fire protection facilities at Y-12 Oak Ridge National Laboratory (ORNL) Oak Ridge, Tennessee	<b>2. Project No.:</b> 88-R-817
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**10. Details of Cost Estimate\***

	<u>Item Cost</u>	<u>Total Cost</u>
a. Engineering, design, and inspection at approximately 20% of construction costs, item b. ....		\$ 245
b. Construction costs.....		1,199
(1) Building modifications.....	\$1,199	
Subtotal.....		1,444
c. Contingency at approximately 21% of above costs.....		306
Total project cost.....		\$1,750

\*Based on data from a conceptual design report completed in FY 1984 and revised in February 1985 at a total cost of \$55,000.

**11. Method of Performance**

Design and inspection will be performed under a negotiated architect-engineer contract. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts awarded on the basis of competitive bids.

**12. Funding Schedule of Project Funding and Other Related Funding Requirements**

Not required because the total estimated cost is less than \$5,000,000.

**13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements**

Not required because the total estimated cost is less than \$5,000,000.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

- |  |   |
|--|---|
| 1. Title and location of project: Sanitary sewage treatment facility<br>Pacific Northwest Laboratory<br>Richland, Washington | 2. Project No.: 88-R-814  |
| 3. Date A-E work initiated: 2nd Qtr. FY 1988   | 5. Previous cost estimate: none<br>Date: none \$  |
| 3a. Date physical construction starts: 3rd Qtr. FY 1989  | 6. Current cost estimate: \$ 3,000<br>Less amount for PE&D:       0<br>Net cost estimate:       \$ 3,000<br>Date: June 1986 |
| 4. Date construction ends: 4th Qtr. FY 1990  |   |

7. <u>Financial Schedule:</u>	<u>Fiscal year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1988	\$ 3,000	\$ 1,000	\$ 1,000	\$ 420
	1989	0	2,000	2,000	1,800
	1990	0	0	0	780

8. Brief Physical Description of Project

This project will provide a new sanitary sewage treatment facility of about 300,000 gallons/day capacity to replace the existing undersized and inadequate septic tank system. A pre-engineered metal building about 24 feet x 28 feet, utilities and a road will be provided for the sewage treatment facility operations and maintenance. Process water in laboratory buildings now going to the sanitary sewer will be properly routed to the process sewer to minimize loads on the sewage treatment facility.

Improvements to land includes clearing and grading about four acres of unoccupied land north of the 300 Area for the new sanitary storage treatment facility, a fence around the plant and a road to the plant.

CONSTRUCTION PROJECT DATA SHEETS

- 
1. Title and location of project: Sanitary sewage treatment facility  
Pacific Northwest Laboratory  
Richland, Washington
2. Project No.: 88-R-814
- 

8. Brief Physical Description of Project (continued)

Buildings include a pre-engineered building of about 700 square feet with operating, laboratory and maintenance space.

Utilities in the project include the elements making up the sewage treatment plant, such as ponds, diversion systems and other secondary treatment systems; installation of about 3300 feet of water line, electrical supply and telephone line to the sewage treatment plant.

9. Purpose, Justification of Need For, and Scope of Project

The existing 300 Area sanitary sewage system is in marginal compliance with the state of Washington regulations and may not be in compliance with new proposed guidelines. Environmental data collected to assess the impact of the existing 300 Area sanitary sewage system on the underlying ground water and the adjacent stretch of the Columbia River revealed low fecal coliform bacteria levels upstream, adjacent to and downstream of the sewage leaching trenches. The data indicates fecal coliform concentrations below the State of Washington criteria for Class A water, provided that direct domestic usage of the ground water is restricted accordingly. While the presence of fecal coliform in the ground water is marginally acceptable at this time because well water is not used for human consumption, it could prove to be unacceptable in the near future with expected stricter interpretation of Washington State laws. The State's program goal is to maintain the highest possible standards to ensure the purity of all waters in the state. It also requires the use of all known available and reasonable methods to prevent and control the discharge of wastes into state waters. The existing septic tank installation was designed for approximately 95,000 gallons/day and it is overloaded in regard to sewage treatment by the 250,000-400,000 gallons/day (winter and summer, respectively) entering the system. The Washington State Health Department has indicated that construction of any additional septic tanks to increase the capacity would not be approved as the use of septic tanks is not an acceptable means of sewage treatment for the present use. About 140,000 gallons/day of summertime cooling water for air conditioning units will be rerouted to other sewer systems to minimize the design capacity of the new sewage treatment plant. The new sewage treatment plant will be designed for about 300,000 gallon/day, which will allow for a 20% growth.

It is estimated that the gross annual added cost for operating the new sewage plant is \$40,000 per year, which consists of \$30,000 for operations and maintenance and \$10,000 for utility costs.



CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Sanitary sewage treatment facility  
Pacific Northwest Laboratory  
Richland, Washington

2. Project No.: 88-R-814

10. Details of Cost Estimate

	<u>Item Costs</u>	<u>Total Cost</u>
a. Engineering, design and inspection @ about 14% of construction, Item b.		\$ 300
b. Construction costs.....		2,200
(1) Improvements to land - 460.....	\$ 450	
(2) Buildings - 501,700 sq. ft @ \$100/sq ft.....	70	
(3) Other structures - 550.....	0	
(4) Special facilities 700.....	0	
(5) Utilities - 600.....	1,680	
c. Contingency @ about 20% of above costs.....		500
Total estimated cost.....		<u>\$ 3,000</u>

11. Method of Performance

Definitive design and construction engineering/inspection will be performed by an offsite architect-engineer (A-E) under a negotiated contract. Construction of the sanitary sewage facility will be performed by fixed price contractors awarded on the basis of competitive bids. Project management will be by the operating contractor.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not Required

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

- |   |   |
|---|---|
| 1. Title and location of project: Hazardous waste handling facility<br>Lawrence Berkeley Laboratory (LBL)<br>Berkeley, California | 2. Project No.: 88-R-812  |
| 3. Date A-E work initiated: 2nd Qtr. FY 1988<br><br>3a. Date physical construction starts: 4th Qtr. FY 1989                       | 5. Previous cost estimate: none<br>Date:  |
| 4. Date construction ends: 1st Qtr. FY 1991   | 6. Current cost estimate: \$ 4,650<br>Less amount for PE&D: 0<br>Net cost estimate: \$ 4,650<br>Date: June 1986 |

7. <u>Financial Schedule:</u>	<u>Fiscal year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1988	\$ 4,650	\$ 500	\$ 500	\$ 350
	1989	0	4,150	4,150	1,660
	1990	0	0	0	2,115
	1991	0	0	0	525

8. Brief Physical Description of Project

This project will provide a remote site for a badly needed hazardous waste handling facility including a specialized 12,300 gross square feet building and adjacent yard area.

The project will be located in upper Strawberry Canyon, north of the Buildings 74-83 Biosciences Complex. Construction will include an access road, site utilities, grading and paving of two yard areas, and a 12,300 GSF building for hazardous waste handling and storage. Yard lighting, fencing, storm drainage, and sanitary sewers will also be provided. To avoid costly imported fill, the project will utilize two on-site borrow areas. These areas will be graded and sealed to control erosion, and will serve as remote vehicle storage areas.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Hazardous waste handling facility  
Lawrence Berkeley Laboratory (LBL)  
Berkeley, California

2. Project No.: 88-R-812

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8. Brief Physical Description of Project (continued)

The hazardous waste handling facility is sited in general conformance with the 1984 LBL Site Development Plan approved by the Department of Energy in FY 1984.

The new Government-owned facilities described herein will be located on leased land owned by the Regents of the University of California.

9. Purpose, Justification of Need, and Scope of Project

Many factors necessitate the relocation of the LBL hazardous waste handling facility. The existing facility was constructed as a temporary handling area with the expectation that a permanent facility would be constructed at a later date, in accordance with the LBL site plan. Currently, the facility handles diverse hazardous wastes including radioactive transuranic elements, toxic liquid chemicals such as PCB's, toxic gases such as phosphine and arsene, and flammable solvents. Handling and detoxifying these wastes always poses the potential for releases from accidental causes such as traffic accidents, fire, incomplete reactions or explosions.

In its current location, the facility is in close (350-500 feet) proximity to large laboratory (250 personnel) and non-laboratory (400 personnel) populations. Thus, relocating the handling facility to the proposed site would reduce potential exposure to personnel in the event of a release.

Additionally, the interim facility is located in a region that has been prone to landslides in the past. A recent Environmental Protection Agency (EPA) review identified the flammable materials storage area as requiring improvement. The facility relocation would alleviate the need for improvement.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Hazardous waste handling facility  
Lawrence Berkeley Laboratory (LBL)  
Berkeley, California

2. Project No.: 88-R-812

10. Details of Cost Estimate \*

	<u>Item Costs</u>	<u>Total Cost</u>
a. Engineering, design and inspection @ about 17% of construction, Item b.....		\$ 565
b. Construction costs.....		3,310
(1) Improvements to land.....	\$1,415	
(2) Building: 12,300 Sq. ft. @ \$113/sq. ft. ....	1,390	
(3) Site utilities.....	505	
Mechanical.....	\$ 180	
Electrical.....	325	
Subtotal.....		<u>3,875</u>
c. Contingency @ 20% of above costs.....		775
Total estimated cost.....		<u>\$4,650</u>

\* Conceptual design is complete.

11. Method of Performance

Engineering, design and inspection will be performed under a negotiated Architect-Engineer subcontract. Inspection and some engineering will be done by LBL personnel. Construction and procurement will be accomplished by fixed price subcontracts awarded on the basis of competitive bids. Minor construction work may be done using LBL forces. At the time of scoping construction and procurement, specific parts of the project will be set aside for Small Business Administration (SBA) 8A subcontracts. Candidate items are landscaping, hydroseeding, furnishings, and specialty items.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not required.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Plant Modifications to Comply with EPA Requirements 2. Project No.: 88-R-809  
 Argonne National Laboratory (ANL)  
 Argonne, Illinois

3. Date A-E work initiated: 1st Qtr. FY 1988

5. Previous cost estimate: none  
 Date: N/A

3a. Date physical construction starts: 4th Qtr. FY 1988

6. Current cost estimate: \$ 1,820  
 Less amount for PE&D: 0  
 Net cost estimate: \$ 1,820  
 Date: September 1986

4. Date construction ends: 2nd Qtr. FY 1990

7. Financial Schedule:	Fiscal Year	Authorization	Appropriations	Obligations	Costs
	1988	\$ 1,820	\$ 820	\$ 820	\$ 600
	1989	0	1,000	1,000	880
	1990	0	0	0	340

8. Brief Physical Description of Project

This project will collect and neutralize coal pile run-off (rainwater) at a new treatment facility before discharging it to Sawmill Creek. An earthen dirt berm with an impervious clay liner installed near the coal pile will provide positive containment and collection of the run-off in an equalization pond. It will then be clarified and neutralized with caustic before being discharged into Sawmill Creek. The coal particles will be thickened and dewatered prior to ultimate disposal.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Plant Modifications to Comply with EPA Requirements 2. Project No.: 88-R-809  
Argonne National Laboratory (ANL)  
Argonne, Illinois

8. Brief Physical Description of Project (continued)

Untreated boiler cooling and demineralizer rinse waters originating at the site will be diverted from storm water drainage systems feeding Sawmill Creek into the laboratory sewer system. Boiler bottom blowdown from Building 108 will be diverted from a retention pond that flows to Sawmill Creek into the new coal pile runoff treatment plant. Pressure filter blowdown from the domestic water treatment plant, sludge blowdown from the canal water treatment plant, and untreated cooling tower blowdown will be diverted from storm water drainage systems feeding Sawmill Creek into the sanitary sewer system.

Partial excavation, dewatering, disposal of water treatment plant solids from the existing lime sludge pond, and other associated work will be performed. The lime sludge will be utilized as a soil sweetener on farmland.

9. Purpose, Justification of Need, and Scope of Project

Coal, the principal fuel at the Boiler House, is stored outdoors in a large pile. Precipitation that falls on the coal pile reacts with the sulfur in the coal to form sulfuric acid and dissolves iron and other metals to a level exceeding EPA effluent limitations for discharge into Sawmill Creek and the Des Plaines River. At present, this run-off is collected and directed into a sludge pond on the site, which overflows into Sawmill Creek during times of heavy rain. Implementation will assure compliance with EPA regulations for direct discharge of the treated coal pile run-off into the creek.

Effluent discharge samples from the various National Pollution Discharge Elimination System (NPDES) permit locations have been in violation of EPA permit limits. In order to comply with the permit criteria it is necessary to divert these contaminated flow streams from the domestic water and canal water treatment plants and various building cooling towers to the sanitary sewer system. Collection of the boiler cooling and demineralizer blowdowns from Building 108 would permit treatment of the constituents in violation of standards. These wastes will be ultimately conveyed to the central waste water treatment plant located at facility 570 for treatment prior to discharge into Sawmill Creek.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Plant Modifications to Comply with EPA Requirements 2. Project No.: 88-R-809  
Argonne National Laboratory (ANL)  
Argonne, Illinois

9. Purpose, Justification of Need for and Scope of Project (continued)

The existing water treatment plant uses lime addition to "soften" the relatively hardwater caused by the ions of calcium and magnesium present in the water supply. These ions are precipitated as lime sludges in the water softening process. The lime sludges are conveyed to a sludge pond for disposal. An ion exchange water treatment system is currently under construction and will eliminate further generation of lime sludges and need for use of the pond.

Continuous effluent discharges from the sludge pond are polluting neighboring Sawmill Creek (used for swimming and fishing). These violations have been cited by the Illinois Environmental Protection Agency (IEPA) and are a health safety and public relations problem for ANL and the Department of Energy (DOE).

Underlying the sludge pond is a 100 ft. thick deposit of glacial till on top of the Niagaran Shallow Dolomite Bedrock Aquifer. This is widely used as a source of groundwater by ANL and adjacent municipalities. The existing pond is a blight on the landscape, killing vegetation and continuing to expand the adjacent area into a barren swamp.

Partial cleaning out the accumulated lime sludges in the sludge pond and some other associated work will mitigate further EPA permit violations of adjacent waters and will also slow down the rate of decay of the surrounding vegetation.

10. Details of Cost Estimate \*

	<u>Total Cost</u>
a. Engineering, design and inspection @ approximately 15% of construction, Item b.....	\$ 198
b. Construction costs.....	1,326
c. Contingency @ approximately 19% of above costs.....	296
Total estimated cost.....	<u>\$1,820</u>

\*Based upon a completed conceptual design and current cost data.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Plant Modifications to Comply with EPA Requirements 2. Project No.: 88-R-809  
Argonne National Laboratory (ANL)  
Argonne, Illinois

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11. Method of Performance

Engineering, design and inspection will be performed by Laboratory engineering personnel, aided by outside Architect/Engineering (A/E) firms. Construction will be accomplished by fixed-price contract awarded on the basis of competitive bidding.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not Applicable.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not Applicable.



DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Electrical system rehabilitation, phase I Argonne National Laboratory (ANL) Argonne, Illinois	2. Project No.: 88-R-807
3. Date A-E work initiated: 1st Qtr. FY 1988	5. Previous cost estimate: none Date: none
3a. Date physical construction starts: 3rd Qtr. FY 1989	6. Current cost estimate: \$ 5,060 Less amount for PE&D: 0 Net cost estimate: \$ 5,060 Date: June 1986
4. Date construction ends: 4th Qtr. FY 1991	

7. <u>Financial Schedule</u>	<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1988	\$5,060	\$ 500	\$ 500	\$ 400
	1989	0	2,000	2,000	1,600
	1990	0	2,560	2,560	3,060

8. Brief Physical Description of Project

The project provides for the rehabilitation of the main electrical distribution system's major components. The work consists of the following critical elements:

- a. Replace the two 10MVA, 132kV/12.5kV, main transformers at Facility 543 and provide oil containment facilities in accordance with current Federal/State Environmental Protection Agency (EPA) regulations. This work consists of the following:
  - (1) Replace two over-aged 10 MVA, 132 kV/12.5kV oil-filled transformers with new units.
  - (2) Provide oil containment facilities to comply with the current Federal EPA regulations.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Electrical system rehabilitation, phase I      2. Project No.: 88-R-807  
Argonne National Laboratory (ANL)  
Argonne, Illinois

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8. Brief Physical Description of Project (continued)

- (3) Replace two over-aged 15kV oil circuit-breakers with new vacuum circuit-breakers.
  - (4) Replace inadequate metering and protective relaying equipment with new equipment.
  - (5) Replace the air "tie" switch with a new vacuum circuit-breaker with needed automatic transfer capabilities.
  - (6) Provide, as a part of the new metering equipment, provisions for ultimate future expansion into the energy monitoring and control system.
  - (7) Repair and paint the overhead structure.
- b. Replace deteriorating poles, cross-arms insulators, down-guys, and miscellaneous hardware on the two main two 15kV overhead lines between Facility 543 and Facility 544.
- c. Replace the two 1MVA voltage regulators at Facility 544. This work consists of the following:
- (1) Replace nine obsolete 15kV air switches on the overhead structure with new units.
  - (2) Replace the "government surplus" 1.0MVA, 12kV voltage regulators with new units sized to accommodate the forced-air ratings of the two 10MVA transformers at Facility 543 which feed these regulators.
  - (3) Replace the 15 aging oil-filled outdoor 15kV circuit-breakers with new vacuum circuit-breakers in a walk-in structure.
  - (4) Replace the protective relaying equipment with the state-of-the-art solid-state relaying equipment.
  - (5) Provide individual feeder metering facilities.
  - (6) Replace the inadequate meter house with space in the walk-in switchgear.
  - (7) Replace the aged battery and battery charging equipment with new state-of-the-art equipment.
- d. Replace two 1MVA, 12.5kV transformers at Facility 545 and provide oil containment facilities in accordance with current Federal/State EPA regulations. This work consists of the following:
- (1) Replace two 1MVA rebuilt "World War II government surplus" transformers with new oil-filled equipment.
  - (2) Provide oil containment facilities to meet Federal EPA requirements.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Electrical system rehabilitation, phase I      2. Project No.: 88-R-807  
Argonne National Laboratory (ANL)  
Argonne, Illinois

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8. Brief Physical Description of Project (continued)

- (3) Provide switchgear to protect the two new transformers and the recently relocated unit substation (for the scrubber facilities).
- (4) Provide required 480 volt protective vacuum circuit-breaker for the two new transformers.
- (5) Provide protective relaying equipment to protect and to coordinate the equipment with the entire distribution system.

9. Purpose, Justification of Need for, and Scope of Project

- a. The present transformers and regulators were "World War II government surplus" when they were installed thirty five years ago. They are now well over 40 years of age, which is beyond the predicted life expectancy of this type of equipment. The two old transformers in Facility 545 were "rebuilt" in 1978 after a failure in service. While this equipment is now operational, the risk of an unscheduled shutdown of the Laboratory facilities is high and is increasing. By 1988 the site's scientific programs will be in jeopardy if critical replacements are not made.
- b. There are no acceptable oil containment facilities at these locations. A major fault or leak in these oil-filled units could cause extensive and expensive cleanup problems, as well as the possibility of polluting the adjacent waterway systems.
- c. At the present there are very limited means of adequately measuring the electrical load or demand on these major pieces of equipment or main feeders. This information is critical to permit the Laboratory to intelligently monitor and analyze the site distribution system and to set overload devices on these feeders.
- d. The local utility company, as well as other large users of this type of equipment (transformers, regulators, switchgear, etc.) in general, write off the value of this equipment over thirty years. Thereafter, the components become candidates for replacement. The above described laboratory equipment is in a comparable category.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Electrical system rehabilitation, phase I      2. Project No.: 88-R-807  
Argonne National Laboratory (ANL)  
Argonne, Illinois

9. Purpose, Justification of Need for, and Scope of Project (continued)

- e. Certain parts, particularly air switches, are unreliable in their operation and replacement parts are impossible to obtain, as the manufacturer has long ago gone out of business. When replacement parts have been needed, they have been fabricated, which is extremely costly, and their reliability is questionable.
- f. The proposed rehabilitation of this critical equipment will assure continued reliability of the system to supply electrical power to the laboratory scientific programs.
- g. Other expected benefits are:
  - (1) Eliminate the costly emergency repairs and ultimate replacement of components on a "crash" basis in the event of the failure of a major component of the system.
  - (2) Reduction of the energy losses in these transformers will result in energy savings.

10. Details of Cost Estimate\*

	<u>Item Cost</u>
a. Engineering design and inspection @ 15% of construction costs, item b .....	\$ 590
b. Construction.....	3,930
c. Contingency @ 12% of above costs.....	540
Total estimated cost.....	<u>\$5,060</u>

\*Based upon a completed conceptual design and current cost data.

11. Method of Performance

The engineering work will be performed under a lump sum contract with a consultant with specific expertise in electrical distribution systems. The construction work will be a fixed price contract awarded on the basis of competitive bidding. Major equipment components will be purchased by the laboratory to expedite delivery of long lead time items. The current anticipated lead time for the transformers, regulators, and switchgear is 10 to 16 months. Advance procurement of these items will be instituted early in the project.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Electrical system rehabilitation, phase I  
 Argonne National Laboratory (ANL)  
 Argonne, Illinois

2. Project No.: 88-R-807

11. Method of Performance (continued)

All PCB (polychlorinated biphenol) contaminated equipment will be handled and disposed of according to EPA requirements. The project estimate includes the cost of PCB handling and disposal.

Laboratory personnel will perform field inspection. In order to not compromise the integrity of the system, phased replacement of equipment will be planned and scheduled to cause no interruption of electric service to the site.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

	<u>Prior</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>FY 1990</u>	<u>Total</u>
	<u>Years</u>				
a. Total project funding					
1. Total facility costs					
(a) Construction line item.....	\$ 0	\$ 400	\$1,600	\$3,060	\$5,060
(b) PE&D.....	0	0	0	0	0
(c) Expense funded equipment.....	0	0	0	0	0
(d) Inventories.....	0	0	0	0	0
Total facility costs.....	<u>\$ 0</u>	<u>\$ 400</u>	<u>\$1,600</u>	<u>\$3,060</u>	<u>\$5,060</u>
2. Other project funding					
(a) R&D necessary to complete construction.....	0	0	0	0	0
(b) Other project related costs.....	24	0	0	0	24
Total other project funding.....	<u>24</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>24</u>
Total project costs (Items 1 & 2)..	<u>\$ 24</u>	<u>\$ 400</u>	<u>\$1,600</u>	<u>\$3,060</u>	<u>\$5,084</u>
b. Other related funding requirements (estimated life of project: 30 years).....					\$ 0
1. Facility operating costs.....					0
2. Activity operating expenses directly related to the facility.....					0

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Electrical system rehabilitation, phase I      2. Project No.: 88-R-807  
Argonne National Laboratory (ANL)  
Argonne, Illinois

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12. Funding Schedule of Project Funding and Other Related Funding Requirements (continued)

3. Capital equipment not related to construction but related to the programmatic effort in the facility.....	0
4. GPP or other construction related to programmatic effort in the facility.....	0
5. Other costs.....	0
Total other related annual funding requirements.....	\$ 0

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility costs
  - (a) Construction line item - No narrative required
  - (b) PE&D - None
  - (c) Expense funded equipment - None
  - (d) Inventories - None
2. Other project funding
  - (a) No R&D effort is required
  - (b) \$24,000 for a conceptual design

b. Other related funding requirements

- The revised electrical distribution system will have a useful lifetime upwards of 30 years.
1. Facility operating costs - Implementation of this project will replace existing physical components in the electrical distribution system with new state-of-the-art equipment. This will result in a reduction of maintenance and operating costs while restoring an acceptable level of operational efficiency and reliability to the system, thus the system's operating cost is reported as zero.
  2. Activity operating expenses directly related to the facility - Although this project will restore and replace general purpose facilities employed to supply electrical power to a wide variety of activities, there is no activity operating expense directly related to, or required for support of this project, thus the activity operating expense is reported as zero.
  3. Capital equipment not related to construction but related to the activity effort in the facility - None
  4. GPP or other construction related to activity effort - None
  5. Other costs - None

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

- |   |   |
|---|---|
| 1. Title and location of project: Environmental health & safety project<br>Lawrence Berkeley Laboratory (LBL)<br>Berkeley, California | 2. Project No.: 88-R-806  |
| 3. Date A-E work initiated: 2nd Qtr. FY 1988  | 5. Previous cost estimate: none<br>Date:  |
| 3a. Date physical construction starts: 4th Qtr. FY 1988   | 6. Current cost estimate: \$10,325<br>Less amount for PE&D: 0<br>Net cost estimate: \$10,325<br>Date: June 1986 |
| 4. Date construction ends: 4th Qtr. FY 1991   |   |

7. <u>Financial Schedule:</u>	<u>Fiscal year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1988	\$10,325	\$ 850	\$ 850	\$ 500
	1989	0	3,448	3,448	3,334
	1990	0	3,020	3,020	3,038
	1991	0	3,007	3,007	3,453

8. Brief Physical Description of Project

a. Air Sampling/Monitoring

Provide improved interior and exterior constant volume sampling devices for radiation monitoring. Upgrade equipment for on-site radiation and off-site environmental monitoring.

CONSTRUCTION PROJECT DATA SHEETS

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I. Title and location of project: Environmental health & safety project  
Lawrence Berkeley Laboratory (LBL)  
Berkeley, California

2. Project No.: 88-R-806

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8. Brief Physical Description of Project (continued)

b. Building 26 Addition

A proposed Medical Services Building addition will be a second story, 2800 gross square foot addition to Building 26. This addition will be a matching steel frame structure on spread footings with metal decking and reinforced concrete floor, metal roof decking and built-up roofing, metal exterior siding, gypsum wallboard partitions, insulation, suspended ceilings, and resilient floor covering. Power, lighting, ventilation, heat, and all utilities will be included. Present medical functions will be expanded with two additional examination rooms, one office, one small medical conference room, and an equipment storage room.

c. Building 77 Waste Treatment Unit Replacement

A proposed treatment facility will treat effluent from the plating shop, remove heavy metals, and discharge treated wastes into the sanitary sewer. It will include a small building to house the new unit.

d. Monitor Underground Fuel Tanks

Drill three monitoring wells at each of eight existing tank locations and install monitoring devices.

e. Ventilation Improvements

Rehabilitate building ventilation systems by rebuilding and replacing defective and deteriorated air supply systems, controls, and fume hood exhaust systems.

f. Water Supply Cross-Connection

Rehabilitate potable water systems with backflow preventers, including industrial water, closed systems, and fire sprinkler risers.



CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Environmental health & safety project  
Lawrence Berkeley Laboratory (LBL)  
Berkeley, California

2. Project No.: 88-R-806

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8. Brief Physical Description of Project (continued)

g. Emergency Shower Water Supply Conversion

Connect emergency shower water supply systems to the domestic water system.

h. Area Lighting

Provide area lighting at 35 outdoor locations, including roadway luminaires and path and sidewalk lighting.

i. Replace Drum Storage Racks

Provide enclosures and replace racks and catch trays for 18 existing drum storage racks.

j. Building 77 Chemical Storage Facility

A proposed chemical storage facility will be located near Building 77. It will be a one-story, 600 gross square foot steel-framed structure with reinforced concrete spread footings and floor slab, metal roof deck and siding, insulation, and built-up roofing. This facility will have steel shelving, utilities, lighting, and ventilation. All interior exposed metals will have corrosion-resistant coatings.

k. Buildings 70-70A, Replace Acid Pipe Fittings

Replace deteriorated pyrex fittings. Existing laboratory furniture, piping, and electrical services must be re-routed for access to acid pipe fittings.

The government-owned additions and improvements described herein are located on leased land owned by the Regents of the University of California.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Environmental health & safety project  
Lawrence Berkeley Laboratory (LBL)  
Berkeley, California

2. Project No.: 88-R-806

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9. Purpose, Justification of Need, and Scope of Project

a. Air Sampling/Monitoring

Equipment and facilities are old, deteriorated, and in need of upgrading or replacement. Compliance with DOE regulations, protection of environment, and personnel health and safety must be maintained.

b. Building 26 Addition

Medical Services have severe functional space limitations. Certain patient examination procedures occur in the corridor. Supplies and equipment are stored in the corridor. There is no room available for either private staff conferences or staff/patient consultations.

c. Building 77 Waste Treatment Unit Replacement

The existing waste treatment facility is inadequate and unreliable. Spent solutions are presently trucked to an off-site commercial waste treatment facility at great expense and risk of transportation hazards. Plating shop operations are hampered by existing treatment facility breakdown, maintenance problems and obsolescence.

d. Monitor Underground Fuel Tanks

New State of California regulations require the monitoring of underground chemical storage tanks.

e. Ventilation Improvements

Controls are obsolete and/or inoperative, requiring replacement. Laboratory HVAC systems are out of balance; equipment is defective; ducts are deteriorated and require repair or replacement.

f. Water Supply Cross-Connection

Hillside drinking water supplies should be safeguarded with cross-connection devices between potable and non-potable water systems. Existing devices are old and deteriorated. Old cross-connections need approved devices added to them.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Environmental health & safety project  
Lawrence Berkeley Laboratory (LBL)  
Berkeley, California

2. Project No.: 88-R-806

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9. Purpose, Justification of Need, and Scope of Project (continued)

g. Emergency Shower Water Supply Conversion

At many locations, showers are at present supplied from industrial water supply. They need to be converted to potable water supply for personnel safety.

h. Area Lighting

In certain poorly lit outdoor areas, additional exterior lighting will improve personnel safety and minimize risk of injury to pedestrians and motorists.

i. Replace Drum Storage Racks

Existing sitewide installations have deteriorated with time; some areas lack proper containment provisions. New environmental concerns require proper handling to avoid leaks and spills.

j. Building 77 Chemical Storage Facility

There is an immediate need for adequate safe storage space for current activities. Chemicals used in the Building 77 Plating Shop are now stored in a crowded room or outside the building, where they are exposed to weather.

k. Buildings 70-70A, Replace Acid Pipe Fittings

In laboratories where hydrofluoric acid has been used extensively, the glass pipe, traps, and metal couplings have eroded and deteriorated.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Environmental health & safety project Lawrence Berkeley Laboratory (LBL) Berkeley, California	2. Project No.: 88-R-806
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10. Details of Cost Estimate \*

	<u>Item Costs</u>	<u>Total Cost</u>
a. Engineering, design and inspection @ about 18% of construction, Item b.....		\$ 1,127
b. Construction costs.....		6,264
(1) Improvements to land (Schedule II).....	\$ 32	
(2) Buildings.....	3,900	
(3) Other construction (other than buildings).....	435	
(4) Special facilities (Schedule I).....	833	
(5) Utilities (Schedule II).....	1,064	
c. Standard equipment (Schedule I).....		1,193
d. Removal costs less salvage (Schedule II).....		20
Subtotal.....		8,604
e. Contingency at about 20% (of which \$780 is for building construction).....		1,721
Total estimated cost.....		\$10,325

\* Conceptual design is complete.

11. Method of Performance

Engineering, design and inspection will be performed under a negotiated Architect-Engineer Subcontract. Inspection, some engineering and some construction will be accomplished by LBL forces. Construction and Procurement will be accomplished by fixed price subcontracts awarded on the basis of competitive bids.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Environmental health & safety project Lawrence Berkeley Laboratory (LBL) Berkeley, California	2. Project No.: 88-R-806
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12. Funding Schedule of Project Funding and Other Related Funding Requirements

	Prior Yrs.	FY 1988	FY 1989	FY 1990	FY 1991	Total
a. Total project costs						
1. Total facility costs						
(a) Construction line item..	\$ 0	\$ 500	\$ 3,334	\$ 3,038	\$ 3,453	\$10,325
Total direct costs.....	\$ 0	\$ 500	\$ 3,334	\$ 3,038	\$ 3,453	\$10,325
b. Total related funding requirements (estimated)						
1. Facility operating costs.....			\$ 15			
2. Programmatic operating expenses (Programs already exist that will be using these facilities. No increase in program costs will be incurred.).....			0			
Total related annual costs.....			\$ 15			

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Programs already exist that will be using these facilities.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

- |   |   |
|---|---|
| 1. Title and location of project: Environmental improvements<br>Brookhaven National Laboratory (BNL)<br>Upton, New York | 2. Project No.: 88-R-805  |
| 3. Date A-E work initiated: 2nd Qtr. FY 1988  | 5. Previous cost estimate: none<br>Date: none   |
| 3a. Date physical construction starts: 4th Qtr. FY 1988   | 6. Current cost estimate: \$ 4,000<br>Less amount for PE&D: 0<br>Net cost estimate: \$ 4,000<br>Date: June 1986 |
| 4. Date construction ends: 4th Qtr. FY 1991   |   |

7. <u>Financial Schedule</u>	<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1988	\$4,000	\$ 611	\$ 611	\$ 560
	1989	0	1,900	1,900	1,800
	1990	0	1,489	1,489	1,000
	1991	0	0	0	640

8. Brief Physical Description of Project

Four (4) buildings will have asbestos insulation removed from duct, piping, and equipment. These buildings are Biology (463), Hot Laboratory (801), Magnetic Fusion (820A), and Beam Components Building (914). This project supports the present Laboratory program to upgrade and correct potential environmental problems. Twelve buildings presently served by cesspools will be connected to the central sanitary sewage system. These buildings are Telephone Equipment Building (449), Mechanical/Electrical Maintenance Shop (452), Water Treatment Plant (624), Cryogenic Test Facility (904), Assembly Building (905), Works Buildings (919A & 919B), Receiving/Warehouse (926), Assembly/Storage (935), On Line Data Facility (940) and Production Holding Facility (945) with adjacent trailer (122).

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Environmental improvements  
Brookhaven National Laboratory (BNL)  
Upton, New York

2. Project No.: 88-R-805

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9. Purpose, Justification of Need for, and Scope of Project

Asbestos removal is the only certain way to ensure that BNL's facilities meet Occupational Safety and Health Act (OSHA) and Environmental Protection Agency (EPA) requirements, to provide a safe working environment, and to avoid possible future liability considerations. The Laboratory is situated over Long Island's sole source ground water aquifer. To continue the use of cesspools as a means of waste disposal, which includes both sewage and laboratory wastes from these buildings, is not prudent and is highly questionable in light of the latest EPA Drinking Water Act. Under present regulations, continuous sampling, monitoring, and analyses are required with permits and associated fees anticipated in the near future. There also exists the future possibility of forced shutdowns of these facilities by the State of New York's Department of Environmental Conservation (DEC).

The four buildings presently containing asbestos insulation will have this insulation removed and disposed of in a safe and environmentally approved area in accordance with local and federal codes. Piping, ductwork, and vessels will be re-insulated to meet the latest DOE requirements for energy conservation.

The 12 buildings presently served by cesspools will be connected to the central sanitary sewage system. New lift stations will be required in most cases to transport the sewage to the nearest sanitary manhole. The abandoned cesspools will be evacuated, if necessary, and filled in with sand in accordance with local and federal codes.

10. Details of Cost Estimate\*

	<u>Item Cost</u>	<u>Total Cost</u>
a. Architect-Engineer, design and inspection at approximately 12% of construction costs, item b. ....		\$ 388
b. Construction costs.....		3,231
(1) Cesspool abandonment and connection to sanitary system.....	\$ 409	
(2) Asbestos removal and re-insulation of equipment.....	2,822	
c. Contingency on the above costs @ approximately 11%.....		381
Total estimated cost.....		<u>\$4,000</u>

\*The estimates are based on a completed conceptual design report.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Environmental improvements  
Brookhaven National Laboratory (BNL)  
Upton, New York

2. Project No.: 88-R-805

11. Method of Performance

Design, engineering, major procurement, construction, inspection and program administration will be accomplished by the operating contractor (BNL) either in-house or by contracting with local Architectural/Engineering firms. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts and purchase orders awarded on the basis of competitive bidding.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not applicable.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not applicable.



DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

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|---|--|
| 1. Title and location of project: Building piping systems upgrade,<br>at Y-12<br>Oak Ridge National Laboratory (ORNL)<br>Oak Ridge, Tennessee | 2. Project No.: 88-R-804   |
| 3. Date A-E work initiated: 1st Qtr. FY 1988  | 5. Previous cost estimate: none<br>Date: none  |
| 3a. Date physical construction starts: 4th Qtr. FY 1989   | 6. Current cost estimate: \$ 1,850<br>Less amount for PE&D:        0<br>Net cost estimate:         \$ 1,850<br>Date: June 1986 |
| 4. Date construction ends: 2nd Qtr. FY 1990   |  |

7. <u>Financial Schedule</u>	<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1988	\$ 520	\$ 520	\$ 520	\$ 265
	1989	1,330	1,330	1,330	1,170
	1990	0	0	0	415

8. Brief Physical Description of Project

This project is designed to upgrade or replace the most critical portions of the inadequate building piping systems serving Oak Ridge National Laboratory (ORNL) research facilities located in the Y-12 Plant. Those portions of the building piping systems not covered by this project will be addressed by specific building upgrade or replacement projects planned for later years.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Building piping systems upgrade, at Y-12 Oak Ridge National Laboratory (ORNL) Oak Ridge, Tennessee	2. Project No.: 88-R-804
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8. Brief Physical Description of Project (continued)

This project restores outdated and unreliable building utility distribution piping systems and deteriorated cooling towers. Existing cooling towers will be replaced with new towers of equivalent capacity. The piping systems that are no longer reasonably repairable and require replacement, include steam supply and condensate return, process and potable water, cooling tower water, demineralized water, instrument air, natural gas, and other similar systems. In addition, the work will include the systematic replacement and/or refurbishment of major system components such as pumps, traps, reducing stations, drainage systems, cooling towers, and main distribution headers (both inside and outside of buildings).

9. Purpose, Justification of Need for, and Scope of Project

Four major ORNL activities (biological research, engineering technology research, fusion energy research and stable isotope production), with an annual operating budget in excess of \$75 million (FY 1985) are housed in ten large buildings and numerous ancillary ones at the Y-12 plant. The replacement value of these buildings (1.4 million sq. ft.) and the equipment they house is over \$500 million. These structures were constructed during World War II to house electromagnetical and chemical uranium enrichment processes. Since the war these buildings have been modified to accommodate the ORNL activities. These modifications utilized the existing building piping systems and provided little or no systematic upgrading over the years. Age, the compromises of war-time construction, and continued heavy use have rendered a number of critical piping systems seriously deficient. This project will address those areas with the highest probability and greatest impact of failure.

The systems being upgraded to meet ongoing requirements are basic to any research facility and would be required by any occupant. These include the steam and condensate system used for building heating, the potable water system used for domestic purposes, the process water system used for equipment cooling and other research purposes, the building and research functions. During their forty years of use these critical systems have become inefficient, unreliable, and in some cases only partially operable. Pipes rupture due to corrosion, valves have become inoperable due to deteriorated gates and plugs, and scaling (mineral build-up on pipe interiors) has reduced flow by 50 to 90 percent.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Building piping systems upgrade, at Y-12 Oak Ridge National Laboratory (ORNL) Oak Ridge, Tennessee	2. Project No.: 88-R-804
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9. Purpose, Justification of Need for, and Scope of Project (continued)

As these piping systems continue to age and deteriorate, a marked increase in the frequency and severity of failure is expected. Many of the past and current failures have resulted in disruptions to normal activities measured in hours up to several days. The repair of these failures has exposed normally concealed portions of the system which show clear and convincing evidence of future more significant failures. These failures would be measured in days, weeks, or perhaps months. Such disruptions would have major adverse consequences resulting in major loss of personnel time (higher program cost), inability to meet program milestones, and in certain instances the loss of irreplaceable experimental data. The detailed cost impacts of these disruptions on laboratory activities is impossible to project since they depend on when, where, how often and for how long the disruption occurs. However, it can be said that minor disruptions involving few people would cost in the thousands to tens-of-thousands-of-dollars range, while major disruptions involving many people or loss of research could easily reach a cost of millions-of-dollars.

To avoid these significant and unacceptable consequences the system deficiencies have been critically evaluated to assess 1) the probability of an avoidable failure occurring and 2) the significance of its impact on the activities housed within the structure. In addition, ongoing costs and operational needs were considered. While the overall list of system deficiencies is very large and will ultimately require attention, only that portion which stood out as the urgent and compelling is included in this project.

10. Details of Cost Estimate\*

	<u>Item Cost</u>	<u>Total Cost</u>
a. Engineering, design, and inspection at approximately 19% of construction costs, item b. ....		\$ 250
b. Construction costs.....		1,340
(1) Building modifications.....	\$ 650	
(2) Outside Utilities.....	250	
(3) Other Structures.....	440	
Subtotal.....		<hr/> 1,590

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Building piping systems upgrade, at Y-12 Oak Ridge National Laboratory (ORNL) Oak Ridge, Tennessee	2. Project No.: 88-R-804
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10. Detail of Cost Estimate\* (continued)

c. Contingency at approximately 16% of above costs.....	260
Total project cost.....	\$1,850

\*The above estimates are based on a conceptual design report completed in February 1986 at a cost of \$30,000.

11. Method of Performance

Design and inspection will be performed under a negotiated architect-engineer contract. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts awarded on the basis of competitive bids.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not required because the total estimated cost is less than \$5,000,000.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required because the total estimated cost is less than \$5,000,000.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

- |  |   |
|--|---|
| 1. Title and location of project: Multiprogram laboratory building rehabilitation<br>Brookhaven National Laboratory (BNL)<br>Upton, N.Y. | 2. Project No.: 88-R-802  |
| 3. Date A-E work initiated: 1st Qtr. FY 1988   | 5. Previous cost estimate: none<br>Date:  |
| 3a. Date physical construction starts: 2nd Qtr. FY 1988  | 6. Current cost estimate: \$ 1,900<br>Less amount for PE&D: 0<br>Net cost estimate: \$ 1,900<br>Date: June 1986 |
| 4. Date construction ends: 3rd Qtr. FY 1989  |   |

<u>7. Financial Schedule:</u>	<u>Fiscal year</u>	<u>Authorizations</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1988	\$ 1,900	\$ 500	\$ 500	\$ 500
	1989	0	1,400	1,400	1,400

8. Brief Physical Description of Project

The project will include modifications to and rehabilitation of some of the oldest portions of the Laboratory's Biology building. The present building complex was constructed in three phases. Phase I was a World War II masonry Army Post Exchange (PX) building built in 1945 and converted for laboratory use in 1949; Phase II was a new masonry addition similar to Phase I and was constructed in 1952; and Phase III, the "new" wing, was constructed in 1961. The project includes the complete removal and replacement of the roofing system and insulation over Phases I and II. Included will be the complete rehabilitation of both 1949 vintage greenhouses, the upgrading of bathrooms and 21 offices. All of these portions are, at best substandard.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Multiprogram laboratory building rehabilitation  
Brookhaven National Laboratory (BNL)  
Upton, N.Y.

2. Project No.: 88-R-802

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8. Brief Physical Description of Project (continued)

The roof replacement will be extremely difficult due to the myriad of mechanical equipment and support structures, the multitude of roof penetrations, and the extent of decayed and saturated insulation. The conceptual design process has examined all possible solutions, including the construction of a superimposed penthouse. It is presently expected that a state-of-the-art insulation-roof membrane system will be installed which will require minimum interruptions to operations due to temporary relocations of equipment.

Four bathrooms will be gutted and rehabilitated. New ceramic tile finishes and plumbing fixtures will be installed in conformance to current standards. Twenty-one substandard offices will be rehabilitated to include suspended acoustic ceilings, lighting, floor finishes and environmental systems. Sash also will be replaced with non-ferrous type energy efficient insulated glass.

The two major existing greenhouses will be detoxified, and reglazed. Their structural components, vents, mechanisms, and other defective parts will all be repaired or replaced. Finally, both greenhouses will be painted.

9. Purpose, Justification of Need, and Scope of Project

For the past 25 years, the Laboratory has allocated General Plant Projects funding and operating funds to upgrade, maintain and convert many of the 58 laboratories in the two older portions of the Biology complex. A total of \$2,000,000 has been allocated in capital improvements in the past 8 years and over \$185,000 in operating funds have been spent for major maintenance upgrades for the entire building. Two trailers were acquired to supplement office space short falls and other stop-gap measures were taken to augment space needs. These include conversion of offices and/or cold boxes to laboratories or vice-versa as needed. Minimum funds have been available to rehabilitate other areas since programmatic facilities and mechanical systems must be maintained at a reasonable and safe level of operating efficiency.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Multiprogram laboratory building rehabilitation  
Brookhaven National Laboratory (BNL)  
Upton, N.Y.

2. Project No.: 88-R-802

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9. Purpose, Justification of Need, and Scope of Project (continued)

Roof flooding is commonplace, the freeze-thaw process in winter is the worst cause of leaks, and the lack of drains at low points all cause inconvenience and damage to the spaces and equipment below. Twenty-one undersized, overcrowded and generally miserable offices in the original PX building will be rehabilitated as best as possible to provide the scientific staff with a much improved and attractive place to work even though the spaces will continue to be substantially undersized.

Although seemingly costly, these effects will be cost effective not only by saving the previous capital investments but by creating an environment that will be more attractive when recruiting and retaining first class investigators to do research on important DOE missions.

10. Details of Cost Estimate \*

	<u>Item Cost</u>	<u>Total Cost</u>
a. Engineering, design and inspection 15% of b .....		\$ 206
b. Construction.....		1,375
(1) Roofing and steel.....	\$ 605	
(2) Interior modifications.....	310	
(3) Greenhouses rehabilitation.....	460	
Subtotal.....		<u>1,581</u>
c. Contingency @ 20% of above costs.....		319
Total estimated cost.....		<u>\$1,900</u>

\* The estimate is based on conceptual design which is 100% complete.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Multiprogram laboratory building rehabilitation  
Brookhaven National Laboratory (BNL)  
Upton, N.Y.

2. Project No.: 88-R-802

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11. Method of Performance

Building design will be on the basis of negotiated-engineer contract. Construction and procurement will be accomplished by a fixed contract and purchase orders awarded on the basis of competitive bidding.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not required.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required.



DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

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|--|---|
| 1. Title and location of project: Upgraded steam distribution system<br>Oak Ridge National Laboratory,<br>Oak Ridge, Tennessee | 2. Project No.: 87-R-759                                |
| 3. Date A-E work initiated: 1st Qtr. FY 1987   | 5. Previous cost estimate: None<br>Date: None           |
| 3a. Date physical construction starts: 1st Qtr. FY 1988  | 6. Current cost estimate: \$6,800<br>Date: January 1986 |
| 4. Date construction ends: 4th Qtr. FY 1990  |   |

7. <u>Financial Schedule:</u>	<u>Fiscal Year</u>	<u>Authorizations</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1987	\$ 6,800	\$ 1,328	\$ 1,328	\$ 1,128
	1988	0	5,472	5,472	2,979
	1989	0	0	0	1,900
	1990	0	0	0	793

8. Brief Physical Description of Project

This project will replace deteriorated portions of the Oak Ridge National Laboratory (ORNL) steam distribution system, predominantly in the eastern portion of ORNL, provide looping and isolation valves to improve system reliability and maintainability, and provide condensate return lines as appropriate. Concurrently, deteriorated air lines paralleling the steam distribution system will be replaced.

9. Purpose, Justification of Need for, and Scope of Project

The ORNL steam distribution was originally built in the early 1940's and was modified and expanded through the years. Much of the underground piping has been in service for more than 30 years and is approaching the end of its expected life.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Upgraded steam distribution system  
Oak Ridge National Laboratory,  
Oak Ridge, Tennessee

2. Project No.: 87-R-759

9. Purpose, Justification of Need for, and Scope of Project (continued)

Recent failures in the steel conduit and bellows expansion joints have resulted in major emergency repairs. A \$400,000 emergency General Plant Project (GPP) was completed in FY 1984 to repair a deteriorated bellows expansion joint and replace steam and parallel air lines. In addition to the energy loss, this expansion joint failure was a safety hazard to personnel in the vicinity. Because of these failures and anticipated future failures, a major portion of the buried steam system can no longer be considered reliable. These conclusions are based on an evaluation report by Energy Systems Engineering and further verified by measurements conducted in an Energy Division investigation.

Another \$250,000 GPP was also completed in FY 1984 replacing sections of the underground mains to the 7,000 area with above ground lines. The previous underground line was in contact with groundwater and was experiencing excessive heat loss.

As the steam distribution system is presently configured, a single component failure such as a valve, distribution pipe, or expansion bellows, could result in a total system shutdown. Such a shutdown would impact millions of dollars worth of ongoing research experiments and related activities. Heavily used research facilities such as the Oak Ridge Electron Linear Accelerator and the Holifield Heavy Ion Research Facility would be shut down within 24 hours of loss of steam; while a program such as the Space Nuclear Project is susceptible to loss of up to 10 years of test data on long-term creep tests conducted in the High-Temperature Gas Cooled Reactor.

The upgraded system, in addition to improving reliability will allow most services to be continued in the event of line failure by providing steam through alternate routes provided by the added loops and isolation valves. The condensate return system will reduce the treated water and steam load output from the steam plant and hence operating costs.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Upgraded steam distribution system  
Oak Ridge National Laboratory,  
Oak Ridge, Tennessee

2. Project No.: 87-R-759

9. Purpose, Justification of Need for, and Scope of Project (continued)

In the aforementioned FY 1984 GPP, it was found that the air lines were deteriorated and rapidly approaching the end of their useful life; hence, concurrent with replacement of the steam lines, all deteriorated air lines will be replaced and provided with cathodic protection.

Alternatives to the proposed project are presented in a feasibility study dated February 1, 1984, prepared by an Architect-Engineer (A-E). The report included: (1) upgraded steam system; (2) low-temperature hot water system; and (3) high-temperature hot water system.

The first alternative - low-temperature hot water system - although offering operating savings through lowered energy consumption and maintenance costs, cannot economically support the significantly higher capital costs of installation including the necessary conversion of building heating systems from steam to hot water.

The second alternative - high-temperature hot water system - was quickly determined to be less cost-effective than the low-temperature hot water system as a result of even higher capital costs due to more expensive piping mandated by the use of higher pressures. Further, this option does not offer all of the advantages of the low-temperature system.

10. Details of Cost Estimate\*

	<u>Total Cost</u>
a. Engineering, design, and inspection at approximately 18% of construction costs, item b.....	\$ 908
b. Construction costs.....	4,997
Subtotal.....	5,905
c. Contingency at approximately 15% of above costs.....	895
Total estimated costs.....	\$ 6,800

\*The cost estimate is based on a conceptual design report, completed in March 1984 at a cost of \$130,000 and revised in February 1985.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Upgraded steam distribution system  
Oak Ridge National Laboratory,  
Oak Ridge, Tennessee

2. Project No.: 87-R-759

11. Method of Performance

Design and inspection will be performed under a negotiated architect-engineer contract. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts awarded on the basis of competitive bidding.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

	<u>Prior Years</u>	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>FY 1990</u>	<u>Total</u>
a. Total project costs						
1. Total facility costs						
(a) Construction line item.....	\$ 0	\$ 1,128	\$ 2,979	\$ 1,900	\$ 793	\$ 6,800
(b) PE&D.....	0	0	0	0	0	0
(c) Expense funded equipment.....	0	0	0	0	0	0
(d) Inventories.....	0	0	0	0	0	0
Total direct costs.....	\$ 0	\$ 1,128	\$ 2,979	\$ 1,900	\$ 793	\$ 6,800
2. Other project costs						
(a) R&D necessary to complete construction.....	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
(b) Other project-related costs.....	130	0	0	0	0	130
Total other project costs.....	\$ 130	\$ 0	\$ 0	\$ 0	\$ 0	\$ 130
Total project costs (Items 1 and 2)..	\$ 130	\$ 1,128	\$ 2,979	\$ 1,900	\$ 793	\$ 6,930
b. Total related annual costs (estimated life: 20 years)						
1. Facility operating costs.....						\$544
2. Programmatic operating expenses directly related to the facility.....						0
3. Capital equipment not related to construction but related to the programmatic effort in the facility.....						0
4. GPP or other construction related to the programmatic effort in the facility.....						0
5. Other costs.....						0
Total related annual costs.....						\$544

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Upgraded steam distribution system  
Oak Ridge National Laboratory,  
Oak Ridge, Tennessee

2. Project No.: 87-R-759

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility costs

- (a) Construction line item - No narrative required
- (b) PE&D - No narrative required
- (c) Expense funded equipment - No narrative required
- (d) Inventories - No narrative required

2. Other project funding

- (a) R&D necessary to complete construction - No narrative required
- (b) Conceptual design costs - The conceptual design report was completed in March 1984 at a cost of approximately \$130,000.

b. Total related funding requirement - The estimated useful life of the Upgraded Steam System is 20 years.

- 1. Facility operating costs - these are the estimated costs pertaining to the east end distribution system and building piping systems. They include the energy losses of the distribution, building and condensate return systems due to conduction, trap loss, pit flooding and leakage. They also include maintenance costs for all the piping as well as the pumping costs of the condensate return.
- 2. Programmatic operating expenses directly related to the facility - No narrative required
- 3. Capital equipment not related to construction but related to the programmatic effort in the facility - No narrative required
- 4. GPP or other construction related to the programmatic effort in the facility - No narrative required

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Rehabilitate Mechanical Utilities  
 Lawrence Berkeley Laboratory  
 Berkeley, California

2. Project No.: 87-R-758

3. Date A-E work initiated: 2nd Qtr. FY 1987

3a. Date physical construction starts: 3rd Qtr. FY 1988

4. Date construction ends: 4th Qtr. FY 1990

5. Previous cost estimate: None  
 Date: None

6. Current cost estimate: \$ 5,500  
 Less amount for PE&D: 0  
 Net cost estimate: \$ 5,500  
 Date: January 1986

7. <u>Financial Schedule:</u>	<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1987	\$ 5,500	\$ 915	\$ 915	\$ 260
	1988	0	3,000	3,000	1,100
	1989	0	1,585	1,585	2,580
	1990	0	0	0	1,560

8. Brief Physical Description of Project

Lawrence Berkeley Laboratory (LBL) was established over 40 years ago. Portions of the LBL utility systems have deteriorated to the point where maintenance costs have become excessive and service interruptions have become frequent. Most utility systems at LBL were constructed to meet the requirements of specific buildings and experimental programs.

1. Title and location of project: Rehabilitate Mechanical Utilities  
Lawrence Berkeley Laboratory  
Berkeley, California

2. Project No.: 87-R-758

8. Brief Physical Description of Project (cont'd.)

The work proposed under this project will upgrade sections of systems that have been identified as having the most serious deficiencies.

Some examples of the mechanical utilities deficiencies to be addressed are:

1. The 4-inch domestic water main to Building 74 is badly damaged, and failure will jeopardize programs that utilize the animal colony. Piping cross connections have been made with the industrial water supply in violation of the Plumbing Code, and the 8-inch domestic water main from Shasta Reservoir is overstressed due to soil settlement - failure will greatly reduce flow to many Laboratory buildings.
2. The cooling tower at Building 88 is overloaded on hot days, and requires increased cooling capacity.
3. The central compressed air plant is not sufficiently reliable, and interruptions affect various programs lab wide that rely upon the central air supply.
4. Natural gas mains have exceeded expected life and leaks would result in fire and loss of life, hazards and interruptions to programs.

Proposed facilities will be designed to the latest codes and will use the most suitable types of materials and equipment. The design will provide for more reliable service, safer and more efficient operation, better access and backup capacity for critical features such as fire protection. New work will avoid, wherever possible unstable areas on the site and will incorporate the best design and construction practices to mitigate unfavorable site conditions when these areas cannot be bypassed. Timely construction of the proposed work will prevent future breakdowns that could be hazardous, that could disrupt vital LBL functions, and that could result in costly repairs to the old systems.

The improvements described herein will be made to existing government-owned facilities located on leased land owned by the Regents of the University of California.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Rehabilitate Mechanical Utilities  
Lawrence Berkeley Laboratory  
Berkeley, California

2. Project No.: 87-R-758

9. Purpose, Justification of Need for, and Scope of Project

The work proposed under this project is the upgrading and/or replacement of components of existing utility systems throughout the Lawrence Berkeley Laboratory site; this project will not completely rehabilitate the systems, but it will correct the more urgent and serious deficiencies. Much of the piping and equipment that comprise these systems has been in place for many years. Portions of the utilities have outlived their useful life, as evidenced by the repairs and piecemeal replacement that have been necessary to keep the systems in operation. Other portions of the systems, have become obsolete because of changing requirements. Still other sections of utilities have been constructed in areas of the site in which unstable or otherwise unfavorable soil conditions exist; the earlier systems constructed in these areas did not utilize materials and construction methods that are now available to offset the adverse natural conditions. Furthermore, safety standards, quality of materials, and construction techniques have changed over the years so that some of the facilities constructed in the 1940s, the 1950s, and even the 1960s are now substandard. In short, the age, the changing requirements for services, natural site conditions, and higher standards for safety and construction all have contributed to the deficiencies in the existing utility systems.

The rehabilitation of LBL site mechanical utilities has been planned to be phased in two separate projects scheduled for funding in FY 1987, Phase I, and in FY 1990, Phase II. The plan for phasing results from the need to mitigate program disruptions through careful sequencing of construction, to enhance the cost effectiveness of the work by improving the flexibility for change in the first phase, and, finally, to prioritize LBL's funding in relation to other urgent needs.

10. Details of Cost Estimate<sup>a/</sup>:

	<u>Total Cost</u>
a. Engineering, design, and inspection at about 15% of construction costs.....	\$ 600
b. Construction costs.....	3,900
Subtotal.....	\$ 4,500
c. Contingency at about 22% above costs.....	1,000
Total estimated costs.....	\$ 5,500

<sup>a/</sup> Based on completed conceptual design.



CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Rehabilitate Mechanical Utilities  
Lawrence Berkeley Laboratory  
Berkeley, California

2. Project No.: 87-R-758

11. Method of Performance

Engineering design will be performed under a negotiated architect engineer subcontract. Inspection, some engineering and some construction will be accomplished by LBL engineering staff. Construction and procurement will be accomplished by fixed price subcontracts awarded on the basis of competitive bids. At the time of scoping construction and procurement, specific parts of the project will be set aside for Small Business Administration 8A subcontracts. Candidate items are painting and labeling air and propane equipment and piping associated with upgrading the compressor plant and the propane plant.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

	<u>Prior Years</u>	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>FY 1990</u>	<u>Total</u>
a. Total project costs						
1. Total facility costs						
(a) Construction line item.....	\$ 0	\$ 260	\$ 1,100	\$ 2,580	\$ 1,560	\$ 5,500
(b) CP&D.....	0	0	0	0	0	0
(c) Expense funded equipment.....	0	0	0	0	0	0
(d) Inventories.....	0	0	0	0	0	0
Total direct costs.....	\$ 0	\$ 260	\$ 1,100	\$ 2,580	\$ 1,560	\$ 5,500
2. Other project costs						
(a) R&D necessary to complete construction.....	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
(b) Other project related costs..	0	0	0	0	0	0
Total other project costs....	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Total project costs (Items 1 & 2).....	\$ 0	\$ 260	\$ 1,100	\$ 2,580	\$ 1,560	\$ 5,500

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Rehabilitate Mechanical Utilities  
Lawrence Berkeley Laboratory  
Berkeley, California

2. Project No.: 87-R-758

12. Funding Schedule of Project Funding and Other Related Funding Requirements (continued)

b. Total related annual costs (50 years)

1. Facility operating costs.....	\$	0
2. Programmatic operating expenses directly related to the facility .....		0
3. Capital equipment not related to construction but related to the programmatic effort in the facility .....		0
4. GPP or other construction related to programmatic effort in the facility.....		0
5. Other costs.....	\$	0
Total other related annual funding costs.....		\$ 0

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility costs

- (a) Construction line item - No narrative required
- (b) CP&D - No narrative required
- (c) Expense funded equipment - No narrative required
- (d) Inventories - No narrative required

b. Total related funding requirements (Facility Program use est. 50 years).

- 1. Facility operating costs - No narrative required
- 2. Programmatic operating expenses - No narrative required
- 3. Capital equipment no related to construction - No narrative required
- 4. GPP or other construction - No narrative required
- 5. Other costs - No narrative required

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Electrical system rehabilitation  
 Lawrence Berkeley Laboratory  
 Berkeley, California

2. Project No.: 87-R-757

3. Date A-E work initiated: 2nd Qtr. FY 1987

5. Previous cost estimate: None  
 Date: None

3a. Date physical construction starts: 3rd Qtr. FY 1988

6. Current cost estimate: \$ 2,600  
 Less amount for PE&D: 0

4. Date construction ends: 4th Qtr. FY 1989

Net cost estimate: \$ 2,600  
 Date: January 1986

7. <u>Financial Schedule:</u>	<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1987	\$ 2,600	\$ 300	\$ 300	\$ 140
	1988	0	2,300	2,300	1,780
	1989	0	0	0	680

8. Brief Physical Description of Project

This project is the first of several elements to improve the reliability of the electrical distribution system for the entire Laboratory.

This project will rehabilitate the 12kV main substation of Lawrence Berkeley Laboratory's (LBL) power distribution system. LBL's main substation is located on the upper hill area and distributes 28 Megawatts peak power to area substations through a 12.46 kV primary distribution system. The main substation is served by Pacific Gas and Electric (PG&E) through two 115kV/12.46kV transformers with 20 MVA and 30 MVA capacity. The main substation switchgear is arranged in split bus configuration, each bus connecting directly to PG&E switches. Each bus consists of three feeder breakers. A metal enclosed tie switch provides for connection of the two bus systems. The rehabilitation of the main substation will include the replacement of the existing substandard circuit breakers and addition of incoming, tie and feeder circuit breakers. The project provides also for addition of an air switch assembly consisting of feeder and tie switches. The project will utilize the existing substation site with the following structural modifications:

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Electrical system rehabilitation  
Lawrence Berkeley Laboratory  
Berkeley, California

2. Project No.: 87-R-757

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8. Brief Physical Description of Project (continued)

- o Increase of substation floor space by 600 square feet.
- o Extension of existing underground cable vault by 11 feet.
- o Construction of retaining walls, up-ramp and stairs for elevated floor section.

The following major items comprise the scope of this project:

1. Replace six existing air circuit breakers with power vacuum circuit breakers.
2. Add three incoming line breakers to the 12kV buses.
3. Replace one existing tie switch between Bus 1 and 2 with a full capacity circuit breaker.
4. Add four feeder breakers to Bus 1 and 3 feeder breakers to Bus 2.
5. Add air switch assembly consisting of 6 feeders and one tie load interrupter switch.
6. Install data acquisition system and communications unit for remote control indication and metering.
7. Perform a power system study determining short circuit levels and protective device coordination.

These new government-owned facilities or improvements will be located on leased land owned by the Regents of the University of California.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Electrical system rehabilitation  
Lawrence Berkeley Laboratory  
Berkeley, California

2. Project No.: 87-R-757

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9. Purpose, Justification of Need for, and Scope of Project

This project will correct existing deficiencies at the 12kV main substation, which feeds the area substations of the entire Laboratory. The project will upgrade the substation to current National Electrical Code (NEC) safety requirements and provide for improvement in reliability and maintainability. The project will permit LBL to take advantage of favorable electric rate schedules by providing access to reduced cost interruptible power or higher cost firm power to all Laboratory facilities. The project will fully provide for present and long range power distribution requirements at LBL's main substation.

The existing 12kV main substation does not meet the Laboratory's operating requirements for the following reasons:

1. The existing substation equipment is aged, substandard, and hazardous;
2. The existing bus configuration does not permit LBL to isolate utility incoming lines and bus sections without cooperation from the utility and prior operation of their switchgear.
3. The tie switch in the switchgear assembly is underrated and unsafe to operate without cooperation from the utility company and prior operation of their switches.
4. The existing switchgear has insufficient circuit breakers requiring doubling of outgoing feeders and direct connection of outgoing feeders to the main bus.
5. The minimum space requirements stipulated by the National Electric Code for safe operation and maintenance are not complied with.

The above deficiencies have resulted in the following operational difficulties:

- o Incoming line power failure on one supply line requires public utility switching prior to LBL's closing tie switch and restoring service. This results in extensive response time and long power outages.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Electrical system rehabilitation  
Lawrence Berkeley Laboratory  
Berkeley, California

2. Project No.: 87-R-757

9. Purpose, Justification of Need for, and Scope of Project (continued)

- o Maintenance on switchgear is only performed when power outage occurs. The switchgear construction is such that safe maintenance can only be performed with line and load side de-energized. The line sides can only be de-energized by public utility switching, which occurs at infrequent intervals.
- o Utilization of cost economic power source is not always possible. The existing number of feeder breakers is insufficient to provide dual sources to all users for most economic power rate selection.
- o Decreased reliability in dual connected supply feeders due to circuit breaker tripping caused by failure in one feeder line and affecting service in the other line.

10. Details of Cost Estimate\*:

	<u>Item Cost</u>	<u>Total Cost</u>
a. Engineering, design, and inspection at about 15% of construction costs, item b.....		\$ 280
b. Construction costs.....		1,850
(1) Improvements to land.....	\$ 130	
(2) Utilities.....	240	
(3) Special facilities engineered equipment.....	\$ 1,480	
Subtotal.....		<u>\$ 2,130</u>
c. Contingency at about 22% above costs.....		470
Total estimated costs.....		<u>\$ 2,600</u>

\*Based upon a completed conceptual design.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Electrical system rehabilitation  
Lawrence Berkeley Laboratory  
Berkeley, California

2. Project No.: 87-R-757

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11. Method of Performance

Engineering design will be performed under a negotiated architect engineer subcontract. Inspection and some engineering will be done by LBL personnel. Construction and procurement will be accomplished by fixed price subcontracts awarded on the basis of competitive bids. At the time of scoping construction and procurement, specific parts of the project will be set aside for SBA 8A subcontracts. Candidate items are conduit placement, structural slab, cable splicing, fencing and landscaping.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not required.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Water line replacement  
 Argonne National Laboratory (ANL)  
 Argonne, Illinois

2. Project No.: 87-R-756

3. Date A-E work initiated: 1st Qtr. FY 1987

3a. Date physical construction starts: 1st Qtr. FY 1988

4. Date construction ends: 4th Qtr. FY 1989

5. Previous cost estimate: None  
 Date: None

6. Current cost estimate: \$ 5,200  
 Less amount for PE&D: 0  
 Net cost estimate: \$ 5,200  
 Date: January 1986

7. <u>Financial Schedule:</u>	<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1987	\$ 5,200	\$ 566	\$ 566	\$ 400
	1988	0	2,000	2,000	2,100
	1989	0	2,634	2,634	2,700

8. Brief Physical Description of Project

This project will rehabilitate all of the deteriorated water lines which serve permanent buildings and areas at Argonne National Laboratory (ANL). Approximately 18 miles of cast iron water line in the size range of 2 inches to 18 inches will be replaced. The new water lines will consist of polyvinyl chloride (PVC) and reinforced concrete pipe (RCP) approved for potable water distribution and cast iron valves and fittings with cathodic protection.



## CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Water line replacement  
Argonne National Laboratory (ANL)  
Argonne, Illinois

2. Project No.: 87-R-756

### 9. Purpose, Justification of Need for, and Scope of Project

This project is proposed because the water lines at ANL will become unreliable for fire protection use and Laboratory operations by 1990. Replacement of the water line will restore the reliability necessary for fire safety and efficient Laboratory operations.

Due to soil-side corrosion and graphitization of the cast iron pipe (determined by metallographic analysis), the water lines have reached the end of their useful life in most sections. The water lines will experience pipe breaks at an increasing rate as they age and are subjected to changes in stress caused by temperature changes or nearby excavation. The high frequency of pipe breaks will result in water supply outages to major buildings for two reasons: 1) increased number of simultaneous pipe breaks so that buildings with water supply from two directions in the grid will have both supplies cut off; 2) the cast iron pipe has become so weak that it cannot be repaired with a sleeve and replacement of an entire section typically requires one week.

The history of pipe breaks of the potable water system at ANL was analyzed by a corrosion consultant, C. P. Dillion and Associates, in 1979. The frequency of pipe breaks follow a semilogarithmic curve typical of corrosion and aging in cast iron pipe. Over 100 pipe breaks per year are projected to occur in 1986 and beyond. Projections to 1983 have proven accurate. By 1990 the fire distribution system will not supply water reliably for fire protection use.

The Laboratory has three water distribution systems: a) domestic/fire (14.8 miles), b) laboratory (3.3 miles), c) canal (5.5 miles). The majority of the domestic/fire and laboratory water lines were installed in 1950; the canal water lines were installed in 1963. Since the laboratory and canal water lines run parallel to the fire/domestic lines in most areas, replacing all three lines simultaneously is economical. Although the canal lines are only 20 years old, they have become heavily scaled and no longer deliver the rated volume of water. During the summer, several buildings are not supplied with sufficient cooling water requiring supplemental feed from the domestic/fire system. In 1980, acid cleaning of the canal lines was investigated by a commercial firm; acid cleaning on a test sample failed to remove the scale safely. Replacement of the canal lines will return the canal system to its rated capacity. Since 1983, the canal water treatment has been modified so that in the future treatment water will no longer scale the lines.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Water line replacement  
 Argonne National Laboratory (ANL)  
 Argonne, Illinois

2. Project No.: 87-R-756

9. Purpose, Justification of Need for, and Scope of Project (continued)

Scope of Project: This project will replace 11.1 miles of domestic/fire, 2.9 miles of laboratory and 4.4 miles of canal water lines. The remaining portions of the existing water lines either serve buildings planned for demolition or will have been rehabilitated with funding currently in the Fire Safety Improvements Line Item.

Alternatives to cast iron pipe were investigated. PVC pipe was chosen for its low cost and high corrosion resistance. The new PVC pipe will withstand the corrosiveness of the soil. Cast iron valves and fittings will be provided with sacrificial anodes for cathodic protection. This project will reduce the frequency of water line breaks due to the deteriorated cast iron pipe. The beneficial results are: a) reliability of fire protection water for property and life safety and b) reliability of laboratory and canal water distribution for Laboratory programs.

10. Details of Cost Estimate\*:

	<u>Item Cost</u>	<u>Total Cost</u>
a. Engineering, design, and inspection at 13% of construction costs, item b.....		\$ 530
b. Construction costs.....		4,180
(1) Site work.....	0	
(2) Buildings.....	0	
(3) Utilities.....	\$ 4,180	
Subtotal.....		\$ 4,710
c. Contingency at 10% above costs.....		490
Total estimated costs.....		\$ 5,200

\*Based upon a completed conceptual design and current cost data.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Water line replacement  
Argonne National Laboratory (ANL)  
Argonne, Illinois

2. Project No.: 87-R-756

11. Method of Performance

Engineering and design will be accomplished by an architect engineer under Laboratory supervision. Construction inspection will be accomplished by Laboratory personnel. Construction will be accomplished via lump-sum, competitively bid construction contract.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

	<u>Prior Years</u>	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>Total</u>
a. Total project cost					
1. Total costs					
(a) Construction line item.....	\$ 0	\$ 400	\$ 2,100	\$ 2,700	\$ 5,200
(b) PE&D.....	0	0	0	0	0
(c) Expense funded equipment.....	0	0	0	0	0
(d) Inventories.....	0	0	0	0	0
Total direct costs.....	<u>\$ 0</u>	<u>\$ 400</u>	<u>\$ 2,100</u>	<u>\$ 2,700</u>	<u>\$ 5,200</u>
2. Other project costs					
(a) R&D necessary to complete construction.....	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
(b) Other project related costs.....	8	0	0	0	8
Total other project costs.....	<u>\$ 8</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 8</u>
Total project costs (Item 1 and 2)...	<u>\$ 8</u>	<u>\$ 400</u>	<u>\$ 2,100</u>	<u>\$ 2,700</u>	<u>\$ 5,208</u>
b. Other related funding requirements					
1. Facility operating costs.....					0
2. Activity operating expenses directly related to the facility.....					0
3. Capital equipment not related to construction but related to the programmatic effort in the facility.....					0
4. GPP or other construction related to programmatic effort in the facility.....					0
5. Other costs.....					0
Total related annual costs.....					0

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Water line replacement  
Argonne National Laboratory (ANL)  
Argonne, Illinois

2. Project No.: 87-R-756

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

- a. Total project funding
  - 1. Total facility costs
    - (a) Construction line item - No narrative required
    - (b) PE&D - None
    - (c) Expense funded equipment - None
    - (d) Inventories - None
  - 2. Other project funding
    - (a) No R & D effort is required
    - (b) \$8,000 for conceptual design
- b. Total related funding requirements

The water lines will have a useful lifetime longer than 30 years.

- 1. Facility operating costs - Implementation of this project will replace existing water lines. This will result in a reduction of maintenance to repair pipe breaks, and restore an acceptable level of operational efficiency to existing facilities. Thus the facility operating cost is reported as zero.
- 2. Operating expenses directly related to the facility - Programmatic although this project will restore and replace general purpose facilities employed to perform a wide variety of activities, there is no activity operating expense directly related to, or required for support of this project, thus the activity operating expense is reported as zero.
- 3. Capital equipment not related to construction but related to the activity effort in the facility - None
- 4. GPP or other construction related to activity effort - None
- 5. Other costs - None

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Mechanical systems rehabilitation  
 Argonne National Laboratory (ANL)  
 Argonne, Illinois

2. Project No.: 87-R-755

3. Date A-E work initiated: 1st Qtr. FY 1987

3a. Date physical construction starts: 4th Qtr. FY 1987

4. Date construction ends: 1st Qtr. FY 1989

5. Previous cost estimate: None  
 Date: None

6. Current cost estimate: \$ 3,200  
 Less amount for PE&D: 0  
 Net cost estimate: \$ 3,200  
 Date: January 1986

<u>7. Financial Schedule:</u>	<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1987	\$ 3,200	\$ 600	\$ 600	\$ 575
	1988	0	2,100	2,100	1,590
	1989	0	500	500	1,035

8. Brief Physical Description of Project

This project will restore worn parts of the central heating ventilation and air conditioning (HVAC) systems in three large office and laboratory buildings, Building 203, Building 205, and Building 212. Forty-three large field fabricated walk-in type air handling units require extensive rebuilding. These units range in size from 8,000 to 30,000 cfm (each roughly 25 to 75 tons of refrigeration capacity). Each provides ventilation air and climate control to a large bank of experimental laboratories and their adjacent offices. Required work is as follows:

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Mechanical systems rehabilitation  
Argonne National Laboratory (ANL)  
Argonne, Illinois

2. Project No.: 87-R-755

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8. Brief Physical Description of Project (cont'd.)

Chilled Water Coils: The air handling units selected for overhaul are those with steel coil frames rusted through. The frames no longer support the coils, nor do they prevent untreated air from bypassing the coils. Replacement entails providing adjacent coil blank-off panels, new local piping, and vapor-proof exterior insulation over the new parts.

Preheat Coils: This project will replace all preheat coils in the selected air-handling units with glycol-filled coils. The existing steam coils require replacing because of corroded frames. The poor performance of the aged steam coils and the resulting downstream damage to the systems makes renovation with new technology urgent. Replacement must include new coil supports, steam-to-glycol heat exchangers at selected locations, appropriate changes in the control hardware, new local piping and associated pipe insulation.

Filters: Replacement of selected filter banks within the air handling units is included in the project scope. Those selected for replacement are located downstream of the coils they are intended to protect. Their location and rusted condition have made them maintenance liabilities, and their low-tech filtering efficiency is no longer adequate for the scientific programs which rely on them. Replacement must include current technology automatic 85% efficiency filters, appropriate sheet metal modifications to accommodate the change, some modifications of electrical conduit and wiring, and associated monitoring instruments.

Sheet Metal: Sheet metal parts downstream of the cooling coils will be replaced. They are corroded from moisture carry-over. Coil drain pans, metal floors and the lower parts of the housings require repair or replacement to maintain airtightness. Upstream portions of the housings are generally in good condition and represent a considerable asset compared with the cost of all-new air handling assemblies.

Controls: Existing 3-way chilled water control valves are worn obsolete types. They will be replaced with energy-efficient 2-way valves. Associated control components of obsolete manufacture and poor parts availability have been marked for replacement.

Painting: All exposed new work will be painted.

## CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Mechanical systems rehabilitation  
Argonne National Laboratory (ANL)  
Argonne, Illinois

2. Project No.: 87-R-755

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8. Brief Physical Description of Project (cont'd.)

Packaged Units: In addition, six packaged air conditioning units deemed to be rusted beyond reasonable repair will be replaced in total. Eight other salvageable packaged units will be equipped with glycol preheat coils and rusted filter sections will be replaced.

9. Purpose, Justification of Need for, and Scope of Project

The three buildings in question are large permanent brick laboratory-office buildings, each housing from 200 to 340 people and serving important scientific research programs such as the tandem-linac, battery development, laser projects, basic energy sciences and nuclear energy studies. The mechanical components providing the essential ambient control for the scientists are from 25 to over 30 years old and have served their normal useful lives (20 to 25 years is average, according to DOE Life Cycle Costing guidelines). Cooling, humidity control, and clean air delivery are no longer reliable. Large scale unprecedented low chilled water flows in these buildings have been traced to unreliable preheat performance, in turn causing downstream coil freezing, frequent system drainage, extraordinary pipe corrosion, and widespread clogging of small water passages. Correction is urgent.

The air systems included in this project comprise approximately one-half of the total units for the three buildings. Units that can be temporarily restored by strategic coil replacement and those units showing little deterioration have not been included in this list and will be assigned for future attention when required.

The extent of so much simultaneous use and aging carries the scope of renewal beyond available operating funds; capital funding is required. Because of the close inter-relation of components it is more cost effective to completely rebuild each central unit instead of replacing parts piecemeal. The one obvious alternative of abandoning these failing systems amounts to an unreasonable condemnation of large investments in otherwise very high quality permanent research facilities. A second alternative of buying all new air handling facilities is undesirable from a research-interruption viewpoint and is considered unnecessarily expensive. The third known alternative, of piecemeal parts replacement is the one now in use. Proper use of operating funds under acceptable accounting procedures limits both the character and the extent of permissible renovation. The result of this alternative is marginal reliability and poor return for effort and expense.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Mechanical systems rehabilitation  
Argonne National Laboratory (ANL)  
Argonne, Illinois

2. Project No.: 87-R-755

9. Purpose, Justification of Need for, and Scope of Project (cont'd.)

Thoughtful preplanning of rebuilding offers opportunities to use current technology to improve reliability (glycol preheat) and save energy (2-way control valves and improved control cycles). Overall, the project will release operating people from intensive breakdown maintenance and allow a return to more reasonable maintenance planning for the units involved.

10. Details of Cost Estimate\*:

	<u>Item Cost</u>	<u>Total Cost</u>
a. Engineering, design, and inspection at 15% of construction costs, item b.....		\$ 353
b. Construction costs.....		2,373
c. Demolition and removal and debris.....		59
Subtotal.....		\$ 2,785
d. Contingency at 15% of above costs.....		415
Total estimated costs.....		\$ 3,200

11. Method of Performance

Design and inspection will be performed by ANL personnel assisted by outside engineering services. Construction and procurement will be accomplished by fixed-price contracts awarded on the basis of competitive bidding.

\*Based upon a completed conceptual design and current cost data.



CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Mechanical systems rehabilitation  
Argonne National Laboratory (ANL)  
Argonne, Illinois
2. Project No.: 87-R-755
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12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not required, TEC is less than \$5,000,000.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Rehabilitate laboratory space  
 Argonne National Laboratory (ANL)  
 Argonne, Illinois

2. Project No.: 87-R-753

3. Date A-E work initiated: 1st Qtr. FY 1987

3a. Date physical construction starts: 1st Qtr. FY 1988

4. Date construction ends: 3rd Qtr. FY 1990

5. Previous cost estimate: None  
 Date: None

6. Current cost estimate: \$ 12,035  
 Less amount for PE&D: 0  
 Net cost estimate: \$ 12,035  
 Date: January 1986

7. <u>Financial Schedule:</u>	<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1987	\$ 12,035	\$ 1,235	\$ 1,235	\$ 1,235
	1988	0	3,600	3,600	2,000
	1989	0	3,600	3,600	4,100
	1990	0	3,600	3,600	4,700

8. Brief Physical Description of Project

This project is the first phase of a two phase project that will rehabilitate a large multipurpose laboratory and office building at ANL (Building 200). The 359,600 gross square feet brick structure was put into service in 1951 and has a replacement value of \$86,100,000 and an expended useful life of 60%. Phase I will rehabilitate wings A-F, which totals 166,000 gross square feet of space. The remainder of the building will be renovated in phase II.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Rehabilitate laboratory space  
Argonne National Laboratory (ANL)  
Argonne, Illinois

2. Project No.: 87-R-753

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8. Brief Physical Description of Project (continued)

The workscope will encompass essentially all aspects of building construction, except structure and roofing<sup>1</sup>, including (as needed): building envelope (windows, tuckpointing); building interiors (painting, partition, floor tile, ceiling tile); electrical main distribution systems (transformers, switchgear, wiring); lighting (panels, fixtures, wiring), heating ventilation and air conditioning (HVAC) (pumps, fans, filters, coils, heat exchangers, air compressors, controls, ductwork, piping<sup>2</sup>); plumbing (toilet fixtures, water heaters, pumps, water and drain piping); laboratory and process piping (water heaters, distilled water system, air compressors and driers, nitrogen and oxygen storage tanks and evaporators, gas, water and drain piping); elevators (hydraulics controls cabs); removal and disposal of potentially contaminated or hazardous materials such as exhaust ductwork, laboratory drain piping and asbestos insulation.

9. Purpose, Justification of Need for, and Scope of Project

By the time this project is funded, the building will have been in constant use as a major laboratory and office building for more than 35 years. The needs of scientific programs have changed dramatically in this time period. The facility does not meet current construction codes and safety standards. In addition, systems that provide electric power, process fluids, heating, cooling, humidity control, clean air delivery and laboratory exhaust for control of hazardous materials are becoming less reliable each year because of aging. Adequate maintenance is difficult and very costly because replacement parts for many of the components are no longer available and shop effort is required for temporary repairs.

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<sup>1</sup> Included under on-going Project No. 85-R-702 "Replace Laboratory Roofs".

<sup>2</sup> Chillers and cooling towers are included under Project No. 85-R-709 "Central Chilled Water System "Phase I".

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Rehabilitate laboratory space  
Argonne National Laboratory (ANL)  
Argonne, Illinois

2. Project No.: 87-R-753

9. Purpose, Justification of Need for, and Scope of Project (continued)

The need exists, therefore, for a total upgrade of the building as described in the work scope above. If this facility upgrade is not supported, maintenance effort to keep the facility in an operational condition can be expected to continuously increase. Shutdowns due to major building equipment failures can be expected to cause major interruptions in current and future R & D activities and require long term experiments to start again. Health, safety, security and environmental risks will continue to increase. Personnel morale and productivity are also likely to be adversely affected.

10. Details of Cost Estimate\*:

Total Cost

a. Engineering, design, and inspection at approximately 17% of construction costs, item b.....	\$ 1,530
b. Construction costs.....	9,000
c. Contingency at approximately 14% of above costs .....	1,505
Total estimated cost.....	<u>\$ 12,035</u>

\*Based upon a completed conceptual design and current cost data.

11. Method of Performance

Engineering, design and inspection will be performed by Laboratory engineering personnel, aided by outside A/E firms. Construction will be accomplished by fixed-price contract awarded specializing in fire protection design. Construction and procurement will be accomplished by fixed-price contracts and purchase orders awarded on the basis of competitive bidding.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Rehabilitate laboratory space  
Argonne National Laboratory (ANL)  
Argonne, Illinois

2. Project No.: 87-R-753

12. Funding Schedule of Project Funding and Other Related Funding Requirements

	<u>Prior Years</u>	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1988</u>	<u>FY 1990</u>	<u>Total</u>
a. Total project costs						
1. Total facility costs						
(a) Construction line item .....	\$ 0	\$ 1,235	\$ 2,000	\$ 4,100	\$ 4,700	\$12,035
(b) PE&D .....	0	0	0	0	0	0
(c) Expense funded equipment .....	0	0	0	0	0	0
(d) Inventories .....	0	0	0	0	0	0
Total direct costs .....	\$ 0	\$ 1,235	\$ 2,000	\$ 4,100	\$ 4,700	\$12,035
2. Other project costs						
(a) R&D necessary to complete construction .....	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
(b) Other project related costs .....	51	0	0	0	0	51
Total other project costs .....	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Total project costs (Item 1 and 2)..	\$ 51	\$ 1,235	\$ 2,000	\$ 4,100	\$ 4,700	\$12,086
b. Other related annual costs (estimated life of project: 20 years)						
1. Facility operating costs .....						\$ 0
2. Activity operating expenses directly related to the facility .....						0
3. Capital equipment not related to construction but related to the programmatic effort in the facility .....						0
4. GPP or other construction related to programmatic effort in the facility.....						0
5. Other costs .....						0
Total related annual costs.....						0

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Rehabilitate laboratory space  
Argonne National Laboratory (ANL)  
Argonne, Illinois

2. Project No.: 87-R-753

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13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility
  - (a) Construction line item - No narrative required
  - (b) PE&D - None
  - (c) Expense funded equipment - None
  - (d) Inventories - None
2. Other project funding
  - (a) No R&D effort is required
  - (b) \$51,000 spent for conceptual design

b. Other related funding requirements

1. Facility operating costs - Rehabilitation of this facility will increase energy efficiency and greatly lower operating costs, thus the facility operating cost is given as zero.
2. Activity operating expenses directly related to the facility - There is no activity operating expense directly related to, or required for support of this project, thus the activity operating expense is given as zero.
3. There is no capital equipment related to the activity effort, not related to construction.
4. GPP or other construction related to activity effort - None
5. Other costs - None

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

- |   |   |
|---|---|
| 1. Title and location of project: Piping system restoration<br>Oak Ridge National Laboratory,<br>Oak Ridge, Tennessee | 2. Project No.: 87-R-752                                |
| 3. Date A-E work initiated: 1st Qtr. FY 1987  | 5. Previous cost estimate: None<br>Date: None           |
| 3a. Date physical construction starts: 1st Qtr. FY 1988   | 6. Current cost estimate: \$3,800<br>Date: January 1985 |
| 4. Date construction ends: 2nd Qtr. FY 1989   |   |

7. <u>Financial Schedule:</u>	<u>Fiscal Year</u>	<u>Authorizations</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1987	\$ 3,800	\$ 725	\$ 725	\$ 360
	1988	0	3,075	3,075	1,855
	1989	0	0	0	1,585

8. Brief Physical Description of Project

This project contains three parts:

- o The replacement, refurbishment, or upgrading of unreliable or overloaded utility piping distribution systems currently serving Oak Ridge National Laboratory (ORNL) facilities located in the Y-12 Plant. The outdated piping distribution systems included in the project are no longer efficiently repaired. They include steam, cooling-tower water, and demineralized water. In addition to pipe replacement, valves, filters, pumps, and motors will also be replaced.
- o The addition of a demineralizer and feed water charcoal filter to the central demineralized water system in order to provide a continuous supply of demineralized water adequate to meet ORNL at Y-12 requirements.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Piping system restoration  
Oak Ridge National Laboratory,  
Oak Ridge, Tennessee

2. Project No.: 87-R-752

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8. Brief Physical Description of Project (continued)

- o The installation of a new air compressor and dryer with a capacity of 3,000 cubic feet per minute (cfm) in the central instrument air system to provide air to critical operations. This unit is needed to meet existing requirements of ORNL at Y-12.

9. Purpose, Justification of Need for, and Scope of Project

The purpose of this project is to restore two critical utilities supporting ORNL at Y-12 to an appropriate level of reliability and capacity, thus minimizing the adverse consequences of potential system failures or curtailments on research activities.

ORNL at Y-12 facilities are supplied utility services from central systems operated by the Y-12 Utilities Department. These systems consist of many pieces of equipment and distribution networks that predate ORNL's presence in Y-12. As such, the systems were installed and maintained primarily in support of weapon component production. ORNL facilities have been provided these utility services because the ORNL divisions occupy buildings that formerly housed weapons-related activities. Relatively few ORNL capital or programmatic funds have been spent to expand or renovate the distribution networks, to enlarge system capacity, or to replace worn or obsolete equipment.

Since 1980, the Y-12 Plant has been systematically replacing several worn or unreliable pieces of equipment, including compressors that supply the central systems. However, this replacement has occurred almost exclusively in the portion of Y-12 dedicated to weapons components production. Old compressors in the ORNL portion of the plant are not currently scheduled for replacement.

Two systems of specific interest, instrument air and demineralized water, are structured so that the two areas which they serve can be separated. In emergency situations, demineralized water can be totally shut off to ORNL facilities, and the instrument air distribution network valves so ORNL facilities will be solely dependent on an inadequate, 30-year-old compressor.



CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Piping system restoration  
Oak Ridge National Laboratory,  
Oak Ridge, Tennessee

2. Project No.: 87-R-752

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9. Purpose, Justification of Need for, and Scope of Project (continued)

The demineralized water system currently is being upgraded by the Y-12 Plant to a 200-gallon-per-minute (gpm) production rate. However, backup capacity during demineralizer regeneration is only 100 gpm. The 200 gpm will supply both Y-12 and ORNL facility requirements, but 100 gpm will not. During regeneration of the primary demineralizer, it is to be expected that demineralized water to ORNL facilities will, on occasions, be curtailed. Depending on the type of feed water used (condensate, softened water, or process water), regeneration can occur as often as once a day using process water or once every 4 to 6 days using softened water. The Biology, Fusion Energy, and Engineering Technology divisions, and the Isotope Enrichment Group of the Operations Division use demineralized water in various experimental and operational activities. A prolonged shutdown of demineralized water would have a significant negative impact on all four divisions.

The proposed demineralizer (100-gpm capacity) will be installed in the central demineralized water plant to ensure a continuous 200-gpm production rate. It is vital to ORNL research objectives that the proposed demineralizer and filter be installed to ensure a reliable supply of demineralized water.

The instrument air compressors being replaced by Y-12 are in the production portion of the plant. The new units are sized only to meet production requirements and do not include capacity for ORNL facilities. Despite this replacement program, the newly defined instrument air requirements and the continued existence of several old and unreliable compressors makes doubtful a secure supply of instrument air unless ORNL invests in the system capacity.

The reciprocating compressor to be replaced has a nominal 1,500 cfm capacity. As is typical of a reciprocating-type compressor of its age, this compressor needs an extensive annual overhaul to prolong its life. Immediately after the overhaul, the compressor produces 1,500 cfm; but in a period of about 2 months, this capacity deteriorates to approximately 1,000 cfm.

## CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Piping system restoration  
Oak Ridge National Laboratory,  
Oak Ridge, Tennessee

2. Project No.: 87-R-752

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9. Purpose, Justification of Need for, and Scope of Project (continued)

ORNL facilities require approximately 3,000 cfm, and the new compressor is sized to meet this requirements. Only by investing in a new compressor of this size can ORNL ensure a reliable and adequate supply of instrument air. The integration of this instrument air into research and production activities by using in pneumatic control systems, equipment operation, cooling, test and inspection, and various support activities makes the installation of this new compressor vital to the accomplishment of ORNL objectives.

Based on engineering assessments, the continued operation of laboratory facilities is vulnerable to other unreliable utility piping distribution systems that have not been systematically upgraded since their installation in the 1940's. Though recognized as an urgent need, the work has not been possible, except on a piecemeal basis, under prevailing budget limitations. Renovations and upgrading of the utility piping distribution systems will enhance the inherent capability of these facilities over the long term. Systems that can be categorized as unreliable include the tower-water distribution and recirculating-demineralized water distribution systems serving the Isotope Separations building. These systems date back to the mid-1940's. Since that time, upgrading has occurred through routine or emergency maintenance. Valve gates have rusted and no longer seal. Filters have deteriorated such that internal element supports are not functional.

A major steam-control station providing process and heating steam to the Fusion Energy Administration and Laboratory facility does not provide adequate control and experiences frequent outages requiring much maintenance. Recirculating-demineralized water pumps serving the Fusion Energy and Engineering Technology building are about 30 years old and require expensive, time-consuming repairs because replacement parts are no longer available and must be shop fabricated.

The utility systems serving ORNL at Y-12 cannot be considered as separate systems from the Y-12 utility system. The systems were installed in the 1940's as continuous systems designed to serve the site as a whole. In the portion of Y-12 not occupied by ORNL, the system's condition reached the critical point in FY 1979, and refurbishment was approved starting in FY 1980. The same risks apply to these ORNL facilities within Y-12, which were constructed during the same time period.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Piping system restoration  
Oak Ridge National Laboratory,  
Oak Ridge, Tennessee

2. Project No.: 87-R-752

9. Purpose Justification of Need for, and Scope of Project (continued)

Considering the importance of the research programs and the magnitude of the total investment, it is important that the reliability of piped utility services for these facilities be restored to original status and, in many cases, modified to accommodate current levels of use.

10. Details of Cost Estimate\*

	<u>Item Cost</u>	<u>Total Cost</u>
a. Engineering, design, and inspection at approximately 15% of construction costs, item b.....		\$ 401
b. Construction costs.....		2,756
(1) 4000 building modifications.....	\$ 684	
(2) Special facilities.....	2,072	
Subtotal.....		<u>3,157</u>
c. Contingency at approximately 20% of above costs.....		643
Total estimated costs.....		<u>\$ 3,800</u>

11. Method of Performance

Design and inspection will be performed under a negotiated architect-engineer contract. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts awarded on the basis of competitive bids.

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\*The above estimate is based on a completed conceptual design.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Piping system restoration  
Oak Ridge National Laboratory,  
Oak Ridge, Tennessee

2. Project No.: 87-R-752

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12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not required; total estimated cost is less than \$5,000,000.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Fire protection improvements (phase II)  
 Brookhaven National Laboratory (BNL)  
 Upton, New York

2. Project No.: 86-R-726

3. Date A-E work initiated: 2nd Qtr. FY 1986

3a. Date physical construction starts: 3rd Qtr. FY 1986

4. Date construction ends: 4th Qtr. FY 1989

5. Previous cost estimate: None  
 Date: None

6. Current cost estimate: \$ 3,000  
 Less FY 1984 PE&D: 0  
 Net cost estimate: \$ 3,000  
 Date: December 1984

7. <u>Financial Schedule:</u>	<u>Fiscal Year</u>	<u>Authorizations</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1986	\$ 3,000	\$ 481	\$ 481	\$ 127
	1987	0	1,680	1,680	1,299
	1988	0	400	400	1,119
	1989	0	439	439	455

8. Brief Physical Description of Project

This project provides for the design, fabrication and installation of various fire protection improvements affecting over 210,000 square feet of building space. The improvements consist of:

1. Providing automatic sprinkler protection in basement, laboratories and storage areas of facilities designated as high loss potential areas. Areas included are Building 510, 555, 815, 830, 901 and 928.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Fire protection improvements (phase II)  
Brookhaven National Laboratory (BNL)  
Upton, New York
2. Project No.: 86-R-726
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8. Brief Physical Description of Project (continued)

2. Provide complete or partial automatic sprinkler protection (either new, or extension of existing systems) in buildings of combustible contents and/or construction which have a direct impact or exposure to DOE programs. These include Buildings 130, 179, 211, 355, 356, 480, 610 and 923.
3. Transferring the existing fire alarm panels from BNL's old telegraph system to BNL multiplexed central alarm station (completion of a multiplexed central alarm station is scheduled in FY 1985). This will eliminate basic operational deficiencies in the existing system and bring BNL into full compliance with general industrial standards and DOE guidelines.
4. Raising the level of fire protection at Building 30 (Brookhaven Center) and other miscellaneous buildings to improve the life safety aspects. These improvements include: modifications to exits to comply with the National Fire Protection Association (NFPA) 101 (the Life Safety Code), extending sprinkler protection into unprotected areas, installing fire extinguishing systems above localized areas of high hazards (i.e., grills, deep fat fryers).

All installations and modifications will be in accordance with DOE recommended standards. Specifically, sprinkler protection will conform to National Fire Protection Association Standard 13. Sprinkler systems will be hydraulically designed to minimize costs. Wetpipe system on 100 sq. ft. spacing will be used in heated areas. Dry pipe systems will be used for unheated or partially heated areas. Water supplies will be taken from the existing BNL site water distribution system.

Transferring the fire alarm system to BNL's new central station facility will include all the work necessary to comply with the National Fire Code's 72 Series and DOE Orders.

9. Purpose, Justification of Need for, and Scope of Project

The purpose of this project is to reduce the risk of loss due to fire at BNL. Only key facilities have been included. Key facilities are defined as:

- a. Buildings containing operations directly involved in DOE program activities; or



CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Fire protection improvements (phase II)  
Brookhaven National Laboratory (BNL)  
Upton, New York

2. Project No.: 86-R-726

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11. Method of Performance

Design and inspection will be performed under one or more negotiated architect-engineer contracts with firms specializing in fire protection design. Construction and procurement will be accomplished by fixed-price contracts and purchase orders awarded on the basis of competitive bidding.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not required.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required.



DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

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|---|--|
| 1. Title and location of project: Central chilled water plant<br>Argonne National Laboratory<br>Argonne, Illinois | 2. Project No.: 85-R-709   |
| 3. Date A-E work initiated: 1st Qtr. FY 1986  | 5. Previous cost estimate: none<br>Date: none  |
| 3a. Date physical construction starts: 2nd Qtr. FY 1987   | 6. Current cost estimate: \$ 5,200<br>Less amount for PE&D: 0<br>Net cost estimate: \$ 5,200<br>Date: September 1983 |
| 4. Date Construction ends: 4th Qtr. FY 1988   |  |

7. Financial Schedule

<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
1986	5,200	962	962	62
1987	0	3,600	3,600	3,650
1988	0	638	638	1,488

8. Brief Physical Description of Project

This project establishes a central water chilling plant to serve all the principal buildings in the central research group. Two new electric centrifugal chillers totaling 3200 tons are planned for a now-unoccupied area of the former Zero Gradient Synchrotron (ZGS) facilities. Use is made of existing cooling towers, pumps, piping, and electrical power. Approximately 3 miles of chilled water supply and return piping are routed to the user buildings. Local terminal connections are included. The connecting pipeline is specified as uninsulated, corrosion-resistant plastic pipe, buried below frost line. New chilled water circulation pumps are included for the control facility, with necessary pump modifications of the terminal delivery points.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Central chilled water plant  
Argonne National Laboratory  
Argonne, Illinois

2. Project No.: 85-R-709

9. Purpose, Justification of Need for, and Scope of Project

The proposed project offers an integrated, cost-saving alternate to piecemeal replacing of worn out water chillers. The water chillers installed during construction of the Laboratory are beyond their normal life expectancy; to maintain active research operations, the ANL Institutional Plan, 1983-1988, identifies a nearly \$6,000,000 program of chiller replacement. By establishing a central water chilling plant, greater reliability and more economical operations are possible. A 1977 ANL engineering study aimed at integrated water chilling facilities identified the savings and also pointed to savings possible by retiring steam-driven chillers in favor of electrical. However, when combined with the unavoidable necessity of replacing worn out chillers, the central plant concept is definitely attractive, offering both immediate benefits and greatly enhanced potentials. The annual estimated savings in energy, repair, and maintenance, in 1983 dollars, is approximately \$500,000 for providing a central chilled water plant to replace eight existing steam driven chillers in the above mentioned four buildings.

In addition to the benefits of central chilled water supply, this project makes use of existing facilities: i.e., the vacant area in Building 370 and the under-utilized electric substations and pumped cooling tower water lines from the cooling tower near Building 370. If these under-utilized facilities were not available, a new building for the central chillers complete with new cooling towers, pumps, and electrical substation would have to be constructed at an additional cost to the project of \$763,000. The capacity built into the existing facilities will accommodate the central chilling concept, yet allow a generous margin to attract future research programs. Superimposing the water chilling function offers assurance that the existing facilities will remain profitably available in good condition.

10. Details of Cost Estimate

	<u>Item Cost</u>	<u>Total Cost</u>
a. Engineering, design and inspection at 18% of construction, Item b.....		\$ 600
b. Construction costs .....		3,270
(1) Valve pits .....	\$ 135	
(2) Trenching and backfill .....	460	
(3) Buried chilled water piping .....	1,280	

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Central chilled water plant Argonne National Laboratory Argonne, Illinois	2. Project No.: 85-R-709
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10. Details of Cost Estimate (continued)

(4) Piping and equipment within buildings .....	1,170	
(5) Controls and metering .....	60	
(6) Electrical power for chillers and pumps .....	165	
Subtotal.....		\$ 3,870
c. Procurement costs (chillers, primary pumps & strainer) .....		600
d. Contingency - 16.3% of engineering, construction & procurement .....		730
Total estimated cost.....		\$ 5,200

11. Method of Performance

Engineering, design and inspection will be performed by laboratory engineering personnel, aided by outside A/E firms. Construction will be accomplished by fixed-price contract awarded on the basis of competitive bidding.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

	<u>Prior Years</u>	<u>FY 1986</u>	<u>FY 1987</u>	<u>FY 1988</u>	<u>Total</u>
a. Total project costs					
1. Total facility costs					
(a) Construction line item ...	\$ 0	\$ 62	\$ 3,650	\$ 1,488	\$ 5,200
(b) PE&D .....	0	0	0	0	0
(c) Expense funded equipment..	0	0	0	0	0
(d) Inventories .....	0	0	0	0	0
Total facility costs ...	\$ 0	\$ 62	\$ 3,650	\$ 1,488	\$ 5,200

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Central chilled water plant Argonne National Laboratory Argonne, Illinois	2. Project No.: 85-R-709
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12. Funding Schedule of Project Funding and Other Related Funding Requirements (continued)

2. Other project costs					
(a) R&D necessary to complete construction .....	0	0	0	0	0
(b) Other project related costs .....	20	0	0	0	20
Total other project costs .....	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
(Items 1 and 2) .....	\$ 20	\$ 62	\$ 3,650	\$ 1,488	\$ 5,220

b. Total related funding requirements (estimated life of project: 20 years) - N/A

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility costs (N/A)

2. Other project funding

(a) No R&D effort is required

(b) \$20,000 spent for conceptual design

b. Total related funding requirements - The central water chilling facility to be established will have a useful lifetime upwards of 20 years.

1. Facility operating costs - Implementation of this project will replace existing physical functions within individual buildings with a central plant. This will result in a reduction of maintenance and operating costs while restoring an acceptable level of operational efficiency to existing facilities, thus the facility operating cost is reported as zero.

CONSTRUCTION PROJECT DATA SHEET

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1. Title and location of project: Central chilled water plant  
Argonne National Laboratory  
Argonne, Illinois

2. Project No.: 85-R-709

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13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (continued)

2. Activity operating expenses directly related to the facility - Although this project will restore and replace general purpose facilities employed to perform a wide variety of activities, there is no activity operating expense directly related to, or required for support of this project, thus the activity operating expense is reported as zero.
3. Capital equipment not related to construction but related to the activity effort in the facility - None.
4. GPP or other construction related to activity effort - None
5. Other costs - None



CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Hanford site fire alarm system upgrade  
Richland, Washington
2. Project No.: 85-R-707
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8. Brief Physical Description of Project (continued)

This project will replace approximately 240 master alarm boxes and 50 street boxes, which are distributed through-out the site. This will require additional equipment to interface the new master boxes with the existing detector circuits in the facilities. The existing alarm receiving equipment at the fire stations will be replaced with new equipment compatible with the new alarm boxes. Significant features of the new alarm receiving equipment includes printout of facility location and alarming zone within the facility. This equipment will be supplemented with a new computer aided dispatching system. This will increase the efficiency of responding emergency personnel by providing information not available with the existing system. This includes information such as type of occupancy, recommended extinguishing agents, and adjacent conditions.

9. Purpose, Justification of Need for, and Scope of Project

The purpose of this project is to update the existing fire alarm system with a more reliable and efficient system. There has been no significant overhaul of the Hanford fire alarm system since the site was originally established in the early 1940's. Some system components are approaching 50 years in age. Repair of components is difficult at best due to the lack of spare parts. Overhead conductors are generally in excess of 20 years old with significant amounts in excess of 30 years old. Due to the normal aging process the insulation of these conductors is brittle and breaks easily leaving conductors exposed and permitting faults in the system. In some locations, alarms are transmitted to the fire stations on underground conductors. Major portions of these lines are uncharted and are subject to dig-ups during construction and maintenance activities.

Due to deterioration and age of the system components, numerous false and nuisance alarms as well as ground faults occur. Records of alarm signals for calendar years 1979, 1980 and 1981 indicate alarms due to electrical problems, malfunctions, atmospheric phenomenon, and equipment failures ranged between 28 and 37 percent of the total number of alarms received. It is estimated that the proposed system could eliminate 50 percent of these alarms.

As the facilities at the site have been increased in size as well as number, additions to the fire alarm reporting system have been made to cover them. Unfortunately, by necessity, requirements of the National Fire Codes have been violated. These violations concern connection of detectors to master alarm boxes in an unacceptable manner, inadequate annunciation, and inappropriate alarm receiving at the fire stations.





CONSTRUCTION PROJECT DATA SHEET

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1. Title and location of project: Hanford site fire alarm system upgrade  
Richland, Washington

2. Project No.: 85-R-707

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13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required. TEC is less than \$5,000,000.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

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|---|--|
| 1. Title and location of project: Medical facility<br>Lawrence Livermore National Laboratory<br>Livermore, California | 2. Project No.: 85-R-706   |
| 3. Date A-E work initiated: 1st Qtr. FY 1985  | 5. Previous cost estimate: None<br>Date: none  |
| 3a. Date physical construction starts: 1st Qtr. FY 1986   | 6. Current cost estimate: \$ 7,300<br>Less amount for CP&D:       0<br>Net cost estimate:       \$ 7,300<br>Date: September 1983 |
| 4. Date construction ends: 1st Qtr. FY 1989   |  |

7. Financial Schedule

<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
1985	\$ 7,300	\$ 500	\$ 500	\$ 196
1986	0	2,694	2,694	338
1987	0	3,600	3,600	4,404
1988	0	162	162	1,662
1989	0	344	344	700

8. Brief Physical Description of Project

This project will provide a 25,600 gross square foot building for a new and expanded facility for Health Services and will house all of the 32 medical staff and support personnel. The functions accommodated in this space will be a waiting area, receptionist, interview rooms, administrative offices, records area, health maintenance offices, physical examination rooms, observation room, emergency treatment (major and minor), diagnostic laboratories, specimen rooms, X-ray room, dark room/process lab, autoclave and clean hold area, ambulance entry, personnel decontamination facility, eye safety examination rooms, toilets, storage and equipment rooms.

The building will be designed to relate to the existing nearby major facilities and will be constructed of fire-resistive materials. Fire sprinkler system as well as other safety devices, will be installed. Normal

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Medical facility Lawrence Livermore National Laboratory Livermore, California	2. Project No.: 85-R-706
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8. Brief Physical Description of Project (continued)

medical laboratory building utilities, heating, ventilation, power, lighting, and communication systems will be provided. The building will be cooled by mechanical refrigeration. In addition, the decontamination area will require special ventilation, sewage retention tanks, and floor treatment. Energy conserving design will be utilized throughout the facility.

Normal site utilities will be extended from mains and connections to storm and sanitary sewers will be made. Electrical power will be extended from high voltage feeders to a new substation serving this building. Area lighting will be installed for safety and security. Site development will comply with the Master Site Plan and will include grading, paving, off-street parking, curbs, gutters, sidewalks, fencing, security screens, and minimal landscaping.

9. Purpose, Justification of Need for, and Scope of Project

Adequate health service support to the over 7600 employees of Lawrence Livermore National Laboratory (LLNL) primarily consists of two major elements. First, preventative approaches to both the physical and mental health of the work-force. This is accomplished through performance of over 3500 physical examinations a year, attention to the potential hazards of one of the country's foremost applied physics and engineering facilities and support to those who may be unduly stressed by working in such an environment. Second, is the availability of adequate emergency response to a very broad spectrum of hazards ranging from intense radioactivity, through almost every possible chemical, mechanical and electrical risk, to the "normal" falls, cuts, etc., that go with a dynamic population that includes over a thousand contractor employees in addition to the LLNL staff. Although blessed with one of the best safety records of the national laboratories, the health services facility must be prepared for major incidents.

The current health facility is housed in a 40 year old World War II barracks building that is shared with the South Badge Office. It was barely adequate for a medical staff of less than 20 and a population of less than 5,000. Today the building limits physical examinations to approximately two thirds of the DOE guidelines for a laboratory of LLNL's size. Several other health services required by DOE order, DOT regulation, California code, American National Standards Institute (ANSI) standards, and LLNL policy are currently not being provided due to the physical restraints of the current building. For example, in the event of persons being

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Medical facility  
Lawrence Livermore National Laboratory  
Livermore, California

2. Project No.: 85-R-706

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9. Purpose, Justification of Need for, and Scope of Project (continued)

contaminated with radioactive, toxic, or carcinogenic materials, they cannot be adequately treated without significant risk to the current facility and attending personnel. A special unit needs to be constructed to deal with this particular type of emergency situation. The present facility is generally not capable of handling a large variety of emergency situations nor a large number of casualties.

10. Details of Cost Estimate\*

a. Engineering, design, and inspection at approximately 13% of construction costs .....		\$ 700
1) Title I & II .....	\$ 400	
2) Title III .....	300	
b. Construction costs .....		5,550
1) Improvements to land including grading, paving, walks and landscaping .....	550	
2) Buildings Medical, 25,600 sq. ft. at \$162 per sq. ft.....	4,150	
3) Utilities, including mechanical, power, communications, storm and sanitary sewer.	850	
c. Standard equipment .....		140
d. Relocation cost .....		100
Subtotal .....		\$ 6,490
f. Contingency at approximately 12% of other costs (except item a. and c. above) .....		810
Total estimated cost.....		\$ 7,300

\*Based on complete conceptual design.

11. Method of Performance

This project will be designed and constructed under a procedure commonly referred to as turnkey contracting. The project will be competitively bid with each bidder submitting a design and cost proposal. Minor work will be performed by LLNL forces.

CONSTRUCTION PROJECT DATA SHEETS

<b>1. Title and location of project:</b> Medical facility Lawrence Livermore National Laboratory Livermore, California	<b>2. Project No.:</b> 85-R-706
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**12. Funding Schedule of Project Funding and Other Related Funding Requirements**

	<u>Prior Years</u>	<u>FY 1985</u>	<u>FY 1986</u>	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>Total</u>
<b>a. Total project costs</b>							
<b>1. Total facility costs</b>							
a. Construction line item ....	\$ 0	\$ 196	\$ 338	\$ 4,404	\$ 1,662	\$ 700	\$ 7,300
b. CP&D .....	0	0	0	0	0	0	0
c. Expense funded equipment ..	0	0	0	0	0	0	0
d. Inventories .....	0	0	0	0	0	0	\$ 0
Total direct costs .....	\$ 0	\$ 196	\$ 338	\$ 4,404	\$ 1,662	\$ 700	\$ 7,300
<b>2. Other project costs</b>							
a. R&D necessary to complete construction .....	120	0	0	0	0	0	120
b. Other project related costs	0	0	0	0	0	0	0
Total other project costs .....	120	0	0	0	0	0	120
Total project costs .....	\$ 120	\$ 196	\$ 338	\$ 4,404	\$ 1,662	700	\$ 7,420
<b>b. Other related annual costs (estimated life of facility: 40 years)</b>							
1. Facility operating costs .....						\$ 230	
2. Programmatic operating expenses directly related to the facility .....						3,280	
3. Capital equipment not related to construction but related to the programmatic effort in the facility .....						300	
4. GPP or other construction related to programmatic effort in the facility .....						100	
5. Other costs .....						0	
Total other related annual funding costs .....						\$ 3,910	

CONSTRUCTION PROJECT DATA SHEETS

1: Title and location of project: Medical facility  
Lawrence Livermore National Laboratory  
Livermore, California

2. Project No.: 85-R-706

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

- a. Total project funding
  1. Total facility costs
    - a. Construction line item - No narrative required.
    - b. Expense funded equipment - No narrative required.
    - c. Inventories - No narrative required.
  2. Other project funding
    - a. R&D necessary to complete construction  
Total funding in this classification represents the conceptual design cost and other studies determined to be necessary.
    - b. Other related project cost - No narrative required.
- b. Total related-funding requirements
  1. Facility operating costs - Operating costs of the facility are estimated to be \$226,000 per year including \$92,900 escalation (based on FY 1982 average maintenance and utility cost of \$5.20 per sq. ft. escalated to \$8.83 in FY 1987. Maintenance cost escalated at 7% per annum, and utility cost escalated at 15% per annum).
  2. Programmatic operating expenses directly related to the facility - This estimate is for 32 total programmatic and support personnel at \$102,540 average per person in FY 1987. Ninety percent of these people are presently housed in existing scattered buildings and trailers and will be moved to this new facility. The operating funds for these people are a normal part of the past and current programs. The remaining 10 percent represent growth projected to FY 1987. Funds for this growth have been included in program projections.
  3. Capital equipment not related to construction but related to the programmatic effort in the facility - This is an average annual estimate which includes both the small items needed for continuous operation of the facility and the occasional large item over \$100,000 which cannot be described at this time, but can be predicted as needed to maintain technical excellence in efforts conducted in the facility.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Medical facility  
Lawrence Livermore National Laboratory  
Livermore, California

2. Project No.: 85-R-706

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13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (continued)

4. Maintenance, repair, GPP or other construction related to programmatic effort - None
5. Other costs - No narrative required.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Replace laboratory roofs Argonne National Laboratory Argonne, Illinois	2. Project No.: 85-R-702
3. Date A-E work initiated: 1st Qtr. FY 1985	5. Previous cost estimate: none Date: none
3a. Date physical construction starts: 4th Qtr. FY 1985	6. Current cost estimate: \$ 8,950 Less amount for PE&D: 0 Net cost estimate: \$ 8,950
4. Date construction ends: 4th Qtr. FY 1988	Date: December 1986

7. Financial Schedule

<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
1985	\$ 9,800	\$ 3,308	\$ 3,308	\$ 2,110
1986	0	2,983	2,983	3,312
1987	0	2,392	2,392	3,261
1988	0	267	267	267

8. Brief Physical Description of Project

The proposed project will replace built-up membrane roofs on principal general purpose laboratory buildings, giving priority to existing conditions. Approximately 880,000 square feet of roof will be replaced. The work will consist of stripping existing membrane and insulation where conditions require, patching decks as required, improving drainage by compensating for low spots, installing new current technology membranes designed to best fit field conditions, adding insulation to bring heat transfer resistance up to current DOE standards, and, finally, providing protection to the membranes from temperature extremes and attack from photochemical activity. Flashings, curbs, gravel stops, and fascia will be renewed as their conditions dictate. Satisfactory function of roofing components will be warranted for 10 years, directly by the material manufacturers.



CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Replace laboratory roofs  
Argonne National Laboratory  
Argonne, Illinois

2. Project No.: 85-R-702

9. Purpose, Justification of Need for, and Scope of Project

The purposes of this project are to restore the weather tightness of roofs on laboratory buildings, and to bring the resistance to heat transfer up to current Federal energy use standards. This project provides a multi-year plan, described in the ANL Institutional Plan, FY 1983-FY 1985, whose goal is the replacement of all roofs older than 25 years on permanent general purpose buildings. At this age they have exceeded normal life expectancy for conventional built-up membrane construction. Resources expended on reconditioning efforts exceed good business judgment, yet the research programs housed under the roofs have been impacted.

Total replacement is required. Programs housed in these buildings include Basic Energy Research, Fossil Energy Research, Conservation, Renewable Energy, Environmental Protection, Safety, and Emergency Preparedness. Twenty one buildings are scheduled with approximately 880,000 square feet of roof needing immediate attention.

10. Details of Cost Estimate

ANL has replaced over 70,000 square feet of roofs since 1982 under five separate competitively bid contracts. In addition to the roof area, the amount of roof and insulation to be removed, the relative number of roof penetrations and other complications to be provided all produced a range of unit prices from \$6.03 to \$8.68 per square foot when normalized to mid-1982. The mean unit cost derived from these bids was \$7.30 in mid-1982.

The various elements contributing to the total unit cost of roof replacement are identified in the following table:

<u>Cost Element</u>	<u>Job Cost Breakdown</u>	<u>\$ Per Sq. Ft.</u> <u>Mid-1982</u>
Tear-off of old roof and insulation (90% of roof area).....		\$1.34
Preparation of substrate .....		0.38
Improve water drainage (average) .....		1.04

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Replace Laboratory roofs  
Argonne National Laboratory  
Argonne, Illinois

2. Project No.: 85-R-702

10. Details of Cost Estimate (continued)

Single-ply PVC membrane .....	1.48
Irma Board - 2" thick insulation .....	2.04
Pro-rated edge and penetration details (average) .....	1.02
Warranties (included in above costs) .....	--
Estimated total .....	<u>\$7.30</u>

The following estimated total cost of the project is for the construction of approximately 200,000 square feet for three years, 80,000 square feet in the last year of the project. The above unit cost of \$7.30 in mid-1982 has been escalated for each annual increment of construction, using the escalation rates projected below.\*

	<u>Total Cost</u>
a. Engineering, design and inspection at approximately 11% of construction, Item b. ....	\$ 900
b. Construction costs, 880,000 sq. ft. @ \$10.80/sq. ft. ....	7,150
c. Contingency @ approximately 10% of above costs .....	900
Total estimated cost.....	<u>\$ 8,950</u>

\*Based upon a completed conceptual design and current cost data.

11. Method of Performance

Engineering, design and inspection will be performed by laboratory engineering personnel. Construction will be accomplished by fixed-price contracts awarded on the basis of competitive bidding.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Replace laboratory roofs Argonne National Laboratory Argonne, Illinois	2. Project No.: 85-R-702
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12. Funding Schedule of Project Funding and Other Related Funding Requirements

	<u>Prior Years</u>	<u>FY 1985</u>	<u>FY 1986</u>	<u>FY 1987</u>	<u>FY 1988</u>	<u>Total</u>
a. Total project costs						
1. Total facility costs						
(a) Construction line item ..	0	\$ 2,110	\$ 3,312	\$ 3,261	\$ 267	\$ 8,950
(b) PE&D .....	0	0	0	0	0	0
(c) Expense funded equipment.	0	0	0	0	0	0
(d) Inventories .....	0	0	0	0	0	0
Total facility costs .	<u>0</u>	<u>\$ 2,110</u>	<u>\$ 3,312</u>	<u>\$ 3,261</u>	<u>\$ 267</u>	<u>\$ 8,950</u>
2. Other project costs						
(a) R&D necessary to complete construction .....	0	0	0	0	0	0
(b) Other project related costs .....	<u>8</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>8</u>
Total other project costs .....	<u>\$ 8</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 8</u>
Total project costs (items 1 and 2) .....	<u>\$ 8</u>	<u>\$ 2,110</u>	<u>\$ 3,312</u>	<u>\$ 3,261</u>	<u>\$ 267</u>	<u>\$ 8,958</u>
b. Other related annual costs (estimated life of project: 20 years)						
1. Facility operating costs .....						0
2. Programmatic operating expenses directly related to the facility .....						0
3. Capital equipment not related to construction but related to the programmatic effort in the facility .....						0
4. GPP or other construction related to programmatic effort in the facility .....						0
5. Other costs .....						0
Total other related annual costs .....						0

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Replace laboratory roofs  
Argonne National Laboratory  
Argonne, Illinois

2. Project No.: 85-R-702

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility

- (a) Construction line item - No narrative required
- (b) PE&D - None
- (c) Expense funded equipment - None
- (d) Inventories - None

2. Other project funding

- (a) No R&D effort is required
- (b) \$8,000 spent for conceptual design

b. Total related funding requirements - The roofing components to be replaced or rehabilitated will have useful lifetimes of approximately 20 years.

- 1. Facility operating costs - Implementation of this project will rehabilitate or replace physical components of buildings. This will result in a reduction of maintenance costs while restoring the respective system components to an acceptable level of operational efficiency, thus the facility operating cost is reported as zero.
- 2. Programmatic operating expenses directly related to the facility - Although this project will rehabilitate general purpose facilities employed to perform a wide variety of activities, there is no programmatic operating expense directly related to, or required for supply of this project, thus the programmatic operating expenses is reported at zero.
- 3. Capital equipment not related to construction but related to the programmatic effort in the facility - None
- 4. Maintenance, repair, GPP or other construction related to programmatic effort - None
- 5. Other costs - None

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

- |   |  |
|---|--|
| 1. Title and location of project: Central chilled water facility<br>Brookhaven National Laboratory<br>Upton, New York | 2. Project No.: 85-R-701   |
| 3. Date A-E work initiated: 1st Qtr. FY 1985  | 5. Previous cost estimate: none<br>Date: none  |
| 3a. Date physical construction starts: 1st Qtr. FY 1986   | 6. Current cost estimate: \$15,000<br>Less amount for PE&D: 0<br>Net cost estimate: \$15,000<br>Date: September 1983 |
| 4. Date construction ends: 3rd Qtr. FY 1988   |  |

7. Financial Schedule:

<u>Fiscal Year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
1985	\$15,000	\$ 2,200	\$ 2,200	\$ 425
1986	0	6,832	6,832	473
1987	0	5,700	5,700	7,714
1988	0	268	268	6,388

8. Brief Physical Description of Project

This project proposes the construction of a central chilled water and compressed air facility. It will provide 5,100 tons of refrigeration and 1,500 standard cubic feet per minute (SCFM) of compressed air service for distribution to the following six major research complexes on site: Biology - Building 463; Medical Research Center - Building 490; Physics - Building 510; Applied Mathematics - Building 515; Laboratory Wings - Building 703; Hot Laboratory - Building 801.

The project consists of the installation of approximately 16,000 feet of underground chilled water piping and 8,000 feet of compressed air piping; the erection of one 5,100 ton capacity multicell cooling tower of completely fireproof construction and two buildings (a central chilled water and compressed air structure, and

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Central chilled water facility  
Brookhaven National Laboratory  
Upton, New York

2. Project No.: 85-R-701

8. Brief Physical Description of Project (continued)

a condenser water pump house) having a total gross area of approximately 6,140 square feet and a gross volume of 115,100 cubic feet. Necessary switchgear at 13.8 KV, 2.4 KV and 480 volts, and a 500 KVA transformer substation are also included. Certain utility systems that interfere with construction will be extended, modified, or relocated; these include steam, water, electric power, telephone, and storm and sanitary drains. The present macadam service road (Temple Place) located adjacent to the central steam plant will be extended (20' x 50') in order to provide access to the proposed facility.

The building identified as central chilled water and compressed air structure will be approximately 56' x 90' x 20' high. This building will abut and connect with the south wall elevation of the existing central steam facility.

The building will be approximately 5,040 square feet and will consist of slab-on-grade, steel framing, insulated sandwich wall siding with a built-up insulated roof deck.

The equipment level at grade will contain the following major refrigerations apparatus and associated components: Three 1,700 ton chillers, one 1,500 SCFM air compressor, three chilled water pumps, an automatic central control and monitoring system, electrical switchgear, motor control stations and associated piping and electrical lines.

The condenser water pump house of approximately 1,100 square feet will house two vertical condenser water pumps, and will be constructed with a slab-on-grade, concrete block walls, and built-up roof deck.

9. Purpose, Justification of Need for, and Scope of Project

This project is the most cost effective method for replacing major refrigeration and compressed air equipment that have become obsolete and beyond economical repair. The multiple independent systems that exist at Brookhaven National Laboratory historically have ever increasing operating and maintenance costs as the equipment ages. A new central chilled water facility would have lower maintenance and operating cost, and be able to maximize load diversity presently not possible with the independent building systems.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Central chilled water facility  
Brookhaven National Laboratory  
Upton, New York

2. Project No.: 85-R-701

9. Purpose, Justification of Need for, and Scope of Project (continued)

This project provides a firm base for substantial future reductions in capital construction, maintenance costs and energy consumption. In the future, work and spent individual air conditioning and compressed air systems in other scientific buildings will be replaced with chilled water and compressed air from the proposed central facility.

Background Profile of Existing Systems and Facilities

The existing decentralized systems of air conditioning, refrigeration, and compressed air are the result of each system being conceived as a self-contained entity as opposed to other basic utility services such as electrical power, potable water, waste water, steam, gas, etc., which are extended to a new facility from a central source. Chilled water, however, presently requires refrigeration units (centrifugal, steam absorption, etc.), cooling towers, pumps, electrical equipment, etc. to provide complete and independent systems for supplying environmental air conditioning to each building. This approach has resulted in a multiplicity of equipment and systems.

The major buildings are presently served by 36 units consisting of steam absorption, centrifugal and helical screw, refrigeration water chillers totaling 11,147 tons.

There are approximately 6,500 tons of additional refrigeration installed throughout various complexes. These range from small one-ton window air conditioning units to 150-ton reciprocating refrigeration assemblies.

Proposed Central Chilled Water Facility

It is proposed to construct a central chilled water and compressed air facility as a utility similar to other central facilities. The new chilled water plant will supply the refrigeration requirements for the six buildings and eliminate the use of well water used for once-through cooling at the Medical Research Center. The cooling systems being replaced were installed in the 1950s and 1960s and are obsolete, and beyond their normal life expectancy, and incur increasing operational and maintenance costs each year. In addition, this proposed facility would supply a source of clean, oil-free, low dewpoint compressed air for experimental and utility services within these facilities.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Central chilled water facility  
Brookhaven National Laboratory  
Upton, New York

2. Project No.: 85-R-701

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9. Purpose, Justification of Need for, and Scope of Project (continued)

The proposed central chilled water and compressed air facility offers many tangible benefits over the multiplicity of the decentralized systems. Some of the major benefits are:

- A. Permit new refrigeration systems to be installed at a lower initial cost (\$360/ton) as compared with separate, independent systems (\$790/ton).
- B. Reduce operating and maintenance costs due to the elimination of independent chilled water and compressed air systems by centralization of major equipment.
- C. Reduce capital installation costs due to utilization of load diversity among the various complexes.
- D. Provide two additional proven wells for integration with the laboratory's potable and firefighting water supply system. The two existing wells in the Medical Research Center used for once-through cooling can be diverted to reinforce the domestic water system capacity.
- E. Provide for restructuring of the laboratory's present steam supply by removing from service the existing steam absorption machines (used for cooling). Approximately 148 million pounds of steam per year will be redeployed for better utilization (e.g., 20,000 lbs. of steam per hour for winter heating in lieu of winter air conditioning).
- F. Permit the recycling of treated effluent from the central sewage facility for use as make-up at the central steam plant and the proposed central chilled water and compressed air plant. This would reduce the load on the potable water system by approximately 600 gpm.
- G. Utilize the return tower condenser water to preheat boiler water make-up (approximately 25,000 GPD) at the Central Steam Facility conserving approximately 90 million pounds of steam a year (equal to saving 700,000 gallons of No. 6 fuel oil).
- H. Reduce the energy costs at the six buildings by approximately 56% in today's dollars due to improved utilization and diversity source.



CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Central chilled water facility  
Brookhaven National Laboratory  
Upton, New York

2. Project No.: 85-R-701

10. Details of Cost Estimate

	<u>Item Cost</u>	<u>Total Cost</u>
a. Architect-engineer, design and inspection at approximately 12% of construction costs, Item c .....		\$ 1,400
b. Land and land rights .....		0
c. Construction costs .....		11,600
(1) Improvements to Land .....	\$ 98	
Site preparation (L.S.) .....	\$ 60	
Road and area surfacing, 1000 S.Y. @ \$28 .....	28	
Area lighting (L.S.) .....	10	
(2) Buildings (6,140 S.F. @ approximately \$136) .....	833	
(3) Equipment (within buildings) .....	6,050	
1700-ton machine (3) @ \$516,000 .....	\$ 1,548	
Primary chilled water pumps (3) @ \$39,000 .....	117	
Secondary chilled water pumps (6) \$14,000 .....	84	
Air compressor (1) .....	187	
Chilled water, condenser, water, compressed air piping and miscellaneous accessories and equipment including six building tie-ins .....	2,789	
Condenser water pumps (2) @ \$52,000 .....	104	
Chemical water treatment system .....	91	
Automatic central control and monitoring system .....	905	
Electrical switchgear and distribution .....	225	
(4) Cooling Tower .....	536	
(5) Utilities .....	4,083	
Relocation of piping, electric lines, sewer and storm piping telephone, switchgear and distribution .....	932	
Chilled and condenser water supply and return piping .....	2,208	

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Central chilled water facility Brookhaven National Laboratory Upton, New York	2. Project No.: 85-R-701
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10. Details of Cost Estimate (continued)

Compressed air piping, valves (approximately 30 @ \$6500),  
excavation, backfill, etc. for all underground utilities  
(10,000 ft. @ \$46 per ft.) ..... 943

Subtotal .....	\$13,000	
d. Contingency @ approximately 15% of above costs .....		2,000
Total estimated cost .....		<u>\$15,000</u>

11. Method of Performance

Design and inspection will be performed under a negotiated architect-engineer contract. Construction and procurement will be accomplished by fixed-price contracts awarded on the basis of competitive bidding.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

	<u>Prior Years</u>	<u>FY 1985</u>	<u>FY 1986</u>	<u>FY 1987</u>	<u>FY 1988</u>	<u>Total</u>
a. Total project costs						
1. Total facility costs						
(a) Construction line item ..	\$ 0	\$ 425	\$ 473	\$ 7,714	\$ 6,388	\$15,000
(b) PE&D .....	0	0	0	0	0	0
(d) Inventories .....	0	0	0	0	0	0
Total facility costs ..	<u>0</u>	<u>\$ 425</u>	<u>\$ 473</u>	<u>\$ 7,714</u>	<u>\$ 6,388</u>	<u>\$15,000</u>
Total project costs .....	\$ 0	\$ 425	\$ 473	\$ 7,714	\$ 6,388	\$15,000
b. <u>Other related annual costs</u> (estimated life of project: 20 years)						
1. Facility operating cost .....						\$1,549
2. Programmatic operating expenses directly related to the facility .....						0

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Central chilled water facility  
Brookhaven National Laboratory  
Upton, New York

2. Project No.: 85-R-701

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12. Funding Schedule of Project Funding and Other Related Funding Requirements (continued)

3. Capital equipment not related to construction but related to the programmatic effort of this facility .....	0
4. GPP or other construction related to the programmatic effort in the facility .....	0
5. Other costs .....	<u>0</u>
Total related annual costs .....	\$ 1,549

The \$1,549,000 annual operating cost is estimated as follows:

Maintenance and Operation	\$ 317,000
Energy (Utilities)	<u>1,232,000</u>
Total operating costs	\$1,549,000

However, if this facility is not funded, the existing systems in the six (6) buildings previously mentioned will have an annual operating cost as follows:

Maintenance and Operation	\$ 578,000
Energy (Utilities)	<u>2,341,000</u>
Total operating costs	\$2,919,000

The annual savings of non-energy is \$261,000 and energy is \$1,109,000 for this proposed facility, when constructed.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

- a. Total project funding
  - 1. Total facility
    - (a) Construction line item - Not required
    - (b) CP&D - Not required
    - (c) Expense funded equipment - Not required
    - (d) Inventories - Not required

CONSTRUCTION PROJECT DATA SHEET

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1. Title and location of project: Central chilled water facility  
Brookhaven National Laboratory  
Upton, New York

2. Project No.: 85-R-701

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13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (continued)

2. Other project funding
  - (a) R&D necessary to complete - Not required
  - (b) Other project related funding - Not required
3. Capital equipment not related to construction but related to the activity effort in the facility.  
Not required
4. GPP or other construction related to programmatic effort  
Not required
5. Other costs  
Not required

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Road repair, various locations (ANL, INEL, LBL, RL)	2. Project No.: 84-ER-103
3. Date A-E work initiated: 2nd Qtr. FY 1984	5. Previous cost estimate: \$16,000 Date: August 1982
3a. Date physical construction starts: 4th Qtr. FY 1984	6. Current cost estimate: \$17,777 Less amount of PE&D: 0 Net Cost Estimate: \$17,777 Date: December 1986
4. Date construction ends: 4th Qtr. FY 1990	

7. <u>Financial Schedule:</u>	<u>Fiscal Year</u>	<u>Authorizations</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1984	\$ 19,500 <sup>a/</sup>	\$ 6,500	\$ 6,500	\$ 737
	1985	0	3,750	3,746	7,098
	1986	0	2,973	2,977	3,999
	1987	0	1,807	3,016	1,845
	1988	0	500	500	900
	1989	0	500	500	2,394
	1990	0	538	538	804

8. Brief Physical Description of Project

This project is for the restoration, widening, and improvement of roads at various sites to improve traffic safety and bring these roads into conformance with current standards and practices in highway construction. Brief descriptions of each component, by site, follows:

<sup>a/</sup> \$3,500,000 reprogrammed from 82-E-306 in FY 1984.









CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Road repair, various locations (ANL, INEL, LBL, RL)      2. Project No.: 84-ER-103

9. Purpose, Justification of Need for, and Scope of Project (continued)

This project will be constructed at the Lawrence Berkeley Laboratory which is non-Government owned property.

D. Repair Existing Roads, Phase I, Argonne National Laboratory (ANL), Argonne, Illinois - The site roads are deteriorating at a faster rate than they can be economically repaired. This deterioration reflects the age of the roads, approximately 30 years, and the severity of the climate at the ANL-East site. Failing road edges, the result of base course failures and late winter thaws, cannot be corrected by patching methods. The use of operating funds in an attempt to maintain the roadways in serviceable condition has resulted in unsatisfactory road conditions at best, and a heavy drain on the Laboratory's resources.

A full reconstruction program for those sections of the roadway network which are in worst condition will be provided by this project.

10. Details of Cost Estimate\*

	<u>Richland</u>	<u>INEL</u>	<u>LBL</u>	<u>ANL</u>	<u>Total</u>
a. Engineering and design and inspection.....	\$ 900	\$ 535	\$ 165	\$ 200	\$ 1,800
b. Construction costs.....	5,051	6,136	1,045	1,600	13,832
Subtotal.....	<u>5,951</u>	<u>6,671</u>	<u>1,210</u>	<u>1,800</u>	<u>15,632</u>
c. Contingency.....	800	955	190	200	2,145
Total estimated cost.....	<u>\$ 6,751</u>	<u>\$ 7,626</u>	<u>\$ 1,400</u>	<u>\$ 2,000</u>	<u>\$17,777</u>

\*Conceptual Design Reports completed.

11. Method of Performance

A. RL Subproject - Design and inspection will be accomplished by a negotiated architect-engineering contract or the on-site architect-engineer firm. The major portion of the construction will be accomplished under fixed-price contracts awarded on the basis of competitive bids. Relocation of any power or utility poles will be accomplished through negotiations with the appropriate utility.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Road repair, various locations (ANL, INEL, LBL, RL)      2. Project No.: 84-ER-103

11. Method of Performance (continued)

- B. INEL Subproject - Overall responsibilities for design and construction will be assigned to the INEL prime contractors administered by DOE-ID. The INEL contractor will provide technical direction of the design effort. Construction will be accomplished by fixed price subcontracts awarded on the basis of competitive bidding.
- C. LBL Subproject - Design and inspection will be performed under a negotiated architect-engineer contract. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts and subcontract awarded on the basis of competitive bidding.
- D. ANL Subproject - Engineering, design and inspection will be performed by Laboratory engineering personnel. Construction will be accomplished by fixed-price contract awarded on the basis of competitive bidding.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

	Prior								
	Years	<u>FY 1984</u>	<u>FY 1985</u>	<u>FY 1986</u>	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>FY 1990</u>	<u>Total</u>
a. Total project costs									
1. Total facility costs									
(a) Construction line item.....	\$ 0	\$ 737	\$7,098	\$3,999	\$1,845	\$ 900	\$2,394	\$ 804	\$17,777
(b) PE&D.....	0	0	0	0	0	0	0	0	0
(c) Expense funded equipment.....	0	0	0	0	0	0	0	0	0
(d) Inventories.....	0	0	0	0	0	0	0	0	0
Total facility costs..	\$ 0	\$ 737	\$7,098	\$3,999	\$1,845	\$ 900	\$2,394	\$ 804	\$17,777

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Road repair, various locations (ANL, INEL, LBL, RL)      2. Project No.: 84-ER-103

12. Funding Schedule of Project Funding and Other Related Funding Requirements (continued)

2. Other project costs										
(a) R&D necessary to complete construction.	\$ 30	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 30
(b) Other project related costs.....	0	0	0	0	0	0	0	0	0	0
Total other project funding.....	30	0	0	0	0	0	0	0	0	30
Total project costs (1 and 2).....	\$ 30	\$ 737	\$7,098	\$3,999	\$1,845	\$ 900	\$2,394	\$ 804	\$17,807	

	<u>Annual Cost</u>
b. Other related annual costs (estimated life of project: 25 years)	
1. Facility operating costs.....	\$ 50
2. Programmatic operating expenses directly related to the facility.....	0
3. Capital equipment not related to construction but related to the programmatic effort in the facility.....	0
4. GPP or other construction related to programmatic effort in the facility.....	0
Total other costs.....	\$ 50

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

- a. Total project costs:
1. Total Facility:
    - a) Construction Line Item
    - b) PE&D - No PE&D required.
    - c) Expense Funded Equipment - There is no expense funded equipment.
    - d) Inventories - There are no inventories required.
  2. Other project funding:
    - a) Research and Development is not necessary for this project. The amount shown covers conceptual design activities.
    - b) Other Project Related Costs - No other project related costs are anticipated.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Road repair, various locations (ANL, INEL, LBL, RL)      2. Project No.: 84-ER-103

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13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (continued)

- b. Total related funding requirements:
1. These costs are the average maintenance cost of roads at the various sites. They are based on a cost per square foot of new surface escalated to 1987.
  2. Programmatic Operating Expenses - None
  3. Capital Equipment not Related to Construction - None
  4. GPP or Other Construction Related to Programmatic Effort - No GPP funds are required by this project.
  5. Other Costs - No other costs are anticipated.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 ENVIRONMENTAL COMPLIANCE UPGRADE

(Tabular dollars in thousands. Narrative material in whole dollars.)

- |  |   |
|--|---|
| 1. Title and location of project: Liquid low-level waste collection and transfer systems upgrade<br>Oak Ridge National Laboratory (ORNL)<br>Oak Ridge, Tennessee | 2. Project No.: 88-R-830  |
| 3. Date A-E work initiated: 1st Qtr. FY 1988   | 5. Previous cost estimate: none<br>Date:  |
| 3a. Date physical construction starts: 2nd Qtr. FY 1989  | 6. Current cost estimate: \$35,000<br>Less amount for PE&D: 0<br>Net cost Estimate: \$35,000<br>Date: June 1986 |
| 4. Date Construction ends: 4th Qtr. FY 1991  |   |

7. <u>Financial Schedule:</u>	<u>Fiscal year</u>	<u>Authorization</u>	<u>Appropriations</u>	<u>Obligations</u>	<u>Costs</u>
	1988	\$35,000	\$ 4,800	\$ 4,800	\$ 2,400
	1989	0	11,700	11,700	8,100
	1990	0	13,300	13,300	17,600
	1991	0	5,200	5,200	6,900

8. Brief Physical Description of Project

The proposed project will upgrade a portion of the existing Bethel Valley liquid low-level waste (LLW) collection and transfer (CAT) system at Oak Ridge National Laboratory (ORNL) with the best available technology for satisfying regulatory requirements. The LLW-CAT system is an extensive underground piping system which transfers low-level radioactive liquid waste from the waste generating and processing facilities to an evaporator facility for volume reduction. The proposed project includes approximately one mile of 2-inch and 3-inch doubly contained stainless steel pipeline with approximately five stainless steel tanks of nominal 1000-

## CONSTRUCTION PROJECT DATA SHEETS

- 
1. Title and location of project: Liquid low-level waste collection and transfer systems upgrade  
Oak Ridge National Laboratory (ORNL)  
Oak Ridge, Tennessee
2. Project No.: 88-R-830
- 

### 8. Brief Physical Description of Project (continued)

gal capacity located in underground stainless-steel-lined concrete vaults. The pipelines are equipped with an active leak detection system which utilizes pressurized nitrogen and are cathodically protected against corrosion. The tanks have provisions for flow control, pH monitoring, and temperature monitoring and will be equipped with an automatic caustic addition system for pH neutralization. Local monitoring and control stations will be provided and integrated with the existing Waste Operations Control Center (WOCC) to provide monitoring and control of overall CAT system operation.

The project will also provide a new central facility for receiving and discharging to the pipeline system liquid low-level radioactive waste that is transported by truck in tanks and small bottles. The facility will be a single-story building (approximately 4,000 square feet) of standard construction located near the evaporator facility. The facility will have provisions for discharging the tank trucks within contained and ventilated rooms and glove boxes for discharging the small bottles of LLW. Facility features will include diked floors, suitable piping and tankage, glove boxes, and appropriate ventilation and handling equipment to assure operator safety and environmental compliance. New trucks, of a standard chassis designed to meet American Society of Mechanical Engineers (ASME) standards and Department of Transportation (DOT) requirements, will be provided to transport waste. This will provide backup service to maintain the operation of critical facilities during system outages and will provide bottle transportation capability for facilities where the low volume of waste generated does not warrant the cost of pipeline or tank truck service.

### 9. Purpose, Justification of Need, and Scope of Project

The purpose of this project is to upgrade a significant portion of ORNL's LLW-CAT system in a cost effective manner which will protect personnel and public safety and health and the environment and meet all applicable regulations as it supports the laboratory's research mission. Since its beginning in the early 1940s, a primary mission of the ORNL has been the support of the Department of Energy's (DOE) programs involving radioactive materials. This effort is expected to continue and grow during the next 50 years and beyond. The LLW system and its CAT component are essential to that effort and, if not kept in operation, will significantly affect ORNL's capabilities for successfully fulfilling that mission.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Liquid low-level waste collection and transfer systems upgrade  
Oak Ridge National Laboratory (ORNL)  
Oak Ridge, Tennessee

2. Project No.: 88-R-830

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9. Purpose, Justification of Need, and Scope of Project (continued)

Currently, the majority of the existing system is constructed of 40-year-old technology which is rapidly deteriorating. More than 30 contaminated leak sites have been documented against the existing system, most of those occurring in the last 10-15 years of operation. The most notable incident occurred January 23, 1985, with a release of SR-90 into the Sewage Treatment Plant. Several days later, the concentration of SR-90 at White Oak Dam increased by a factor of 3, exceeding the DOE average monthly limit. After an intensive two-month effort to locate the source of contamination, a broken LLW pipeline was discovered at the Manipulator Repair Facility with a 7-foot-deep hole directly underneath the breakpoint. This type of accident is typical of those expected to occur at an increasing rate as the system gets older and deterioration continues. Hence, this project is urgently needed to stop the recurring leaks of low-level waste with their potential for adverse safety, health, and environmental impact.

During the 1970s and 1980s, the number of regulations and the depth of requirements have increased dramatically in the areas of radioactive and hazardous waste management. During the last two years, actions by both DOE and the EPA have caused an immediate need to fix problems associated with the LLW system and its CAT component.

In April 1985, DOE issued Order 5480.14 requiring that its operating contractors implement the DOE comprehensive environmental response, compensation, and liability act (CERCLA) program. This DOE order requires: 1) the identification and quantification of the presence of hazardous substances that may cause an unacceptable risk to health, safety, and environment, 2) the establishment and implementation of a plan for eliminating sources of contamination and completing the remedial actions necessary for cleanup, and 3) verifying that the actions taken have been successful. The proposed project is a necessary part of the elimination of sources of contamination.

In July 1985, EPA issued its proposed standards for hazardous waste storage and treatment tank systems. These are RCRA regulations that fall under 40 CFR parts 260-266 and 270. For existing tank systems, either full secondary containment or a groundwater monitoring system is required, with leak testing every six months. For new tank systems, full secondary containment with an integral leak detection system and cathodic protection is required. The existing CAT system will not comply to these regulations when they are promulgated.

## CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Liquid low-level waste collection and transfer systems upgrade  
Oak Ridge National Laboratory (ORNL)  
Oak Ridge, Tennessee

2. Project No.: 88-R-830

### 9. Purpose, Justification of Need for, and Scope of Project (continued)

In December 1977, the Clean Water Act (CWA) was issued by the federal government and in the same time frame the Water Quality Control Act was issued by the state of Tennessee. The acts complement each other and basically state that discharges of pollutants into public waters must be eliminated. Currently, under upset conditions discharges are frequently unacceptable compared to existing standards.

The RCRA Part application, recently submitted by ORNL for the low-level waste (LLW) system, identified the CAT component as a RCRA hazardous waste system. Therefore, the system is subject to the proposed hazardous waste storage and treatment tank systems requirements established by EPA. With its history of leak problems and overall general age and deteriorated condition, it certainly has been a generator of CERCLA waste and, until upgraded, will continue to be a source of additional contamination. Although not labeled as a CERCLA facility, it is definitely a major element of DOE's program for CERCLA compliance.

In summary then this project's purpose is to provide a cost effective LLW-CAT system upgrade which supports the laboratory's research mission, protects personnel and public safety and the environment and meets all regulatory requirements.

As presented above, these regulations include DOE Order 5480.14, 40 CFR parts 260-266 and 270, covering the Resource Conservation and Recovery Act (RCRA), and the Clean Water Acts. The regulating agencies are DOE, EPA, and the state of Tennessee. The regulations basically require ORNL to have an LLW-CAT system which has double containment, active leak detection, and corrosion protection on critical contact surfaces. The regulators are likely to require compliance within the next 2-5 years, or a strict compliance schedule which requires negotiation.

With this project as a DOE response to the system's deterioration the potential for negotiations of a compliance schedule that will avoid the shutdown of significant facilities seems reasonable. Without prompt funding of this project the shutdown of significant facilities is a very clear possibility in the next 2-4 years or sooner.

If this project is not implemented, and the existing system is shut down, several critical facilities at ORNL will cease operation with severe consequences to DOE and others who depend on the flexible capabilities and unique products found at ORNL. For example, ORNL produces the nation's (and in some cases the world's) only supply of certain isotopes (e.g.  $^{252}\text{Cf}$ ) which are used for a variety of military and health-care purposes.



CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Liquid low-level waste collection and transfer systems upgrade  
Oak Ridge National Laboratory (ORNL)  
Oak Ridge, Tennessee

2. Project No.: 88-R-830

9. Purpose, Justification of Need for, and Scope of Project (continued)

ORNL also provides a lot of special work for others which involves unique equipment capabilities like hot cells that cannot be performed anywhere other than at ORNL. The majority of this unique capability, which involves radioactive work, will be lost if this project is not implemented and the LLW-CAT system is shut down.

The scope of the project was defined by the need to use the "best available technology" and provide service to only those critical facilities which offer significant benefits to ORNL and DOE. The chosen technology has been used at ORNL in the same application for almost 10 years with excellent results. Only those facilities that could justify a strong need for continued LLW-CAT pipeline service were included in the scope.

10. Details of Cost Estimate \*

	<u>Item Costs</u>	<u>Total Cost</u>
a. Engineering, design and inspection @ about 12% of construction, Item b.....		\$ 3,000
b. Construction costs.....		25,000
(1) Land improvements.....	\$ 36	
(2) New buildings.....	405	
(3) Special facilities.....	24,518	
(4) Outside utilities.....	41	
Subtotal.....		<u>28,000</u>
c. Contingency at approximately 25% of above costs.....		7,000
Total estimated cost.....		<u>\$35,000</u>

\* These cost numbers are based on a Conceptual Design Report completed in February 1986 at a cost of \$600,000.

11. Method of Performance

Design and inspection will be performed under negotiated architect-engineer contract and by the operating contractor. Where the construction involves contact with radioactive contamination, a cost-plus-award-fee (CPAF) contractor qualified in such work will be utilized.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Liquid low-level waste collection and transfer systems upgrade Oak Ridge National Laboratory (ORNL) Oak Ridge, Tennessee	2. Project No.: 88-R-830
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12. Funding Schedule of Project Funding and Other Related Funding Requirements

	<u>Prior Yrs.</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>FY 1990</u>	<u>FY 1991</u>	<u>Total</u>
a. Total project costs						
1. Total facility costs						
(a) Construction line item..	\$ 0	\$ 2,400	\$ 8,100	\$17,600	\$ 6,900	\$35,000
Total direct costs.....	\$ 0	\$ 2,400	\$ 8,100	\$17,600	\$ 6,900	\$35,000
2. Other project funding						
(a) R&D necessary to complete construction.....	0	0	0	0	0	0
- Conceptual design.....	600	0	0	0	0	600
- Design criteria and advance procurement report.....	600	200	0	0	0	800
(b) Other project related costs.....	0	0	0	0	0	0
Total other project funding..	1,200	200	0	0	0	1,400
Total project costs..... (Items 1 and 2)	\$ 1,200	\$ 2,600	\$ 8,100	\$17,600	\$ 6,900	\$36,400*
b. Total related annual costs (estimated life: 30 years)						
1. Facility operating costs.....						\$ 0**
2. Programmatic operating expenses not directly related to facility.....						0
3. Capital equipment not related to construction but related to the programmatic effort in the facility.....						0

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Liquid low-level waste collection and transfer systems upgrade  
Oak Ridge National Laboratory (ORNL)  
Oak Ridge, Tennessee

2. Project No.: 88-R-830

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12. Funding Schedule of Project Funding and Other Related Funding Requirements (continued)

4. GPP or other construction related to the programmatic effort in the facility.....	0
5. Other costs.....	0
Total related annual costs.....	\$ 0

\* Costs are projected costs, not obligations, for each fiscal year.

\*\*The proposed project is not expected to significantly affect the current operating cost for ORNL. Additional operating costs are not needed as a result of this project.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility costs  
No narrative required.

2. Other project funding

(a) R&D necessary to complete construction

Conceptual Design--the conceptual design was completed in February 1986 at a cost of \$600,000.

- Design Criteria and Advance Procurement Report

Approximately \$800,000 will be spent in FY 1987 (\$600K) and FY 1988 (\$200K) to prepare the design criteria and Advance Procurement Report.

(b) Other project related costs

No narrative required.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Liquid low-level waste collection and transfer systems upgrade  
Oak Ridge National Laboratory (ORNL)  
Oak Ridge, Tennessee

2. Project No.: 88-R-830

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13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (continued)

b. Other related funding requirements

The useful life of the LLW-CAT system is projected to be 30 years.

1. Facility operating cost

The proposed project is not expected to significantly affect the current operating cost for ORNL. Additional operating funds are not needed as a result of this project.

2. Programmatic operating expenses not directly related to the facility

No narrative required.

3. Capital equipment not related to construction but related to the programmatic effort in the facility.

No narrative required.

4. GPP or other construction related to the programmatic effort in the facility

No narrative required.

5. Other costs

No narrative required.

DEPARTMENT OF ENERGY  
 1988 CONGRESSIONAL BUDGET REQUEST  
 CONSTRUCTION PROJECT DATA SHEETS  
 ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
 MULTIPROGRAM ENERGY LABORATORIES--FACILITIES SUPPORT  
 MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES  
 (Tabular dollars in thousands. Narrative material in whole dollars.)

- |   |   |
|---|---|
| 1. Title and location of project: Non-radiological process waste treatment project<br>Oak Ridge National Laboratory<br>Oak Ridge, Tennessee | 2. Project No.: 86-R-801  |
| 3. Date A-E work initiated: 1st Qtr. FY 1986  | 5. Previous cost estimate: 3,000*<br>Date: December 1984  |
| 3a. Date physical construction starts: 3rd Qtr. FY 1987   | 6. Current cost estimate: \$18,000<br>Less FY 1984 PE&D: 0<br>Net cost estimate: \$18,000<br>Date: September 1985 |
| 4. Date construction ends: 4th Qtr. FY 1989   |   |

7. Financial Schedule:	Fiscal Year	Authorizations	Appropriations	Obligations	Costs
	1986	\$ 3,000	\$ 2,887	\$ 2,887	\$ 1,552
	1987	15,000	7,000	7,000	5,000
	1988	0	8,000	8,000	7,148
	1989	0	113	113	4,300

8. Brief Physical Description of Project

A Non-Radiological Wastewater Treatment Project (NRWTP) is proposed for the Oak Ridge National Laboratory (ORNL) that will address regulatory environmental compliance concerns. Among these concerns are certain non-radiological process waste streams which are currently discharged untreated into area creeks and the active use of surface impoundments for process wastewater. This project proposes to modify process systems (eliminate nitric acid regeneration of demineralizers) and to collect and treat these streams as required to meet discharge parameters as established by the Environmental Protection Agency (EPA) and the State of Tennessee and to eliminate the discharge of hazardous wastewater into surface impoundments. The NRWTP will provide required collection, treatment, and monitoring facilities based on wastewater characterization and treatability studies to meet effluent criteria established by regulatory agencies.

\*Previous cost estimate of \$3,000,000 provided for Title I and II engineering design FY 1986.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Non-radiological process  
waste treatment project  
Oak Ridge National Laboratory  
Oak Ridge, Tennessee

2. Project No.: 86-R-801

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8. Brief Physical Description of Project (continued)

Physical construction will include pumps, tanks, and piping to transfer wastewater to treatment facilities, tankage to replace surface impoundments process modification (replacement of nitric acid demineralizer regeneration systems) to reduce pollutant loading, special equipment to accomplish the desired handling and treatment of wastewater and resultant solid waste, computerized monitoring and control equipment, and new buildings to house equipment and support facilities.

9. Purpose, Justification of Need for, and Scope of Project

The purposes of this project are to resolve the major Clean Water Act concerns at ORNL with respect to the discharge of nonradiological process wastewater and to eliminate the discharge of hazardous wastewater into surface impoundments by November 8, 1988, in compliance with provisions of the reauthorized Resource Conservation and Recovery Act (RCRA). Current liquid effluents are not in compliance with the Clean Water Act and the Tennessee Water Quality Act. The National Pollutant Discharge Elimination System (NPDES) permit issued by the EPA and state will identify new monitoring and effluent points and discharge limits. The permit will require that all process wastewater be treated. This project will provide treatment which will ensure ORNL's compliance with discharge parameters. The project will also provide tankage to eliminate the discharge of process wastewater into surface impoundments. Cleanup of these impoundments will be provided under other projects.

The proposed project will treat the effluent streams from ORNL facilities including the Process Waste Treatment Plant (Building 3544), Central Research and Administration (4500 Area), Environmental Sciences Laboratory (Building 1505), Radioisotope Production Laboratories (3000 Area, non-radiological effluents), various flows from Melton Valley (High-Flux Isotope Reactor and the Transuranium Processing Plant, non-radiological effluents), and other waste streams.



CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Non-radiological process  
waste treatment project  
Oak Ridge National Laboratory  
Oak Ridge, Tennessee

2. Project No.: 86-R-801

12. Funding Schedule of Project Funding and Other Related Funding Requirements

	<u>Prior Years</u>	<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>	<u>Total</u>
a. Total project costs					
1. Total facility costs					
(a) Construction line item .....	\$ 1,552	\$ 5,000	\$ 7,148	\$ 4,300	\$18,000
(b) PE&D .....	0	0	0	0	0
(c) Expense funded equipment .....	0	0	0	0	0
(d) Inventories .....	0	0	0	0	0
Total facility costs .....	<u>\$ 1,552</u>	<u>\$ 5,000</u>	<u>\$ 7,148</u>	<u>\$ 4,300</u>	<u>\$18,000</u>
2. Other project costs					
(a) R&D necessary to complete construction .....	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
(b) Conceptual design costs .....	350	0	0	0	350
Total other project costs .....	<u>\$ 350</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$ 350</u>
Total project costs .....	<u>\$ 1,902</u>	<u>\$ 5,000</u>	<u>\$ 7,148</u>	<u>\$ 4,300</u>	<u>\$18,350*</u>

\*This total includes \$350,000 for a Conceptual Design completed in May 1985.



CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Non-radiological process  
waste treatment project  
Oak Ridge National Laboratory  
Oak Ridge, Tennessee

2. Project No.: 86-R-801

12. Funding Schedule of Project Funding and Other Related Funding Requirement (continued)

b. Total related annual costs (estimated life: 20 years)	
1. Facility operating costs .....	\$ 1,600
2. Programmatic operating expenses not directly related to the facility .....	0
3. Capital equipment not related to construction but related to the programmatic effort in the facility .....	0
4. GPP or other construction related to the programmatic effort in the facility .....	0
5. Other costs .....	<u>600*</u>
Total related annual costs .....	\$ 2,200**

\*This cost is a one-time cost in FY 1985.

\*\*These costs are expressed in FY 1984 dollars and do not include overhead.

13. Narrative Explanation of Funding Schedule

a. Total project funding

1. Total facility costs

(a) Construction line item

No narrative required.

(b) PE&D

No narrative required.

(c) Expense funded requirement

No narrative required.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Non-radiological process  
waste treatment project  
Oak Ridge National Laboratory  
Oak Ridge, Tennessee

2. Project No.: 86-R-801

13. Narrative Explanation of Funding Schedule (continued)

(d) Inventories

No narrative required.

2. Other project funding

(a) R&D necessary to complete construction

No narrative required.

(b) Conceptual design costs

Approximately \$350,000 will be spent in FY 1985 to provide a Conceptual Design.

b. Total related funding requirement

The useful life of the NRWTP is 20 years.

1. Facility operating costs - these estimated costs include chemicals and supplies, labor costs, utilities, and waste disposal.

2. Programmatic operating expenses not directly related to the facility

No narrative required.

3. Capital equipment not related to construction but related to the programmatic effort in the facility

No narrative required.

CONSTRUCTION PROJECT DATA SHEETS

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1. Title and location of project: Non-radiological process  
waste treatment project  
Oak Ridge National Laboratory  
Oak Ridge, Tennessee

2. Project No.: 86-R-801

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13. Narrative Explanation of Funding Schedule (continued)

4. GPP or other construction related to the programmatic effort in the facility

No narrative required.

5. Other costs - this estimated cost is to conduct waste stream characterization, treatability studies, effluent definition, and other support activities necessary prior to Title I and II design of this project.