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Volume 3 of 7

Congressional Budget Request

Energy Supply Research and Development

Volume 3

FY 1987

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

FISCAL YEAR 1987 CONGRESSIONAL BUDGET REQUEST

ENERGY SUPPLY RESEARCH AND DEVELOPMENT

VOLUME 3

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DEPARTMENT OF ENERGY

FISCAL YEAR 1987 CONGRESSIONAL BUDGET REQUEST

SUMMARY OF ESTIMATES BY APPROPRIATIONS

(in thousands of dollars)

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

DEPARTMENT OF ENERGY

FISCAL YEAR 1987 CONGRESSIONAL BUDGET REQUEST

SUMMARY OF ESTIMATES BY APPROPRIATIONS

(in thousands of dollars)

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

Department of Energy
FY 1987 Congressional Staffing Request
Total Work Force

	FY1985 FTE USAGE	FY1986 CONGR REQ	FY1987 -FY86	FY1987 CONGR REQ
ENERGY & WATER SUBCOMMITTEE				
HEADQUARTERS	4,865	4,965	-18	4,947
FIELD	9,133	9,185	111	9,296
SUBCOMMITTEE TOTAL	13,998	14,150	93	14,243
INTERIOR SUBCOMMITTEE				
HEADQUARTERS	1,353	1,304	-166	1,138
FIELD	907	896	-226	670
SUBCOMMITTEE TOTAL	2,260	2,200	-392	1,808
GRAND TOTAL	16,258	16,350	-299	16,051
ADJUSTMENT		-132	-198	-330
ADJUSTED TOTAL	16,258	16,218	-497	15,721

Department of Energy
F Y 1987 Congressional Staffing Request
Total Work Force

	FY1985 FTE USAGE	FY1986 CONGR REQ	FY1987 -FY86	FY1987 CONGR REQ
10:ENERGY SUPPLY RESEARCH AND DEV	937	934	-34	900
HEADQUARTERS	811	820	-28	792
FIELD	126	114	-6	108
15:URANIUM ENRICHMENT	69	66	1	67
HEADQUARTERS	58	55	1	56
FIELD	11	11	0	11
20:GENERAL SCIENCE AND RESEARCH	37	39	0	39
HEADQUARTERS	37	39	0	39
25:ATOMIC ENERGY DEFENSE ACTIVITI	2,618	2,702	131	2,833
HEADQUARTERS	496	518	9	527
FIELD	2,122	2,184	122	2,306
30:DEPARTMENTAL ADMINISTRATION	3,307	3,332	-5	3,327
HEADQUARTERS	1,721	1,726	0	1,726
FIELD	1,586	1,606	-5	1,601
34:ALASKA POWER ADMINISTRATION	37	38	0	38
FIELD	37	38	0	38
36:BONNEVILLE POWER ADMIN	3,510	3,480	0	3,480
FIELD	3,510	3,480	0	3,480
38:SOUTHEASTERN POWER ADMIN	38	40	0	40
FIELD	38	40	0	40
42:SOUTHWESTERN POWER ADMIN	186	186	0	186
FIELD	186	186	0	186
46:WESTERN AREA POWER ADMIN	1,161	1,160	0	1,160
FIELD	1,161	1,160	0	1,160
50:WAPA - COLORADO RIVER BASIN	219	219	0	219
FIELD	219	219	0	219
52:FEDERAL ENERGY REGULATORY COMM	1,617	1,659	0	1,659
HEADQUARTERS	1,617	1,659	0	1,659
54:NUCLEAR WASTE FUND	238	292	0	292
HEADQUARTERS	123	147	0	147
FIELD	115	145	0	145
56:GEOTHERMAL RESOURCES DEV FUND	2	1	0	1
HEADQUARTERS	2	1	0	1
65:FOSSIL ENERGY RESEARCH AND DEV	714	700	-161	539
HEADQUARTERS	151	135	-26	109
FIELD	563	565	-135	430
70:NAVAL PETROL & OIL SHALE RES	104	104	-9	95
HEADQUARTERS	23	23	0	23
FIELD	81	81	-9	72
75:ENERGY CONSERVATION	333	352	-134	218
HEADQUARTERS	208	227	-79	148
FIELD	125	125	-55	70
80:EMERGENCY PREPAREDNESS	74	71	0	71
HEADQUARTERS	74	71	0	71
81:ECONOMIC REGULATION	377	340	-50	290
HEADQUARTERS	377	340	-50	290
85:STRATEGIC PETROLEUM RESERVE	178	152	-32	120
HEADQUARTERS	40	27	-5	22
FIELD	138	125	-27	98
90:ENERGY INFORMATION ACTIVITIES	480	481	-6	475
HEADQUARTERS	480	481	-6	475
94:ADVANCES FOR CO-OP WORK	2	2	0	2
FIELD	2	2	0	2
GRAND TOTAL	16,258	16,350	-299	16,051
ADJUSTMENT		-132	-198	-330
ADJUSTED TOTAL	16,258	16,218	-497	15,721

DEPARTMENT OF ENERGY

Proposed Appropriation Language

Energy Supply, Research and Development Activities

(Including Transfer of Funds)

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

DEPARTMENT OF ENERGY

FISCAL YEAR 1987 CONGRESSIONAL BUDGET REQUEST

SUMMARY OF ESTIMATES BY APPROPRIATION BY MAJOR ACTIVITY

ENERGY SUPPLY RESEARCH AND DEVELOPMENT

(Budget Authority in Thousands of Dollars)

	FY 1985 Actual	FY 1986 Estimate	FY 1987 Request
Solar Energy	$ 171,587	$ 144,624	$ 72,292
Geothermal	29,698	26,681	17,930
Hydropower	447	481	---
Electric Energy Systems	19,717	11,548	7,619
Energy Storage Systems	18,642	17,292	8,008
Nuclear Energy R&D	412,612	375,684	330,900
Remedial Action & Waste Technology	170,365	230,047	294,100
Civilian Waste R&D	25,886	16,864	6,500
Environmental, Safety and Health	38,053	46,921	76,098
Biological and Environmental Research	187,746	179,950	196,565
Liquified Gaseous Spill Test Facility	4,289	1,732	1,200
Magnetic Fusion	429,653	365,469	333,000
Basic Energy Sciences	410,888	433,770	441,370
Energy Research Analysis	2,970	2,598	3,550
University Research Instrumentation	4,950	6,254	5,000
University Research Support	10,059	10,296	10,975
Advisory and Oversight Program Direction	2,900	2,674	2,900
Multi-Program Laboratories Facilities Support	33,200	39,824	60,190
Small Business Innovation Research Program	24,724	---	---
In-House Energy Management	14,821	11,709	16,500
Technical Information and Management	13,442	12,413	10,775
Policy and Management	3,380	3,497	3,887
Subtotal, Energy Supply R&D	2,029,690	1,939,528	1,899,951
Less Use of Prior Year Balances and Other Adjustment	-62,400	-243,230	-645,789
Total, Energy Supply R&D	$1,967,490	$1,696,298	$1,254,162

SUPPORTING RESEARCH AND TECHNICAL ANALYSIS

DEPARTMENT OF ENERGY

FISCAL YEAR 1987 CONGRESSIONAL BUDGET REQUEST

ENERGY SUPPLY RESEARCH AND DEVELOPMENT

VOLUME 3

SUPPORTING RESEARCH AND TECHNICAL ANALYSIS

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Multiprogram Energy Laboratories - Facilities Support Program

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

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

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

Multiprogram Energy Laboratories General Purpose Facilities

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

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

Environmental Compliance Upgrade at ORNL

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

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

DEPARTMENT OF ENERGY
FY 1987 CONGRESSIONAL BUDGET REQUEST
LEAD TABLE
MULTIPROGRAM ENERGY LABORATORIES - FACILITIES SUPPORT
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
(Tabular dollars in thousands. Narrative material in whole dollars.)

	FY 1985 Appropriation	FY 1986 Appropriation	FY 1987 Base	FY 1987 Request	Request vs Base
Multiprogram Energy Laboratories-General Purpose Facilities					
Construction.....	$ 33,200	$ 22,819	$ 22,819	$ 34,935	$+12,116
Subtotal MEL-GPF.....	33,200	22,819	22,819	34,935	+12,116
Environmental Compliance (ORNL)					
Operating Expenses.....	0 a/	9,307	9,307	14,255	+ 4,948
Capital Equipment.....	0	962	962	1,000	+ 38
Construction.....	0	6,736	6,736	10,000	+ 3,264
Subtotal Environmental Compliance.....	0 a/	17,005	17,005	25,255	+ 8,250
Total					
Operating Expenses.....	0	9,307	9,307	14,255	+ 4,948
Capital Equipment.....	0	962	962	1,000	+ 38
Construction.....	33,200	29,555	29,555	44,935	+15,380
Multiprogram Energy Laboratories - Facilities Support.....	$ 33,200	$ 39,824 b/c/	$ 39,824 b/c/	$ 60,190 b/	$+20,366

Authorization: Section 647, Public Law 95-91.

a/ Reprogramming request received final approval April 1985; $5,435,000 was devoted to this activity.

b/ Totals reflect a reduction of $310,000 in FY 1986, and $490,000 in FY 1987 for management initiatives savings.

c/ Total 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 $700,000 for proposed reprogramming to the Environmental Safety and Health (ES&H) Program.

Department of Energy

FY 1987 Congressional Budget Request

Adjustments to FY 1986 Appropriations

	FY 1986 Confer.	Management Initiatives	Gramm-Rudman-Hollings	ES&H Transfer/ Reprogramming	Subtotal	Comparability Adjustments	Adjusted Approp. Total
Multiprogram Energy Laboratories Facilities Support							
Multiprogram General Purpose Facilities							
Construction	$ 24,025	$ -310	$ -896		$ 22,819		$ 22,819
Environmental Compliance							
Operating Expenses	10,400	--	-393	-700	9,307		9,307
Capital Equipment	1,000	--	-38	--	962		962
Construction	7,000	--	-264	--	6,736		6,736
Subtotal	18,400	--	-695	-700	17,005		17,005
Subtotal, Multiprogram Energy Laboratories Support	42,425	-310	-1,591	-700	39,824		39,824
Management Initiatives							
Operating Expenses	--	--					
Capital Equipment	--	--					
Construction	-310	310					
Subtotal	-310	310					
Total, Multiprogram Energy Laboratories Facilities Support	$ 42,115	--	$ -1,591	$ -700	$ 39,824		$ 39,824
Operating Expenses	(10,400)		(-393)	(-700)	(9,307)		(9,307)
Capital Equipment	(1,000)		(-38)	(--)	(962)		(962)
Construction	(30,715)		(-1,160)	(--)	(29,555)		(29,555)

DEPARTMENT OF ENERGY
1987 CONGRESSIONAL BUDGET REQUEST
SUMMARY OF CHANGES
MULTIPROGRAM ENERGY LABORATORIES - FACILITIES SUPPORT
(In thousands of dollars)

1986 Appropriation enacted	$41,415
1986 Gramm-Rudman reduction	- 1,591
1986 adjusted	39,824
Program increases and decreases:	
o Provides new construction starts at various locations for Multiprogram Energy Laboratories-General Purpose Facility (MEL-GPF) subprogram	+9,510
o Prior year projects	+2,606
o Environmental Compliance operating expenses to correct environmental problems at ORNL	+4,948
o Project at ORNL for Non-Radiological Process Waste Treatment Facility	+4,113
o Environmental compliance GPP/Capital Equipment	- 811
1987 budget request	$60,190

	FY 1985	FY 1986	FY 1987 Request
Multiprogram Energy Laboratories - Facilities Support	$33,200	$39,824	$60,190

The MEL-FS program is responsible for assuring support facilities at the five energy multiprogram laboratories (ANL, BNL, LBL, ORNL, and PNL) are adequate for accomplishing the research missions assigned them in an efficient manner that meets security, environmental, safety, and health requirements. The General Purpose Facilities (GPF) subprogram and the Environmental Compliance Upgrade subprogram are discussed below.

Multiprogram Energy Laboratories - General Purpose Facilities	33,200	22,819	34,935

As mentioned in the overview, the five multiprogram energy laboratories are complete research reservations with unique research facilities and all necessary support facilities to accommodate over 17,000 scientists, engineers and other support staff. The facilities include over 900 buildings (12,700,000 gross square feet of space) for laboratory and office space, craft shops, warehouses, security facilities, fire houses, cafeterias, vehicle and large equipment maintenance and repair, etc. Further, the laboratories have facilities to generate operating resources such as steam, chilled water, regular and special purpose waters, compressed air etc, and facilities to distribute these and electricity. There exist facilities to handle the many wastes streams (solid, liquid and air) that are generated in the normal course of research and development activities. And, there are roads, parking lots, street lighting, fencing and other site related facilities. The replacement costs of these facilities is over $2.8 billion in FY 1987 dollars.

In the late seventies the department focused attention on the declining overall condition of these facilities and increasing backlog of projects to renovate, upgrade and replace facilities. This led to the creation of this consolidated program (MEL-GPF) in FY 1981. The program systematically and comprehensively addresses the tasks of reducing the backlog and ensuring that facilities adequately meet research requirements as well as safety, health, environmental and security requirements.

The latest assessment of the backlog in FY 1985 indicated $700,000,000 in identified projects. All projects included had to address existing deficiencies only, could not significantly expand existing capacities or capabilities and had to have sound economic justification if space was to be added because of overcrowding, scattered operations or use of leased space. The bulk of these funds ($498 million) are for renovation, upgrade and replacement of existing buildings. Utility upgrades amounted to $184 million, and all other needs at $18 million. (The environmental upgrade needs at ORNL are not included in these estimates - see Environmental Compliance and Upgrade subprogram.)

Several factors contribute to the extensive backlog:

1. Inadequate Building Practices

   Much of the agency's original physical plant was built during times of crisis (e.g. World War II) when either shortages of materials or the urgency of the programs dictated utilizing inferior materials and/or rapid construction techniques. These practices have resulted in premature aging of some of the plant and expansion of routine maintenance to keep the plant on-line. More recently, as programs expanded, temporary facilities such as trailers and prefabricated buildings have been used in lieu of permanent

facilities. These have a much shorter life span, and were contemplated to be temporary until more suitable facilities could be provided.

2. Aging and Deterioration

The aging and wear of facilities, particularly utility systems, affect the reliability of service and increase the downtime and routine maintenance costs for most systems. Real property at the laboratories averages 27 years, with many of the facilities going back to the 1940's and earlier. Many of these buildings and utility systems have no remaining service life and must be replaced to continue operations at the laboratories.

3. Facility Support Lagged Operating Growth

Improvements to support facilities did not keep up with increases in R&D programs. The result is that existing facilities have been utilized well beyond their design capacities. This is especially noticeable in utility systems, roads, and laboratory facilities. Because adequate permanent facilities have not been available, the laboratories have, of necessity, converted space designed for other purposes (e.g., warehouse space) into laboratory space, and have continued to rely on World War II barrack type buildings which are limited in application and have leased offsite space in several instances. Such solutions can seldom provide the quality laboratory space needed to meet today's research standards.

4. Lack of Institutional Support for GPF

Prior to the program, the installations suffered from a lack of adequate institutional support largely because they accommodate many programs. All resident programs fund operating expenses to cover the work performed. However, only the assigned lead program (i.e., landlord) had been responsible in the past for providing general purpose facilities, which actually support many or all residing programs. More often than not, budget ceilings have prevented the lead program from accomodating both direct program requirements and institutional needs including general purpose facilities.

The operational impacts of these facilities' deficiencies are: increased operating costs; increased safety, security, health and environmental risks; greater likelihood of program interruption and delay; and lower morale and productivity.

As part of the annual planning process for MEL-GPF, several steps have been taken to assure that most of the above practices are not repeated.

1. The Institutional Planning and Site Development planning processes are designed to ensure orderly planning of the operation, maintenance, and development of the multiprogram laboratories. These processes require careful consideration be given to facility needs, both strategic and specific.

2. A systematic, agency-wide approach to determining funding levels for General Plant Projects (GPP) has been established and a significant effort to increase overall GPP funding has begun.

3. An improved maintenance management system is being implemented to prevent the deferral of maintenance when it is detrimental to the physical well being of necessary facilities.

4. Better project development and management during construction will be utilized to keep the quality of construction high and costs low.

5. Finally, the planning and programming process utilized by the MEL-GPP program will assure that the proper attention is paid to potential critical deficiencies so that they may be corrected prior to any serious impact on mission accomplishment.

To address the most urgent needs, the Department is proposing a FY 1987 budget of $34,935,000. This funding level will just adequately maintain the capability and capacity of the laboratories to effectively support world class energy and general sciences research while meeting the Department's security, health, safety, environmental, and efficiency standards and goals. At this pace, the Department will adequately maintain its investment but the $700,000,000 backlog of deficiencies will not be reduced appreciably. The request for construction funds follow:

	FY 1985	FY 1986	FY 1987 Request
Construction	$33,200	$22,819	$34,935

The FY 1987 request of $34,935,000 for construction is required to continue ongoing projects, and to provide for needed new starts consistent with the plan to eliminate deficiencies developed over a 20 year period. This funding level is considered the essential "base" program. All project costs are supported by completed conceptual designs.

	TEC	FY 1987 Request
1. Continuation of Ongoing Projects		$25,425
Fire Protection Improvements, BNL (86-R-726)	3,000	2,500
Central Chilled Water Facility, BNL (85-R-701)	15,000	5,700
Replace Laboratory Roofs, ANL (85-R-702)	9,800	2,392
Electric Distribution System Upgrade, ORNL (85-R-703)	2,200	1,400
Medical Facility, LLNL (85-R-706)	7,300	4,000
Fire Alarm System, RL (85-R-707)	4,850	1,225
Central Chilled Water Plant, ANL (85-R-709)	5,200	3,600
Central Chilled Water System Restoration ORNL (85-R-712)	4,700	2,600
Road Repair (Various Locations) (84-ER-103)	19,190	2,008
2. New Starts		$ 9,510

The new projects proposed for FY 1987 are identified below. They have been selected based on a prioritization process that gives highest priority to subprojects that address significant environmental, safety, health and security deficiencies. Equally high in priority are subprojects that assure that on-going research activities are not interrupted or delayed due to failures of support systems or services. These systems include production of steam and chilled water, utility distribution systems. Next highest priority subprojects are those that support the efficiency and productivity of operations, including major upgrading or renovation of buildings to provide adequate housing for the laboratory staff. Many of the subprojects below contain elements at all three

priority levels (e.g., replacing an old leaking water system will ensure better fire protection and continued uninterrupted operations and will be less costly to maintain than existing systems). The total estimated cost for each project is based on a completed conceptual design report.

Type of Facilities	TEC	FY 1987 Request
Buildings:		
-Laboratory Restoration I, PNL (87-R-751)..	$ 2,100	$ 2,100
-Piping System Restoration, ORNL (87-R-752)	3,800	725
-Rehabilitate, Laboratory Space (87-R-753) (Building 200), ANL.....	12,035	1,235
Utilities:		
-Mechanical Systems Rehabilitation, ANL.... (87-R-755)	3,200	1,100
-Waterline Replacement, ANL (87-R-756).....	5,200	1,000
-Electrical System Rehabilitation, LBL..... (87-R-757)	2,600	300
-Rehabilitate Mechanical Utilities, LBL.... (87-R-758)	5,500	1,050
-Upgrade Steam Distribution System, ORNL... (87-R-759)	6,800	2,000
Total.....		$ 9,510

The outyear mortgages for projects contained in the MEL-GPF subprogram are $23,399,000 in 1988, and $8,492,000 in 1989. Fuller descriptions and justifications for these projects are provided in the attached data sheets.

	FY 1985	FY 1986	FY 1987 Request
Environmental Compliance Upgrade (ORNL).....	$ 0*	$17,005	$25,255

As stated earlier in the major activity overview for the Multiprogram Energy Laboratories-Facilities Support Program, the Department is faced with an extensive environmental cleanup effort at ORNL. The environmental projects identified as necessary to be undertaken to ensure compliance with existing State and Federal regulations are significant. These projects range from identifying, monitoring, and cleaning up existing tanks, ponds, and burial grounds containing hazardous and radioactive wastes, to upgrading operating systems and processes for handling radioactive, hazardous, and chemical wastes.

In response to the need for comprehensive characterization of ORNL discharges to the environment, extensive groundwater monitoring and soil/sediment sampling programs were initiated. Characterization plans and site assessments are being proposed to outline multiyear remedial action efforts as required under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). Well installation was completed around the active surface impoundments in FY 1985, with work to continue through FY 1987 for the placement of an estimated 800 wells at the ORNL site. Near term characterizations are underway for the

*Reprogramming request received final approval April 1985; $5,435,000 was devoted to this activity.

priority sites, including the White Oak Creek Watershed, the RCRA impoundments, and specific Low Level Waste (LLW)-line leak sites. This characterization data will then be used to prepare long term closure plans for over 130 areas contained in the current inventory of contaminated ORNL sites.

In the area of modification, replacement, and upgrading of existing processes, progress has already been made and significant activities are planned. A new Sewage Treatment Plant has been constructed and is now operational. This plant has eliminated a significant National Pollutant Discharge Elimination System (NPDES) noncompliance problem. In addition, some 14,000 feet of sanitary line has been relined to reduce inflow of contaminated water and reduce the load on the plant. Activities are currently underway to characterize the process waste system for similar lining under FY 1986 GPP funding. A total of 22 RCRA compliance groundwater monitoring wells have been installed around active ORNL impoundments under FY 1985 GPP funding.

Upcoming activities will include the construction of a Nonradiological Wastewater Treatment Plant for removal of organics and heavy metals from ORNL process waste streams, continued upgrading of physical integrity of all ORNL waste collection systems, characterization activities for implementation of Best Management Practices as required by the NPDES permit, continued installation of RCRA compliance groundwater monitoring wells, elimination of sources of ORNL nitrate discharges, addition of process waste treatment capability at ORNL Y-12 facilities, installation of additional monitoring capability, and implementation of projects related to management of hazardous and mixed wastes and air pollution control.

It has been determined that $25,255,000 is required in FY 1987 to continue these efforts at ORNL. These funds consist of operating expenses, capital equipment, and construction as follows:

	FY 1985	FY 1986	FY 1987 Request
Operating Expenses.....	$ 0	$ 9,307	$14,255

The requested operating expense funds of $14,255,000 are required for the following:

- The process waste system is 40 years old and has reached design life expectancy. It has a number of identified problems including the integrity of the drainage system, connection of nonprocess-related drainage, and the lack of treatment available for chemical pollutants. To correct these problems, funds will be utilized to rehabilitate short sections of drainage lines, upgrade various manholes, correct connections of nonprocess wastewater into the system, and update piping drawings. In addition, design criteria, studies, and estimates will be prepared to support capital projects to upgrade the process waste system.

- The ORNL process waste system is in need of repair to prevent the inflow of contaminated groundwater into the system. Funds will be utilized to rehabilitate short sections of pipes, repair manholes, correct piping cross-connects, and update piping drawings.

- The ORNL storm sewer system needs to be upgraded to correct connections with the process waste system and to take corrective actions where the system has been contaminated by past spills of radioactivity and/or hazardous material. Funds will be used for minor corrective actions, to

upgrade drawings, to eliminate cross-connects, and to repair and install dikes to isolate storage tanks from the storm sewer.

- Eleven ponds at ORNL will require characterization, alternative assessment, and corrective actions to be in compliance with RCRA/CERCLA. Characterization of the ponds will be completed in FY 1987 and alternative corrective actions will be evaluated. Engineering designs for the final corrective actions will be initiated. In addition, some immediate corrective actions will likely be required to treat contaminated underground water. The extent of groundwater contamination will be determined in FY 1985 and FY 1986 as part of the characterization activities.

- Some 32 past spill sites at ORNL will also require characterization, alternative assessments, and corrective action. Emphasis in FY 1987 will be on characterization and alternative evaluation at the priority sites (3019 and 3028 areas). These efforts will include installation of an extensive groundwater monitoring network, evaluation of the sampling data, and assessment of the alternatives for groundwater control in that area of the Laboratory.

- The White Oak Creek watershed, which drains approximately 6.4 square miles, has received treated and untreated, radioactive and chemical effluent from ORNL activities since 1943. In FY 1987 a major effort to characterize the watershed and to evaluate remedial action alternatives will be made. This effort will result in thorough evaluation of alternatives so that the most cost effective cleanup can be implemented.

- Long range planning and support to GPP projects will continue. In addition NEPA evaluations will be required for ponds, spill sites, and White Oak Creek water shed. The maintenance, surveillance, and decommission planning of selected inactive ORNL facilities will be initiated in FY 1987.

	FY 1985	FY 1986	FY 1987 Request
Capital Equipment.....	$ 0	$ 962	$ 1,000

The requested capital equipment funds of $1,000,000 are required for general purpose equipment. This equipment will include sludge/soil handling equipment to support cleanup activities described above.

Construction.....	0	6,736	10,000

The FY 1987 budget request of $10,000,000 for construction is required for general plant projects and one line item construction project.

	FY 1987 Request
1. General Plant Projects (87-R-770).....	$ 3,000

These projects provide for the many miscellaneous alterations, additions, modifications, and replacements of items required to reduce or eliminate environmentally harmful discharges from ORNL. The proposed projects in FY 1987 include replacing failed process and low level radioactive waste lines, installing process wastewater treatment systems, improving groundwater monitoring capabilities, and upgrading hazardous waste facilities.

	FY 1987 Request
2. Nonradiological Process Waste Treatment Facilities (86-R-801) TEC $18,000.....	$ 7,000

The purpose of this project is to collect and treat the nonradiological waste effluents from ORNL facilities so that they will comply with the water quality requirements set by the State of Tennessee and the Environmental Protection Agency. The project includes pumps, tanks, and piping to transfer wastewater to a central treatment facility and the special equipment necessary to treat the wastewater to the limits established by the National Pollutant Discharge Elimination System (NPDES) permit for ORNL.

DEPARTMENT OF ENERGY
1987 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

3a. Date physical construction starts: 4th Qtr. FY 1984

4. Date construction ends: 4th Qtr. FY 1988

5. Previous cost estimate: $16,000
Date: August 1982

6. Current cost estimate: $19,190
Less amount of PE&D: 0
Net Cost Estimate: $19,190
Date: June 1984

7. Financial Schedule:

Fiscal Year	Authorizations	Appropriations	Obligations	Costs
1984	$ 19,500[a/]	$ 6,500	$ 6,500	$ 737
1985	0	3,750	3,746	7,098
1986	0	2,973	2,973	3,028
1987	0	2,008	2,008	2,782
1988	0	2,717	2,717	1,917
1989	0	1,242	1,246	2,628
1990	0	0	0	1,000

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:

A. Traffic Safety Improvements, Route 4, Richland, Washington - Approximately thirteen miles of Route 4, the arterial road servicing the Hanford area, will be improved to be more consistent with Washington State highway design

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

1. Title and location of project: Road repair, various locations (ANL, INEL, LBL, RL)

2. Project No.: 84-ER-103

8. Brief Physical Description of Project (continued)

guidelines. Each lane will be widened approximately 2 feet to provide standard 12-foot lanes. Shoulder surfaces will be treated and widened to provide the standard design width. Acceleration, deceleration, and holding lanes will be provided where required.

Safety hazards such as poles, fire hydrants, and telephone cable boxes will be removed or relocated as required. Appropriate traffic control devices, lane markers, guard rails, roadway signs, pavement markings, and crash protection will be provided as necessary. Connecting service and frontage raods will be upgraded concurrently. The road shall be resurfaced with an asphalt overlay to eliminate the cracked and uneven places and to match and blend with the additions proposed by this project. The intended useful life of this project is 25 years.

B. INEL Road Refurbishment, Idaho National Engineering Laboratory (INEL), Idaho - This project provides for restoring approximately 37 miles of INEL primary and secondary roads to a safe and reliable condition. The project design will provide an engineered road cross section meeting traffic density and load requirements. Since this is not a total reconstruction project, the repair methods will vary from applying an asphaltic leveling course on the existing surface to demolishing and reconstructing the total road cross section. The work method selected will depend on conditions along the route of each section to be restored. The completed roads will have painted traffic striping, proper crown, adequate surface-thickness, engineered base-course, compacted subgrade and side drainage.

C. Roadwork Project - Safety Program, Lawrence Berkeley Laboratory (LBL), Berkeley, California - This project provides for increasing the radius of curves at various intersections and widening of the main access road to the Laboratory. Vertical and horizontal curves will be removed and roads realigned to conform to the Department of Transportation Highway Design Standard. Included will be separation of pedestrian and vehicular traffic in some areas of the complex.

D. Repair Existing Roads, Argonne National Laboratory (ANL), Argonne, Illinois - This project will reconstruct approximately 10 miles of roadway serving the ANL-East Laboratory site. Included in this reconstruction effort are the main entrance routes to the site and those roads serving the principal permanent buildings and facilities. Roads serving buildings that are to be deactivated will not be reconstructed.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Road repair, various locations (ANL, INEL, LBL, RL)

2. Project No.: 84-ER-103

8. Brief Physical Description of Project (continued)

Work to be performed includes:

a. Repair of base course failures
b. Resurfacing with 2-1/2 inch bituminous concrete topping
c. Rework and repair of road shoulders
d. Raising existing manholes to match new road alterations
e. Restriping of traffic lanes and crosswalks
f. Replacement of deteriorated culvert pipes

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

A. Trafffc Safety Improvements, Route 4, Richland, Washington - Route 4 is the arterial servicing the Hanford Site. This roadway was built in 1943 prior to formalization of national policies on highway design. Lack of conformance to current highway design guidelines has created serious traffic hazards on the Hanford Site. In addition, Route 4 has deteriorated over the years. The road surface is cracked and uneven, lanes are narrow, and in most places the shoulders are soft, narrow and rutted. The existing lanes are only 10 feet wide, 2 feet narrower than required by current standards. The 10-foot lanes allow very little maneuvering room, and create heavy traffic loads along the road edge. This stress causes pavement edge break-up and hence further reduction of lane width, and deep ruts in the shoulders. These factors have caused increased maintenance and safety problems. This project proposes to improve that portion of Route 4 from the 1100 Area to the Wye Barricade, a distance of approximately 13 miles. This area carries the greatest amount of traffic and has the highest accident rate.

B. INEL Road Refurbishment, Idaho National Engineering Laboratory (INEL), Idaho - The roads proposed for reconstruction are the sole access to active INEL Facility areas. They have been maintained in continuous use since their original construction during the 1950's and 1960's. Maintenance efforts since that time have included patching, seal coating and surface overlays. Deterioration in the base course and subgrade has progressed to the point that these efforts provide only short term improvement. In addition, pavement edge-breakage has narrowed the road in some sections to less than the minimum required for safe two-lane operation. The current situation has resulted from combinations of the following circumstances:

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)

- Existing roads that were not designed for current traffic density and loads which have led to continuing surface and subsurface breakdowns

- Extreme winter cold temperatures ranging to -40°F causing surface course brittleness and shrinkage leading to extensive cracking, subsequent moisture penetration and subsurface failure.

- High summer temperatures ranging to 100°F causing road weakness in areas of minimum road stability. This results in ruts, depressions and washboards on the road surface.

- Moisture entry through surface cracks and unpaved shoulders. This causes reduced subsurface support strength and surface breaking.

- Frost heave caused by soil capillarity and poor drainage during winter weather. This results in both surface breakup and subsurface failure.

C. Road Project - Safety Program, Lawrence Berkeley (LBL), Berkeley, California - The existing radius of the curves of the main access road to the laboratory are such that semi-trailers are found to go over the road center line. In some areas of the laboratory pedestrians and vehicles must use the same road way.

Improvement of the laboratory roading and pedestrian systems is required to bring the old substandard roads and sidewalks in the hilly LBL terrain up to acceptable code and safety standards by improving alignment sight distance, removing horizontal and vertical curves, increasing the radius of curves and widening the access road to the site.

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.

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)

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*

	Richland	INEL	LBL	ANL	Total
a. Engineering and design and inspection	$ 900	$ 535	$ 165	$ 200	$ 1,8 0
b. Construction costs	5,100	5,800	2,745	1,600	15,245
Subtotal	6,000	6,335	2,910	1,800	17,045
c. Contingency	800	955	190	200	2,145
Total estimated cost	$ 6,800	$ 7,290	$ 3,1 0	$ 2,000	$19,190

*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.

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.

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

	Prior Years	FY 1984	FY 1985	FY 1986	FY 1987	FY 1988	FY 1989	FY 1990	Total
a. Total project costs									
1. Total facility costs									
(a) Construction line item	$ 0	$ 737	$ 7,098	$ 3,028	$ 2,782	$ 1,917	$ 2,628	$ 1,000	$19,190
(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	$ 3,028	$ 2,782	$ 1,917	$ 2,628	$ 1,000	$19,190
2. Other project costs									
(a) R&D necessary to complete construction.	$ 30	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 30
(b) Other project related costs	0	0	0	0	0	0	0	0	0
Total other project funding	30	0	0	0	0	0	0	0	30
Total project costs (1 and 2)	$ 30	$ 737	$ 7,098	$ 3,028	$ 2,782	$ 1,917	$ 2,628	$ 1,000	$19,220

b. Other related annual costs (estimated life of project: 25 years)	Annual Cost
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

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Road repair, various locations (ANL, INEL, LBL, RL)

2. Project No.: 84-ER-103

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.

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
1987 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
Brookhaven National Laboratory
Upton, New York

2. Project No.: 85-R-701

3. Date A-E work initiated: 1st Qtr. FY 1985

3a. Date physical construction starts: 1st Qtr. FY 1986

4. Date construction ends: 3rd Qtr. FY 1988

5. Previous cost estimate: none
Date: none

6. Current cost estimate: $15,000
Less amount for PE&D: 0
Net cost estimate: $15,000
Date: September 1983

7. Financial Schedule:

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1985	$15,000	$ 2,200	$ 2,200	$ 425
1986	0	6,832	6,832	1,292
1987	0	5,700	5,700	6,895
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 a condenser water pump

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)

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.

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.

CONSTRUCTION PROJECT DATA SHEETS

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

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

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.

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:

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)

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

	Item Cost	Total Cost
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	
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		$15,000

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

II. 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

	Prior Years	FY 1985	FY 1986	FY 1987	FY 1988	Total
a. Total project costs						
1. Total facility costs						
(a) Construction line item ..	$ 0	$ 425	$ 1,292	$ 6,895	$ 6,388	$15,000
(b) PE&O	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0
Total facility costs ..	0	$ 425	$ 1,292	$ 6,895	$ 6,388	$15,000
Total project costs	$ 0	$ 425	$ 1,292	$ 6,895	$ 6,388	$15,000

b. Other related annual costs (estimated life of project: 20 years)

1. Facility operating cost	$1,549
2. Programmatic operating expenses directly related to the facility	0
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	0
Total related annual costs	$ 1,549

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

Maintenance and Operation	$ 317,000
Energy (Utilities)	1,232,000
Total operating costs	$1,549,000

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

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

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)	2,341,000
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

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
1987 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

3a. Date physical construction starts: 4th Qtr. FY 1985

4. Date construction ends: 4th Qtr. FY 1988

5. Previous cost estimate: none
Date: none

6. Current cost estimate: $ 9,800
Less amount for PE&D: 0
Net cost estimate: $ 9,800
Date: December 1983

7. Financial Schedule

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1985	$ 9,800	$ 3,308	$ 3,308	$ 2,110
1986	0	2,983	2,983	3,803
1987	0	2,392	2,392	2,770
1988	0	1,117	1,117	1,117

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 380,000 sq. ft. 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.

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:

Job Cost Breakdown

Cost Element	$ Per Sq Ft Mid-1982
Tear-off of old roof and insulation (90% of roof area)	$1.34
Preparation of substrate	0.38
Improve water drainage (average)	1.04
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	$7.30

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)

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.*

	Total Cost
a. Engineering, design and inspection at approximately 11% of construction, Item b.	$ 900
b. Construction costs, 800,000 sq. ft. @ $10.80/sq. ft.	8,000
c. Contingency @ approximately 10% of above costs	900
Total estimated cost	$ 9,800

*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.

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

	Prior Years	FY 1985	FY 1986	FY 1987	FY 1988	Total
a. Total project costs						
1. Total facility costs						
(a) Construction line item ..	0	$ 2,110	$ 3,803	$ 2,770	$ 1,117	$ 9,800
(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 facility costs .	0	$ 2,110	$ 3,803	$ 2,770	$ 1,117	$ 9,800

CONSTRUCTION PROJECT DATA SHEETS

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

2. Project No.: 85-R-702

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

	Prior Years	FY 1985	FY 1986	FY 1987	FY 1988	Total
2. Other project costs						
(a) R&D necessary to complete construction	0	0	0	0	0	0
(b) Other project related costs	8	0	0	0	0	8
Total other project costs	$ 8	$ 0	$ 0	$ 0	$ 0	$ 8
Total project costs (Items 1 and 2)	$ 8	$ 2,110	$ 3,803	$ 2,770	$ 1,117	$ 9,808

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

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

CONSTRUCTION PROJECT DATA SHEETS

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

-702

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

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 or 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

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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: Primary electrical distribution system restoration
Oak Ridge National Laboratory
Oak Ridge, Tennessee

2. Project No.: 85-R-703

3. Date A-E work initiated: 1st Qtr. FY 1985

3a. Date physical construction starts: 4th Qtr. FY 1985

4. Date construction ends: 4th Qtr. FY 1988

5. Previous cost estimate:
Date: none

6. Current cost estimate: $ 2,200
Less amount for PE&D: 0
Net cost estimate: $ 2,200

Date: September 1983

7. Financial Schedule

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1985	$ 2,200	$ 800	$ 800	$ 229
1986	0	0	0	440
1987	0	1,400	1,400	671
1988	0	0	0	860

8. Brief Physical Description of Project

This project will involve a series of restoration activities which will increase the reliability of the existing electrical distribution system to an appropriate level. These activities will include repair or replacement of

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

2. Project No.: 85-R-703

8. Brief Physical Description of Project (continued)

deteriorated components, replacement of deficient items, and the elimination of potential safety and environmental hazards. Deteriorated equipment to be replaced includes wooden poles, transformers, and cables. Correction of deficiencies include replacing fused disconnect switches with electrically-operated circuit breakers, improving lightning protection of overhead lines, and replacement of single-pole switches with three-pole switches. Correction of potential safety hazards includes additional isolation switches for buildings and facilities and improved relaying. Correction of potential environmental hazards includes replacing deteriorated liquid-filled (oil and polychlorinated biphenol [PCB]) transformers.

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

This project will renew and upgrade the existing primary electrical distribution system to an appropriate level of reliability and enable it to effectively support various research activities at the Laboratory. Much of this system at Oak Ridge National Laboratory (ORNL) was built in 1943. Many of the components are beyond their expected life and are showing clear evidence of deterioration to the point where an escalating number of failures are projected. Examples of this deterioration are: (1) several oil filled transformers which have become severely corroded internally due to moisture and acid content will be replaced; (2) fused disconnect switches will be replaced with the electrically operated circuit breakers; (3) unshielded cable which is in violation to the National Electric Code will be replaced with approved shielded cable; (4) lightning protection will be improved on those circuits supplying the High Flux Isotope Reactor, Transuranium Processing Plant, Health Physics Research Reactor and to the Tower Shielding Facility thereby increasing the reliability of these circuits.

In addition, single pole switches will be replaced with three pole switches. This change will allow operating personnel to be better utilized during emergency conditions and reduce switching time which resules from waiting for called in maintenance personnel.

The cost estimate is based on a conceptual design completed during FY 1982 and will be issued during FY 1983 at an estimated cost of $20,000.

CONSTRUCTION PROJECT DATA SHEETS

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

2. Project No.: 85-R-703

10. Details of Cost Estimate*

	Item Cost	Total Cost
a. Engineering, design, and inspection at approximately 13% of construction costs, item b		$ 220
b. Construction costs		1,720
(1) Outside utilities	$, 1,720	
Subtotal		$ 1,940
c. Contingency at approximately 13% of above costs		260
Total estimated cost		$ 2,200

*Based on a Conceptual Design Report completed in FY 1982 at a cost of approximately $20,000.

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

Not Required. TEC is less than $5,000,000.

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

Not Required. TEC is less than $5,000,000.

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ENERGY SUPPLY RESEARCH AND DEVELOPMENT
MULTIPROGRAM ENERGY LABORATORIES-FACILITIES SUPPORT
MUTLIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

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

2. Project No.: 85-R-706

3. Date A-E work initiated: 1st Qtr. FY 1985

3a. Date physical construction starts: 1st Qtr. FY 1986

4. Date construction ends: 1st Qtr. FY 1988

5. Previous cost estimate: None
Date: none

6. Current cost estimate: $ 7,300
Less amount for CP&D: 0
Net cost estimate: $ 7,300
Date: September 1983

7. Financial Schedule

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1985	$ 7,300	$ 500	$ 500	$ 196
1986	0	2,694	2,694	2,194
1987	0	4,000	4,000	4,804
1988	0	106	106	106

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 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.

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

2. Project No.: 85-R-706

8. Brief Physical Description of Project (continued)

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 workforce. 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 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.

CONSTRUCTION PROJECT DATA SHEETS

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

2. Project No.: 85-R-706

10. Details of Cost Estimate*

	Item Cost	Total Cost
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.

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

2. Project No.: 85-R-706

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

	Prior Years	FY 1985	FY 1986	FY 1987	FY 1988	Total
a. Total project costs						
1. Total facility costs						
a. Construction line item	$ 0	$ 196	$ 2,194	$ 4,804	$ 106	$ 7,300
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	$ 196	$ 2,194	$ 4,804	$ 106	$ 7,300
2. Other project costs						
a. R&D necessary to complete construction	120	0	0	0	0	120
b. Other project related costs	0	0	0	0	0	0
Total other project costs	120	0	0	0	0	120
Total project costs	$ 120	$ 196	$ 2,194	$ 4,804	$ 106	$ 7,420

b. Other related annual costs (estimated life of facility: 40 years)

1. Facility operating costs	$ 230
2. Programmatic operating expens s 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

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 (continued)

4. Maintenance, repair, GPP or other construction related to programmatic effort - None

5. Other costs - No narrative required.

DEPARTMENT OF ENERGY
1987 CONGRESSIONAL BUDGET REQUEST
CONSTRUCTION PROJECT DATA SHEETS
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
MUTLIPROGRAM 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: Hanford site fire alarm system upgrade
Richland, Washington

2. Project No.: 85-R-707

3. Date A-E work initiated: 1st Qtr. FY 1985

3a. Date physical construction starts: 2nd Qtr. FY 1986

4. Date construction ends: 4th Qtr. FY 1988

5. Previous cost estimate: none
Date: none

6. Current cost estimate: $ 4,850
Less amount for PE&D: 0
Net cost estimate: $ 4,850
Date: September 1983

7. Financial Schedule

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1985	$ 4,850	$ 1,300	$ 1,300	$ 91
1986	0	1,708	1,708	2,078
1987	0	1,225	1,225	1,514
1988	0	617	617	1,167

8. Brief Physical Description of Project

This project provides for the design, procurement and construction of an upgraded fire alarm system which will be commensurate with required levels of protection for the Hanford Site. The project will replace all existing master alarm boxes and street boxes with radio boxes, replace alarm receiving equipment and consoles at the fire stations, and provide a computer aided dispatch system.

CONSTRUCTION PROJECT DATA SHEETS

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

2. Project No.: 85-R-707

8. Brief Physical Description of Project (continued)

This project will replace approximately 240 master alarm boxes and 50 street boxes, which are distributed throughout 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

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

2. Project No.: 85-R-707

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

The need for the fire alarm system upgrade is based on an audit report done in June 1982 by consultants specializing in fire protection and safety engineering. The audit report identifies 30 categories of deficiencies within the existing fire alarm system. An Engineering Study addressed alternative solutions for correcting existing deficiencies. Through the site survey, overall system analysis, and the consultant's fire alarm system expertise, it was concluded that to achieve compliance with National Fire Protection Association (NFPA), ensure system reliability, future flexibility and ease of operation, a radio fire alarm system alone fulfilled these requirements.

Delay of this project will increase the risk of serious fire accidents due to continued aging of the system and its components. Also, maintenance costs of the existing system will continue to increase.

10. Details of Cost Estimate

	Item Cost	Total Cost
a. Engineering design and inspection at approximately 13% of construction costs		$ 500
b. Construction costs		3,720
(1) Construction (includes equipment and labor)	$ 1,910	
c. Standard equipment includes 6 consoles ($54,000/ea.) computer aided dispatch system ($284,000) and approximately 278 radio alarm boxes ($4,600/ea.)	1,810	
Subtotal		$ 4,220
d. Contingency at approximately 15% of above cost		630
Total estimated cost.....		$ 4,850

11. Method of Performance

Design, inspection, and construction will be accomplished by fixed-price contracts awarded on the basis of competitive bidding. It will be a design, procure and install contract as presently planned.

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

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

CONSTRUCTION PROJECT DATA SHEET

1. Title and location of project:	Hanford site fire alarm system upgrade Richland, Washington	2. Project No.:	85-R-707

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

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

DEPARTMENT OF ENERGY
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MULTIPROGRAM ENERGY LABROATORIES-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 plant
Argonne National Laboratory
Argonne, Illinois

2. Project No.: 85-R-709

3. Date A-E work initiated: 1st Qtr. FY 1986

3a. Date physical construction starts: 2nd Qtr. FY 1987

4. Date Construction ends: 4th Qtr. FY 1988

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: September 1983

7. Financial Schedule

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1986	5,200	962	962	712
1987	0	3,600	3,600	3,000
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

	Item Cost	Total Cost
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	
(4) Piping and equipment within buildings	1,170	
(5) Controls and metering	60	
(6) Electrical power for chillers and pumps	165	
Subtotal		$ 3,870

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

2. Project No.: 85-R-709

10. Details of Cost Estimate (continued)

	Total Cost
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

	Prior Years	FY 1986	FY 1987	FY 1988	Total
a. Total project costs					
1. Total facility costs					
(a) Construction line item ...	$ 0	$ 750	$ 3,000	$ 1,450	$ 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	$ 750	$ 3,000	$ 1,450	$ 5,200
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	$ 750	$ 3,000	$ 1,450	$ 5,220

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

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

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 coststst- 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.

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

DEPARTMENT OF ENERGY
1987 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 system restoration
Oak Ridge National Laboratory, Tennessee

2. Project No.: 85-R-712

3. Date A-E work initiated: 1st Qtr. FY 1985

3a. Date physical construction starts: 1st Qtr. FY 1986

4. Date construction ends: 4th Qtr. FY 1988

5. Previous cost estimate: None
Date: None

6. Current cost estimate: $ 4,700
Less amount for CP&D: 0
Net cost estimate: $ 4,700
Date: September 1983

7. Financial Schedule

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1985	$ 4,700	$ 1,000	$ 1,000	$ 556
1986	0	1,058	1,058	862
1987	0	2,600	2,600	2,240
1988	0	42	42	1,042

8. Brief Physical Description of Project

This project will remove from service three obsolete 600 ton chiller units located in the Central Research and Administration Complex and provide replacement capacity. The Central Compressor Facility structure will be expanded, if required, for the installation of 2,000 ton centrifugal chiller and the associated pumps, controls, and piping. Concurrently, the cooling tower system supplying condenser water to the facility will be upgraded to correct a marginal capacity condition during peak demand periods.

CONSTRUCTION PROJECT DATA SHEETS

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

2. Project No.: 85-R-712

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

The purpose of this project is to: replace three 600 ton chiller units due to age, condition, and limited capacity; increase capacity of a marginal cooling tower system.

The Central Research and Administration Complex consists of seven major facilities with approximately 1,000,000 sq. ft. of floor space and approximately a third of the Laboratories' research personnel. The space is used by multi-discipline groups and supporting service divisions participating in applied and basic research programs.

The units to be replaced were obtained from surplus channels in 1952 and are now approximately 35 years old. Their reliability continues to decline, and, in recent years, two of the three machines have been out of service for several weeks or more. Repair parts are no longer stocked by the manufacturer and downtimes are extended by the need to custom fabricate the necessary parts.

The declining reliability of these machines will continue and more frequent interruptions and greater delays to programmatic activities can be anticipated. Many programmatic activities are dependent on computer services and the ORNL Computer Center located in the area served by the 600 ton chillers.

10. Details of Cost Estimate*

	Item Cost	Total Cost
a. Engineering, design, and inspection at approximately 12% of construction costs, item b.		$ 450
b. Construction costs		3,700
(1) Land improvements including grading, landscaping	$ 43	
(2) Building addition (2,500 sq. ft. @ $153/sq. ft.)	382	
(3) Building modifications (concrete work, etc.)	131	
(4) Other structures (cooling tower)	419	
(5) Special facilities (chiller, pumps, piping, etc.)	2,745	
Subtotal		$ 4,150
c. Contingency at approximately 13% of above costs		550
Total estimated cost		$ 4,700

*Cost estimate based on completed conceptual design.

CONSTRUCTION PROJECT DATA SHEETS

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

2. Project No.: 85-R-712

11. Method of Performance

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

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. TEC is less than $5,000,000.

DEPARTMENT OF ENERGY
1987 CONGRESSIONAL BUDGET REQUEST
CONSTRUCTION PROJECT DATA SHEETS
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
MULTIPROGRAM ENERGY LABORATORIES-FACILITIES SUPPORT
MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES PROGRAM
(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 1988

5. Previous cost estimate: None
Date: None

6. Current cost estimate: $ 3,000
Less FY 1984 PESD: 0
Net cost estimate: $ 3,000
Date: December 1984

7. Financial Schedule:

Fiscal Year	Authorizations	Appropriations	Obligations	Costs
1986	$ 3,000	$ 481	$ 481	$ 281
1987	0	2,500	2,500	1,700
1988	0	19	19	1,019

8. Brief Physical Description of Project

This project provides for the design, fabrication and installation of various fire protection improvements affecting over 210,000 sq. ft. 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.

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

2. Project No.: 86-R-726

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

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

2. Project No.: 86-R-726

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

b. Vital support buildings for program buildings

Each key facility was examined in relation to several interrelated risk factors: potential dollar loss due to fire, effectiveness and reliability of existing fire protection (if any), amount of combustibles present, type of potential fire (i.e., smokey, flash, average), access by fire department, salvageability, potential extension of fire, impact on experiments, and life safety of occupants. Automatic sprinkler protection has been proposed over fire detection since the above factors were especially unfavorable (i.e., difficult fire department access, over one million dollars loss potential, potential fire spread is great, program impact is severe).

The Gamewell telegraph portions of the system are in excess of 25 years old. Maintenance is high, alarm information provided is limited, expansion is limited and costly. The telegraph system does not indicate when a field unit resets nor does it indicate when a local system is in trouble. Transferring the fire alarms from the Gamewell System to the new multiplexed system will satisfy DOE requirements and provide an easy expandable, economical alarm system.

10. Details of Cost Estimate

	Item Cost	Total Cost
a. Engineering, design, and inspection at approximately 12% of construction costs, item b		$ 285
b. Construction costs		2,370
1. Sprinkler system installation into existing building (approximately 210,000 sq. ft. at $360/head)	$ 1,125	
2. 13 new water mains with trenching control valves and wet taps (approximately 1,200 feet at $90 per ft.)	219	
3. Connect sprinkler alarms into existing fire alarm system (15 risers at $8,400 each)	126	
4. Transfer fire alarm to new site protective signaling system (150 buildings at $6,000 each)	900	
Subtotal		2,655
c. Contingency at approximately 13% of above costs (Items a & b)		345
Total estimated cost		$ 3,000

CONSTRUCTION PROJECT DATA SHEETS

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

2. Project No.: 86-R-726

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
1987 CONGRESSIONAL BUDGET REQUEST
CONSTRUCTION PROJECT DATA SHEETS
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
ENERGY MULTIPROGRAM LABORATORIES-GENERAL PURPOSE FACILITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: Laboratory restoration I
Richland, Washington

2. Project No.: 87-R-751

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

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

4. Date Construction ends: 4th Qtr. FY 1988

5. Previous cost estimate: None

6. Current cost estimate: $ 2,100
Less amount for PE&D: 0
Net cost estimate: $ 2,100
Date: January 1986

7. Financial Schedule:

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1987	$ 2,100	$ 2,100	$ 2,100	$ 400
1988	0	0	0	1,690
1989	0	0	0	10

8. Brief Physical Description of Project

The existing first stage of two stages of air filtration in the radioactive ventilization exhaust system of a major 300 Area analytical chemistry facility uses disposable High Efficiency Particulate Air (HEPA) filters that are inserted into permanent, sheet-metal filter housings. The air that is being filtered is drawn from gloveboxes and hoods in which radioactive materials are used. This project will remove approximately 140 of the existing, obsolete filter housings and replace them with new support stands, ductwork, and instrumentation that will allow self-contained, disposable filter units to be used. The housings, ductwork and used filters removed by the project will be suitably packaged and disposed. The initial set of new, self-contained filters will be supplied by the project.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Laboratory restoration I
Richland, Washington

2. Project No.: 87-R-751

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

The analytical chemistry facility is used for chemistry studies of radioactive materials. In order to comply with the release limits for radionuclides to the environment given in DOE Order 5480.1, Chapter XI, two stages of filtration must be provided for air exhausted from hoods and gloveboxes in which radioactive materials are used. The two stages satisfy the combined requirements for release limits and reliability during normal and accident conditions. This project, by replacing 140 obsolete filter housings, will complete replacement of all the first stage filters in the building with modern, air tight filter housings.

Over the life of the facility, virtually every radionuclide has been present in the gloveboxes and hoods served by the exhaust system that this project will modify. Large quantities of fissile materials, mixed fission products, and radioactive metal scrap (from reactor fuels) are routinely handled in the facility. The presence of these different radioactive materials, in significant quantities, requires that the ventilation system operate and be maintained in a very safe condition. Assuring that there is a high confidence level in the reliability of the system under both normal and accident conditions.

The existing filter housings are mechanically worn to the point that some are very difficult to seal. Air can leak between the filter and the frame, thus allowing contamination to spread into the duct work downstream from the filters. When the filter is sealed properly, air is prevented from leaking past the filter and contamination is caught on the filter rather than being trapped downstream on the larger, secondary building filters. The seal problem is encountered both when new filters are installed and while filters are in service. At a given time, between 10% and 15% of the filters may fail to pass required performance tests. Loss of seal during operation reduces the effectiveness of the exhaust system, and may result in a release of contamination into downstream duct work between the primary and secondary filters. Correcting the seal problems results in decreased operating costs. The proposed system will assure total sealing and reduce filter changes by operations personnel to as low as reasonably achievable (ALARA) radiation exposure conditions, which is not possible with the existing housings.

The impact of not proceeding with this project will be to not allow operational and maintenance personnel to meet the ALARA radiation exposure. There would also be a higher potential for radioactive release from the building during an accident condition and the stoppage of all work in the building.

CONSTRUCTION PROJECT DATA SHEETS

1. Title and location of project: Laboratory restoration I, Richland, Washington — 2. Project No.: 87-R-751

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

Because of many filter boxes, ventilation ducts, overhead piping and wire chases, the surface area on which contamination could be deposited is very large. A release of contaminated particles in the basement would be extremely difficult and expensive to clear up. With many of the past R&D programs processed in the building, costs could have gone into the mildion dollar range to restore proper conditions. This project will reduce that risk to something that is minimal when utilized with proper filter changing.

10. Details of Cost Estimate[a/]

	Item Cost	Total Cost
a. Engineering, design and inspection at approximately 6% of construction costs, item b		$ 100
b. Construction costs		1,620
(1) Improvements to land	$ 0	
(2) Building services modifications	1,620	
(3) Utilities	0	
(4) Equipment	0	
c. Contingency at approximately 23% of above costs		380
Total estimated cost		$2,100

a/ This estimate is based on 100% completion of conceptual design.

11. Method of Performance

Design and inspection will be performed by the onsite architect-engineer. Construction and procurement will be accomplished by the onsite cost plus award fee (CPAF) contractor for the radioactive work.

12. Funding Schedule of Project and Other Related Funding Requirements

Not required.

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

Not required.

DEPARTMENT OF ENERGY
1987 CONGRESSIONAL BUDGET REQUEST
CONSTRUCTION PROJECT DATA SHEETS
ENERGY SUPPLY RESEARCH AND DEVELOPMEN
MULTIPROGRAM ENERGY TABORATORIES - GENERAL PURPOSE FACILITIES PROGRAM
(Tabular dollars in thousands. Narrative material in whole dollars.)

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

2. Project No.: 87-R-752

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

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

4. Date construction ends: 2nd Qtr. FY 1989

5. Previous cost estimate: None
Date: None

6. Current cost estimate: $3,800
Date: January 1985

7. Financial Schedule:

Fiscal Year	Authorizations	Appropriations	Obligations	Costs
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:

- 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.

- 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.

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

2. Project No.: 87-R-752

8. Brief Physical Description of Project (continued)

- 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.

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)

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.

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)

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.

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*

	Item Cost	Total Cost
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		3,157
c. Contingency at approximately 20% of above costs		643
Total estimated costs		$ 3,800

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.

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

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

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
1987 CONGRESSIONAL BUDGET REQUEST
CONSTRUCTION PROJECT DATA SHEETS
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
MULTIPROGRAM ENERGY LABORATORIES-FACILITIES SUPPORT
MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES PROGRAM
(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. Financial Schedule:

Fiscal Year	Authorization	Appropriations	Obligations	Costs
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

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

2. Project No.: 87-R-753

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

The workscope will encompass essentially all aspects of building construction, except structure and roofing[1], 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[2]); 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 much effort is required for temporary repairs.

1 Included under on-going Project No. 85-R-702 "Replace Laboratory Roofs".
2 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 (cont'd)

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. Cantingency at approximately 14% of above costs	1,505
Total estimated cost	$ 12,035

*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.

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

	Prior Years	FY 1987	FY 1988	FY 1989	FY 1990	Total
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

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

2. Project No.: 87-R-753

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

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CONSTRUCTION PROJECT DATA SHEETS
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
MULTIPROGRAM ENERGY LABORATORIES-FACILITIES SUPPORT
MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES PROGRAM
(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

7. Financial Schedule:

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1987	$ 3,200	$ 1,100	$ 1,100	$ 1,060
1988	0	2,100	2,100	1,590
1989	0	0	0	550

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:

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

2. Project No.: 87-R-755

B. 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 painting.

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

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 ambiance 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*:

	Item Cost	Total Cost
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

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

2. Project No.: 87-R-755

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
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CONSTRUCTION PROJECT DATA SHEETS
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
MULTIPROGRAM ENERGY LABORATORIES-FACILITIES SUPPORT
MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES PROGRAM
(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. Financial Schedule:

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1987	$ 5,200	$ 1,000	$ 1,000	$ 400
1988	0	2,000	2,000	2,100
1989	0	2,200	2,200	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 case 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 (cont'd.)

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*:

	Item Cost	Total Cost
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.

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

2. Project No.: 87-R-756

II. 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

	Prior Years	FY 1987	FY 19 8	FY 19 9	Total
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	$ 0	$ 400	$ 2,100	$ 2,700	$ 5,200
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	$ 8	$ 0	$ 0	$ 0	$ 8
Total project costs (Item 1 and 2)	$ 8	$ 400	$ 2,100	$ 2,700	$ 5,208

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

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CONSTRUCTION PROJECT DATA SHEETS
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
MULTIPROGRAM ENERGY LABORATORIES-FACILITIES SUPPORT
MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES PROGRAM
(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

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

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

5. Previous cost estimate: None
Date: None

6. Current cost estimate: $ 2,600
Less amount for PE&D: 0
Net cost estimate: $ 2,600
Date: January 1986

7. Financial Schedule:

Fiscal Year	Authorization	Appropriations	Obligations	Costs
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

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

2. Project No.: 87-R-757

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

- 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

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

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:

- 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.

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 (cont'd)

- 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.
- 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.
- 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*:

	Item Cost	Total Cost
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		$ 2,130
c. Contingency at about 22% above costs		470
Total estimated costs		$ 2,600

*Based upon a completed conceptual design.

CONSTRUCTION PROJECT DATA SHEETS

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

2. Project No.: 87-R-757

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
1987 CONGRESSIONAL BUDGET REQUEST
CONSTRUCTION PROJECT DATA SHEETS
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
MULTIPROGRAM ENERGY LABORATORIES-FACILITIES SUPPORT
MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES PROGRAM
(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. Financial Schedule:

Fiscal Year	Authorization	Appropriations	Obligations	Costs
1987	$ 5,500	$ 1,050	$ 1,050	$ 260
1988	0	3,000	3,000	1,100
1989	0	1,450	1,450	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 form 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 program labwide 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 utilized 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[a/]:

	Total Cost
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

a/ Based on completed conceptual design.

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

	Prior Years	FY 1987	FY 1988	FY 1989	FY 1990	Total
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

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

2. Project No.: 87-R-758

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 costsi - 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
1987 CONGRESSIONAL BUDGET REQUEST
CONSTRUCTION PROJECT DATA SHEETS
ENERGY SUPPLY RESEARCH AND DEVELOPMENT
MULTIPROGRAM ENERGY LABORATORIES - GENERAL PURPOSE FACILITIES PROGRAM
(Tabular dollars in thousands. Narrative material in whole dollars.)

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

2. Project No.: 87-R-759

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 1990

5. Previous cost estimate: None
Date: None

6. Current cost estimate: $6,800
Date: January 1986

7. Financial Schedule:

Fiscal Year	Authorizations	Appropriations	Obligations	Costs
1987	$ 6,800	$ 2,000	$ 2,000	$ 1,700
1988	0	4,800	4,800	2,600
1989	0	0	0	1,900
1990	0	0	0	600

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 stream 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.

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 systemt- 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 systemt- 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*

	Total Cost
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

	Prior Years	FY 1987	FY 1988	FY 1989	FY 1990	Total
a. Total project costs						
1. Total facility costs						
(a) Construction line item	$ 0	$ 1,700	$ 2,600	$ 1,900	$ 600	$ 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	$ 1,700	$ 2,600	$ 1,900	$ 600	$ 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	$ 1,700	$ 2,600	$ 1,900	$ 600	$ 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

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1987 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: Non-radiological process waste treatment project
Oak Ridge National Laboratory
Oak Ridge, Tennessee

2. Project No.: 86-R-801

3. Date A-E work initiated: 1st Qtr. FY 1986

3a. Date physical construction starts: 3rd Qtr. FY 1987

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

5. Previous cost estimate: 3,000*
Date: December 1984

6. Current cost estimate: $18,000
Less FY 1984 PE&D: 0
Net cost estimate $18,000
Date: September 1985

7. Financial Schedule:

Fiscal Year	Authorizations	Appropriations	Obligations	Costs
1986	$ 3,000	$ 2,887	$ 2,887	$ 1,587
1987	15,000	7,000	7,000	5,000
1988	0	8,113	8,113	7,113
1989	0	0	0	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 eldminate 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.

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

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 those 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.

Considered a major stream, the effluent from Building 3544, is currently being treated by ion exchange to remove only radioactivity but has exceeded NPDES limits in several parameters (dissolved solids, chemical oxygen demand (COD), and nitrates). Other streams are not currently treated and surpass the NPDES requirements and must be treated. The current waste treatment plant (Building 3544), even with modifications, does not have the capability to treat all exceeded parameters, and is designed for a lower feed rate than will be required to treat the combined feed streams. Therefore, it is necessary to build a new wastewater treatment system with the capability to treat these streams.

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

10. Details of Cost Estimate	Item Cost	Total Cost
a. Engineering, design, and inspection at approximately 24%* of construction costs, item b		$ 2,700
b. Construction costs		11,280
(1) Land improvements	$ 250	
(2) New buildings	605	
(3) Special facilities	9,420	
(4) Outside utilities	1,005	
Subtotal		13,980
c. Contingency at approximately 29% of above costs		4,020
Total estimated cost		$ 18,000

*This estimate is from the Conceptual Design Report completed in May 1985.

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

11. Method of Performance

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

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

	Prior Years	FY 1987	FY 1988	FY 1989	Total
a. Total project costs					
1. Total facility costs					
(a) Construction line item	$ 1,587	$ 5,000	$ 7,113	$ 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	$ 1,587	$ 5,000	$ 7,113	$ 4,300	$18,000
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	$ 350	$ 0	$ 0	$ 0	$ 350
Total project costs	$ 1,937	$ 5,000	$ 7,113	$ 4,300	$18,350*

*This total includes $350,000 for a Conceptual Design completed in May 1985.

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	600*
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.

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

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)

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.

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ENVIRONMENTAL COMPLIANCE UPGRADE
(Tabular dollars in thousands. Narrative material in whole dollars.)

1. Title and location of project: General plant projects
Oak Ridge National Laboratory
Oak Ridge, Tennessee

2. Project No.: 87-R-770

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

3a. Date physical construction starts: 2nd Qtr. FY 1987

4. Date construction ends: 4th Qtr. FY 1988

5. Previous cost estimate: None
Date:

6. Current cost estimate: $3,000
Less FY 1985 PE&D: 0
Net cost estimate $3,000
Date: January 1985

7. Financial Schedule:

Fiscal Year	Obligations	Costs FY 1985	FY 1986	FY 1987	After FY 1987
1987	3,000	0	0	1,500	1,500

8. Brief Physical Description of Project

These projects provide for the many miscellaneous alterations, additions, modifications, replacements, and non-major new construction items required to reduce or eliminate environmentally harmful discharges from ORNL.

o Upgrade Process Waste Collection System, 2000 area ...a..E..... $ 800

This project will provide modifications to the Process Waste Collection System in the 2000 area of ORNL. Preliminary investigations indicate that inappropriate cross-connections between the various collection systems exist which allow process effluents to be discharged to White Oak untreated. This project will correct these inappropriate connections and provide miscellaneous upgrading of system integrity.

1. Title and location of project: General plant projects
Oak Ridge National Laboratory
Oak Ridge, Tennessee

2. Project No.: 87-R-770

8. Brief Physical Description of Project (continued)

o Groundwater Monitoring Network, Phase III ..... $ 350

This project is Phase III of an overall groundwater monitoring network being installed at ORNL and surrounding areas to determine to what extent the groundwater is contaminated. This network consists of a large number of groundwater wells strategically located around specific impoundments, pits, disposal areas, etc.

o Hydrostatic Head Measuring Stations, Bethel Valley 950

This project consists of the construction of several Hydrostatic Head Measuring Stations at preselected locations in the Bethel Valley area. Each station will consist of a cluster of three separate wells, one drilled to a depth of about 80 feet below grade, a second drilled to a depth of 200 feet below grade, and a third drilled to a depth of 400 feet below grade.

o Wastewater Piping Replacement, 4500 Area 900

This project will provide modifications and upgrading to the Process Waste Collection System in the ORNL 4500 Area. Preliminary investigations indicate that inappropriate cross-connections between the various collection systems exist which allow process effluents to be discharged to White Oak Creek untreated. This project will correct these deficiencies and provide other miscellaneous upgrading of system integrity.

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

o Upgrade Process Waste Collection System, 2000 Area

Inappropriate connections of process drains to the storm sewer or sanitary sewer introduce Category III effluents to these systems. These effluents are discharged to area streams and exceed ORNL's national Pollutant Discharge Elimination System (NPDES) permit limits. This project is necessary to meet permit compliance requirements.

1. Title and location of project: General plant projects
Oak Ridge National Laboratory
Oak Ridge, Tennessee

2. Project No.: 87-R-770

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

- o Groundwater Monitoring Network, Phase III

  Various ponds, impoundments, and other disposal/storage areas around the ORNL site have been determined to be RCRA sites. To meet the RCRA regulations, a groundwater monitoring system must be installed around each of these sites. The monitoring network is needed to determine if groundwater contamination is occurring and to determine containment of RCRA regulated waste.

- o Hydrostatic Head Measuring Stations, Bethel Valley

  The hydrostatic head measuring stations will provide the capability to define and model groundwater flow in the ORNL area. It is necessary to develop an accurate description of large-scale groundwater flow in the Bethel Valley area to support alternative evaluations for cleanup actions under both RCRA and CERCLA.

- o Wastewater Piping Replacement, 4500 Area

  Inappropriate connections of process drains to the storm sewer or sanitary sewer introduce Category III effluents to these systems. These effluents are discharged to area streams and exceed ORNL's National Pollutant Discharge Elimination System (NPDES) permit limits. This project is necessary to meet permit compliance requirements.

10. Details of Cost Estimate

The estimated costs are preliminary and in general indicate the magnitude of each program. These costs included engineering, design, construction, and inspection.

11. Method of Performance

Design will be on the basis of negotiated architect-engineer contracts. To the extent feasible, construction and procurement will be accomplished by firm fixed-price contracts and subcontracts awarded on the basis of competitive bidding.