Construction

Mission Supporting Goals and Objectives

FY 2001 New Construction Line Items

The Stockpile Stewardship program is requesting funding and authorization for three construction new starts and a pilot line item to fund Title I and II engineering and design activities. One of the three construction new starts will provide a laboratory facility necessary to support the Stockpile Stewardship campaigns. The other two are plant projects that are necessary to replace current obsolete facilities that are required to support Directed Stockpile Work. All of the external independent assessments (EIAs) for these projects will be completed and the reports provided to Congress before May, 2000.

Defense Programs is also requesting funding for a Preliminary Project Design and Engineering line item. This line item will provide Title I and II engineering and design efforts on construction projects prior to Defense Programs requesting physical construction funding. This will allow design efforts to be further completed prior to the establishment of project baselines, and thus aid the Department in necessary project management improvements. This project management effort is being piloted by Defense Programs. It is expected that the rest of the Department will move to this funding methodology if approved by Congress, and if the pilot is found to be an effective means of increasing project management oversight.

The three construction project new starts are:

01-D-101, Distributed Information Systems Laboratory (DISL) SNL, Livermore, California will house efforts to develop and implement distributed information systems for the Stockpile Stewardship program. Research at DISL will concentrate on secure networking, high performance distributed and distance computing, and visualization and collaboration technologies that need development to help create design and manufacturing productivity environments for the future weapons complex.

01-D-124, Highly Enriched Uranium (HEU) Materials Facility, Y-12 Plant, will provide a state of the art highly enriched uranium storage and handling facility for the Y-12 Plant. The Highly Enriched Uranium Materials Facility will support the consolidation of strategic reserve and excess HEU. This facility will be segregated into two distinct areas, one for the storage of the current inventory and one for disassembly and storage under the provisions of START III. The START III area will also contain the material stored under International Atomic Energy Agency (IAEA) safeguards. The HEU Materials Facility will provide an increased security posture as well as achieve cost savings through the consolidation of material.

01-D-126 , Weapons Evaluation Testing Laboratory (WETL), Pantex Plant, will replace the current Weapons Evaluation Testing Laboratory (WETL) facility with a new facility containing state-of-the-art upgraded high resolution test data acquisition hardware and software systems. The new facility will be located in an area to achieve operational efficiencies and cost savings. This new facility will incorporate new diagnostic and test capability developed through the Enhanced Surveillance Program. This

capability will provide tools to predict when components fail and is necessary to support the Stockpile

Evaluation Program for the 21st century.

Significant Schedule Adjustments to On Going Projects

The following significant changes have been made to the funding and completion schedules of on-going projects.

The estimated completion date of physical construction on project **00-D-103, Terascale Simulation Facility, Lawrence Livermore National Laboratory,** has been moved out from the fourth quarter of FY 2004 to the second quarter of FY 2006. This delay in the construction project reflects adjustments in delivery dates for the ASCI computer platforms. Due to the delayed completion of the project, the total estimated cost of the project increases by $5.5 million.

In response to projected cost increases and schedule delays associated with project **96-D-111, National Ignition Facility (NIF), Lawrence Livermore National Laboratory (LLNL)**, the Office of Defense Programs, LLNL and NIF Project management have been working together to bring the project back on track as directed by Secretary Richardson. The NIF Project has changed its method of execution to address cleanliness problems in assembling and installing the laser and target system infrastructure. Assembly and installation will be performed by industrial partners with proven records of constructing similarly complex facilities. The project is currently incorporating these changes into a new NIF baseline which will be certified by the Department and submitted to Congress by June 1, 2000. A revised Construction Project Data Sheet will be submitted to Congress with the Secretary's certification of the new NIF baseline.

Project **95-D-102, CMR Upgrades Project, Los Alamos National Laboratory**, has been significantly downscoped and final year funding is requested in FY 2001. In January 1999, the Department approved the "Strategy for Managing Risks at the CMR" documenting the risk mitigation measures (including the CMR Upgrades Project) required to safely operate the CMR through 2010, by which time a replacement facility is expected to be available. This strategy, along with the revised safety authorization basis, determined that certain upgrades within the approved 1995 baseline of the project were no longer required and/or cost effective. This enabled the Department to reduce the scope of the CMR Upgrades Project and reduce the total estimated cost from $174,100,000 to $106,020,000. The bulk of the cost savings were achieved through the cancellation of several existing subprojects.

As a result of Defense Programs' allocation of the bottom line Weapons Activities general reduction in the FY 2000 Appropriation, no FY 2000 funding was provided for project **98-D-124, Stockpile Management Restructuring Initiative/ Y-12 Consolidation, Y-12 Plant**. Defense Programs is currently reviewing the scope of the project in light of current workload requirements. It is anticipated that this review will result in much of the planned consolidation activities to be indefinitely deferred, therefore no new funding is requested for this project in FY 2001.

No new funding is requested for **98-D-126, Accelerator Production of Tritium (APT), Various Locations**, design activities as the Defense Programs continues to focus on the Commercial Light Water Reactor (CLWR) primary tritium production option.

Performance Measures

- # Initiate design activities on the proposed FY 2001 construction projects.
- # In FY 2001, complete procurement of the Dual-Axis Radiographic Hydrotesting Facility's (DARHT) (97-D-102) second axis hardware and complete designs of the DARHT Detector and Vessel Preparation Facility.
- # Continue construction activities for the Strategic Computing Complex at Los Alamos National Laboratory under a Design/Build Contract (00-D-105).
- # Complete and certify a new cost and schedule baseline for the National Ignition Facility (96-D-111) by June 1, 2000.
- # Complete design and initiate construction of the Joint Computational Engineering Laboratory (00-D-107) in FY 2001.
- # Complete site preparation activities for the Tritium Extraction Facility (98-D-125) in FY 2000, and initiate physical construction in FY 2001.
- # Maintain current schedules on the Stockpile Management Restructuring Initiative projects at Kansas City, Pantex and Y-12 Plants and the Savannah River Site.
- # Complete physical construction activities for the Security Enhancement project at the Pantex Plant (88-D-123).

Funding Profile

(dollars in thousands)

NEW STRUCTURE	FY 1999 Current Appropriation	FY 2000 Original Appropriation	FY 2000 Adjustments	FY 2000 Current Appropriation	FY 2001 Request
Construction	518,984	539,919	-9,663 [a]	530,256	414,173
Adjustments	0	-7,650 [b]	7,650	0	0
Total, Construction	518,984	532,269	-2,013 [c]	530,256	414,173

OLD STRUCTURE	FY 1999 Current Appropriation	FY 2000 Original Appropriation	FY 2000 Adjustments	FY 2000 Current Appropriation	FY 2001 Request
Stockpile Stewardship	391,326	379,240	-3,931 [d]	375,309	NA
Stockpile Management	127,658	160,679	-5,732 [e]	154,947	NA
Subtotal, Construction	518,984	539,919	-9,663	530,256	NA
Adjustments	0	-7,650 [b]	7,650	0	NA
Total, Construction	518,984	532,269	-2,013 [c]	530,256	NA

[a] Reflects the allocated share of $7,650,000 of the $29,800,000 General Reduction, in the Weapons Activities appropriation; and $2,013,000 of the $16,887,000 Recission under Public Law 106-113.

[b] Reflects the allocated share of $7,650,000 of the $29,800,000 General Reduction, in the Weapons Activities appropriation.

[c] Reflects the allocated share of $2,013,000 of the $16,887,000 Recission under Public Law 106-113.

[d] Reflects reduction of $2,5000,000 associated with the Weapons Activities General Reduction (see note “b”), and reduction of $1,431,000 associated with the FY 2000 Recission (see note “c”).

[e] Reflects reduction of $5,150,000 associated with the Weapons Activities General Reduction (see note “b”), and reduction of $582,000 associated with the FY 2000 Recission (see note “c”).

Detailed Program Justification

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Initiate three FY 2001 Construction New Starts: one laboratory research facility to support implementation of the Stockpile Stewardship campaigns, and two plant infrastructure projects to replace obsolete facilities	0	0	23,100
Pilot the **Preliminary Project Design and Engineering** project management improvement	0	0	14,500
Continue three **FY 2000 Computing and Simulation facilities**. The completion date on the **Terascale Simulation Facility**, LLNL (00-D-103) has been delayed one year consistent with adjustments to ASCI platform delivery schedules	0	35,665	67,700
Continue the **Stockpile Management Restructuring Initiative** projects to resize the production plants consistent with planned workload levels	53,008	40,584	59,530
Construction efforts to provide an assured source of tritium using a commercial light water reactor continue, with a suspension of the **APT** backup technology design activities	26,000	68,738	75,000
Final year of funding for the **Dual-Axis Radiographic Hydrotest Facility**	36,000	60,768	35,232
Continue the **National Ignition Facility,** consistent with the current schedule, pending re-baselining following S-1 directed project review	284,200	247,158	74,100
The **CMR Upgrades Project**, LANL has been downsized to support only those improvements necessary to support facility usage through FY 2010, at which point a replacement facility is expected to be available	5,000	14,943	13,337
Other ongoing construction projects	114,776	62,400	51,674
Total, Construction	518,984	530,256	414,173

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2000 vs FY 2001 ($000)
Three new start construction projects are requested for FY 2001: one laboratory research projects to support implementation of the Stockpile Stewardship campaigns, and two plant infrastructure projects to replace obsolete facilities	23,100
Pilot the **Preliminary Project Design and Engineering** project management improvement	14,500
FY 2000 Computing and Simulation facilities continue, Terascale Simulation Facility completion date delayed one year consistent with ASCI platform delivery schedule adjustments	32,035
The **Stockpile Management Restructuring Initiative** is in full construction mode in FY 2001 following completion of design efforts	18,946
Construction of the **Tritium Extraction Facility** continues on schedule while the effort on the backup **Accelerator Production of Technology** is suspended	6,262
Final year funding for the **Dual-Axis Radiographic Hydrotest Facility**	-25,536
Continue the **National Ignition Facility** consistent with the current schedule, pending re-baselining following S-1 directed project review	-173,058
Final year funding for a downscoped **CMR Upgrades**	-1,606
Other ongoing construction projects	-10,726
Total, Construction	-116,083

Construction Projects

(dollars in thousands)

	Total Estimated Cost (TEC)	Prior Year Appro-priations	FY 1999	FY 2000	FY 2001	Unappro-priated Balance
01-D-101, Distributed Information Systems Laboratory (DISL), SNL . .	35,500	0	0	0	2,300	33,200
01-D-103, Defense Programs Preliminary Project Design and Engineering (PPD&E), VL	14,500	0	0	0	14,500	0
01-D-124 HEU Storage Facility, Y-12	120,000	0	0	0	17,800	102,200
01-D-126 Weapons Evaluation Test Laboratory, SNL	22,181	0	0	0	3,000	19,181
00-D-103, Terascale Simulation Facility, LLNL	89,000	0	0	7,970	5,000	76,030
00-D-105, Strategic Computing Complex, LANL	98,972	0	0	25,902	56,000	17,070
00-D-107, Joint Computational Engineering Laboratory (JCEL), SNL	28,870	0	0	1,793	6,700	20,377
99-D-102, Rehabilitation of Maintenance Facility, LLNL	7,885	0	4,000	3,885	0	0
99-D-103, Isotope Sciences Facility, LLNL	17,392	0	2,000	1,992	5,000	8,400
99-D-104, Protection of Real Property-Roof Reconstruction-Ph. II, LLNL	19,900	0	2,500	2,391	2,800	12,209
99-D-105, Central Health Physics Calibration Facility, LANL	3,896	0	2,900	996	0	0
99-D-106, Model Validation & System Certification Test Center, SNL	18,230	0	1,600	6,475	5,200	4,955
99-D-108, Renovate Existing Roadways, NV	8,981	0	2,000	4,981	2,000	0
99-D-122, Rapid Reactivation, VL .	22,856	0	11,200	11,656	0	0
99-D-123, Replace Mechanical Utility Systems, Y-12 Plant	1,900	0	1,900	0	0	0
99-D-125, Replace Boilers & Controls, KCP	14,300	0	1,000	0	13,000	300
99-D-127, SMRI, Kansas City Plant	122,400	2,900	13,700	16,935	23,765	65,100
99-D-128, SMRI, Pantex Consolidation	13,218	0	1,108	3,416	4,998	3,696

(dollars in thousands)

	Total Estimated Cost (TEC)	Prior Year Appro-priations	FY 1999	FY 2000	FY 2001	Unappro-priated Balance
99-D-132, Nuclear Materials S&S Upgrades Project, LANL	61,143	0	9,700	11,257	18,043	22,143
98-D-123, SMRI, Tritium Facility Modernization & Consolidation, SR	98,400	11,000	27,500	20,233	30,767	8,900
98-D-124, SMRI, Y-12 Consolidation	24,800	6,450	10,700	0	0	7,650
98-D-125, Tritium Extraction Facility (TEF), SRS	318,000	9,650	6,000	32,875	75,000	194,475
98-D-126, Accelerator Production of Tritium (APT), Various Locations . .	177,865	67,865	20,000	35,863	0	54,137
97-D-102, Dual-Axis Radiographic Hydrotest Facility, LANL	259,700	127,700	36,000	60,768	35,232	0
97-D-122, Nuclear Materials Storage Facility Renovation, LANL	22,364	13,200	2,500	0	0	6,664
97-D-123, Structural Upgrades, KCP	18,000	1,400	6,400	4,282	2,918	3,000
96-D-102, Stockpile Stewardship Fac. Revit. Ph. VI, various locations	74,226	44,081	24,106	139	0	5,900
96-D-103, Atlas, LANL	43,300	36,900	6,400	0	0	0
96-D-104, Processing & Environmental Technology Laboratory, SNL	45,859	16,080	18,920	10,859	0	0
96-D-105, Contained Firing Facility Addition, LLNL	49,700	43,000	6,700	0	0	0
96-D-111, National Ignition Facility, LLNL	1,045,700	367,100	284,200	247,158	74,100	73,142
96-D-122, Sewage Treatment Quality Upgrade, Pantex	11,300	7,600	3,700	0	0	0
95-D-102, CMR Upgrades, LANL . .	106,020	72,740	5,000	14,943	13,337	0
93-D-122, Life Safety Upgrades, Y-12	29,200	25,950	3,250	0	0	0
93-D-123, NNR Complex 21, VL . .	165,860	161,860	4,000	0	0	0
88-D-123, Security Enhancements Project, Pantex	131,200	125,000	0	3,487	2,713	0
Total, Construction		1,140,476	518,984	530,256	414,173	738,729

01-D-101, Distributed Information Systems Laboratory (DISL)
Sandia National Laboratories, Livermore, California

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2001 Budget Request *(Preliminary Estimate)*	2Q 2001	2Q 2002	3Q 2002	1Q 2004	35,500	38,100

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
2001	2,300	2,300	1,600
2002	15,400	15,400	6,350
2003	17,800	17,800	18,000
2004	0	0	9,550

3. Project Description, Justification and Scope

The Distributed Information Systems Laboratory (DISL) is a proposed new research facility at Sandia National Laboratories to develop and implement distributed information systems for Defense Programs (DP). It consolidates at one accessible location all activities focused on incorporating those systems to support DP's Stockpile Stewardship Program (SSP). Research at DISL will concentrate on secure networking, high performance distributed and distance computing, and visualization and collaboration technologies that do not exist today, yet need development to help create design and manufacturing productivity environments for the future Nuclear Weapons Complex (NWC). The major objective of DISL is to bring together these technologies to develop a distributed information systems architecture that will link the NWC of the future.

Description:

The proposed facility requires approximately 70,400 gross square feet (gsf) of space to house 130 people needed to perform the necessary research and associated functions. Space will be provided for laboratories, research and development offices, collaborative and meeting areas, management and administrative areas, and public and support areas. Laboratory space will include a central distributed computing and networking laboratory, an advanced visualization laboratory complex, and smaller ancillary laboratories. The laboratories and adjacent demonstration areas will be on raised access flooring, and will have accessible interstitial space above the ceiling, to facilitate changes and modifications to mechanical and electrical systems. The research and development offices will house Sandia technical staff and visiting researchers, and will accommodate multiple computer workstations with monitors and peripherals.

Collaborative and meeting areas will include demonstration and conference rooms to facilitate work with industry and academia. The laboratories, collaborative areas, and office areas will be constructed as secure vault-type rooms to provide the capability to allow classified or unclassified work to be performed simultaneously in adjacent areas should the facility not be upgraded to TSRD level. If the facility is upgraded to TSRD, these areas will support individual programs with common need-to-know information. These areas will be interconnected with a large amount of fiber-optics communications to accommodate the work there. A lobby, reception area, and typical building support space, such as storage and break/vending areas, will also be included in the facility.

DISL will be situated in the central part of Sandia's California (SNL/CA) site, near existing development, parking, and utilities, and easily accessible to visiting working partners. Improvements to land include site work such as new curbs and gutters at existing streets, walkways, planters, minor paving, and landscaping and irrigation surrounding the facility. Utilities work includes extensions of existing nearby water, storm and sanitary sewer, and electrical power and communications systems to the building. The planned location for the facility is currently occupied by Sandia's Building 913, which is in the process of being decontaminated and demolished using operations and maintenance funding. If demolition is not completed in time to allow DISL construction at the preferred location, DISL will be constructed at a nearby alternative location within the central SNL/CA site. The project scope is the same for either location.

Standard equipment will include new and relocated furniture, and multimedia and video conferencing equipment to facilitate collaborations with others offsite. Research and development equipment (Major Computer Items) will include high-performance design, analysis, and graphics workstations ($1,635,000), a high-performance storage system ($470,000), multi-processor and multimedia servers ($1,681,000), advanced visualization systems, including a video wall ($1,572,000), communications plant system ($1,532,000), communications switches, routers, and encrypters ($1,206,000), an immersive collaborative engineering system ($897,000), and equipment cabinets and ancillary networking equipment ($538,000).

Justification:

DP is responsible for the management of the NWC. Changes in the military-political landscape, including the cessation of underground testing and a significantly smaller nuclear weapons manufacturing complex, require DP to find new ways of ensuring a safe, reliable, and secure nuclear weapon stockpile while meeting unchanged certification requirements. How DP will meet these challenges, the “must, should, and could” stockpile refurbishment decisions and schedule, are defined by the Stockpile Life Extension Program (SLEP). To meet DP mission goals and SLEP requirements, DP has developed a Stockpile Stewardship Program that plans to use technology to monitor, remanufacture, and test, through simulation, weapons in the current and future stockpiles. The NWC of the future will be linked by a distributed information architecture which will be developed, in large part, at DISL.

Examples of DP efforts that support the Stockpile Stewardship Program include:

- The Accelerated Strategic Computing Initiative (ASCI), which will create the leading-edge computational modeling and simulation capabilities to help weapons designers shift from test-based methods to computation-based methods for stockpile certification.
- The Distance Computing and Distributed Computing ($DisCom^2$) Program, which will accelerate the ability of DP labs and plants to apply vital high-end and distributed resources (from desktops

to TeraOps [1 TeraOp = 10^{12} floating-point operations per second]) across thousands of miles to meet the urgent and expansive design, analysis, and engineering needs of stockpile stewardship.

- The Advanced Design and Production Technologies (ADAPT) Initiative's Enterprise Integration (EI) strategy, which will:
  - Create seamless, secure, and connected communications.
  - Create products and process information systems that allow rapid access to weapons information.
  - Encourage streamlined business and engineering practices that are more responsive and productive.

With these and other Programs, DP envisions a highly distributed, but totally integrated, system of facility nodes that support information networking and provide cost-effective information integration, access, and preservation.

To realize the mission objectives outlined above, DP must have the ability to access information from across the NWC, fully integrate the design and re-manufacture of nuclear weapons (and components) so as to reduce the redesign time for nuclear weapons by half, and have a means to incorporate emerging information systems technology from the private sector and academia as rapidly as possible. The proposed DISL at SNL will provide the means to accomplish these goals.

The DISL will provide technologies that will allow seamless, secure, reliable access to scientific and engineering and business information by the many geographically dispersed elements of the NWC, including laboratories, production facilities, and DOE offices. DISL will serve as a connectivity node, connecting people to people, people to machines, and machines to machines, allowing access, integration, and preservation of information across the entire NWC.

The DISL will focus on research and development that will greatly enhance the integration of design and manufacturing tasks and thus reduce the time required to redesign nuclear weapons in the enduring stockpile. DISL will house weapon systems engineers together with computer scientists to foster the interchange necessary to ensure that the right technologies for the weapons program are developed when and as they are needed. Specifically, the long-term objective of DISL is to bring together prototype technologies to develop a distributed information systems infrastructure that will be incorporated into DP's virtual enterprise for SSP.

The DISL will serve as a technology deployment center/user facility to accelerate the introduction of advanced information systems technology into the NWC. DP laboratories can neither create a virtual enterprise nor sustain a vibrant high-performance computing market on their own, and so must work closely with industry and academia to develop critical new information technology. Extensive collaboration with industry and academia is a major strategy of ADAPT, ASCI, and DisCom[2], and, therefore, is a cornerstone of the DISL. In addition, the existence of DISL will create opportunities for the DP laboratories to influence the course of technology development in the private sector and maximize benefits to their related core programs.

Existing facilities within the NWC cannot satisfy the need for the development of integrated information systems required to support SSP and its programs. While many of the elements needed to support DP's distributed information systems requirements exist at SNL/CA, the necessary facilities are absent—either they do not have laboratory areas with appropriate infrastructure (computer raised floor; heating, ventilating and air conditioning (HVAC); communications) and size to support required technologies, or they must remain completely classified (these buildings are identified in the SNL/CA Secured Area Master Plan). DISL must have space for classified activities, but must also facilitate unclassified exchanges. Thus DP proposes to create DISL as a single facility—one that consolidates activities and equipment; is sized appropriately; provides space for visiting personnel from the private sector, academia, and other laboratories; and possesses a suitable technological infrastructure, to ensure that DP can meet its critical mission responsibilities related to SSP.

The President has mandated that the nuclear weapons stockpile be safe, secure, and reliable. All U.S. weapons require periodic refurbishment and remanufacture, because they contain components that have limited lifetimes. DP's SLEP lays out the schedule of weapon system alterations, modifications, and improvements to be completed in the coming decades. A major step in the refurbishment and remanufacture of a weapon is Full-Scale Engineering Development (FSED), the step during which weapon designers and systems engineers develop engineering designs, and test and implement them in the production plants. After a weapon has been redesigned through FSED, it goes into production in the weapon plants. A key milestone is the date when the first production unit (FPU) is assembled. SLEP calls for refurbishment in the near-term on the W80 (FPU in FY 2005), in the mid-term on the B83 and W78 (FPU in FY 2007), and in the longer-term on the W76 (FPU in the FY 2007—2011 time frame).

To meet the SLEP schedule, significant reductions in FSED time for weapon systems will be required within a decade. For example, FSED of weapon arming, fuzing, and firing subsystems need to be reduced to 3 years from the 6 required in the past. With present technology, this cannot be done. DISL, planned to be operational in FY 2004, will provide by FY 2006 the technology to enable this reduction in schedule, and is therefore an essential part of DP's plan to meet the SLEP goals. In the specific case of the W76, DISL-provided technology will enable the FSED to be completed in the 2006—2008 time frame, thus enabling FPU to occur on schedule.

There is no facility available that is adequate in its current state to support the distributed information systems research and development activities required to meet DP programmatic goals.

Project Milestones:

FY 2001: Start Design 2Q

4. Details of Cost Estimate

	(dollars in thousands) Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications - $1,136)	1,620	NA
Design Management Costs (1.3% of TEC)	467	NA
Project Management Costs (0.6% of TEC)	199	NA
Total Design Costs (6.4% of TEC)	2,286	NA
Construction Phase		
Improvements to Land	269	NA
Buildings	14,996	NA
Utilities	303	NA
Standard Equipment	1,530	NA
Major Computer Items	9,531	NA
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	619	NA
Construction Management (2.6% of TEC)	934	NA
Project Management (1.2% of TEC)	423	NA
Total Construction Costs (80.6% of TEC)	28,605	NA
Contingencies		
Design Phase (0.9% of TEC)	325	NA
Construction Phase (12.1% of TEC)	4,284	NA
Total Contingencies (13.0% of TEC)	4,609	NA
Total Line Item Costs (TEC)	35,500	NA

This estimate was prepared by GEZ Architects-Engineers and Sandia on the basis of the DISL conceptual design report dated March 1998. Escalation is based on the January 1999 Update of the Departmental Price Change Index for DOE Construction Projects, using the Defense Programs and General Construction guidance.

5. Method of Performance

Design will be performed by an architect-engineer under a fixed-price contract. Inspection will be performed by Sandia. Construction and procurement will be accomplished by fixed-price contracts awarded on the basis of competitive bidding. A design-build strategy was evaluated, but will not be utilized primarily because the funding schedule is not compatible with design-build.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Costs						
Design	0	0	0	1,600	1,011	2,611
Construction	0	0	0	0	32,889	32,889
Total, Line item TEC	0	0	0	1,600	33,900	35,500
Total Facility Costs (Federal and Non-Federal)	0	0	0	1,600	33,900	35,500
Other Project Costs						
Conceptual design costs	637	0	0	0	0	637
Other project-related costs [a]	111	200	200	300	1,152	1,963
Total, Other Project Costs	748	200	200	300	1,152	2,600
Total Project Cost (TPC)	748	200	200	1,900	35,052	38,100

[a] Includes funding to complete the Project Execution Plan, Construction Project Data Sheets, Validations, Design Criteria, A/E Selection, Value Engineering Study, Program Management Support, Readiness Assessment, Start-Up, Move-In, Project Close-Out, and Final Cost Report.

7. Related Annual Funding Requirements

(FY 2004 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [a]	290	N/A
Annual facility maintenance/repair costs [b]	80	N/A
Programmatic operating expenses directly related to the facility [c]	30,000	N/A
Capital equipment not related to construction but related to the programmatic effort in the facility [d]	2,500	N/A
Utility costs	310	N/A
Total related annual funding (operating from FY 2004 through FY 2034)	33,180	N/A

[a] Average annually facility operating costs for materials and labor, including systems operations and custodial services, beginning when the facility is operational in the 3rd Quarter of FY 2004. An average total of 4.3 staff years per year will be required to operate the facility. The new facility will be built at the location where a previous facility existed; however, the new facility does not replace the old one.

[b] Average annual facility maintenance and repair costs for materials and labor, beginning when operational in the 3rd Quarter of FY 2004. An average total of 0.4 staff years per year will be required to maintain and repair the facility.

[c] Annual programmatic operating expenses based on representative current operating expenses of 130 people. The majority of this funding is expected to come from the DOE-DP Offices of Stockpile Computation and Modeling, and Strategic Computing and Modeling. Lesser amounts are expected from other DOE-DP Offices for activities that support their mission needs for engineering information management.

[d] Because information technology evolves with a cycle of 1 to 2 years, DISL activities will require this annual capital equipment outlay.

01-D-103, Defense Programs
Preliminary Project Design and Engineering (PPD&E), Various Locations

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete	
FY 2001 Budget Request (*A-E and technical design only*)	1Q 2001	2Q 2002	NA	NA	14,500 [a]

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
2001	14,500	14,500	12,300
2002	0	0	2,200
2003	0	0	0

3. Project Description, Justification and Scope

This is a pilot project to provide for Architect-Engineering (A-E) services (Title I and Title II) for several Defense Programs construction projects. This allows designated projects to proceed from conceptual design into preliminary design (Title I) and definitive design (Title II). The design effort will be sufficient to assure project feasibility, define the scope, provide detailed estimates of construction costs based on the approved design and working drawings and specifications, and provide construction schedules, including procurements.

Conceptual design studies are prepared for each project using Operations and Maintenance funds. These studies define the scope of the project and produce a rough cost estimate and schedule. Currently they are completed 9-12 months before a Congressional budget is submitted requesting line item funding for a project. The effect of this process is that the conceptual design study is at least 24 months old by the time a line-item appropriation for the project is enacted. The use of a PPD&E line item will enable a project to proceed immediately upon completion of the conceptual design into preliminary and final designs. It will permit acceleration of new facilities, provide savings in construction costs based on current rates of inflation, and permit more mature cost, schedule, and technical baselines for projects when the budget is submitted to Congress.

---

[a] The Total Estimated Cost reflected here is to initiate design efforts for one or more of the subprojects included in this line item in FY 2001. Funding for additional subprojects will be added in outyear requests, as will funding to complete design for any subprojects that Defense Programs determines should proceed.

Once FY 2001 appropriations have been provided for this project, final decisions will be made as to which sub-projects should proceed to Title I design efforts to best support the Stockpile Stewardship mission and how much funding should be applied to each of these subprojects. These decisions will be documented in the project data sheet included in the FY 2002 Congressional budget request. The FY 2002 request for PPD&E will provide funding to start or complete Title II for those sub-projects initiated in FY 2001, as well as funding to begin a new series of Title I subprojects in FY 2002. The Department will notify Congress if program developments require the expenditure of funds for Title I efforts on a subproject not described in this data sheet.

Following completion of Title I design activities, Defense Programs will determine preliminary Title I project baselines, providing detailed funding and schedule estimates for Title II and physical construction. The Department will request external independent experts to assess the project scope, schedule and budget. Based upon the results of this assessment, and a review of the continuing programmatic requirement for the project, Defense Programs will either cancel further action on the subproject, or set final Title I baselines for the project and proceed to Title II activities.

The Title I baseline will be the basis for the request to Congress for authorization and appropriations for physical construction. It is estimated that the request for physical construction funding for most projects will occur in the second fiscal year following initiation of the Title I effort, e.g., FY 2001 Title I subprojects would request physical construction line item funding in the FY 2003 request. Larger or more complex projects requiring additional design effort may not request physical construction funding until the third or fourth year following initiation of Title I activities. Each project that proceeds to physical construction will be separated into an individual construction line item, the total estimated cost (TEC) of which will include the costs of the engineering and design activities funded through the PPD&E account.

Following is the current list of subprojects for which Defense Programs may begin Title I design activities during FY 2001 using PPD&E appropriations. Preliminary estimates for the cost of Title I and II design and engineering efforts for each subproject are provided, as well as very preliminary estimates of the Total Estimated Cost (including physical construction) of each subproject.

FY 2001 Proposed Design Projects

01-01: Microsystems & Engineering Sciences Applications (MESA), SNL

Fiscal Quarter				Total Estimated Cost (Design Only ($000)	Full Total Estimated Cost Projection [a] ($000)
A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
1Q 2001	4Q 2002	1Q 2003	TBD	14,400	350,000 - 400,000

This design project provides preliminary and final (Title I and Title II) A-E services associated with the Microsystems & Engineering Sciences Applications (MESA) Complex at Sandia National Laboratories in Albuquerque, a proposed new, state-of-the-art national complex that will provide essential facilities and capability. The MESA complex will provide for the design, integration, prototyping and fabrication and qualification of microsystems into weapon components, subsystems, and systems within the stockpile.

As currently envisioned, the proposed MESA Complex would include the following elements:

- Microsystems: tooling and modifications to Sandia's existing Microelectronics Development Lab;

- Construction of four new facilities:

  1. ***Microsystems Fabrication*** provides cleanrooms that replace the Compound Semiconductor Research Lab (CSRL) and transition cleanroom space for prototyping new devices.

  2. ***Microsystems Laboratory*** will be used to conduct research and development critical to the development of microsystems components as well as rapid prototyping and testing of these components.

  3. ***Weapons Integration Facility-Classified*** will facilitate design, system integration, and the qualification of weapons systems.

  4. ***Weapons Integration Facility-Unclassified*** will enable collaboration and close proximities between partners from industry and academia and Sandia scientists and engineers, and will encourage and provide the environment necessary for process development and information transfer.

- Associated site utility and infrastructure improvements.

---

[a] The Full TEC Projection (design and construction) is a preliminary estimate based on conceptual data and should not be construed as a project baseline.

01-02: Special Materials Complex, Y-12

Fiscal Quarter				Total Estimated Cost (Design Only ($000)	Full Total Estimated Cost Projection [a] ($000)
A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
1Q 2001	2Q 2003	1Q 2003	1Q2006	33,600	250,000 - 300,000

This design project provides preliminary and final (Title I and Title II) A-E services associated with the Special Material Complex at the Y-12 Plant. This Facility will include:

A Seabreeze and Diallyl Phthalate (DAP) production area - The current production equipment for these materials has deteriorated to the point that operational reliability and worker protection cannot be assured.

- A Beryllium facility - The current facility cannot meet the current exposure limits without burdensome administrative controls and personal protective equipment. The new facility will offer state of the art engineering controls to limit personnel exposure.
- A Purification facility- the current facility is a development scale facility incapable of meeting the projected workloads. The old production scale facility was to be renovated and made operational under the Stockpile Management Restructuring Initive; however, the scope and funding will be deleted from that project and moved to the Special Materials Complex. This will allow the Department to reestablish this capability in a new facility with new equipmnet better suited to meet the current environment safety and health requirements, maintainability, and operational reliability.
- An Isostatic Press - This will provide a collocated press to streamline the production process.

This project is being done in support of the remanufacturing requirements of the future Stockpile Life Extension Programs. Currently the plant cannot meet these goals in the special materials area and this project is needed to provide those capabilities.

01-03: Buss Upgrades for Substations, NV

Fiscal Quarter				Total Estimated Cost (Design Only ($000)	Full Total Estimated Cost Projection [a] ($000)
A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
1Q2001	4Q2002	1Q2003	TBD	1,500	13,000 - 15,000

This design project provides preliminary and final (Title I & II) A-E services associated with the upgrading of the Mercury, Jackass Flats, and Castle Rock Substations. Because of their location, the busses on these substations are subject to live line contact and, therefore, present a life safety hazard.

[a] The Full TEC Projection (design and construction) is a preliminary estimate based on conceptual data and should not be construed as a project baseline.

01-04: Engineering Technology Complex Upgrade, LLNL

Fiscal Quarter				Total Estimated Cost (Design Only ($000)	Full Total Estimated Cost Projection [a] ($000)
A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
1Q2001	4Q2002	1Q2003	TBD	2,500	21,000 - 24,000

This design project provides preliminary and final (Title I and Title II) A-E services associated with the revitalization and enhancement of weapons program capabilities of facilities and equipment in the Building 321 Complex at LLNL. This project will upgrade and increase capabilities in metrology and ultra-precision machining and upgrade the general infrastructure of the complex, thus improving compliance with environmental, safety, and health regulations.

01-05: Stockpile Quality Evaluation and Surveillance Upgrades, Y-12 Plant

Fiscal Quarter				Total Estimated Cost (Design Only ($000)	Full Total Estimated Cost Projection [a] ($000)
A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
1Q2001	4Q2002	1Q2003	TBD	2,500	25,000

This design project provides preliminary and final (Title I and Title II) A-E services associated with upgrades to the Quality Evaluation and Surveillance Program at the Y-12 Plant required to address concerns about the aging stockpile and a newer non-destructive approach to evaluating the stockpile fitness. This project will provide for design, demolition of facilities, building modifications, procurement and installation of equipment to support the shelf-life surveillance program for the W87 Life Extension Program.

a The Full TEC Projection (design and construction) is a preliminary estimate based on conceptual data and should not be construed as a project baseline.

4. Details of Cost Estimate [a]

	(dollars in thousands) Current Estimate	Previous Estimate
Design Phase [b]:		
Preliminary and Final Design Costs (Design Drawings and Specifications)	10,575	NA
Design Management Costs (10% of TEC)	1,450	NA
Project Management Costs (5% of TEC)	725	NA
Design Phase Contingency (12% of TEC)	1,750	
Total Design Costs (100% of TEC)	14,500	NA
Total, Line Item Costs (TEC)	14,500	NA

5. Method of Performance

Design services will be obtained through competitive and/or negotiated contracts. M&O contractor staff may be utilized in areas involving security, production, proliferation, etc. concerns.

6. Schedule of Project Funding

(dollars in thousands)

	Prior	FY 1999	FY 2000	FY 2001	Outyears	Total
Total Facility Costs						
PPD&E	0	0	0	12,300	2,200	14,500
Total Facility Costs (Federal and Non-Federal)	0	0	0	12,300	2,200	14,500
Other Project Costs[c]						
Conceptual design costs	0	460	2,940	0	0	3,400
NEPA documentation costs			1,300	2,700	0	4,000
Other project-related costs	0	0	1,900	1,000	300	3,200
Total, Other Project Costs	0	460	6,140	3,700	2,500	12,800
Total Project Cost (TPC)	0	460	6,140	16,000	32,500	25,100

[a] This cost estimate is based upon direct field inspection and historical cost estimate data, coupled with parametric cost data and completed conceptual studies and designs, when available. The cost estimate includes design phase activities only. Construction activities will be requested as individual line items upon completion of Title I design.

[b] The percentages for Design Management; Project Management; and Design Phase Contingency are estimates base on historical records and are preliminary estimates.

[c] Other Project Costs are preliminary estimates based on subprojects 01-01: Microsystems and Engineering Sciences Applications, SNL, and 01-02: Special Materials Complex, Y-12.

01-D-124, Highly Enriched Uranium Materials Facility

Y-12 Plant, Oak Ridge, Tennessee

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2001 Budget Request *(Preliminary Estimate)*	1Q 2001	1Q 2002	2Q 2001	2Q 2005	120,000	144,000

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
2001	17,800	17,800	11,800
2002	33,500	33,500	25,800
2003	41,200	41,200	40,600
2004	27,500	27,500	36,500
2005	0	0	5,300

3. Project Description, Justification and Scope

The Highly Enriched Uranium Materials Facility will support the consolidation of long-term highly enriched uranium materials into a state-of-the-art facility. The new facility will result in cost savings and an increased security posture and will feature: storage in an earthen-bermed structure for enhanced security, an automated inventory system which minimizes inventory validation, new Safe Secure Trailer (SST) or Safeguard Transport (SGT) shipping/receiving station, a central location near HEU processing facilities, an underground connector to allow direct tie-in to a future EUO Modernization facility which allows a reduced footprint for HEU activities, and a small administrative facility to house the building operators. This facility will be located in a Protected Area. The Systems Requirements Document for the Y-12 Plant HEU Materials Facility, Y/EN-5636 (May 1999), documents the forecasted long-term storage requirement of approximately 14,000 cans and approximately 14,000 55-gallon drums. It will also provide a contingency storage area for an additional 4,000 drums which will be designed such that it can be segregated from the main storage area for non-proliferation initiatives.

The Y-12 Plant Environmental, Safety, and Health (ES&H) Vulnerability Assessment, dated October 1996, resulted in a number of findings related to the current storage of HEU in multiple buildings. The assessment raised issues concerning fire, flooding, natural phenomena, and related concerns which would likely involve major upgrades to existing facilities in order to continue present HEU storage. In addition to ES&H vulnerabilities, existing conditions are inefficient. Maintaining and expanding HEU storage in multiple facilities involves increased security personnel, increased operations personnel, increased maintenance and utility costs, increased Special Nuclear Material (SNM) vehicle transfers, increased cost for ES&H, facility safety assessments and upgrades, and management oversight. Costs for HEU storage will be reduced by implementing this initiative. Cost savings are achieved by reduced personnel requirements, by the efficient use of space and technology, by reduction of the footprint, and by eliminating the necessity for creating additional storage in the old facilities.

This project will provide the following:

- receipt and storage for Canned Sub-Assemblies (CSAs)
- docks for SST/SGT shipping/receiving
- a small administrative facility
- storage space for materials subject to International Atomic Energy Agency (IAEA) safeguards inspections

The life expectancy of the facilities is 50 years, thereby assuring a viable, long-term HEU storage capability to support the enduring weapons stockpile and strategic reserve for the foreseeable future.

The facilities will be designed to meet Conduct of Operations requirements, minimize the number of personnel required for operations, and meet DOE requirements for SNM accountability and control.

FY 2001 funding will be utilized for Titles I and II activities, initial site preparation, and construction management.

Project Milestones:

FY 2001:	A-E Work Initiated	1Q
	Physical Construction Started	2Q
FY 2002:	A-E Work Completed	1Q
FY 2005:	Physical Construction Completed	2Q

4. Details of Cost Estimate [a]

[a] Conceptual design defining these costs was completed in FY 1999 at an estimated cost of $720,000. The annual escalation rates assumed for FY 2000 through FY 2005 are 2.6, 2.6, 2.5, 2.6, 2.9, and 2.9 percent, respectively.

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)	7,750	NA
Design Management Costs (0.8% of TEC)	900	NA
Project Management Costs (1.0% of TEC)	1,250	NA
Total, Design Costs (8.3% of TEC)	9,900	NA
Construction Phase		
Other Structures	73,050	NA
Construction Management (8.6% of TEC)	10,350	NA
Project Management (5.1% of TEC)	6,100	NA
Total, Construction Costs (74.6% of TEC)	89,500	NA
Contingencies		
Design Phase (1.7% of TEC)	2,000	NA
Construction Phase (15.5% of TEC)	18,600	NA
Total, Contingencies (17.2% of TEC)	20,600	NA
Total, Line Item Costs (TEC)	120,000	NA

5. Method of Performance

Overall project direction and responsibility resides with the DOE.

A design and build subcontractor under contract to the Facility Manager will design and manage the construction of the HEU Materials Facility except as noted below. The Facility Manager will be responsible for procuring and then managing the design and build subcontractor.

The Facility Manager will be responsible for project integration and will design the data acquisition system, which will tie in to the existing Central Alarm system. The Facility Manager will design and procure speciality systems and equipment, and will design a portion of the site clearance and readiness package.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Cost						

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Design	0	0	0	8,650	3,250	11,900
Construction	0	0	0	3,150	104,950	108,100
Total, Line item TEC	0	0	0	11,800	108,200	120,000
Total, Facility Costs (Federal and Non-Federal)	0	0	0	11,800	108,200	120,000
Other Project Costs						
Conceptual design cost [a]	0	720	0	0	0	720
Other project-related costs [b]	0	380	3,350	1,830	17,720	23,280
Total, Other Project Costs	0	1,100	3,350	1,830	17,720	24,000
Total, Project Costs (TPC)	0	1,100	3,350	13,630	125,920	144,000

7. Related Annual Funding Requirements [c]

(dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs[d]	60	NA
Annual facility maintenance/repair costs[e]	2,000	NA
Programmatic operating expenses directly related to the facility[f]	7,600	NA

[a] A Conceptual Design Report (CDR) was completed in FY 1999 at an estimated cost of $720,000.

[b] NEPA for this project was included in a Site Wide Environment Impact Study resulting in no cost to this project. FY 1999 costs result from initiation of process descriptions for $50,000; criticality safety support for $85,000; expense budget planning and scheduling for $150,000; and other miscellaneous project support for approximately $95,000. FY 2000 activities include: completing the design criteria at an estimated cost of $400,000; beginning Preliminary Safety Analysis Report (PSAR) at $720,000; designing, building, and testing prototypes of storage racks for $300,000; beginning Criticality Double Contingency Analysis (CDCA) for approximately $1,000,000; and completing the process description, D-B selection, subsurface investigation, Performance Execution Plan, and other project documentation for an estimated cost of $930,000. FY 2001 activities include: completion of the PSAR for an estimated cost of $730,000; continuation of work on the CDCA for approximately $710,000; and $390,000 for other project support. FY 2002 activities include: preparing documentation for use of Safe Secure Trailer (SST) for transporting HEU for a cost of $320,000 and continuing the criticality analysis along with other project documentation at a cost of approximately $250,000. An Operational Readiness Review (ORR) technical basis for operations, relocation of cans, development of operational procedures, training, revisions to plans for fire protection, revisions to nuclear control and accountability (NMC&A) procedures, user acceptance testing, and transfer of material will be performed in the outyears at an estimated cost of $17,150,000.

[c] These costs are from the cost/benefit analysis for the HEU building, with additions for the START facility.

[d] Operating costs are the costs of managing the facility.

[e] Facility utility costs are combined with the facility maintenance and repair costs.

[f] These are the costs for receipt, storage, and inventory of the contents.

	(dollars in thousands)	
	Current Estimate	Previous Estimate
Other costs[g]	350	NA
Total related annual funding (operating from FY 2005 through FY 2054)	10,010	NA

[a] Other costs include the ES&H costs for keeping the facility compliant.

01-D-126, Weapons Evaluation Test Laboratory (WETL), Pantex, Amarillo, Texas

1. Construction Schedule History

	Fiscal Quarter					
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete	Total Estimated Cost ($000)	Total Project Cost ($000)
FY 2001 Budget Request *(Preliminary Estimate)*	2Q 2001	2Q 2002	3Q 2002	1Q 2004	22,181	23, 483

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
2001	3,000	3,000	1,577
2002	11,900	11,900	4,024
2003	4,450	4,450	12,904
2004	2,831	2,831	3,676

3. Project Description, Justification and Scope

The Weapons Evaluation Testing Laboratory (WETL) facility is currently located at the Department of Energy Pantex Plant in Amarillo, Texas, and has been in operation since 1965. The proposed action is to construct a new facility at the Pantex site; relocate some of the existing equipment, augmented with state-of-the-art upgraded high resolution test data acquisition hardware and software systems, from the existing WETL into the new facility; continue existing functions and operations of the WETL in the new facility indefinitely into the future, and remediate any legacy contamination in the existing facility. The existing facility will be retained for other Pantex operations.

The WETL will be relocated from a Material Access Area (MAA) to a Limited Area (LA) zone on the Pantex site. Removal of WETL from the MAA will result in reduction of man-hours necessary to process or move material between WETL and other Pantex facilities. There will be operational cost savings on any material that comes to WETL from outside sources due to decreased security requirements. By locating WETL outside the MAA, guard inspections, security requirements, and radiation safety requirements for outside shipments will be reduced. In addition to providing the operational cost savings from the safeguards and security and radiation safety operations, the new facility will provide cost savings from the workflow improvements, automated data collection and analysis, and material handling procedures.

The new WETL consists of an approximately 30,000-gross-square-foot facility, providing offices and office support, lab/test and test support spaces, and storage space. It is designed architecturally to enhance functional operations and flexibility and provide a more suitable work environment. The proposed site, which is located next to a LA, will be fenced for inclusion into the existing LA at the completion of construction.

Some equipment will be replaced or upgraded. Data acquisition hardware and software will be updated or replaced to permit higher resolution, a higher rate of data transfer, and state-of-the-art data processing capabilities. An existing hydraulic centrifuge will be replaced by an all-electric drive centrifuge. The proposed new facility will enhance efficiency in performing existing work functions. No operational changes will be expected to result from the transfer of functions from the old to the new facility.

The new facility will provide a laboratory environment capable of supporting the Enhanced Surveillance Program (ESP) through flexibility of floor space configuration, appropriate adjacencies for an optimal work environment, and the mechanical and data infrastructure to be dependable and efficient in supporting advanced test technologies.

Each year the Stockpile Surveillance Program draws weapons from the stockpile. These are disassembled and inspected in other Pantex facilities. Some non-nuclear parts and components from these weapon samples are built into system beds and tested at environmental extremes at WETL. Approximately 65 principal tests and hundreds of subsequent tests are conducted each year. If problems are detected or failures occur, a team is formed to evaluate the cause of the anomaly, assess its impact (on stockpile reliability), and recommend a solution. This testing is conducted and the necessary data acquired with special test equipment that is housed in the WETL.

The inefficient layout of the current facility does not support optimal workflow, and the facility also has a number of issues that require immediate attention, including roof leaks and an aging mechanical system. An improved WETL is needed to modernize the facility to integrate ESP initiatives, decrease operational expenses, upgrade old and outdated equipment, and mitigate risk of loss (these needs are discussed in more detail in the following sections).

Support to the Enhanced Surveillance Program (ESP)

ESP is an initiative to develop advanced capabilities for understanding degradation mechanisms in the enduring stockpile. The program has invested tens of millions of dollars in research and development of methodologies to observe and analyze changes in stockpile material prior to aging failure.

The technology base of test data collection equipment used at the existing WETL lacks the capability to acquire the data at the needed volume levels and clarity to support the ESP. In addition to improved data collection equipment, the WETL facility must be capable of supporting advanced test technologies by providing accurate and dependable environmental controls, wide bandwidth data transfer infrastructure, and floor space configuration flexibility.

Decreased Operational Expense

The WETL facility is currently located within the MAA at the Pantex plant, but for security reasons is only required to be located in a LA. The Complex 21 Study completed in May 1993 recommended that WETL should be relocated outside the MAA.

The MAA is the most secure area on the site, designed to protect access to special nuclear material. Because of WETL's location within the MAA, all staff and visitors are subject to security and personnel assurance program (PAP) requirements. This program actively monitors and periodically re-certifies personnel as suitable to perform nuclear explosive duties in a safe and reliable manner and involves medical and psychological evaluation. The security and PAP requirements for WETL personnel and visitors add operational expense that will be avoided if WETL is relocated to a LA.

Additionally, there will be operational cost savings on any material that come to WETL from outside sources due to decreased security requirements. Incoming and outgoing shipments of support material are now received in an area outside the MAA due to security requirements of the MAA. All shipments are inspected prior to movement to WETL, and all shipments require movement through many guard stations. Outgoing shipments require green tags from radiation safety, as does the calibration equipment discussed above. Locating WETL outside the MAA will reduce guard inspections, security requirements and radiation safety requirements. In addition, the project will provide funding for the acquisition of modern test equipment, reducing the number of testers required and thereby reducing labor costs. This labor savings, estimated over a 40-year life cycle, returns the initial investment by a factor of 7.

New building systems will be designed to meet Federal guidelines for energy efficiency, which will also reduce operating costs.

Scope:

- Plan and design the project.

- Construct a new facility, approximately 30,000 gsf, which includes test support spaces, below grade centrifuge rooms and laboratories, storage space, offices and support space, conference and video conference space, and mechanical and electrical systems.

- Provide site work including curbs and gutters, walkways, parking lot, minor paving, and landscaping.

- Extend site utilities to serve WETL.

- Provide equipment for data acquisition systems ($3.8M).

- Provide standard equipment, including new furniture and video conferencing equipment.

The FY 2001 funds will be used to complete Title I design work and initiate Title II design work.

Project Milestones:

FY 2001:	Start Design	2Q
FY 2002:	Complete Design	2Q
	CD3	2Q
	Construction Start	3Q
FY 2004:	Construction Complete	1Q
	CD4	1Q
	Project Closeout	2Q

4. Details of Cost Estimate

	(dollars in thousands)	
	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design, Drawings and Specifications $629)	1,258	NA
Design Management Costs (1.9% of TEC)	418	NA
Project Management Costs (0.2% of TEC)	32	NA
Total Design Costs (7.7% of TEC)	1,708	NA
Construction Phase		
Improvements to Land	503	NA
Buildings	7,230	NA
Special Equipment	3,800	NA
Utilities	1,148	NA
Standard Equipment	247	NA
Equipment Relocation	1,283	
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	1,802	NA
Construction Management (2.4% of TEC)	522	NA
Project Management (2.5% of TEC)	555	NA
Total Construction Costs (77% of TEC)	17,090	NA
Contingencies		
Design Phase (1.4% of TEC)	307	NA
Construction Phase (13.9% of TEC)	3,076	NA
Total Contingencies (15.3% of TEC)	3,383	NA
Total Line Item Cost (TEC) [a]	22,181	NA

5. Method of Performance

Architectural and engineering design will be performed under a negotiated fixed-price contract based on

[a]Escalation rates taken from the FY 2001 DOE escalation multiplier tables.

capability and capacity to perform the work. Inspection will be performed by Sandia Facilities Department. Construction will be performed under a competitive-bid fixed-price contract based on best value. Mason and Hangar Corporation will provide consultation as needed.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY2000	FY2001	Outyears	Total
Project Cost						
Facility Cost						
Design	0	0	0	1,577	438	2,015
Construction	0	0	0	0	20,166	20,166
Total, Line item TEC	0	0	0	1,577	20,604	22,181
Total Facility Costs (Federal and Non-Federal)	0	0	0	1,577	20,604	22,181
Other Project Costs						
Conceptual design cost [a]	227	419	96	0	0	742
Other project-related costs [b]	20	30	132	118	260	560
Total Other Project Costs	247	449	228	118	260	1,302
Total Project Cost (TPC)	247	449	228	1,695	20,864	23,483

7. Related Annual Funding Requirements

[a]Includes NEPA documentation costs.

[b]Including tasks such as Project Execution Plan, Pre-Title I Development, Design Criteria, Safeguards and Security Analysis, Architect/Engineer Selection, Value Engineering Study, Independent Cost Estimate, Energy Conservation Report, Fire Hazards Assessment, Site Surveys, Soils Reports, Permits, Administrative Support, Operations and Maintenance Support, ES&H Monitoring, Operations Testing, Energy Management Control System Support, Readiness Assessment.

	(FY 2004 dollars in thousands)	
	Current Estimate	Previous Estimate
Annual facility operating costs [a]	194	0
Annual facility maintenance and repair costs [b]	118	0
Programmatic operating expenses directly related to the facility [c]	7,343	0
Utility costs	23	0
Total related annual funding (operating from FY 2004 through FY 2044)	7,678	0

[a]When the facility is operational in the 2nd Quarter of FY 2004, the average cost will be $265,000 for labor and materials per year.

[b]A total of 1.0 staff years per year is required to maintain the facility.

[c]Annual programmatic operating expenses are estimated at $7.4M, based on representative current WETL operating expenses and the System Test Equipment (STE) labor. The majority of this funding is expected to come from DOE/DP for activities in support of the Nuclear Weapons Stockpile Stewardship Program. If a new WETL is constructed, funds will be provided to acquire modern test equipment, which reduces the number of testers required, thus reducing the current labor costs to the representative amount. This labor savings, estimated over a 40-year life cycle, returns the initial investment by a factor of 7.

00-D-103, Terascale Simulation Facility, Lawrence Livermore National Laboratory, Livermore, California

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

The funding profile for this project has been changed and the project completion date has been pushed out one and a half years due to a change in the delivery schedule of the computer capabilities to be housed in the facility. The TEC and the TPC have been increased to reflect the additional escalation associated with the extension of the schedule.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2000 Budget Request (*Preliminary Estimate*)	2Q 2000	2Q 2001	4Q 2000	4Q 2004	83,500	86,200
FY 2001 Budget Request *(Current Baseline Estimate*)	3Q 2000	3Q 2001	4Q 2001	2Q 2006	89,000	92,200

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
2000	7,970 [a]	7,970	3,500
2001	5,000	5,000	8,300
2002	26,000	26,000	25,200
2003	25,030	25,030	27,000
2004	20,000	20,000	15,600
2005	5,000	5,000	7,000
2006	0	0	2,400

3. Project Description, Justification and Scope

Description

The project provides for the design, engineering and construction of the Terascale Simulation Facility (TSF - Building 453) which will be capable of housing the 100 TeraOps-class computers required to meet the Accelerated Strategic Computing Initiative (ASCI). The building will encompass approximately 270,000 square feet. The building will contain a multi-story office tower with an adjacent computer

[a] Original appropriation was $8,000,000. This was reduced by $30,000 for the FY 2000 rescission enacted by P.L. 106-113.

center. The Terascale Simulation Facility (TSF) proposed here is designed from inception to enable the very large-scale weapons simulations essential to ensuring the safety and reliability of America's nuclear stockpile. The timeline for construction is driven by requirements coming from the ASCI within the Stockpile Stewardship Program (SSP). The TSF will manage the computers, the networks and the data and visualization capabilities necessary to store and understand the data generated by the most powerful computing systems in the world.

Justification

The Accelerated Strategic Computing Initiative has as its mission the acceleration of simulation to meet the demands of the nation's nuclear defense mission. The challenge is to maintain confidence in the nuclear stockpile without nuclear testing. Along with sub-critical experiments, one of the primary tools employed will be 3-D scientific weapons calculations of unprecedented computational scope. As has been emphasized in the ASCI Program Plan, it is the rapid aging of both the stockpile and the designers with test experience that is at the heart of the issue and the reason for acceleration. The most critical period is between 2003 and 2010. By 2003, the number of designers with test experience will be reduced by about 50 percent from their numbers in 1990. By 2010, the percentage will be further reduced to about 15 percent. By 2003, most of the weapons in the stockpile will be in transition from their designed field life to beyond field life design. By 2010, about half will be in the beyond-field-life design stage. Therefore some validated mechanism or capability must be available soon to certify the safety and reliability of this aging stockpile. A major element of this capability will be the ASCI applications codes and the associated terascale simulation environment. The ASCI program intends by the middle of the decade, to reach a threshold state simulation capability in which the first functional "full system calculation" generation of codes requiring a 100+ TeraOps computer will be used to certify the stockpile. The remaining designers and analysts with test experience will be an indispensable part of this process, because they will validate the models and early simulation results.

The ASCI applications codes and the weapons analysts who make use of these applications require a supporting simulation infrastructure of major proportions, which includes:

1. Terascale computing platforms (ASCI Platforms)
2. A supporting numerical environment consisting of data management, data visualization and data delivery systems (Visual Interactive Environment for Weapon Simulation or VIEWS)
3. Sophisticated computer science and numerical methods research and development teams (ASCI Problem Solving Environment (PSE) and Alliances)
4. A first rate operations, user services and systems team
5. Data and visualization corridor capability including data assessment theaters, high performance desktop visualization systems and other innovative technologies.

To house, organize and manage these simulation systems and services requires a new facility with sufficient electrical power, mechanical support, networking infrastructure and space for computers and staff. The proposed TSF at LLNL will meet these requirements.

Scope

The TSF project will construct a building (Building 453) of approximately 270,000 square feet located adjacent to an existing (but far less capable) computer facility, Building 451, on the LLNL main site. The building will contain a multi-story office tower with an adjacent computer center. The computer center will house computer machine rooms totaling approximately 47,500 square feet. The computer machine rooms will be clear span (without impediments) and of an aspect ratio designed to minimize the maximum distance between computing nodes and switch racks. The ceiling height will be sufficiently high to assure proper forced air circulation. A raised access floor will be provided in order to allow adequate room for air circulation, cabling, electrical, plumbing, and fire/leak detection equipment.

The first computer structure will be available for occupancy in FY 2004. The building will be initially built with enough power and cooling to support two terascale systems, the first to be installed in FY 2004. The computer center and electrical rooms will be designed so that power and cooling capacity can be shifted to areas requiring greater or lesser load. As a risk reduction strategy, the building will be further designed so that power and mechanical resources can be easily added in the event that systems sited in the future will require higher levels of power. However, it is expected that by the middle of the decade the rate of growth of the peak capability of installed computers will relax. Therefore, the building should have enough power and cooling to accept any system procured after that time.

The TSF will include meeting rooms, offices, and a data and visualization capability. Scientists will be able to utilize innovative visualization technologies, including an Assessment Theater. The theater will be used both for prototyping advanced visualization concepts and for ongoing data analysis and data assimilation by weapons scientists. In short, the theater represents the area where physical and computer scientists working together will visualize and make accessible to the human eye and mind the huge data sets generated by the computers. This will allow workers to understand and assess the status of the immensely complex weapons systems being simulated.

The office space will accommodate staff and scientists who require access both to classified and unclassified workstations. Vendors, operational and problem solving environment staff must have immediate access to computer systems, since the simulation environment will require very active support. A key principle underlying all TSF planning is tight coupling between Stockpile Stewardship Program elements and the platforms. Thus, the TSF will also house the nucleus of the classified and unclassified (LabNet) networks. To assure the efficient operation of remote Assessment Theaters high speed networking hubs will connect the computers seamlessly to key weapons scientists and analysts at the highest performance available.

Project Milestones

FY 2000:	Start Design	3Q
FY 2001:	Complete Title II Design	3Q
	Start Construction	4Q

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications – $3,800)	5,050	4,715
Design Management Costs (0.8% of TEC)	750	530
Project Management Costs (0.7% of TEC)	600	530
Total Design Costs (7.2% of TEC)	6,400	5,775
Construction Phase		
Improvements to Land	2,100	1,700
Buildings	47,850	46,505
Utilities	10,600	10,400
Standard Equipment	1,500	1,255
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	3,800	2,940
Construction Management (3.8% of TEC)	3,400	2,655
Project Management (1.9% of TEC)	1,650	1,490
Total Construction Costs (79.7% of TEC)	70,900	66,945
Contingencies		
Design Phase (1.1% of TEC)	1,000	900
Construction Phase (12.0% of TEC)	10,700	9,880
Total Contingencies (13.1% of TEC)	11,700	10,780
Total, Line Item Costs (TEC) [a]	89,000	83,500

5. Method of Performance

Design shall be performed under a negotiated Best Value architect/engineer contract. Construction and procurement shall be accomplished by fixed-price contracts based on competitive bidding and best value award.

[a] Escalation rates taken from the FY 2001 DOE escalation multiplier tables dated January, 1999.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Costs						
Design	0	0	3,500	3,200	700	7,400
Construction	0	0	0	5,100	76,500	81,600
Total, Line item TEC	0	0	3,500	8,300	77,200	89,000
Total Facility Costs (Federal and Non-Federal)	0	0	3,500	8,300	77,200	89,000
Other Project Costs						
Conceptual design costs	500	800	0	0	0	1,300
NEPA documentation costs	0	150	0	0	0	150
Other project-related costs [a]	410	520	0	0	820	1,750
Total, Other Project Costs	910	1,470	0	0	820	3,200
Total Project Cost (TPC)	910	1,470	3,500	8,300	78,020	92,200

7. Related Annual Funding Requirements

(FY 2006 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [b]	1,500	1,400
Programmatic operating expenses directly related to the facility [c]	56,200	53,100
Utility costs [d]	8,500	8,000
Total related annual funding (operating from FY 2006 through FY 2025)	66,200	62,500

[a] Including tasks such as Project Execution Plan, Pre-Title I Development, Design Criteria, Safeguards and Security Analysis, Architect/Engineer Selection, Value Engineering Study, Independent Cost Estimate, Energy Conservation Report, Fire Hazards Assessment, Site Surveys, Soil Reports, Permits, Administrative Support, Operations and Maintenance Support, ES&H Monitoring, Operations Testing, Energy Management Control System Support, Readiness Assessment.

[b] Facility operating costs are approximately $ 1,500,000 per year (which also includes facility maintenance and repair costs), when facility is operational in 4th Qtr. FY 2006. Costs are based on the LLNL internal indirect rate Laboratory Facility Charge (LFC) for facility operating costs.

[c] The annual operating expenses for the Terascale Simulation Facility are estimated at $ 56,200,000 based on representative current operating expenses of 300 personnel. The majority of this funding is expected to come from DOE/DP for activities in support of the Nuclear Weapons Stockpile Stewardship Program.

[d] Costs are based on LLNL utility recharge rates.

00-D-105, Strategic Computing Complex (SCC) Los Alamos National Laboratory, Los Alamos, New Mexico

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

The TEC for this project decreases to $98,972,000 due to a reduction of $1,028,000 to the contingency based on a review of the risk associated with the type of design-build contract being used for this project. The TPC decreases by $183,000 due to the contingency reduction which is partially offset by an increase in renegotiated overhead rates applied to the Other Project Costs (OPC).

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2000 Budget Request *(Preliminary Estimate)*	1Q 2000	4Q 2000	1Q 2000	2Q 2002	100,000	106,800
FY 2001 Budget Request *(Current Budget Estimate)*	1Q 2000	4Q 2000	1Q 2000	2Q 2002	98,972	106,617

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
2000	25,902 [a]	25,902	20,977
2001	56,000	56,000	61,175
2002	17,070	17,070	16,820

3. Project Description, Justification and Scope

Justification

Without nuclear testing, large-scale computations are the only means of predicting the safety, reliability, and yield of a nuclear weapon. The nuclear stockpile is aging. Generically, aging produces effects that introduce small three-dimensional defects which break the symmetries which designers have invoked in the past when designing nuclear weapons. We are also faced with the issue of the aging of the weapon scientists and engineers that were responsible for developing and testing the weapons in our stockpile. The new simulation models being developed for the stockpile can best be validated by these weapon

[a] Original appropriation was $26,000,000. This was reduced by $98,000 for the FY 2000 rescission enacted by P.L. 106-113.

scientists and engineers. Consequently, greatly enhanced computational requirements in both speed and memory are needed in the near future. It is estimated that assessing the safety and performance of the stockpile will require a factor of 100,000 increase in computational power over what has been required to design new weapons. The Accelerated Strategic Computing Initiative (ASCI), one of the highest priority programs within the Stockpile Stewardship Program, is designed to maintain the safety, reliability, and performance of the nuclear weapons in the stockpile, and is dedicated, and on track, to achieving this goal in less than a decade.

Numerical simulations are now the most important mechanism for the integration of the many complex processes which take place in a thermonuclear weapon. This means that the continued certification of the safety and reliability of the nation's nuclear stockpile relies to a greater extent on computer simulations. To respond to this challenge, the Strategic Computing Complex (SCC) at Los Alamos will be capable of initially supporting a 30 TeraOps (30 trillion floating point operations per second) computer platform and be capable of expanding to 100 TeraOps before 2004. To meet urgent national security requirements associated with nuclear weapons Stockpile Stewardship, this facility must be operational by the 2nd quarter of FY 2002. There is no other facility capable of housing and powering the ASCI supercomputer planned for the SCC.

The SCC and its associated information infrastructure—the high-speed networks, workstations, visualization centers, interactive data-analysis tools and collaborative laboratories—will support the Stockpile Stewardship Program and, potentially, other research efforts involving the simulation of complex phenomena of national importance. The SCC will enable the fulfillment of the prime stewardship mission to ensure the safety, reliability and performance of the Nation's nuclear weapons stockpile without underground nuclear testing. For example, it will be possible to simulate weapons safety scenarios at a multiscale level, beginning with the weapon in its transport container and going through detailed descriptions of components all the way down to the microstructure of the aged high-explosive material.

Description and Scope

| The SCC will be a three-story structure with approximately 291,000 gross square feet which will house the world's largest and most capable computer (initially 30 TeraOps) in a specially designed 43,500 net square-foot computer room. This room will be supported by electrical and mechanical rooms in excess of 60,000 square feet.

The facility will provide a dynamic environment for approximately 300 nuclear weapons designers, computer scientists, code developers, and university and industrial scientists and engineers to collaborate to extend the cutting edge of simulation and modeling development in support of nuclear weapons stockpile stewardship requirements. These scientists and engineers will work together, with support personnel, in simulation laboratories (approximately 200 in classified and 100 in unclassified areas). The facility will be located in Technical Area 3 (TA-3) at the Los Alamos National Laboratory.

The SCC features a visualization environment consisting of two immersive theaters, one in the classified area and one in the unclassified area. These theaters will have overhead projection and wrap-around features supporting the latest virtual-reality and visionarium environments. These theaters represent the highest-end capability available for data viewing analysis.

A powerwall theater in the secure environment will provide high-resolution interleaved displays that fill a wall with the latest projection technology. In addition to the powerwall display, this theater will contain conference capability, multiple display monitors, and electronic white-boards to promote effective teaming and collaborative discussions.

A third simulation environment promoting collaborations among teams is supplied by the areas designated as collaboratories. There are four of these areas, and they will contain conference space, a media-stack including laser-disc recorders for animation production and viewing, an immersadesk for compact virtual-reality (VR) analysis, multiple high-resolution graphics heads, electronic white-board, video teleconferencing tools, and electronic collaborative tools for effective interaction with researchers at open and secure sites. The collaboratory provides the users, code developers, and managers with an informal, information- and technology-rich environment with systems for simulation development, collaboration, discussion, media-development, presentation, and problem analysis. The SCC will bring together weapons code development teams to integrate experiments, material, physical computer and experimental sciences in support of the Stockpile Stewardship Program.

An auditorium with seating for approximately 200 people will be provided to serve both classified and unclassified meetings. Conference rooms will be available in the classified and unclassified areas.

The proposed facility concept consists of a three-story structure that includes offices, simulation laboratories, collaboratories, a power wall, and a visualization theater. Site utilities directly related to this facility will be extended and upgraded as necessary.

The mechanical systems will be designed for maximum flexibility. The computer-room cooling system is planned to be adaptable for air-cooled computers, water-cooled computers, or a combination of both types. The simulation laboratory spaces are heated, cooled, and ventilated with modular, variable-volume air handling units, with separate air handling unit systems for classified and unclassified areas. Energy conservation is provided by the use of cooling-tower heat exchangers that are used to meet cooling requirements without running chillers during winter and cooler months.

The SCC facility will be fed by two different 13.2 kV underground power sources and is configured with double-ended switchgear and unit substations to allow switching for maintenance and isolation of faults. The proposed design consists of power conditioners, K-rated transformers, and distribution equipment rated for the high harmonics generated by the computer. The system is modular and expandable to allow growth and easy modification. A grounding ring surrounds the building in addition to a signal reference grid in the computer room to reduce electrical noise. A lightning protection system is incorporated into the facility. A fire detection system will be installed to monitor the entire building, as will a highly sensitive smoke detection system under the computer-raised floor. Communication lines will service the facility through an underground ductbank system utilizing fiber optic cable for both secure and open systems. Copper lines will be used for the voice communication system.

The facility infrastructure is designed to be scalable. At construction completion, the facility will have mechanical and electrical equipment installed to support up to 30 TeraOps. As requirements go beyond the 30 TeraOps capability, mechanical and electrical equipment can be added within the building in increments as required to support the computer technology at that time. This scalable feature of the SCC includes future installation of chillers, cooling towers, computer room air-conditioning units, substations, motor-generator power-conditioners, transformers, and panelboards. Scalability provides the Department of Energy (DOE) with a cost-effective option of not installing additional support equipment until it is needed and the ability to capitalize on technological advances in computing technology, as well as in the support equipment. The computers and simulation equipment to be housed in the SCC are not funded as part of this project, they are funded as part of the ASCI Operations and Maintenance program.

Project Milestones:

FY 2000:	Start Design	1Q
	Start Construction	1Q [a]
FY 2002:	Complete Construction	2Q
	Operational Start	3Q

4. Details of Cost Estimate

	(dollars in thousands)	
	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design, Drawings and Specifications - $2,875)	3,764	5,665
Design Management Costs (0.3% of TEC)	298	384
Project Management Costs (0.8% of TEC)	816	1,007
Total Design Costs (4.9% of TEC)	4,878	7,056
Construction Phase		
Improvements to Land	3,505	971
Buildings	58,139	56,255
Utilities	8,059	7,985
Standard Equipment	2,231	3,717
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	4,184	4,170
Construction Management (5.1% of TEC)	5,067	4,309
Project Management (1.6% of TEC)	1,658	1,508
Total Construction Costs (83.7% of TEC)	82,843	78,915
Contingencies		
Design Phase (0.9% of TEC)	880	1,501
Construction Phase (10.4% of TEC)	10,371	12,528
Total Contingencies (11.3% of TEC)	11,251	14,029
Total, Line Item Costs (TEC) [b]	98,972	100,000

[a] To meet the proposed completion of the computer room by January 2002, this project was executed through a design-build contract. Design for grading and onsite utilities began in October 1999, physical construction on this aspect of the project commenced at the end of December 1999, while design on the building was nearly complete. LANL installation of Fire, Security, and Communication systems will start and end in 2Q FY 2002.

[b] Escalation rates taken from the January 1999 DOE escalation multiplier tables.

5. Method of Performance

Design, construction, and procurement was accomplished by a competitive best value fixed-price design-build contract. Design-build is a project delivery system where a single entity performs both the design and construction. Some advantages of design-build include a single source for construction activities, cost control and accountability. The removal of existing utilities located on the SCC site and installation of new perimeter utilities plus the construction of electrical services to the site will be performed by the site services contractor under fixed price contracts.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Costs						
| Design	0	0	5,327	431	0	5,758
| Construction	0	0	15,650	60,744	16,820	93,214
| Total, Line item TEC	0	0	20,977	61,175	16,820	98,972
| Total Facility Costs (Federal and Non-Federal)	0	0	20,977	61,175	16,820	98,972
| Other Project Costs						
| Conceptual design costs	959	1,436	52	0	0	2,447
| NEPA documentation costs	68	60	41	43	39	251
| Other ES&H costs	85	1	12	12	70	180
| Other project-related costs [a]	758	1,292	614	445	1,658	4,767
| Total, Other Project Costs	1,870	2,789	719	500	1,767	7,645
| Total Project Cost (TPC)	1,870	2,789	21,696	61,675	18,587	106,617

[a] Project Execution Plan, Feasibility Studies, Estimating Support, Scheduling and Controls Support, Safeguards and Security Analysis, Design-Build Source Selection Committee work, Value Engineering Study, Fire Hazards Assessment, Site Surveys, Soil Reports, Permits, Administrative Support, Operations and Maintenance Support, ES&H Monitoring, Operations Testing, and Readiness Assessment.

7. Related Annual Funding Requirements

(FY 2002 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [a]	650	650
Annual facility maintenance/repair costs [b]	1,270	1,270
Programmatic operating expenses directly related to the facility [c]	55,000	55,000
Utility costs	6,600	6,600
Total related annual funding (operating from FY 2002 through FY 2021)	63,520	63,520

[a] When the facility is operational in the 2nd Quarter of FY 2002, costs will average $650,000 for labor and material per year. An average of 3.0 staff years will be required to operate the facility.

[b] Based on projected annual costs for LANL site services subcontractor as derived from historical maintenance and repair costs for the LDCC facility.

[c] Annual programmatic operating expenses are estimated at $55,000,000 based on representative operating expenses of 300 people. The majority of this funding is expected to come from DOE/DP for activities in support of the Stockpile Stewardship Program.

00-D-107, Joint Computational Engineering Laboratory, Sandia National Laboratories, Albuquerque, New Mexico

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

This facility will now be capable of meeting Top-Secret Restricted-Data (TSRD) security requirements and the siting of the facility has been changed from the previous data sheet based on a siting study. The TPC for the project increased by $140,000 for costs associated with the evaluation of the TSRD requirements.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2000 Budget Request *(Preliminary Estimate)*	2Q 2000	2Q 2001	3Q 2001	4Q 2003	28,870	30,303
FY 2001 Budget Request *(Current Budget Estimate)*	3Q 2000	3Q 2001	1Q 2002	2Q 2004	28,870	30,443

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
2000	1,793 [a]	1,793	1,000
2001	6,700	6,700	3,761
2002	20,377	20,377	17,748
2003	0	0	6,361

3. Project Description, Justification and Scope

Description:

The Joint Computational Engineering Laboratory (JCEL) will be a new, state-of-the-art facility at Sandia National Laboratories for research, development, and application of leading-edge, high-end computational and communications technologies. JCEL will provide office space and laboratories for 175 people in a building with a total of approximately 55,200 gross square feet. JCEL will be the center of Sandia's computational modeling, analysis, and design community, and will be constructed in close proximity to Sandia's existing computer and communications building, presently occupied by part of this community.

[a] Original appropriation was $1,800,000. This was reduced by $7,000 for the FY 2000 rescission enacted by P.L. 106-113.

Justification:

The primary mission of JCEL is to ensure the rapid development and application of high performance computing, modeling, analysis, design, and simulation, which forms the foundation of DOE's Science-Based Stockpile Stewardship (SBSS) vision and, more specifically, supports the Accelerated Strategic Computing Initiative (ASCI). The goal of ASCI is to accelerate the development of simulation capabilities that are needed to ensure the confidence of the stockpile.

JCEL will primarily focus on computational simulation and virtual-prototyping. JCEL focuses on modeling and simulation to support model- and simulation-based life cycle engineering and to serve as a testbed for and a prototype of the "virtual enterprise." In essence, JCEL's mission is to develop advanced Stockpile Stewardship Program (SSP) tools. In JCEL, design alternatives will be explored using iterative simulations of virtual prototypes. Surety and reliability assessments will be model-based and incorporate fundamental understanding of critical component response to the full range and all credible combinations of environmental inputs by DoD. Tools developed within JCEL will ultimately support manufacturing efforts elsewhere within Sandia and the NWC by enabling product design alternatives to be modeled, analyzed, evaluated, and modified as necessary by engineers—all through the use of simulation.

As required by the ASCI, JCEL is critical to Sandia's mission role to serve as integrator of the Nuclear Weapons Complex (NWC) into a "virtual enterprise." JCEL will lead the way with campus-wide distributed technologies, "data everywhere/people-anywhere" data management and data interpretation technologies, and the computational plants to enable it. JCEL will serve as a major integration node—connecting people to people, people to machines, and machines to machines, allowing access, integration, and preservation of information across the entire Sandia, NM site. JCEL will serve as a prototype of the "virtual enterprise," which will serve as a model for how to integrate the many heterogeneous nodes of the existing NWC into a virtual business enterprise for affordable and effective stockpile stewardship.

JCEL will utilize key expertise to create strategic simulations and advanced collaborative environments, and it will provide space for strategic partners from universities, DOE laboratories, and the private sector to work together to integrate the technological expertise of government, universities, and industry. Increased interaction, collaboration, and teamwork are essential for shifting more rapidly to science-based methods and for effective stewardship of the nuclear stockpile. JCEL will provide classified and unclassified space in close proximity to facilitate collaboration between the users of high-end simulation technology and the developers, including research and development partners from universities and industry, while maintaining strict security of classified weapon information. JCEL will also include space designed to encourage interaction and collaboration among the scientists and engineers occupying the building and will provide work space tailored for multidisciplinary, high-performance teams who will develop computer codes and analyze nuclear weapons.

JCEL will provide labs for developing, prototyping and using Virtual Environment Technology, where designers, analysts, and experimenters can interact with each other as if they were in the same room. Moreover, JCEL will use, as well as develop, this leading-edge technology. It will prototype and demonstrate a science and engineering workplace of the 21st century.

The communications networks will enable JCEL's occupants to use the supercomputers in the DOE complex. To display the extensive results of complicated, three-dimensional simulations of nuclear weapons, the JCEL project will also provide computer equipment for virtual reality and advanced visualization techniques, graphics workstations and printers, and video equipment.

To achieve its goals, the JCEL project will provide:

- A facility of approximately 55,200 gross square feet located in Technical Area I of Sandia National Laboratories on Kirtland Air Force Base in Albuquerque, New Mexico.
- Laboratory space, office space, management and administrative space, and interaction and meeting space.
- A facility which will meet Top-Secret Restricted-Data (TSRD) security requirements.
- Classified communications within the facility and between the facility and the rest of Sandia and DOE complex.
- Computer equipment for displaying and printing the results from complex, three-dimensional computer simulations of nuclear weapons.
- Classified computer workstations for use by leading engineers and scientists from the NWC.
- Video equipment for video conferencing, displaying, and editing video images produced by computer simulations.

Benefits

- Reduced program costs through use of high-fidelity computer simulations developed through JCEL programs to reduce the scope of costly test programs.
- Faster response on stockpile stewardship issues that will arise.
- Rapid interchange of appropriate technology.
- Accelerated Defense Programs technology development.
- Cost savings in the development of Sandia research foundation technology base.

Scope:

Plan, design, and construct a new, three-story building to accommodate a total of about 175 people, which will provide classified (at the TSRD level) space in close proximity to the Sandia Central Computing Facility in building 880. The project will provide computer equipment to: display three-dimensional simulations; support engineers and scientists and provide video conferencing capability. Computer equipment includes: Advanced Virtual Reality (VR) display facilities ($2,800,000); Advanced Conference Room Equipment ($1,875,000); and Systems Prototyping Laboratories ($890,000). In addition, the project will move existing furniture and install some new furniture. Site landscaping, parking, pedestrian access improvements, signage, and fencing improvements will be provided.

Project Milestones:

FY 2001	Complete Design	3Q
	Critical Decision 3, Approval to Start Construction	3Q

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications - $802)	1,604	1,604
Design Management Costs (0.7% of TEC)	213	213
Project Management Costs (0.6% of TEC)	178	178
Total Design Costs (6.9% of TEC)	1,995	1,995
Construction Phase		
Improvements to Land	1,056	1,056
Buildings	12,076	12,076
Utilities	719	719
Standard Equipment	2,431	2,431
Major Computer Items	5,676	5,676
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	895	895
Construction Management (1.6% of TEC)	463	463
Project Management (0.9% of TEC)	255	255
Total Construction Costs (81.6% of TEC)	23,571	23,571
Contingencies		
Design Phase (0.9% of TEC)	263	263
Construction Phase (10.5% of TEC)	3,041	3,041
Total Contingencies (11.4% of TEC)	3,304	3,304
Total, Line Item Costs (TEC) [a]	28,870	28,870

5. Method of Performance

Architectural and engineering design and inspection will be performed by Sandia Facilities Departments and/or under a competitive-bid fixed-price contract based on capability and capacity to perform the work. Construction will be performed under a competitive-bid fixed-price contract or multiple competitive-bid fixed-price contracts.

[a] Escalation rates taken from the FY 2001 DOE escalation multiplier tables.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Costs						
Design	0	0	1,000	1,258	0	2,258
Construction	0	0	0	2,503	24,109	26,612
Total, Line item TEC	0	0	1,000	3,761	24,109	28,870
Total Facility Costs (Federal and Non-Federal)	0	0	1,000	3,761	24,109	28,870
Other Project Costs						
Conceptual design costs [a]	989	0	0	0	0	989
Other project-related costs [b]	159	130	168	35	92	584
Total, Other Project Costs	1,148	130	168	35	92	1,573
Total Project Cost (TPC)	1,148	130	1,168	3,796	24,201	30,443

7. Related Annual Funding Requirements

(FY 2003 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [c]	267	259
Annual facility maintenance/repair costs [d]	122	118
Programmatic operating expenses directly related to the facility [e]	52,530	51,000
Utility costs	202	196
Total related annual funding (operating from FY 2003 through FY 2032)	53,121	51,573

[a] Includes NEPA documentation costs.

[b] Including tasks such as Project Execution Plan, Pre-Title I Development, Design Criteria, Safeguards and Security Analysis, Architect/Engineer Selection, Value Engineering Study, Independent Cost Estimate, Energy Conservation Report, Fire Hazards Assessment, Site Surveys, Soils Reports, Permits, Administrative Support, Operations and Maintenance Support, ES&H Monitoring, Operations Testing, Energy Management Control System Support, Readiness Assessment, and Facility Security requirements.

[c] When all facilities are operational in the 2th Quarter of FY 2004, average $267,000 for labor and materials per year. An average of 3.4 staff years will be required to operate the facility.

[d] A total of 1.0 staff years per year are required to maintain the facility.

[e] Annual programmatic operating expenses are estimated at $52,530,000, based on representative current operating expenses of 175 people. The majority of this funding is expected to come from DOE/DP for activities in support of the Nuclear Weapons Stockpile Stewardship Program. Lesser amounts are expected from other sources for activities which are mutually beneficial to the funding source and DOE/DP. By bringing these activities together in one building, we expect the effectiveness of this work to be increased by at least 10% and probably much more. This would correspond to a savings of at least $5 million per year of DOE/DP operating funds.

99-D-103, Isotope Sciences Facility, Lawrence Livermore National Laboratory, Livermore, California

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

- # The TEC and TPC for this project have been reduced by the amount of the FY 2000 rescission enacted by P.L. 106-113.
- # Initiation of design and construction activities slipped to FY 2000 due to delays associated with the congressionally mandated independent assessments. These delays have not impacted the TEC or TPC of the project.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1999 Budget Request (*Preliminary Estimate*)	1Q 1999	4Q 1999	2Q 2000	2Q 2002	19,400	19,800
FY 2000 Budget Request	4Q 1999	1Q 2003	2Q 2000	2Q 2004	17,400	17,700
| FY 2001 Budget Request (*Current Baseline Estimate*)	2Q 2000	3Q 2003 [a]	3Q 2000	2Q 2004	17,392	17,692

[a] Project design and construction components are organized into separate phases with construction on individual phases proceeding upon completion of the design for that phase.

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1999	2,000	2,000	0
2000	1,992 [a]	1,992	2,300
2001	5,000	5,000	5,700
2002	4,400	4,400	5,400
2003	4,000	4,000	3,700
2004	0	0	292

3. Project Description, Justification and Scope

This project provides for a major rehabilitation of the nuclear chemistry facilities at Lawrence Livermore National Laboratory to extend the life of these essential program facilities. The principle objective of the project is to enhance the radio chemistry research, analytical, and characterization services provided to Defense Program activities at LLNL. These facilities also support critical analytical waste characterization and programmatic environmental monitoring activities as well.

The project provides for a seismic retrofit and construction of an office addition to the Isotope Science Facility (Building 151), retrofit of Building 151/Building 154 ventilation systems, decontamination of the Refractory Materials Facility (Building 241). The current nuclear chemistry building (B-151) is a 31-year old wet-chemistry research building in need of a major rehabilitation to extend its life in support of the Weapons Stockpile Stewardship Program. The seismic rating of Building 151 does not meet current code requirements. This project will provide the seismic modifications necessary to meet current code requirements for performing isotopic research and to support the ongoing mission.

- The Building 151 Office Addition is approximately 22,000 square feet contiguous to B-151. It resolves long-standing co-location and program operating efficiency issues in a cost-effective package. Exterior treatment will be selected consistent with the existing building, with access provided directly from Building 151 at both floor levels. The addition will contain offices, conference and meeting rooms, elevator, rest rooms, programmatic storage, and various support facilities.

- The existing Building 151 HVAC system is inefficient, difficult to maintain, and does not meet current requirements for exhaust and control. The majority of mechanical work entails replacing older fume-hood and glove box exhaust systems with up-to-date variable air volume systems. Two air handling units will be converted from constant-volume to variable-air-volume systems with variable-frequency drives. Building 154 is underutilized due to the difficulties in balancing the three air-pressure zones as required by researchers. To fully utilize this building for wet-

[a] Original appropriation was $2,000,000. This was reduced by $8,000 for the FY 2000 rescission enacted by P.L. 106-113.

chemistry laboratory use, the existing HVAC system, retention tank system, utilities, and fire-protection system must be upgraded. The HVAC work done under a FY 1998 General Plant Project corrected some of the HVAC system problems but not all. In addition, approximately 11 new fume hoods with associated exhaust ductwork, fans, and controls will be provided. B-151 and B-154 HVAC modifications and fume hood replacements will rehabilitate these high downtime and high maintenance subsystems and extend life to meet the current mission. Some safety and operational benefits also result.

After moves are completed from Building 241, it will be characterized and decontaminated for future use by Defense Programs at LLNL. Consolidation of operations from B-241 and personnel from four older trailers complete the efficiency and cost-driven elements, which though minor in cost, have substantial operational benefits.

Along with the seismic retrofit and HVAC system/fume hood replacement, the project encompasses program consolidation for increased efficiency of operations, indirect cost savings, and safety of operations benefits. These are reflected respectively in the B151 Addition, the B-154 HVAC modifications, and program moves from B-241 and various trailers.

Project Milestones:

FY 2000:

Start Design: B-151 Seismic Upgrade, HVAC & Addition	2Q
B-241 Characterization and Decontamination	
B-154 HVAC	
Start Construction: B-241 Characterization and Decontamination	3Q

FY 2001:

Start Construction: B-154 HVAC	1Q
Start Construction: B-151 Seismic Upgrade	3Q
Start Construction: B-151 Office Addition	4Q

4. Details of Cost Estimate

	(dollars in thousands)	
	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications - $1,080)	1,350	1,350
Design Management Costs (0.1% of TEC)	20	20
Project Management Costs (0.5% of TEC)	80	80
Total Design Costs (8.3% of TEC)	1,450	1,450
Construction Phase		
Improvements to Land	275	275
Buildings	7,050	6,875
Utilities	80	155
Standard Equipment	960	940
Removal Cost Less Salvage	2,080	2,160
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	770	785
Construction Management (6.2% of TEC)	1,080	1,100
Project Management (2.9% of TEC)	500	505
Total Construction Costs (73.6% of TEC)	12,795	12,795
Contingencies		
Design Phase (1.4% of TEC)	235	235
Construction Phase (16.7% of TEC)	2,912	2,920
Total Contingencies (18.1% of TEC)	3,147	3,155
Total, Line Item Costs (TEC) [a]	17,392	17,400

The current estimate is based on the Conceptual Design Report of March 1997 and the supplement dated April 1998.

5. Method of Performance

Contracting arrangements are as follows: Design will be performed by A-E and LLNL forces. Construction will be accomplished by fixed-price contracts awarded on the basis of competitive bidding. Activation will be done by LLNL forces.

[a] Escalation rates taken from the FY 2001 DOE escalation multiplier tables (January 1999 update).

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Costs						
Facility Costs						
Design	0	0	1,370	240	75	1,685
Construction	0	0	930	5,460	9,317	15,707
Total, Line item TEC	0	0	2,300	5,700	9,392	17,392
Total Facility Costs (Federal and Non-Federal)	0	0	2,300	5,700	9,392	17,392
Other Project Costs						
Conceptual design costs	150	0	0	0	0	150
NEPA documentation costs	25	0	0	0	0	25
Other project-related costs	75	0	0	0	50	125
Total, Other Project Costs	250	0	0	0	50	300
Total Project Cost (TPC)	250	0	2,300	5,700	9,442	17,692

7. Related Annual Funding Requirements

(FY 2004 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	740	740
Total related annual funding (operating from FY 2004 through FY 2023)	740	740

99-D-104, Protection of Real Property (Roof Reconstruction-Phase II) , Lawrence Livermore National Laboratory, Livermore, California

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

None.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1999 Budget Request (*Preliminary Estimate*)	1Q 1999	1Q 2000	3Q 1999	4Q 2001	19,900	19,930
FY 2000 Budget Request	3Q 1999	2Q 2003	4Q 1999	4Q 2003	19,900	19,970
| FY 2001 Budget Request *(Current Baseline Estimate*)	4Q 1999	2Q 2003	4Q 1999 [a]	4Q 2003	19,900	19,970

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
| 1999	2,500	2,500	419
| 2000	2,391 [b]	2,391	3,487
| 2001	2,800	2,800	3,136
| 2002	2,800	2,800	3,275
| 2003	9,409	9,409	6,251
| 2004	0	0	3,332

---

[a] Design and construction is planned as five separate packages, each including 1 to 4 buildings. Construction on each package will begin upon completion of the design for that package, while design continues on the remaining packages.

[b] Original appropriation was $2,400,000. This was reduced by $9,000 for the FY 2000 rescission enacted by P.L. 106-113.

3. Project Description, Justification and Scope

This project is the second of three phases of the LLNL roof replacement program. The first Phase is funded under 96-D-102. Phase II addresses 11 Weapons Stockpile Stewardship and Management Program buildings which require complete roofing system replacement along with the replacement of associated roof mounted equipment and piping systems which have deteriorated beyond economical repair. This is required in order to maintain and protect the integrity of the facilities and to assure that programmatic work can proceed without the risk of serious damage to the buildings or the programmatic efforts contained within. Work includes buildings: B111, B113, B121, B141, B194, B231, B241, B251, B281, B321, and B332. In all cases, the roofing systems have exceeded their 20-year design life by 11 to 23 years. The same holds true for most of the roof mounted equipment and piping systems as they are original equipment, again with an average design life of 20 years. Both the roofing and mechanical systems have deteriorated to the point where normal repair is no longer a viable alternative.

The 11 roofs in this project are experiencing severe deterioration problems including membrane failure, and the associated roof mounted mechanical equipment is also showing high levels of unreliable operation which adversely effect the support to the programmatic effort. As stated, normal maintenance procedures no longer are effective to maintain weather integrity of the roofing systems, to the point that leaks in the roofing system are jeopardizing experiments, experimental data and equipment. The impact from not replacing the roofing and mechanical equipment systems will result in excessive maintenance and repair costs. In addition, the adverse programmatic impact could cost the Lab and Defense Programs significant dollars in lost production.

Operating expense budgets fund maintenance at a level of required repair, but not at the level required to replace roofs and roof mounted mechanical equipment. Since these 11 buildings are required to support critical Weapons Stockpile Stewardship and Management Program missions, capital funding is requested for the replacement of the roofs and associated roof mounted mechanical equipment.

In FY 2001, buildings 121 and 141 will be reroofed.

Project Milestones:

FY 1999:	Package No. 1 (Building 111 and 194)		
		Start Design	4Q
		Complete Design	4Q
		Start Construction	4Q
FY 2000:	Complete Construction Package No. 1		1Q
	Package No. 2 (Buildings 241 and 332)		
		Start Design	1Q
		Complete Design	2Q
		Start Construction	3Q
		Complete Construction	4Q
FY 2001:	Package No. 3 (Building 121 and 141)		
		Start Design	1Q
		Complete Design	2Q
		Start Construction	3Q
		Complete Construction	4Q

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications - $640)	947	770
Design Management Costs (0.1% of TEC)	29	29
Project Management Costs 0.3% of TEC)	50	50
Total Design Costs (5.2% of TEC)	1,026	849
Construction Phase		
Other Structures	9,018	9,000
Standard Equipment	3,672	3,810
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	2,160	2,183
Construction Management (2.2% of TEC)	444	444
Project Management (4.3% of TEC)	857	844
Total Construction Costs (81.2% of TEC)	16,151	16,281
Contingencies		
Design Phase (1.0% of TEC)	200	207
Construction Phase (12.7% of TEC)	2,523	2,563
Total Contingencies (13.7% of TEC)	2,723	2,770
Total, Line Item Costs (TEC) [a]	19,900	19,900

5. Method of Performance

The Laboratory proposes a new approach to the implementation of this project. Mechanical and electrical modifications will be completed prior to reroofing construction start. Modifications will be accomplished using LLNL personnel. The construction contract is planned to be a unit price based contract with standard construction details. Change order processing and negotiations will be greatly simplified. This new approach should greatly reduce the cost of engineering and design.

[a] Escalation rates taken from FY 1999 DOE escalation multiplier tables. Current estimate based on Conceptual Design Report of March 1997.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Costs						
Design	0	12	315	271	628	1,226
Construction	0	407	3,172	2,865	12,230	18,674
Total, Line item TEC	0	419	3,487	3,136	12,858	19,900
Total Facility Costs (Federal and Non-Federal)	0	419	3,487	3,136	12,858	19,900
Other Project Costs						
Conceptual design costs	30	0	0	0	0	30
NEPA documentation costs	2	0	0	0	0	2
Other ES&H costs	38	0	0	0	0	38
Total, Other Project Costs	70	0	0	0	0	70
Total Project Cost (TPC)	70	419	3,487	3,136	12,858	19,970

7. Related Annual Funding Requirements

(FY 2003 dollars in thousands)

	Current Estimate	Previous Estimate
Total related annual funding (operating from FY 2003 through FY 2022)	0	0

99-D-106, Model Validation and Systems Certification Center, Sandia National Laboratories, Albuquerque, New Mexico

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

As a result of value engineering recommendations, several changes have been made to the facility requirements and the communications methodology for this project. However, the changes do not impact overall project TEC or TPC.

- The facility space requirements were reduced from 19,900 square feet to 16,000 square feet as a result of a decision not to relocate the machine shop (building 6587) from its current location.
- The communications methodology was revised: the number of test capabilities that will be direct connected via fiber and copper cables to the Command and Control Center (CCC) will be increased from two to seven; the remaining four of the 11 test capabilities will communicate with the CCC via radio transmission (RF).
- An additional uninterrupted power supply system and switchgear were added to the project.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1999 Budget Request *(Preliminary Estimate)*	2Q 1999	2Q 2000	3Q 2000	4Q 2001	18,219	19,111
FY 2000 Budget Request	3Q 1999	4Q 2000	3Q 2000	4Q 2002	18,230	19,122
| FY 2001 Budget Request *(Current Baseline Estimate)*	4Q 1999	3Q 2001 [a]	4Q 1999 [a]	4Q 2002	18,230	19,122

[a] Schedule milestones have been changed slightly to reflect a change in the phasing of the project. Building abatement and interior demolition work will begin concurrent with design.

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1999	1,600	1,600	508
2000	6,475 [a]	6,475	6,276
2001	5,200	5,200	5,927
2002	4,955	4,955	5,519

3. Project Description, Justification and Scope

The Department of Energy (DOE) has the statutory and mission responsibility for the design, production, maintenance, retirement and dismantlement of the United States nuclear weapons. In support of this mission, Defense Programs is responsible for the engineering development of the nonnuclear components and the overall systems engineering and integration for all nuclear weapons, including the integration of nuclear weapons with their delivery vehicles. Responsibilities also include assuring that weapons' military characteristics (MCs) and Stockpile-to-Target-Sequence (STS) requirements are met for hostile, normal, and abnormal environments.

Pertinent, reliable, and timely information is key to fulfilling these responsibilities, and in part, this information is obtained through laboratory testing and corresponding analysis. Testing is performed in five primary areas in support of nonnuclear components and systems:

- Development testing (testing to certify design intent)
- Experimentation to validate and certify analytical models
- Product certification (such as neutron generators and AT 400 containers)
- Surveillance testing, which sometimes includes investigative testing
- Testing to support dismantlement.

Confidence in certifying the stockpile has been and will continue to be contingent upon high-quality, reliable, and pertinent data and competent analysis of that data, although the approach to obtain and analyze data and the nature of the data will change in response to DOE stockpile stewardship challenges.

In support of DOE's Science-Based Stockpile Stewardship and Sandia's weapon system performance and surety missions, the Model Validation and System Certification Test Center (MVSCTC) will:

- Enable existing, essential test capabilities to continue to provide data necessary for certifying that weapons systems will function as designed in a variety of normal and abnormal environments.

[a] Original appropriation was $6,500,000. This was reduced by $25,000 for the FY 2000 rescission enacted by P.L. 106-113.

| # Enhance existing capabilities to facilitate delivery of large volumes of experimental data and information required to confirm prediction of weapon system behavior by computational tools.

| # Replace an aging and, to a large extent, non-existent communications infrastructure to enable the integration of command and control along with data collection, processing, archival, and distribution systems, and thereby enhance operational effectiveness and efficiencies for meeting strategic needs.

| The MVSCTC Project will provide a modern communications infrastructure coupled with a common control/operations facility for Sandia's eleven full-scale environmental test capabilities located in Tech Area III. The concept design of the MVSCTC reflects an optimized operational system composed of three subsystems including: Communications Infrastructure, Command and Control, and facilities to accommodate related operational functions.

The MVSCTC Project will implement an operational system that allows for both remote and local control of each of the test capabilities. This system will allow for more effective and efficient management of test operations and provide flexibility in meeting programmatic and specific customer needs. The Command and Control Center (CCC) will provide the remote control; Mobile Interface Units (MIUs) will provide | local data acquisition and command and control to field test capabilities.

The MVSCTC communications infrastructure will be comprised of a communications hub (the CCC) and supporting infrastructure (communications media from the CCC to each of the test sites) that will link Sandia's environmental test capabilities to other Sandia personnel involved in modeling, simulation, design and related activities. Additionally, the infrastructure will link the MVSCTC into the nuclear weapons complex (NWC) electronic information network. The communications infrastructure will | consist of high-capacity cabling installed in an underground concrete-encased ductbank of conduits and | radio frequency (RF) and microwave technologies. The capacity and robust nature of this infrastructure | protection ensures not only the viability of the communications infrastructure over the long run but also allows advances in communications technology to be easily incorporated over the life of the system.

Two MIUs, which are self-contained mobile trailers that house the equipment necessary to control the | test capabilities and collect data from them, will be used for local control of field test capabilities. Shared | use of these two MIUs to support test facilities standardizes and reduces the equipment that is otherwise required at each of the test facilities. The MIUs are being built as part of Sandia's Modernization Program; only the purchase and installation of the pertinent communications infrastructure termination equipment to be placed in the MIUs as part of the MVSCTC are included in this capital project request.

Facilities to Accommodate Related Operational Functions

| The MVSCTC will use approximately 16,000 gross square feet within Building 6584 and its related site for the collocation of existing functions (command and control capabilities, customer support, staff offices, and light laboratories), as well as new functions (communications hub and network support equipment.) This new operations center will allow for operational effectiveness and efficiency that has previously been impossible within the current configuration of functions dispersed across multiple facilities.

Special Facilities

Communications Infrastructure

The communications infrastructure is the overall system of fiber-optic and copper lines and related infrastructure elements. To provide needed communications capacities, two unspliced 48-fiber cables will be installed from the CCC to each direct connected test capability. Use of unspliced runs assures longevity of the infrastructure and maximum information transmission capacity.

In addition to the fiber-optic cable, copper lines consisting of up to 30 pairs of telephone cable and 50 pairs of individually-shielded instrumentation cable will be installed. The telephone cable provides 24-hour service to each test capability for telephone, fire, and intrusion systems.

All fiber-optic and copper lines will be installed in a PVC ductbank, placed in a trench and encased in concrete. The depth of the concrete encased ductbank will be 30-inches below grade. Associated manholes and/or junction boxes will be locked.

The proposed communications infrastructure is located primarily within Sandia's Tech Area III. However, the main fiber optic trunk, which is to be installed from the existing Tech Control Center (TCC) in the Technology Support Center (TSC, Building 6585) to the MVSCTC, extends beyond the Tech Area III borders. The TSC is located just outside Tech Areas III and V, approximately 400 linear feet from the MVSCTC common control facility in Building 6584. The Tech Control Center (TCC) in the TSC will provide the point of physical connection into existing telecommunications infrastructure.

Planned connection to the existing copper telephone infrastructure will occur at a location close to the TSC (specifically, Building 6585A containing an optical remote) or at an additional trunk breakout location near the Centrifuge Facility, Building 6526. The actual connection point will depend on modifications that Sandia is presently making to the telephone infrastructure.

Command/Control System

The command and control system includes all the electronic systems required to manage the communications systems, interface the information systems to the test capabilities and allow operators, engineers, and customers to control capability functions and observe and record operations. Electronic equipment required to perform these functions includes: digital network and video switching and transmission hardware; computer systems; video display and recording systems; and hardcopy peripherals. The majority of this equipment will be located in the CCC. Hardware required for the communications network completion at the test site or in the MIUs is also included in the MVSCTC Project scope.

Project Milestones:

FY 1999:	Start Design	4Q
	Complete Building Abatement and Interior Demolition Work	4Q
FY 2000:	Complete Facilities Design	3Q
	Complete Command and Control Design	4Q

	Start Facilities Construction	3Q
FY 2001:	Start Command and Control Construction	1Q
	Complete Facilities Construction	4Q

4. Details of Cost Estimate

	(dollars in thousands)	
	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications -$691)	1,228	938
Design Management Costs (0.7% of TEC)	135	238
Project Management Costs (0.7% of TEC)	123	122
Total Design Costs (8.2% of TEC)	1,486	1,298
Construction Phase		
Improvements to Land	280	227
Buildings	2,918	2,907
Special Equipment	9,247	8,586
Standard Equipment	486	1,473
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	500	422
Construction Management (1.6% of TEC)	297	381
Project Management (0.9% of TEC)	172	154
Total Construction Costs (76.2% of TEC)	13,900	14,150
Contingencies		
Design Phase (1.2% of TEC)	215	213
Construction Phase (14.4% of TEC)	2,629	2,569
Total Contingencies (15.6% of TEC)	2,844	2,782
Total, Line Item Costs (TEC) [a]	18,230	18,230

5. Method of Performance

This work will be accomplished using a Sandia administered fixed-price, incentive, design-build contract.

[a] Escalation rates taken from the January 1998 DOE Price Change Index. Current estimate based on Conceptual Design Document dated October 27, 1998.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Costs						
Design	0	35	1,251	415	0	1,701
Construction	0	473	5,025	5,512	5,519	16,529
Total, Line item TEC	0	508	6,276	5,927	5,519	18,230
Total Facility Costs (Federal and Non-Federal)	0	508	6,276	5,927	5,519	18,230
Other Project Costs						
Conceptual design costs	306	0	0	0	0	306
NEPA documentation costs	20	0	0	0	0	20
Other ES&H costs	0	6	14	14	14	48
Other project-related costs	82	106	98	110	122	518
Total, Other Project Costs	408	112	112	124	136	892
Total Project Cost (TPC)	408	620	6,388	6,051	5,655	19,122

7. Related Annual Funding Requirements

(FY 2002 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [a]	128	141
Annual facility maintenance/repair costs [b]	768	818
Programmatic operating expenses directly related to the facility [c]	5,733	5,733
Capital equipment not related to construction but related to the programmatic effort in the facility	235	235
Utility costs	64	77
Total related annual funding (operating from FY 2002 through FY 2041)	6,928	7,004

[a] Facility operating costs will average $117,000 for labor and $11,000 for materials per year. An average of 1.7 staff years will be required to operate all facilities. The facility does not replace any other facility.

[b] Maintenance and repair costs for all facilities average $328,000 for labor and $440,000 for materials. A total of 4.8 staff years per year is required to maintain all facilities.

[c] Estimate reflects annual programmatic operating expenses associated with the operations and maintenance of the eleven test capabilities that are to be connected through the communications infrastructure to the common command and control facility implemented by the MVSCTC. Estimate includes: all loaded labor associated with direct test activities as well as preventative maintenance; facility costs (space charges, direct purchases, service contracts, etc.) and associated overhead loads. Estimate also includes projected, annualized operating expenditures incurred to maintain, repair, or replace-in-kind the existing equipment in these test capabilities.

99-D-108, Renovate Existing Roadways, Nevada Test Site

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

- # The design and construction schedule have slipped due to delays associated with the congressionally mandated independent assessments.
- # The TEC and TPC of this project have decreased by $2,024,000 due to a $2,005,000 congressionally enacted reduction in the FY 2000 appropriation for this line item and a subsequent FY 2000 rescission of $19,000 enacted by P.L. 106-113.
- # The original scope included approximately $5,000,000 for the renovation of 37 miles of Mercury Highway. As part of the Title I design, an exhaustive engineering study will be conducted to determine which parts of the originally proposed 37 miles require the most extensive work to address the previously identified safety issues. It is likely that only about half of the 37 miles will be renovated due to the $2,024,000 TEC reduction.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1999 Budget Request *(Preliminary Estimate)*	1Q 1999	4Q 1999	1Q 2000	1Q 2001	11,005	11,128
FY 2000 Budget Request	3Q 1999	1Q 2000	2Q 2000	1Q 2001	11,005	11,128
| FY 2001 Budget Request *(Current Baseline Estimate)*	3Q 2000	4Q 2000	4Q 2000	4Q 2001	8,981	9,104

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
| 1999	2,000	2,000	0
2000	4,981 [a]	4,981	1,810
2001	2,000	2,000	7,171

[a] Original appropriation was $5,000,000. This was reduced by $19,000 for the FY 2000 rescission enacted by P.L. 106-113.

3. Project Description, Justification and Scope

This project will completely renovate the worst road segments of the 37 mile-long Mercury Highway that has deteriorated beyond repair. Mercury Highway runs from the southern boundary of the Nevada Test Site (NTS) to the intersection of Rainier Mesa Road in Area 3. An extensive engineering survey of the entire length of the Mercury Highway will be conducted to establish the segment in need of the most urgent renovation. Subject to value engineering studies to be conducted as part of the project design, these renovations could range from a complete roadbed reconstruction to just removing existing debris from pavement cracks, filling cracks with asphalt sealant, installing a stress absorbing membrane, and applying a new asphaltic-concrete overlay. In addition, the 2.3 miles of the Rainier Mesa Road from the intersection of Mercury Highway to the intersection of road 4-04 in Area 4 will be completely reconstructed. Repairs will consist of total reconstruction of the roadbed and the application of the asphalt pavement.

The renovated/reconstructed roadways will have a configuration-cross section that meets all current State of Nevada codes applicable to the NTS. Aggregate shoulders will parallel each side. All required traffic signs, striping, and markers will be included in this project. No buildings or utilities are included in this project.

Mercury Highway is the primary access highway for any activity at the NTS, including subcritical experiments and future missions. This all-weather, paved, asphaltic-concrete road has been in service for almost 40 years. All personnel, heavy equipment, and supplies entering and/or exiting the NTS depend upon this access route. The pavement surface has severely deteriorated because of age, ground motion from underground nuclear events, and heavy truck traffic. Trucks frequently carry loads that far exceed normal highway limits, i.e., H-20 highway wheel-loading. Mercury Highway has been identified as a safety issue regarding the transport of special nuclear material and high explosives. This project will reduce the risk of a potentially dangerous accident. Standard remedial measures, such as crack-filling or chip-and-seal overlays, will do little to extend the road's service life. The proposed renovation/reconstruction will eliminate pavement distress and extend the road's service life.

The Rainier Mesa Road is the only access road to the ongoing Big Explosive Experiment Facility (BEEF) in Area 4. This road is now extensively damaged. Total reconstruction of this road is required to continue use as a viable access road in support of the BEEF program.

Project Milestones:

FY 2000:	Conduct soils and geologic investigations; perform land surveying and start engineering and design efforts	3Q
	Complete engineering and design effort. Start reconstruction of Rainier Mesa Road	4Q
FY 2001:	Start renovation of Mercury Highway	1Q
	Complete renovation/reconstruction of both roadways; Begin close-out and as-built process	4Q

4. Details of Cost Estimate

	(dollars in thousands) Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)	1,160	1,332
Design Management Costs (0.8% of TEC)	70	85
Project Management Costs (2.2% of TEC)	200	189
Total Design Costs (15.9% of TEC)	1,430	1,606
Construction Phase		
Improvements to Land	5,081	6,924
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	90	72
Construction Management (5.9% of TEC)	530	534
Project Management (2.8% of TEC)	250	270
Total Construction Costs (66.3% of TEC)	5,951	7,800
Contingencies		
Design Phase (3.1% of TEC)	280	273
Construction Phase (14.7% of TEC)	1,320	1,326
Total Contingencies (17.8% of TEC)	1,600	1,599
Total, Line Item Costs (TEC) [a]	8,981	11,005

5. Method of Performance

Design will be performed by the performance-based management contractor. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts and subcontracts awarded on the basis of competitive bidding. Inspection, contract administration, surveying, and related project functions will be accomplished by the performance-based management contractor.

[a] Escalation rates taken from the FY 1999 DOE escalation multiplier tables.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY2001	Outyears	Total
Project Cost						
Facility Costs						
Design	0	0	1,610	100	0	1,710
Construction	0	0	200	7,071	0	7,271
Total, Line item TEC	0	0	1,810	7,171	0	8,981
Total Facility Costs (Federal and Non-Federal)	0	0	1,810	7,171	0	8,981
Other Project Costs						
Conceptual design costs	92	0	0	0	0	92
NEPA documentation costs	26	0	0	0	0	26
Other project-related costs	5	0	0	0	0	5
Total, Other Project Costs	123	0	0	0	0	123
Total Project Cost (TPC)	123	0	1,810	7,171	0	9,104

7. Related Annual Funding Requirements

(FY 2001 dollars in thousands)

	Current Estimate	Previous Estimate
Total related annual funding (operating from FY 2001 through FY 2035)	0	0

99-D-125, Replace Boilers and Controls, Kansas City Plant
Kansas City, Missouri

(Changes from FY 1999 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

| # This project was planned to start in January 1999, but did not begin until October 1999 because of the period of the congressionally mandated independent assessment of this
| project. Because of this delay, the Total Estimated Cost has increased from $14 million to
| $14.3 million to reflect escalation costs, and the Total Project Cost increased from $14.4 million to $15.0 million due to escalation and the application of burden to other project costs (OPC) which were omitted in the original cost estimate.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1999 Budget Request *(Preliminary Estimate)*	2Q 1999	4Q 2000	4Q 2000	4Q 2002	14,000	14,400
FY 2001 Budget Request *(Current Baseline Estimate)*	1Q 2000	2Q 2001	2Q 2001	4Q 2003	14,300	14,977

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1999	1,000	1,000	1,000
2000	0	0	0
2001	13,000	13,000	5,800
2002	300	300	6,900
2003	0	0	600

3. Project Description, Justification and Scope

This project will renovate and upgrade the existing steam generating facility located at the West Boilerhouse. This project removes four 100,000 PPH (Pound per Hour) boilers, boiler control panels and boiler annunciator panels, water softeners, polisher, pumps, forced draft fans, deaerator, piping, controls, and other existing ancillary boiler support equipment, and replaces them with new equipment including new microprocessor-based control panels and a boiler control room containing annunciator panels and system status indicators, in the same general location. The project will essentially be a one-for-one replacement with slightly reduced overall generating capacity; it will provide system improvements to reflect current technology.

The new boilers will be designed to efficiently and cleanly burn natural gas or No. 2 fuel oil. The burner assembly will contain a ring for natural gas and main and auxiliary fuel oil guns. The main fuel will be natural gas with No. 2 fuel oil as backup. Automatic and continuous blowdown systems, stack opacity monitoring, oxygen monitoring, steam, gas, and oil flow meters, draft fans, drum level fuel and draft controls will be included as well as feedwater pumps and a deaerator. The boiler controls will be microprocessor-based direct digital and will include all safeties. The system is to come complete with heat recovery equipment and controls that are technologically and economically feasible such as economizers and blow down heat recovery. A method to protect the boiler when off line will also be included. Low nitrogen oxide burners will be evaluated, and continuous environmental monitoring of nitrogen oxide and sulphur dioxide will be included as required by the 1990 revisions to the Clean Air Act.

Controls work will consist of the replacement of control components, boiler control panels, annunciator panels in the control room, and installation of a system schematic wall. Control valves will be installed on feedwater, natural gas and fuel oil, and will include positioners, air locks and limit switches. A vortex meter will be installed on each natural gas line. Self-calibrating opacity monitors will be installed on the stacks and continuously monitor stack conditions. The oil, gas trains, and boiler installation will be designed in compliance with National Fire Protection Association (NFPA) 8501.

The equipment in the control room will consist of an industrial grade console computer system, with a high resolution color monitor, laser printer and data logger. The computer will be supplied complete with software, manuals, graphics and reporting capabilities and efficiency calculations.

The control room will include a floor to ceiling wall panel showing schematics of the boilerhouse steam system. This schematic will use replaceable color tiles and LEDs or a projection screen near each piece of equipment to show equipment status on items such as pressure, temperature and flow. The control room will contain two work stations to control the boilers. The work stations will contain multiple computer screens to display alarms and the boilers operating conditions. The screens will be touch sensitive to acknowledge the alarms.

| The following items have been considered and will not be included as part of this project:

| # Cogeneration: Several previous studies have determined that cogeneration under the
| existing natural gas and electricity rates is not economically feasible.
| # Tempered Water System: It is not currently planned to provide any interface and/or
| connection between the steam and tempered water system as a part of this project; this
| project will not include the use of chiller recovered heat as combustion air preheat.
| # Number 6 Fuel Oil: The project will not provide the capability to fire on Number 6,
| (residual) fuel oil due to lack of local availability and environmental concerns with this
| fuel. It is believed that the availability of Number 2 fuel oil is sufficient.
| # Building Ventilation: This project is going to locate equipment on the induced draft fans
| fan deck which is normally significantly above ambient temperatures. The existing
| building operable louvers and windows, as well as the existing Boilerhouse roof exhaust
| fans, will provide sufficient ventilation and combustion air. The "Chilled Water System
| Replacement" project has completely separated the chiller's room from the boiler's room
| by walls and doors. Each resulting building now has an emergency ventilation system
| independent of the other. The decrease in boiler size will help decrease the indoor ambient
air temperatures.

The old boilers will be dismantled and removed in pieces. The overhead door on the west side of the West Boilerhouse will be removed ;and replaced with masonry compatible with the existing building. A new permanent wall opening will be created to facilitate the removal of the scrap boilers and to allow the new, factory assembled boilers and other ancillary equipment to be moved into place. Equipment located in the basement will be moved via the well opening on the southwest corner of the building.

The project is planned to start in the early spring with construction to be staged so that steam production to the plant will not be interrupted for significant periods of time. The general plan will be to remove two boilers from either the north or south end of the building, install two new boilers and bring them on line, then remove and replace the other two boilers. Preparatory work such as construction of the new steam headers, deaerator, feedwater piping and work on other support systems will be done to the extent possible before demolition of the boilers begins.

 # Energy Conservation Analysis

An economizer will be included in this project to preheat the feedwater. This system will reclaim heat from the boiler exhaust steam to heat the feedwater before it enters the deaerator.

Blow down heat recovery will be included in this project. Heat exchangers will recover heat from the blow down water. This heat will be used to preheat the make up water.

During Title I design, variable frequency drives (VFDs) will be evaluated for use with the induced draft fans. The use of VFDs will be based on Life Cycle Cost Analysis and design issues.

Background

The West Boilerhouse at the Department of Energy (DOE), Kansas City Plant (KCP), provides steam for heating, humidity control, and manufacturing processes for tenants of the Bannister Federal Complex. These tenants include the DOE, the General Services Administration (GSA), the Internal Revenue Services (IRS), the Federal Aviation Administration (FAA), the Department of Agriculture (DOA) and the Marine Corps. The steam from this boilerhouse is the only available source of heat for all of these tenants.

Although originally rated at 100,000 pounds per hour, the existing boilers can only achieve 80,000 to 90,000 pounds per hour for any sustained period of time due to their age and deteriorated condition. The boilers are unreliable, mechanically deteriorated, technologically obsolete, and spare parts are not readily available. These boilers must be replaced if the reliability of the steam plant is to be assured.

The bulk of steam generated by these boilers is consumed by the DOE's KCP in meeting its critical Defense Programs (DP) mission. However, the other Federal tenants have critical loads of their own, for which they reimburse the DOE based on memoranda of understanding with DOE.

The boilers were installed in the early 1970's (completion of project in 1974), under a contract administered by GSA. The GSA procedure was to issue a contract to a General Contractor who in turn purchased boilers, burners, controls and accessories and assembled these components on site to provide a complete and working system. The GSA specified system performance and did not detail or specify individual component parts such as burners and controls. To minimize cost and expedite construction, the forced draft fans from the original 1942 boiler system were reused in the installation. The general contractor had no previous experience with plant steam systems and/or boilers. This less than ideal situation was further aggravated when the general contractor went into bankruptcy about two-thirds of the way through the contract. GSA provided additional funds to assure the completion of the project, however, since this was going to be the contractor's last job and all profits were to go to the bankruptcy proceeding, there was little incentive for quality work.

According to both the boiler manufacturer, Riley Stoker, and the burner manufacturer, Peabody Engineering, the contractor's choice of burners was not sanctioned or approved by either manufacturer for installation on an "A" type Riley boiler. As a result of this situation, there have always been problems with the operation of the boilers. These problems have included flame impingement, incomplete combustion of fuel and other systemic problems. Throughout the period since the boilers were started up, the KCP has repeatedly had both Riley and Peabody on site and have made numerous changes to the boilers and controls in an effort to provide efficient and reliable operation. These efforts have only been partially successful.

The boilers, as originally provided, were set up and equipped to burn natural gas as the primary fuel and number 6 fuel oil, a residual fuel, as backup. However, according to Riley Stoker, the boilers were not fabricated with the intended capability to burn any fuel that left a residual deposit. As a result of this, fly ash built up in the combustion chamber during periods when the boilers were fired on number 6 fuel oil. This problem was aggravated by the fact that the poor burner selection resulted in flame impingement and incomplete combustion which increased the problem of fly ash production.

The following problems necessitate replacement of the existing system:

 # Tube Failure

All four boilers in the West Boilerhouse have had a history of excessive tube failure. The fly ash residue created by the poor selection of burners has permeated the refractory in the bottom of the boilers so that over a period of time the tubes in the bottom of the boilers and at the tube connection to the mud drum were packed with the fly ash. Fly ash by nature is hygroscopic and any introduction of moisture, whether from airborne moisture or tube leaks, rapidly finds its way to the fly ash. This fly ash produces an acid compound that attacks the exterior of the tubes. Moisture is trapped between the refractory and the tubes. Historically, the tube failures in these boilers have in almost all cases been in locations where the tube is buried in refractory.

The history of tube failures began almost at the boiler start up. The rate of failure has accelerated so that since 1992, over 2,000 tubes have been replaced in the four boilers. Between 1991 and 1995 there have been eleven separate occurrences of boiler tube leaks with an average down time per lead of between one and two months. A project to retrofit the burners so that number 2 fuel oil is used as the backup fuel was completed in the late 1980's. This has reduced fly ash buildup, but does little to repair already damaged tubes or reduce the residual fly ash in the refractory left by years of using number 6 fuel oil.

 # Refractory Problems

The boilers have also experienced a history of refractory failure. The refractory on the front section of the boilers was originally poured in place and cured while the panel was in a horizontal position. When the refractory was cured, the panel was erected and connected to the boiler body. This procedure has not proven go be satisfactory and is no longer used by Riley Stoker. Over time the front refractory separated from the boiler wall and allows flames to enter the space between the refractory and the boiler shell. The front refractory has been repeatedly repaired on all four boilers. New methods of refractory application have been developed which have reduced but not eliminated the problem. Refractory tile at the throat of the burners are also a maintenance problem and have to be replaced repeatedly.

 # Controls & Air Emissions

The controls for these boilers were technologically obsolete when the system was originally installed. The boiler controls are electro-pneumatic technology. The new standard for boiler controls that was making rapid transitions into the industry when the boilers were installed in 1974 was all electric/electronic based controls. The controls, when they were installed on the

Kansas City Plant boilers, were the last generation of old, electro-pneumatic technology produced by Hays Republic, the controls manufacturer. Hays Republic has not been able to furnish replacement repair parts for many of the control components since the mid-1980's. It is becoming increasingly difficult to find repair parts and it is estimated that within 5 years, no spare parts will be available. The controls have deteriorated and now drift from the control set point and require continuous resetting. Because of the age and condition of the controls, failure of component parts is common. These failures can and often do alter the combustion process to the point that air emissions are outside KCP's permitted values. Failure of a control component in 1992 caused an out of compliance condition on opacity (visual emissions), which resulted in a notice of violation being issued by the city of Kansas City, Missouri. The KCP air emissions are permitted by the Kansas City Air Board and must meet Federal EPA Regulations (40 CFR 60, Appendix B, Sec. 1.), Missouri State Regulation (10 CFR 10-2/06), and Kansas City, Missouri Regulations (section 18.86.D). It is predicted that without new controls, the existing boilers will experience repeated out of compliance conditions as the existing controls continue to age and malfunction.

 # Deaerator

The existing deaerator was installed during the 1970's. The deaerator removes dissolved gases, primarily oxygen, from the feedwater prior to it entering the boilers. This process protects and prolongs the life of boilers and piping system. There is a very limited capability to fire the boilers if this unit is out of service. The deaerator has experienced accelerated deterioration that has repeatedly required work to repair chemical stress cracking to the unit. The corrosion in the deaerator has gotten to the point where frequent repairs are necessary. In the event of a failure of this component, prolonged firing of the boiler on untreated water would significantly damage the already deteriorated boilers and piping systems.

 # Ancillary Problems

In general the ancillary equipment such as piping, softeners, polishers, fans and pumps is in a deteriorated condition. Maintenance on this equipment is increasing with mean time between failures decreasing. All systems have obsolete technology and the acquisition of repair parts continues to be a problem – especially for the boiler feedwater pumps and softener controls.

 # Implications

The existing boilers are deteriorated beyond a point where normal repair and maintenance is cost effective, reliability of the steam plant cannot be assured. Repairs of the boilers and ancillary equipment would require replacement components and many exact replacements are no longer available. It will require significant engineering design support to retrofit other components in areas where original replacements are not available.

Significant deterioration to boiler tubes and internals is so extensive that the only adequate repair would be a complete tube replacement. This would be very costly and would not put the boiler in a like new condition. Release of industrial waste from a ruptured pipe wold most likely enter the plant sanitary sewer system. This occurrence would cause the plant to be in violation of permit.

If a reliable steam supply is to be maintained, it is essential that these boilers be replaced as soon as possible. Failure to replace the existing boilers will subject the KCP to an unacceptable risk of inadequate and unreliable steam supply.

Project Milestones:

FY 2000:	A-E Work Initiated	1Q
FY 2001:	A-E Work Completed	2Q
	Construction Start	2Q
FY 2003:	Physical Construction Complete	4Q

4. Details of Cost Estimate

	(dollars in thousands)	
	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)	626	613
Design Management Costs (0.7% of TEC)	102	100
Project Management Costs (0.08% of TEC)	12	11
Total, Design Costs (5.2% of TEC)	740	724
Construction Phase		
Utilities	10,968	10,738
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	392	384
Construction Management (1.2% of TEC)	166	163
Project Management (0.6% of TEC)	81	79
Total, Construction Costs (81.2% of TEC)	11,607	11,364
Contingencies		
Design Phase (0.7% of TEC)	97	95
Construction Phase (13.0% of TEC)	1,856	1,817
Total, Contingencies (13.7% of TEC)	1,953	1,912
Total, Line Item Costs (TEC) [a]	14,300	14,000

[a] The Conceptual Design Report was completed in February 1997. Escalation is calculated to the midpoint of each activity. Escalation rates were taken from the FY 1999 DOE escalation multiplier tables. Overhead rates were calculated at a factor of 14% for procurement and 77% for internal labor.

5. Method of Performance

Design and inspection will be performed under a KCP negotiated architectural-engineering contract. Construction will be accomplished by fixed-price contract awarded on the basis of competitive proposals and administered by Allied Signal.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Cost						
Design	0	0	700	137	0	837
Construction	0	0	300	5,663	7,500	13,463
Total, Line item TEC	0	0	1,000	5,800	7,500	14,300
Total, Facility Costs (Federal and Non-Federal)	0	0	1,000	5,800	7,500	14,300
Other Project Costs						
Conceptual design cost	40	0	0	0	0	40
NEPA documentation costs	11	0	0	0	0	11
Other project-related costs	103	106	106	150	161	626
Total, Other Project Costs	154	106	106	150	161	677
Total, Project Cost (TPC)	154	106	1,106	5,950	7,661	14,977

7. Related Annual Funding Requirements

(FY 2003 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [a]	0	0
Annual facility maintenance/repair costs	10	10
Total related annual funding (operating from FY 2003 through FY 2032)	10	10

[a] Estimated life of project–30 years.

99-D-127, Stockpile Management Restructuring Initiative Kansas City Plant, Kansas City, Missouri

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

| # The congressionally mandated external assessment found that the Other Projects Costs may have been
| understated and recommended that these costs be reestimated. The reestimate increased the Total
| Project Cost by $1,900,000 to $141,600,000. The reestimate also revealed that $2,900,000 of Total
| Estimated Cost work had been included under the Other Project Cost category. The change to the
| Total Estimated Cost reflects the corrected categorization of this work.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1999 Budget Request *(Preliminary Estimate)*	1Q 1999	2Q 2004 [a]	3Q 1999	3Q 2006	122,500	139,500
FY 2000 Budget Request	2Q 1999	3Q 2004	3Q 1999	2Q 2005	119,500	139,700
FY 2001 Budget Request *(Current Baseline Estimate)*	2Q 1999	3Q 2004	3Q 1999	2Q 2005	122,400	141,600

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1999	13,700	13,700	153
2000	16,935 [b]	16,935	24,156
2001	23,765	23,765	19,600
2002	27,200	27,200	25,689
2003	24,900	24,900	30,317
2004	15,100	15,100	20,662
2005	800	800	1,823

[a] The work packages will be phased as required to maintain production operations. Title I design, Title II design and construction of work packages occur simultaneously after 3rd Qtr. FY 1999.

[b] Original appropriation was $17,000,000. This was reduced by $65,000 for the FY 2000 rescission enacted by P.L. 106-113.

3. Project Description, Justification and Scope

The end of the Cold War radically changed the defense posture of the United States, calling for significant changes and reductions in nuclear weapons complex structure and operations. The initial phase of this retrenchment began when the Department of Energy decided to cease nonnuclear production at three plants and consolidate most of its nonnuclear manufacturing at the Kansas City Plant (KCP). However, even with the influx of new missions, the downturn in defense production meant continued reductions in operating costs and work force.

The Stockpile Management Restructuring Initiative provides a cost-effective plan that capitalizes on the KCP's logistic and manufacturing expertise to ensure quality nonnuclear products through the year 2010 and beyond. Furthermore, the initiative minimizes DOE costs in the near term by lessening risks and reducing operating expenditures concurrent with capital investments. It also provides the technical capability, production capacity, and flexibility necessary to allow the KCP to support scheduled nonnuclear production and a wide range of unanticipated production requirements, confidently and effectively.

The Stockpile Management Restructuring Initiative will allow the KCP's infrastructure to be altered and greatly reduced from the current plant profile, substantially reducing costs to operate the KCP. The restructuring initiative consists of changing the existing plant and operational approach in four major aspects: 1) physically reducing the size of the facility, 2) changing the approach to manufacturing from product-based to process-based, 3) reducing the support infrastructure appropriate for the right-sized operation, and 4) further streamlining the organizational structure to focus directly on the core manufacturing mission.

Currently, the KCP consists of approximately 3.2 million square feet of floor space contained in three connected buildings: the main building, the manufacturing support building (MSB) and the technology transfer center (TTC). Approximately 3 million square feet of floor space is core stockpile management funded. Much of the floor space is underutilized and costly to maintain and approximately 666,000 square feet of vacant floor space will be returned to GSA for reallocation to other Federal agencies. The KCP will be rearranged into three business units and a support operations business unit to bring about an overall reduction in total managed floor space, streamline operations, and produce increased long-term operating efficiencies in manufacturing processes. The approximate square footage of each business unit after consolidation is as follows:

	Square Ft.
Electrical Products Business Unit	236,000
Mechanical Business Unit	350,000
Engineered Materials Business Unit	198,000
Support Operations Business Unit	850,000
Vacant, Unallocated and Unusable	666,000
Total	2,300,000

Electronics Products Business Unit (EPBU) Technology Overview

The electronics products factory includes three process modules: microelectronics, interconnects, and final assembly. Each electronic process module will fabricate all product lines that require the processes of that module. In addition to the three process modules, there will be three manufacturing areas for specialized products: Joint Test Assembly (JTA), Special Electronic Assembly (SEA), and Test Equipment.

The three process modules are:

Microelectronics: All substrates, hybrid microcircuits, chip packages, and leadless chip carriers that require clean room processing are fabricated in the state-of-the-art microelectronics module. The module is located in the new microelectronics facility which was completed in June 1995 and will become fully operational in September 1998.

Interconnects: The interconnects module contains all the processes used to attach and interconnect components. This includes processes such as welding, conventional hand soldering, wave soldering, vapor phase soldering, and belt furnace re-flow soldering. In addition to printed wiring assemblies, interconnect products, such as cables and junction boxes, can be fabricated in this module.

Final Assembly: The fabrication of complete electronic systems is performed in the final assembly module. This consists of the assembly and encapsulation of all components required for complete electronic products. Procured components, printed wiring assemblies, and manufactured hardware are assembled to produce complete electronic systems such as radars, programmers, trajectory sensing, and firesets.

Mechanical Business Unit (MBU) Technology Overview

The MBU will consist of 14 modules which will fabricate or procure all required product lines. This is a process-based approach for most mechanical technologies, complemented by generic product-based manufacturing departments, mechanical support laboratories, and engineering services as follows:

Mechanical Welding: Mechanical Welding is a process-based activity group providing welded mechanical hardware and welding operations in common support of factory operations. The in-place consolidation will combine operations which currently exist in Welding Operations, Interim Reservoir Welding, Model Shop and Tool Room, and the Mechanical Welding Laboratory.

Sheet Metal and Mechanical Assembly: The sheet metal fabrication assembly area will provide common support for a range of mechanical and electromechanical products, and includes typical sheet metal processes as well as laser marking.

Electromechanical Assembly: Electromechanical Assembly will be restructured in a downsized and consolidated operation to provide support of stronglinks and other miniature assemblies which have design features that include miniature solenoids, ceramic electrical headers, miniature springs, friction reducing coatings and bearings, low resistance electrical contacts, magnetically coupled switching, and a host of other unique designs. Most miniature mechanisms require assembly in a Class 100 clean environment, utilizing clean benches within a class 100,000 clean room.

Heat Treating and Abrasive Blasting: The heat treat and abrasive blasting areas provide service for all mechanical product lines. Included in the relocation of the Heat Treat department is the replacement of a portion of the furnaces and support equipment which will not survive the relocation due to their poor condition. The structural integrity of the furnaces being replaced is very poor and modifications would be required to refurbish fire brick and heating elements and the equipment may not survive the relocation. Due to the large size of these furnaces and the criticality of this equipment as a unique capability, new furnaces will be procured and installed in the new location prior to excess of the old equipment.

Mechanical Machining: Mechanical machining and inspection will be a downsized and consolidated operation that will fabricate hardware through traditional and non-traditional means in sizes ranging from large case-type housings to miniature piece parts for assemblies. The machined hardware provided by this module will support requirements of all programs at KCP for both internal and external customers.

Reservoir Fabrication and Assembly: Reservoir production responsibility was transferred from the DOE's Rocky Flats Plant to the KCP through the nonnuclear reconfiguration program. Because of special handling, cleaning and contamination considerations associated with reservoir production, KCP's reservoir facility contains most processes necessary to manufacture, test and inspect a wide variety of production reservoirs. SMRI implementation will not change the Reservoir facility.

TSD Products Manufacturing: TSD Products Manufacturing supports the secure transportation needs for the DOE Transportation Safeguards Division including refurbishment of existing trailers, original manufacture of the new design Safeguards Transporter Trailer (SGT) and multiple short-term special maintenance activities. The TSD manufacturing area will be consolidated by combining the secure trailer sheet metal area with the primary SGT assembly facility.

Mechanical Support Laboratories: Support laboratories for Mechanical Operations will continue to provide the current types of support, though in a smaller footprint through consolidation.

Plastics Molding & Filled Elastomers: This area supports injection, compression, and transfer molding of thermoset and thermoplastic compounds, and material preparation and compression molding of filled elastomeric products.

Cellular Silicone Production: The Cellular Silicone processing operations will not be consolidated with other operations for material incompatibility reasons. The activities associated with the production of cellular silicone products require three major processes: urea screening; silicone base and cellular silicone compounding; and cellular silicone molding, part processing, and product inspection.

Foam Products: Foam Products is a process-based approach, which has combined equipment needed for fabrication of rigid polyurethane foams, filled elastomer foams and foam desiccant product lines.

Plastics Machining, Assembly & Inspection: In the Plastics Machining, Assembly & Inspection module, the manufacturing and machining of all Special Plastics Case Assemblies and Subassemblies, Gas Getters, Composites, and all other plastic products and the related inspection of these products will be consolidated. This consolidation allows for some enhanced utilization of floor space and equipment.

Plating & Painting: These two process modules provide custom metal finishing services to the entire plant. They are not undergoing consolidation as part of the SMRI project.

 # Engineered Materials Business Unit (EMBU) Technology Overview

The engineered materials factory consists of four processing modules as follows:

Model Shop and Tool Room: The Model Shop and Tool Room is a support organization that will provide prototype and evaluation hardware, tool and gage fabrication and maintenance, special grinding of cutting tools, and limited tool design in support of unique and short-cycle time needs of production operations.

Engineering Laboratories: The Engineered Materials Business Unit contains several large laboratories. Except for the Nuclear Grade Steels Receiving and Inspection, and Environmental & Non-Destructive test labs, the Engineering Laboratories will remain unchanged by the SMRI project.

Engineering Services: The Engineered Materials Business Unit provides document control, drafting, and other support services for the other business units. These functions are primarily office areas, and are not modified in the SMRI project.

Metrology: Metrology provides calibration services to the plant and will not be modified under SMRI.

 # Support Operations Technology Overview

Support operations includes boilerhouses, waste management operations, patrol headquarters, stores (including enduring stockpile), maintenance, cafeteria, offices and other functions that are essential for plant operations. Included under this function is the physical plant separation work for walls and utilities and security guard support during construction. Also included is the construction and relocation of a downsized cafeteria. These functions, generally placed in the category of support, are common to plant operations and are not assigned to a specific factory.

Physical Plant Separation: Maximum Foreseeable Fire Loss (MFL) rated separation between the DOE and GSA will be provided by construction of fire rated subdivision walls. Major air handling and utilities systems serving both DOE and GSA will be separated to allow for independent maintenance of these services on both sides of the separation line after the SMRI project is complete.

Stores: New stores will occupy approximately 21 areas, down from the existing 70. Gages and fixtures, chemicals, and some of the production and non-production stores areas will remain in their current locations. Bulk materials and large production and non-production areas will be relocated and resized to meet future stores requirements. This bulk storage area will be located in a high-roof, unexcavated area of the plant which is adjacent to a new high-rack storage area.

Enduring Stockpile: This project provides space for enduring stockpile inventory and to construct fire-rated storage facility enclosures to limit the Maximum Foreseeable Loss (MFL) in accordance with DOE dollar limits. Sites will be provided for a proposed short-term storage of DOE-managed Enduring Stockpile materials. Approximately 105,000 square feet of plant floor space within the new boundaries derived from the facility consolidations will be allocated for the storage of these materials. Thirteen plant areas will be dedicated to this purpose and will be upgraded in place to meet the enduring stockpile storage criteria.

Project Milestones:

FY 1999:	A-E Work Initiated	2Q
	Physical Construction Starts	3Q
FY 2000:	A-E Work Completed	3Q
FY 2005:	Physical Construction Completed	2Q

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)	8,451	8,451
Design Management Costs (1.0% of TEC)	1,268	1,268
Project Management Costs (0.3% of TEC)	422	422
Total, Design Costs (8.3% of TEC)	10,141	10,141
Construction Phase		
Buildings	46,381	46,381
Standard Equipment	32,210	32,210
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	3,440	3,440
Construction Management (5.3% of TEC)	6,477	6,477
Project Management (4.7% of TEC)	5,750	2,850
Total, Construction Costs (77.0% of TEC)	94,258	91,358
Contingencies		
Design Phase (1.5% of TEC)	1,799	1,799
Construction Phase (13.2% of TEC)	16,202	16,202
Total, Contingencies (14.7% of TEC)	18,001	18,001
Total, Line Item Costs (TEC) [a]	122,400	119,500

5. Method of Performance

Design and inspection will be performed under KCP negotiated architect-engineer contract. Construction will be accomplished either by fixed-price contract awarded after competitive proposals or by cost plus incentive fee contracts. All contracts will be administered by Allied Signal.

[a] The Conceptual Design Report was completed in March 1997. Escalation is calculated to the midpoint of each activity. Escalation rates were taken from the FY 1998 DOE escalation multiplier tables. Overhead estimates were calculated at a factor of 14 percent for procurement and 85 percent for internal labor.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Cost						
Design	0	153	5,856	3,000	2,931	11,940
Construction	0	0	18,300	16,600	75,560	110,460
Total, Line item TEC	0	153	24,156	19,500	78,491	122,400
Total, Facility Costs (Federal and Non-Federal)	0	153	24,156	19,600	78,491	122,400
Other Project Costs						
Conceptual design cost	1,000	0	0	0	0	1,000
Other project-related costs	3,093	3,485	3,849	3,230	4,543	18,200
Total, Other Project Costs	4,093	3,485	3,849	3,230	4,543	19,200
Total, Project Cost (TPC)	4,093	3,638	28,005	22,830	83,034	141,600

7. Related Annual Funding Requirements

(FY 2005 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [a]	3,700	3,700
Annual facility maintenance/repair costs	5,400	5,400
Programmatic operating expenses directly related to the facility	9,374	9,374
Total related annual funding (operating from FY 2005 through FY 2034)	18,474	18,474

[a] Estimated life of project–30 years.

99-D-128, Stockpile Management Restructuring Initiative
Pantex Plant, Amarillo, Texas

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

| # None.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1999 Budget Request *(Preliminary Estimate)*	2Q 1999	2Q 2003	4Q 2000	4Q 2006	42,380	49,600
FY 2000 Budget Request	3Q 1999	4Q 2001	2Q 2000	4Q 2004	13,218	17,863
FY 2001 Budget Request *(Current Baseline Estimate)*	3Q 1999	4Q 2001	2Q 2000	4Q 2004	13,218	17,863

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1999	1,108	1,108	74
2000	3,416 [a]	3,416	4,318
2001	4,998	4,998	2,057
2002	3,300	3,300	5,141
2003	286	286	1,518
2004	110	110	110

[a] Original appropriation was $3,429,000. This was reduced by $13,000 for the FY 2000 rescission enacted by P.L. 106-113.

3. Project Description, Justification and Scope

The Pantex Plant Stockpile Management Restructuring Initiative (SMRI) Project will provide for the design and construction for various relocation and upgrades and for the shutdown of obsolete structures. The project will help to reduce the plant footprint by consolidating functions into fewer and more modern facilities.

The scope for this project has been established based upon the Department of Energy's directed workload for the Pantex Plant. This directed workload is the weapons work Pantex is directed to do through Program Control Documents (PCDs), Retirement/Disposal Program Control Documents, the Quality Assurance Production Plan (QAPP), and other special written requests provided by DOE.

The technical baseline for this project has been broken up into three parts that are detailed below:

 # Relocation of High Explosive Formulation to 11-050

This portion of the SMRI project will remove existing High Explosive (HE) machining equipment from Building 11-050 following startup of HE machining operations in Building 12-121. Building 11-050 will be modified to receive the HE formulation related operations currently performed in Building 12-019 East and Building 12-017, and selected operations and equipment from Building 11-017. Following modifications to Building 11-050 the required equipment from these buildings will be relocated and the equipment put into operation in Building 11-050. Finally, Building 12-019 East will be placed into a long-term caretaker status. Equipment and support items will be procured and/or relocated as required and any items that cannot be successfully relocated will be replaced. This portion of the SMRI project will be designed to meet the applicable DOE and regulatory requirements in place at the start of Title I design.

 # Relocate Mass Properties

This portion of the SMRI project will relocate the Mass Properties function to Buildings 12-084 and 12-104 and will consist of modifications to the buildings to accept the mass properties operations from Building 12-060. Four existing pieces of equipment will be replaced by procuring two new, more technically advanced pieces of equipment. Equipment and support items will be procured and/or relocated as required and any items that cannot be successfully relocated will be replaced. This portion of the SMRI project will be designed to meet the applicable DOE and regulatory requirements in place at the start of Title I design.

 # Relocate 35 Account Materials

This portion of the SMRI project will relocate the 35 Account warehousing activities in Buildings 12-005A, 12-005B, 12-010, 12-009, and Ramp 12-R-010 into Building 12-118. The 35 Account activities include materials in contact with a weapon or weapon component during a weapon assembly, disassembly or test units. Typical materials include such items as epoxy resin, paint, dry air, rubber gloves and acetone. Equipment and support items will be procured and/or relocated as required and any items that cannot be successfully relocated will be replaced. This portion of the SMRI project will be designed to meet the applicable DOE and regulatory requirements in place at the start of Title I design. Buildings 12-005A, 12-005B, 12-010, and 12-R-010 will be placed into Long-term Caretaker status.

Project Milestones:

FY 1999: A-E Work Initiated 3Q

FY 2000: Construction Start 2Q

FY 2004: Physical Construction Complete 4Q

4. Details of Cost Estimate

	(dollars in thousands)	
	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)	1,210	1,210
Project Management costs (4.4% of TEC)	579	579
Total, Design Costs (13.5% of TEC)	1,789	1,789
Construction Phase		
Improvements to Land	61	61
Buildings	4,298	4,298
Other Structures	510	510
Utilities	20	20
Standard Equipment	2,873	2,873
Removal Cost Less Salvage	35	35
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	146	146
Construction Management (5.8% of TEC)	773	773
Project Management (3.4% of TEC)	455	455
Total, Construction Costs (69.4% of TEC)	9,171	9,171
Contingencies		
Design Phase (2.7% of TEC)	358	358
Construction Phase (14.3% of TEC)	1,900	1,900
Total, Contingencies (17.1% of TEC)	2,258	2,258
Total, Line Item Costs (TEC) [a]	13,218	13,218

[a]Escalation rates taken from the FY 1999 DOE escalation multiplier tables. The estimate was based on the Independent Cost Reviews (ICR 6/97 and 8/97) of the Conceptual Design Report (Revision 1) and included security guard costs under project management. The current estimate is based on new burden rates and correctly includes security guard costs under construction management.

5. Method of Performance

The design services (Title I, II, and III) will be accomplished by an outside A-E firm and will be administered by the Operating Contractor (Mason and Hanger Corporation). Mason and Hanger Corporation will perform portions of the design for selected projects.

The construction services of this project will be performed by an outside construction contractor operating under a contract to be awarded on the basis of competitive bids. This contract will be administered by the Operating Contractor (Mason and Hanger Corporation).

Construction Management Services will be performed by the DOE Operating Contractor.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Cost						
Design	0	74	1,705	289	79	2,147
Construction	0	0	2,613	1,768	6,690	11,071
Total, Line item TEC	0	74	4,318	2,057	6,769	13,218
Total, Facility Costs (Federal and Non-Federal)	0	74	4,318	2,057	6,769	13,218
Other Project Costs						
Conceptual design cost	768	0	0	0	0	768
NEPA documentation costs	348	60	40	33	72	553
Other ES&H costs	40	43	20	38	97	238
Other project-related costs	384	196	781	782	943	3,086
Total, Other Project Costs	1,540	299	841	853	1,112	4,645
Total, Project Cost (TPC)	1,540	373	5,159	2,910	7,881	17,863

7. Related Annual Funding Requirements

(FY 2004 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [a]	355	355
Annual facility maintenance/repair costs	218	218
Programmatic operating expenses directly related to the facility	1,418	1,418
Capital equipment not related to construction but related to the programmatic effort in the facility	350	350
Utility costs	106	106
Total related annual funding (operating from FY 2004 through FY 2033)	2,447	2,447

[a] Estimated life of project–30 years.

99-D-132, Nuclear Materials Safeguards and Security Upgrades Project, Los Alamos National Laboratory, New Mexico

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

·Addition of a collective protection system in the scope of NMSSUP Phase I.

·External independent project review and associated actions delayed the project start from November 1998 to September 1999.

·The project TPC, schedule and funding profile has changed to reflect the scope addition and start delay.

1. Construction Schedule History

	Fiscal Quarter					
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete	Total Estimated Cost ($000) [a]	Total Project Cost ($000)
FY 1999 Budget Request	1Q 1999	1Q 2001	3Q 2000	3Q 2004	60,746	70,920
FY 2000 Budget Request *(Preliminary Estimate)*	2Q 1999	1Q 2001	3Q 2000	3Q 2004	60,746	70,920
FY 2001 Budget Request *(Current Baseline Estimate)*	4Q 1999	2Q 2002	4Q 2000	4Q 2005	61,143	74,634

[a] TEC and Financial Schedule reflects Phase I only. Future cost estimates and funding profiles will be completed as part of future conceptual design efforts.

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1999	9,700	9,700	0
2000	11,257 [a]	11,257	8,600
2001	18,043	18,043	11,600
2002	9,600	9,600	19,480
2003	5,400	5,400	9,520
2004	7,143	7,143	7,000
2005	0	0	4,943

3. Project Description, Justification and Scope

The Nuclear Material Safeguard and Security Project (NMSSUP) replaces the existing Los Alamos National Laboratory (LANL) security system, addresses Special Nuclear Material (SNM) facility requirements, and addresses malevolent vehicle threats at key nuclear facilities. Assessments of the LANL safeguards and security system have identified numerous system deficiencies due to aging equipment and outdated technologies. The NMSSUP will provide a reliable safeguards and security system to ensure the protection and control of SNM, classified matter, and Departmental property supporting current missions at LANL.

The NMSSUP is separated into multiple phases to accomplish the project goals. Phase 1 will provide for the replacement of safeguard and security control systems (computers/ communications links, etc.) and modification of related facilities. Later phases will replace the Perimeter Intrusion Detection and Assessment System (PIDAS) and interior alarms at two key nuclear material facilities. Future phases will protect classified parts, upgrade other facility alarms and replace the site-wide fire alarm system.

This project is to provide necessary upgrades to the existing Laboratory-wide security systems to bring them into compliance with DOE Order 5632.1C and to address deficiencies cited in the Los Alamos National Laboratory (LANL) Site Safeguards and Security Plan (SSSP). The systems being upgraded have been in operation for up to 14 years, have exceeded their useful design life, and are in need of replacement. Funding is required to continue safe, secure, economical operation of the Laboratory.

Phase 1

A new security system will be installed to include multiple host computers, operator interface consoles, upgrades to existing facilities, and a dedicated communications trunk. Existing facilities will be upgraded to serve as a Central Alarm Station (CAS) and Secondary Alarm Station (SAS) which will house the host

[a] Original appropriation was $11,300,000. This was reduced by $43,000 for the FY 2000 rescission enacted by P.L. 106-113.

computers and security monitoring personnel. To support the transition of the TA-55 local assessment facility for operation as the new CAS, an un-staffed assessment console room at TA-64-1 will be provided. Additional detail is provided below.

Control System

The project will replace the existing Laboratory security system; (Basic Rapid Alarm Security System (BRASS)), computers and software with Argus, a security system provided by Lawrence Livermore National Laboratory (LLNL). The CAS and SAS will be reconfigured, and minor remodeling of the badging office will be performed to accommodate Argus enrollment stations.

Facilities

CAS (TA-55-142) will be upgraded to house the host system computer and new operator consoles. A small utility building will be constructed to accommodate facility support equipment, and provide space for supervisory personnel.

SAS (TA-3-440) will be upgraded to house the host system computer and new operator consoles. A small utility building will be constructed to accommodate facility support equipment. Limited Area fencing and barricades will be installed to enclose the SAS to provide proper security. This facility will also house the training console to support the Argus system.

- A collective protection system has been added to the CAS & SAS to protect the buildings against infiltration of aerosol and gas incapacitating agents.

The Central Guard Facility at TA-64-1 will be upgraded to house a new un-staffed assessment console to support the transition of the TA-55-142 local assessment room to operation as the CAS.

Communications System

A new fiber optic communications network will replace the existing telephone circuits connecting the security control computers to the field concentrators. Phase 1 will install the portion of the communications system that connects the new host computers to the security concentrators at LANL's Category I SNM facilities TA-55 and TA-18. In addition, the communications circuits needed to connect the computers in the CAS, SAS, and the assessment console room will be installed in Phase 1. Because Phase 1 involves installing fiber-optic bundles from the CAS and SAS, those bundles will be sized with adequate capacity in Phase 1 to accommodate the number of fibers needed to support future Phases.

Project Milestones:

Critical Decision 2	4QFY99
Date A/E Work Initiated	4QFY99
Date title II Completed	2QFY01
Critical Decision 3, Controls and Communications System	3QFY00
Critical Decision 3, Facilities	3QFY01
Date Physical Construction Starts	4QFY00
Date Construction Ends	4QFY05
Critical Decision 4	1QFY06

4. Details of Cost Estimate

	(dollars in thousands) Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)	4,063	4,930
Design Management costs (3.2% of TEC)	1,963	1,200
Project Management costs (3.9% of TEC)	2,409	800
Total Design Costs (13.8% of TEC)	8,435	6,930
Construction Phase		
Improvements to Land	364	5,625
Buildings	8,059	6,964
Special Equipment	17,027	21,540
Standard Equipment	4,348	0
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	1,926	4,290
Construction Management (3.1% of TEC)	1,904	2,136
Project Management (3.0% of TEC)	1,830	5,261
Total Construction Costs (58% of TEC)	35,458	45,816
Contingencies		
Design Phase (4% of TEC)	2,450	1,050
Construction Phase (24.2% of TEC)	14,800	6,950
Total Contingencies (28.2% of TEC)	17,250	8,000
Total Line Item Costs (TEC) [a]	61,143	60,746

5. Method of Performance

Engineering, design and inspection will be accomplished under a negotiated architect-engineer (A-E) contract. Construction and procurement will be accomplished by fixed-price contracts awarded on the basis of competitive bidding. The computer system will be procured and installed through a cooperative agreement with Lawrence Livermore National Laboratory.

---

[a] Escalation rates taken from FY 1999 DOE escalation multiplier tables. TEC/TPC and Financial Schedule reflect Phase I only. Phase 2 will be completed as part of a future project.

6. Schedule of Project Funding

	(dollars in thousands)					
	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Cost						
Design	0	0	4,620	2,950	3,315	10,885
Construction	0	0	3,980	8,650	37,628	50,258
Total, Line item TEC	0	0	8,600	11,600	40,943	61,143
Total Facility Costs (Federal and Non-Federal)	0	0	8,600	11,600	40,943	61,143
Other Project Costs						
Conceptual design cost	1,075	0	0	0	0	1,075
NEPA documentation costs	50	0	0	0	0	50
Other ES&H costs	5	50	75	110	840	1,080
Other project-related costs	1,245	1,578	871	1,110	6,482	11,286
Total, Other Project Costs	2,375	1,628	946	1,220	7,322	13,491
Total Project Cost (TPC)	2,375	1,628	9,546	12,820	48,265	74,634

7. Related Annual Funding Requirements

	(FY 2004 dollars in thousands)	
	Current Estimate	Previous Estimate
Annual facility operating costs	1,874	1,874
Annual facility maintenance/repair costs	902	902
Utility costs	59	59
Total related annual funding (operating from FY 2004 through FY 2023)	2,835	2,835

98-D-123, Stockpile Management Restructuring Initiative Tritium Facility Modernization and Consolidation, Savannah River Plant, Aiken, South Carolina

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

None.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1998 Budget Request *(Preliminary Estimate)*	2Q 1998	1Q 2000	1Q 1999	2Q 2002	68,790	85,540
FY 1999 Budget Request [a]	2Q 1998	2Q 2000	3Q 1998	3Q 2004	98,400	122,000
FY 2000 Budget Request [b]	2Q 1998	3Q 2000	3Q 1998	4Q 2004	98,400	122,000
FY 2001 Budget Request [c] *(Current Baseline Estimate)*	2Q 1998	3Q 2000	3Q 1998	4Q 2004	98,400	122,000

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1998	11,000	5,119	5,092
1999	27,500	27,500	19,704
2000	20,233 [d]	26,114	33,937
2001	30,767	30,767	30,767
2002	5,800	5,800	5,800
2003	2,200	2,200	2,200
2004	900	900	900

---

[a] Reflected changes from including scope and associated funding to process tritium containing gases from the Commercial Light Water Reactor (CLWR), which was originally included in the Tritium Extraction Facility (Line Item 98-D-125).

[b] Reflects changes in schedule due to delayed start of design on most processes in Building 233-H.

[c] Detailed technical scope, cost and schedule studies currently underway. May result in an increase to the TEC and TPC.

[d] Original appropriation was $21,800,000. This was reduced by $67,000 for the FY 2000 rescission enacted by P.L. 106-113, and by $1,500,000 for an FY 2000 general reduction.

3. Project Description, Justification and Scope

In 1994, production operations were curtailed at three of the seven weapons production facilities (Mound in Ohio, Pinellas in Florida, and Rocky Flats in Colorado). Their production responsibilities were transferred to two of the remaining four production plants (Kansas City Plant (KCP) and Savannah River Site (SRS)) and to two of the national laboratories (Los Alamos National Laboratory (LANL) and Sandia National Laboratory (SNL), New Mexico). After the closure of these production operations, studies were continued to determine the optimum size and configuration of the nuclear weapons complex. It was recognized that the remaining four production facilities provided excess capacity than that required to support the projected stockpile, and that further closure and consolidation or significant downsizing of operations was necessary. Studies were begun in late 1994 to address whether the reduced stockpile levels necessitated further plant closures and consolidation/collocation at the weapons laboratories or supported the downsizing of operations at the existing production plants. These studies were used to assess all reasonable alternatives which required little or no construction of new facilities. The result of these in-depth programmatic assessments culminated in the development and approval of the Justification of Mission Need document and the Critical Decision I authorization for the Stockpile Management Restructuring Initiative (SMRI) on April 2, 1996.

The SMRI will support the implementation of Departmental decisions related to production facility downsizing or relocation of missions consistent with the Stockpile Stewardship and Management (SSM) Programmatic Environmental Impact Statement (PEIS) and the Tritium Supply and Recycling PEIS Records of Decision (ROD). The preferred alternative for restructuring the stockpile management complex was announced by the Secretary of Energy on February 28, 1996. The Secretary of Energy approved a ROD for the Tritium Supply and Recycling PEIS on December 5, 1995.

The goal of the Stockpile Management Program, as implemented by the SMRI, is to attain the following objectives: (1) fully support the evaluation, enhanced surveillance, maintenance, and repair of the enduring stockpile; (2) provide flexibility to respond to new requirements or to achieve further reductions in the stockpile size; (3) maintain and improve (where necessary) the manufacturing technology necessary to fully support the stockpile; and (4) achieve significant reductions in operating costs for the complex.

The SMRI involves (1) the downsizing of weapons assembly/disassembly and high explosives missions at the Pantex Plant; (2) downsizing nonnuclear component manufacturing at the Kansas City Plant; (3) downsizing weapons secondary and case fabrication at the Oak Ridge Y-12 Plant; and (4) consolidation of existing tritium operations at the SRS.

No new facilities are being proposed for implementing the SMRI. Existing facilities will be utilized to the maximum extent possible. All existing facilities that have been identified for utilization under each site specific recommended alternative will be repaired, upgraded, and/or modified to meet current environment, safety, and health requirements. In addition, they will be configured to maximize effectiveness and efficiency in support of the site-specific downsizing and/or consolidation management capability requirements for the smaller stockpile.

The Tritium Facility Modernization and Consolidation work package will relocate several process systems and equipment and/or process functions from Buildings 232-H into existing buildings within the Tritium Facility. High and Moderate hazard processes will be relocated into Building 233-H.

Low Hazard processes will be relocated to the North end of Building 234-H. The Building 233-H and 234-H service support systems will be upgraded to accommodate the additional loads.

The consolidation of Tritium processing activities into Buildings 233-H, 249-H, and the newer portion of 234-H will improve the safety of operations, reduce environmental releases, improve productivity, and significantly reduce future operating costs.

The consolidation of equipment into fewer operating buildings will allow for the reduction of maintenance, operations, and support staffing. The closure of 232-H will further reduce the Defense Programs operating budget for the SRS. It is estimated that financial pay back for this project can be realized in approximately four years.

The scope of work also includes work that was transferred from the Tritium Extraction Facility, Line Item 98-D-125. These are increases in capacities and flows in the primary separation system, process stripper/tritium recovery system, glovebox stripper/tritium recovery system. Also added is an isotope separation process. These additions will allow the Consolidation project to handle additional process and waste gases from any new tritium source.

Project Milestones

FY 1998: Physical Construction Starts	3Q
FY 2000: A-E Work Completed	3Q
FY 2004: Physical Construction Complete	4Q

4. Details of Cost Estimate

	(dollars in thousands)	
	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)	13,370	13,370
Design Management Costs (0.4% of TEC)	413	413
Project Management Costs (1.0% of TEC)	987	987
Total, Design Costs (15.0% of TEC)	14,770	14,770
Construction Phase		
Improvements to Land	100	100
Buildings [a]	5,300	5,300
Special Equipment	36,345	36,345
Standard Equipment	3,080	3,080
Removal Cost Less Salvage	1,645	1,645
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	7,034	7,034
Construction Management (2.0% of TEC)	1,995	1,995
Project Management (2.4% of TEC)	2,367	2,367
Total, Construction Costs (58.8% of TEC)	57,866	57,866
Contingencies		
Design Phase (5.3% of TEC)	5,240	5,240
Construction Phase (20.9% of TEC)	20,524	20,524
Total, Contingencies (26.2% of TEC)	25,764	25,764
Total, Line Item Costs (TEC) [b]	98,400	98,400

5. Method of Performance

The Management and Operating (M&O) contractor, Westinghouse Savannah River Company, will have overall project performance responsibility. The M&O contractor will accomplish design, construction and procurement, utilizing fixed-price subcontracts awarded on the basis of competitive bidding to the extent feasible.

[a] This amount includes improvements to land, special equipment, other structures and utilities with more exact breakout to be determined.

[b] Escalation rates taken from the FY 1998 DOE escalation multiplier tables.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Cost						
Design	5,092	13,989	929	0	0	20,010
Construction	0	5,715	33,008	30,767	8,900	78,390
Total, Line item TEC	5,092	19,704	33,937	30,767	8,900	98,400
Total, Facility Costs (Federal and Non-Federal)	5,092	19,704	33,937	30,767	8,900	98,400
Other Project Costs						
R&D necessary to complete construction	800	0	0	0	0	800
Conceptual design cost	300	0	0	0	0	300
Decontamination and Decommissioning (D&D)	200	0	0	0	0	200
NEPA documentation costs	30	0	0	0	0	30
Other ES&H costs	10	80	130	190	400	810
Other project-related costs	3,560	2,068	2,570	4,162	9,100	21,460
Total, Other Project Costs	4,900	2,148	2,700	4,352	9,500	23,600
Total, Project Cost (TPC)	9,992	21,852	36,637	35,119	18,400	122,000

7. Related Annual Funding Requirements

(FY 2004 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [a]	330	330
Annual facility maintenance/repair costs	440	440
Programmatic operating expenses directly related to the facility	1,100	1,100
Capital equipment not related to construction but related to the programmatic effort in the facility	30	30
GPP or other construction related to the programmatic effort in the facility	10	10
Utility costs	170	170
Total related annual funding (operating from FY 2004 through FY 2033)	2,080	2,080

[a]Estimated life of project–30 years.

98-D-125, Tritium Extraction Facility, Savannah River Site
Aiken, South Carolina

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

| **#** This Construction Project Data Sheet (CPDS) revised the baselines submitted in the FY 2000 Budget Request. This CPDS better reflects the progress, restrictions, and updated information now available to the Tritium Extraction Facility (TEF) Project. The FY 2000 CPDS was based on completed conceptual design of the TEF. This CPDS is based on completion of preliminary design, and reflects recent experience in estimated costs for competitively procured gloveboxes which are long-lead items essential to the facility. Also, this CPDS better accounts for changes to the TEF Project schedule which were necessary because of Congressional prohibitions against construction of any tritium supply facilities during FY 1999. Included in this schedule revision is a change in strategy for procuring facility design, engineering, and construction services. To meet the FY 2006 completion date, these services will no longer be procured as a fixed price package, but as a series of fixed price subcontracts issued by the Savannah River Site. Taken as a whole, the changes discussed above are significant enough that DOE has rebaselined the TEF Project and the total estimated cost (TEC) of the project will increase from $285.65 million to $323 million. Other project costs (OPC) will decrease so that the TEF total project cost (TPC) will increase by only $10.35 million. Section 4 of this CPDS provides details of these cost adjustments.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1998 Budget Request *(Preliminary Estimate)*	1Q 1998	4Q 2002	1Q 1999	3Q 2005	TBD [a]	TBD
FY 2000 Budget Request	1Q 1998	3Q 2001	1Q 2000	4Q 2004	285,650	390,650
FY 2001 Budget Request *(Revised Baseline Estimate)*	1Q 1998	3Q 2001	1Q 2000	4Q 2004	323,000	401,000

[a] Consistent with OMB Circular A-11, Part 3, full funding was requested for only preliminary and final design of the CLWR TEF in FY 1998.

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1998	9,650	9,650	6,911
1999	6,000	6,000	5,889
2000	32,875 [a]	32,875	35,725
2001	75,000	75,000	73,011
2002	81,125	81,125	70,369
2003	55,000	55,000	63,233
2004	53,000	53,000	57,230
2005	10,000	10,000	10,282
2006	350	350	350

3. Project Description, Justification and Scope

Tritium is a radioactive isotope of hydrogen used in all of the Nation's nuclear weapons. Without tritium, nuclear weapons will not work as designed. At present, no tritium is produced by the U.S. for the nuclear weapons stockpile. Radioactive decay depletes the available tritium by approximately 5.5% each year. In order for these weapons to operate as designed, tritium must be periodically replaced. Although tritium has not been produced by the U.S. for the stockpile since the shutdown of the last production reactor in 1988, tritium requirements have been met through reuse of tritium recovered from dismantled weapons. In order to maintain the Strategic Arms Reduction Treaties (START) 1 force structure and five-year reserve approved by the President in the 1996 Nuclear Weapons Stockpile Memorandum, a new production capability should come on line approximately 2005. To meet this date, site preparation and construction of the Tritium Extraction Facility (TEF) must begin in FY 2000. As part of the dual track production strategy, stated in the Record of Decision for the Tritium Supply and Recycling Final Programmatic Environmental Impact Statement, issued on December 5, 1995, the Commercial Light Water Rector (CLWR) Tritium Extraction Facility shall be constructed at the Savannah River Site. The CLWR TEF shall provide the capability to receive and extract gases containing tritium from CLWR Tritium Producing Burnable Absorber Rods (TPBAR), or other targets of similar design. The TEF will provide shielded remote TPBAR handling for the extraction process, clean-up systems to reduce environmental impact from normal processing and accidental releases, and delivery of extracted gases containing tritium to the Tritium Recycle Facility for further processing.

The TEF will consist of a concrete industrial facility constructed partly below grade. The facility is divided into two major areas: (1) a 15,500 square foot remote handling area (RHA) and (2) a 26,500 square foot tritium processing building. The tritium processing building will be entirely above-ground; the floor of the RHA will be below grade. Major processes and operations systems included within the TEF will be: (1) the Receiving, Handling, and Storage System that will support all functions related the

[a] Original appropriation was $33,000,000. This was reduced by $125,000 for the FY 2000 rescission enacted by P.L. 106-113.

receipt, handling, preparation, and storage of incoming TPBAR and outgoing radioactive waste materials; (2) the Tritium Extraction System that will remove tritium and other gases from the TPBARs, remove contaminates from the gas stream, and store the tritium/helium mixture; (3) the Tritium/Product Process Systems that will separate and purify process gases from the irradiated TPBARs; (4) the Tritium Analysis and Accountability Systems that will support monitoring and tritium accountability; (5) the Solid Waste Management System that will receive solid waste generated by TEF for management and storage prior to disposal in the E-Area vaults; and (6) the Heating, Ventilation, and Air Conditioning System that would provide and distribute conditioned supply air to the underground RHA and the above ground tritium processing area and also discharge exhaust air to the environment via a 100-foot stack.

With CLWR as a basis, the TEF will provide steady-state production capability to the Tritium Recycle Facility (Building 233-H) of as much as 3Kg of tritium per year, if needed. Final purification of gases containing tritium shall be performed in the augmented process equipment located in the Tritium Recycle Facility.

The TEF shall have an operational life span of at least 40 years, minimize radiological and chemical releases to the environment; and minimize waste generation. The TEF security requirements shall be such that TEF is designated as an exclusion area and tritium processing facilities are to be located above ground.

Project Milestones

As baselined, the TEF will be dependent on the Tritium Modernization and Consolidation Project. With this project being completed during 3rd Quarter FY 2004, the final tritium systems will be available for processing extraction gases to ensure weapons stockpile requirements will be met in CY 2005.

FY 1998:	Initiation of Preliminary Design
	Completion of Preliminary Design
FY 1999:	Critical Decision (CD) 2B Approval to Begin Final Design
	Initiation of Final Design
	CD-3 - Approval to Begin Construction
FY 2000:	Initiation of Site Preparation
FY 2001:	Completion of Final Design
	Completion of Site Preparation
	Initiation of Facility Construction
FY 2004	Completion of Facility Construction (Final system turnover to integrated system testing)
FY 2005:	Initiation of Integrated System Testing with Tritium
FY 2006:	Project Completion
	CD-4 - Start of Facility Operations

4. Details of Cost Estimate [a]

	(dollars in thousands) Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design Costs (Design Drawings, Specifications and Construction Support)	58,741 [b]	33,100
Design Management Costs (1.0% of TEC)	3,092	1,649
Project Management Costs (1.4% of TEC)	4,404	4,520
Total Design Costs (20.8% of TEC)	66,237	39,269
Construction Phase		
Improvements to Land [c]	4,719	3,082
Buildings [c]	61,329	125,508
Special Equipment [c]	75,377	14,212
Standard Equipment [c]	24,043	1,487
Major Computer Items [c]	3,496	6,047
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance [d]	22,291	8,348
Construction Management (2.5% of TEC)	8,024	15,764 [b]
Project Management (2.4% of TEC)	7,515	7,280
Total Construction Costs (63.5% of TEC)	206,794	181,728
Contingencies		
Design Phase (6.3% of TEC) [e]	20,000	29,053
Construction Phase (9.4% of TEC) [e]	29,969	35,600
Total Contingencies (15.7% of TEC) [e]	49,969	64,653
Net Federal total estimated cost (TEC)	323,000	285,650

5. Method of Performance

The Savannah River Site M&O Contractor, Westinghouse Savannah River Company (WSRC) will be responsible for the design, construction, inspection and commissioning of the TEF to be built at the Savannah River Site. All conceptual and Preliminary Design work has been completed by site forces. Final Design will be performed by site forces. Based on competitive bid process, a general construction subcontractor will be selected to perform construction and checkout activities through non-radioactive gas testing. Start-up testing with radioactive gases will be performed by site forces.

---

[a] General and administrative overhead rates were calculated at a factor of 5% for TEC and 28% for OPC.

[b] Construction support previously included with construction management.

[c] Project strategy change from Design subcontractor to SRS Design resulted in equipment procurement responsibility residing with SRS and reallocation of certain costs from Buildings to Special and Standard Equipment; Increase in cost of gloveboxes reflected in special equipment costs.

[d] Increased scope for Construction subcontractor, scope previously included with SRS forces as operating costs.

[e] Reduction in contingency results from Preliminary Design completion.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Cost						
Design [a]	6,911	5,889	27,725	45,712	0	86,237
Construction	0	0	8,000	27,299	201,464	236,763
Total, Line item TEC	6,911	5,889	35,725	73,011	201,464	323,000
Total Facility Costs (Federal and Non-Federal)						
Other Project Costs						
Conceptual design cost	3,541	0	0	0	0	3,541
NEPA documentation costs	1,858	0	0	0	0	1,858
Other project costs	5,601	3,000	2,000	1,000	61,000	72,601
Total, Other Project Costs	11,000	3,000	2,000	1,000	61,000	78,000
Total, Project Cost (TPC)	17,911	8,889	37,725	74,011	262,464	401,000

7. Related Annual Funding Requirements

(dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	1,550	1,550
Annual facility maintenance/repair costs	2,500	2,500
Programmatic operating expenses directly related to the facility	6,800	6,800
Capital equipment not related to construction but related to the programmatic effort in the facility	700	700
GPP or other construction related to the programmatic effort in the facility	400	400
Utility costs	950	950
Total related annual funding (operating from FY 2006 through FY 2045)	12,900	12,900

[a] Design includes cost of engineered equipment.

97-D-102, Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT), Los Alamos National Laboratory, Los Alamos, New Mexico

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

The initial capability of the Phase 2 containment vessel was to contain detonations up to the equivalent of 124 pounds of TNT equivalent. A recent review of the near-term and long-term hydro-testing program indicates that this capability is not necessary to satisfy the emissions limits defined in the Record of Decision (ROD). Reducing the containment vessel capability for detonations significantly reduces the physical size of the vessel and correspondingly reduces the size of the Vessel Preparation Facility, which reduces the future cost risk for this project.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1988 Budget Request	1Q 1988	N/A [a]	4Q 1988	4Q 1990	30,000	N/A [b]
FY 1989 Budget Request	3Q 1988	N/A [a]	4Q 1988	4Q 1990	53,400	N/A [b]
FY 1990 Budget Request	3Q 1988	N/A [a]	4Q 1988	4Q 1992	53,400	N/A [b]
FY 1991 Budget Request	3Q 1988	N/A [a]	2Q 1989	4Q 1992	53,400	N/A [b]
FY 1992 Budget Request	3Q 1988	1Q 1995	2Q 1989	4Q 1994	53,400	N/A [c]
FY 1993 Budget Request	3Q 1988	1Q 1995	2Q 1989	4Q 1994	53,400	N/A [c]
FY 1994 Budget Request	3Q 1988	1Q 1995	2Q 1989	3Q 1997	81,400	85,600
FY 1995 Budget Request	3Q 1988	4Q 1995	2Q 1989	3Q 1997	81,400	85,600
FY 1996 Budget Request	3Q 1988	4Q 1995	2Q 1989	3Q 1998	81,400	85,600
FY 1997 Budget Request	3Q 1988	4Q 1995	3Q 1989	1Q 1999	105,700	114,760
FY 1998 Budget Request	3Q 1988	4Q 1995	3Q 1989	1Q 1999	186,700	199,210
FY 1999 Budget Request	3Q 1988	4Q 2000	3Q 1989	4Q 2002	259,700	269,800
FY 2000 Budget Request	3Q 1988	4Q 2000	3Q 1989	4Q 2002	259,700	269,800
FY 2001 Budget Request *(Current Baseline Estimate)* [d]	3Q 1988	4Q 2000	3Q 1989	4Q 2002	259,700	269,800

[a] There was no requirement for A-E duration or completion date during these fiscal years and, therefore, this information is not available.

[b] There was no requirement for TPC during these fiscal years and, therefore, this information is not available.

[c] During these fiscal years, the project was delayed while completing the Accelerator Development Plan in order to verify plans and budgets and, therefore, this information is not available.

[d] Due to the complicated history of this project as described in Section 3, and the fact that it has two distinct phases, it is not possible to identify the specific year for Preliminary Estimate and Title I Baseline.

2. Financial Schedule [a]

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1988	1,800	1,800	201
1989	9,700	9,700	2,912
1990	10,905 [b]	10,905	10,767
1991	5,000 [c]	5,000	7,558
1992	0	0	5,139
1993	3,500 [d]	3,500	2,643
1994	17,000	17,000	5,881
1995	17,000	3,000	6,159
1996	16,495	19,495	5,045
1997	0	11,000	23,873
1998	46,300 [e]	46,300	37,681
1999	36,000	36,000	43,900
2000	60,768 [f]	60,768	59,038
2001	35,232	35,232	41,447
2002	0	0	7,456

3. Project Description, Justification and Scope

The Dual-Axis Radiographic Hydrotest Facility (DARHT) project was previously a subproject of the Nuclear Weapons Research, Development, and Testing Facilities Revitalization, Phase II project (88-D-106). With the virtual completion of the remaining ten subprojects in 88-D-106, the DARHT effort was established as a stand-alone project in FY 1997 so that it can be more readily managed, monitored and funded.

---

[a] Funds appropriated in FY 1988-1996 are from the DARHT subproject 88-D-106 and were moved to 97-D-102 to support management and monitoring of the project.

[b] Reflects an appropriation of $15,760,000 and the subsequent sequestration of $4,855,000 for FY 1990 and the FY 1990 Omnibus reprogramming approved by appropriations subcommittees.

[c] Reflects an appropriation of $16,800,000 and the subsequent FY 1991 Omnibus reprogramming of $11,800,000 approved by Congressional subcommittee.

[d] No funds were appropriated in FY 1993. Reflects reprogramming of $3,500,000 redirected from prior year appropriation from Dormitories subproject of Line Item 88-D-106 at the Nevada Test Site (NTS).

[e] FY 1998 funding represents $24,300,000 for completion of Phase 1 (first-axis) and $22,000,000 for engineering planning and long-lead procurement for Phase 2.

[f] Original appropriation was $61,000,000. This was reduced by $232,000 for the FY 2000 rescission enacted by P.L. 106-113.

Justification

Since its inception in 1988, the DARHT project has been recognized as a key link in DOE efforts to maintain the quality and reliability of the nuclear weapons stockpile. Historically, radiographic hydrodynamic tests and dynamic experiments have been a requirement to support the DOE (and predecessor agencies) mission; they remain an important requirement for future efforts of the Stockpile Stewardship and Management (SS&M) Program as they assist in the understanding and evaluation of nuclear weapon performance. Dynamic experiments are used to gain information on the physical properties and dynamic behavior of materials used in nuclear weapons, including changes due to aging. Hydrodynamic tests are used to obtain diagnostic information on the behavior of a nuclear weapons primary (using simulated materials for the fissile materials in an actual weapon) and to evaluate the effects of aging on the nuclear weapons remaining in the greatly reduced stockpile. The information that comes from these types of tests and experiments cannot be obtained in any other way.

The DOE existing capability to obtain diagnostic information was designed and implemented at a time when the organization could rely on direct observations of the results of underground nuclear tests to provide definitive answers to questions regarding nuclear weapons performance. Without the ability to verify weapons performance through nuclear tests, the remaining diagnostic tools are inadequate by themselves to provide sufficient information. Accordingly, as the Nation moves away from nuclear testing, DOE must enhance its capability to use other tools to predict weapons safety, performance, and reliability. In particular, DOE must enhance its capability to perform hydrodynamic experiments to assess the condition and behavior of nuclear weapons primaries.

Although the current U.S. stockpile is considered to be safe and reliable, the existing weapons are aging beyond their initial design lifetimes and, by the turn of the century, the average age of the stockpile will be older than at any time in the past. To ensure continued confidence in the safety and reliability of the U.S. nuclear weapons stockpile, DOE needs to improve its radiographic hydrodynamic testing capability as soon as possible. Uncertainty in the behavior of the aging weapons in the enduring stockpile will continue to increase with the passage of time because existing testing techniques, by themselves, are not adequate to assess the safety, performance, and reliability of the weapons primaries. Should DOE need to repair or replace any age-affected components, retrofit existing weapons, or apply new technologies to existing weapons, existing techniques are not adequate to assure weapons safety and reliability. In an era without nuclear testing, DOE believes that it is probable that the existing weapons will require these types of repairs or retrofits in the foreseeable future. DOE has determined that no other currently available advanced techniques exist that could provide a level of information regarding nuclear weapons primaries comparable to that which could be obtained from enhanced radiographic hydrodynamic testing.

In addition to weapons work, DOE uses its radiographic testing facilities to support many other science missions, and needs to maintain or improve its radiographic testing capability for this purpose. Hydrodynamic tests and dynamic experiments are important tools for evaluating conventional munitions; for studying hydrodynamics, materials physics, and high-speed impact phenomena; and for assessing and developing techniques for disabling weapons produced by outside interests.

Project History Leading to Current Project Scope

Originally, the project scope included two 16-MeV electron-beam accelerators producing x-rays. In FY 1990, the Department decided to defer construction of the Hydrotest Firing Site (HFS) pending completion of technology development verified by the test results from an Integrated Test Stand (ITS), which consisted of about 30 percent of one x-ray machine. Following the successful ITS test results, development and construction of the hydrotest firing site was re-scoped based on the recommendations of two independent "Blue Ribbon" review committees assembled to assist the Department of Energy (DOE) in enhancing the development of a vital hydrotest capability. The new scope provided for the development, procurement, and installation of the first of two 16-MeV flash x-ray machines (for dual-axis radiography) at the firing site; and construction of a weatherproof building to house the dual-axis radiographic systems and supporting calibration activities. Construction was resumed in FY 1994.

On January 26, 1995, an injunction was issued for this project by the United States District Court for the District of New Mexico, requiring a cessation of all actions associated with the DARHT construction project, including any construction, procurement, design, or any furtherance of the DARHT project pending completion and judicial review of an Environmental Impact Statement (EIS) and Record of Decision (ROD). In response, the Department ceased all project activities and completed an EIS for the project. A ROD was published in October 1995. The preferred option that was selected was to complete the project and operate the DARHT facility with the use of steel containment vessels to minimize the environmental impacts from operation of the facility. This containment option includes multiple phases to eventually obtain at least 75 percent reduction in the emissions from high-explosives testing when compared to the DARHT Baseline Alternative analyzed in the EIS. The January 1995 injunction was lifted in April 1996 and DARHT construction resumed in May 1996.

The DARHT project is now redefined to comply with the ROD preferred alternative and is divided into two phases. The first phase, most of which has been in progress since FY 1988, consists of the construction of a Radiographic Support Laboratory (RSL) and a Hydrotest Firing Site (HFS), which includes the first of two flash x-ray machines. In addition, this phase includes: the initial stage of containment of emissions from the high-explosives experiments to be conducted at the facility; an increase in accelerator energy from 16 to 20 MeV; changes in the accelerator to generate higher electron-beam currents; and improved diagnostics. Phase 1 was completed during FY 1999 and the first axis became operational in July 1999. Phase 2 includes the second flash x-ray machine, as well as the second stage of increased containment of testing emissions. The Department's decision in September 1997 of the Long-Pulse Induction Accelerator as the best technology for the second axis resulted in the current baseline for the project. A third phase of increased containment of testing emissions as defined in the ROD will be evaluated after several years of operating experience on DARHT. If a decision is made at the time to develop a vessel system capable of containing a 400 pounds of TNT equivalent high explosives, a new line item would be proposed.

Phase 1

Phase 1, completed and approved for operations on July 3, 1999, includes the Radiographic Support Laboratory; the first of two flash x-ray machines (for dual-axis radiography) at the firing site; state-of-the-art hydrodiagnostic instrumentation at the firing site; a blastproof building to house the dual-axis radiographic systems and support calibration activities; and, the first containment vessel (an existing vessel design modified for DARHT testing).

Hydrotest Firing Site (HFS)

The entire HFS building was constructed as part of this phase, as well as the first x-ray machine and all electronic and optical diagnostics. The second machine, necessary to complete the essential dual-axis configuration of the facility, is being built in a sequential manner (Phase 2), allowing it to take advantage of engineering and scientific advances that occurred before its construction. The first machine is a state-of-the-art linear induction accelerator, producing an electron beam of approximately 20-MeV that is converted into an x-ray beam. A high speed electronic data acquisition system, a firing site control system, and optical imaging systems are included. Optical instrumentation includes high-speed framing and streak cameras and laser velocity interferometers. To improve the diagnostics capability of this facility, a gamma-ray camera is included.

The HFS building is a two-level, 39,650-square-foot building to house and operate both accelerators. The walls and roof are designed to shield personnel operating the facility from the radiation produced by the accelerators, as well as to resist blast forces resulting from the detonation of explosives. The accelerators are located on a three foot thick concrete slab on grade. Both accelerator rooms contain a total of approximately 13,175 square feet and are equipped with a 10-ton capacity bridge crane. Completion of the entire building for both x-ray machines allows installation of the second machine (Phase 2) to take place without stopping hydrodynamic testing activities on the first machine.

The power supply rooms provide space adjacent to the accelerators for electrical equipment that serves the accelerators. These rooms are equipped with 3-ton capacity bridge cranes. The detection chamber is electromagnetically shielded. Adjacent to the detection chamber are the control room, a cable room, a capacitor discharge unit (CDU) room, and a computer room. The detection chamber, computer room and accelerator control room are also provided with an access flooring system. Other rooms include an optical room, an analyzer room, a Fabry Perot room, a laser illumination room, an assembly room, toilets, and mechanical/electrical equipment room. This area contains approximately 26,475 square feet.

Fire protection is provided throughout by a hydraulically designed foam/water automatic sprinkler system. Plumbing and process piping includes hot and chilled circulating water, potable hot and cold water, industrial cool water, sanitary sewer, compressed air, natural gas, transformer oil, and low-conductivity water systems. A boiler and two chillers are included to provide hot and cold water. This conditioned water is used for heating, ventilating, and air-conditioning the building, with the exception of the detection chamber and accelerator control room, which are serviced with "computer-type" units. Two above-ground, 12,000 gallon oil storage tanks, a cooling tower, and an electrical substation are provided. Power is supplied to the building from an existing 13.2 kV line. The building is equipped with communication systems that include telephone, intercom, and broad band communications.

Site work includes a new asphalt surfaced access road, an asphalt surfaced circulation road and parking area, surface drainage, and erosion control. Utilities extended to the site include natural gas, water, electrical power, and communication services. A septic tank and seepage pit are provided to handle the sanitary sewage.

A prototype vessel system and a temporary cleanout unit are included to obtain the initial 5 percent reduction in testing emissions when compared to the DARHT Baseline Alternative analyzed in the EIS for the first five-year period of facility operation. The prototype vessel system is a modification of an existing steel vessel design for experiments containing up to 27 kg of high-explosives.

Phase 2

Included in DARHT Phase 2 is the second electron beam accelerator which will be installed in the second accelerator hall provided in Phase 1. The second machine, necessary to complete the essential dual-axis configuration of the facility, is being built in a sequential manner, allowing it to take advantage of engineering and scientific advances that have occurred since construction of the first machine. In September 1997, the Department selected the Long-Pulse Linear Induction Accelerator because it presented the greatest technological advancement for the lowest cost and least risk. The second machine will be capable of providing four high-quality beam pulses over four microseconds with each pulse comparable in quality to the single pulse machine in the first axis.

The technology selected for Phase 2 requires a machine that is longer than the accelerator hall provided under Phase 1. To accommodate the longer machine, it was necessary to increase the size of the west accelerator hall by 1,300 square feet. Other modifications that were required to the HFS included a larger roof hatch to install equipment, extension of the 3-foot thick accelerator foundation and glycol system modifications. While the HFS was constructed as part of Phase 1, the changes were driven by Phase 2 requirements and were, therefore, budgeted for in Phase 2.

A preparation facility includes high bay space for cleanout, process, and two staging areas. The high bay spaces will include bridge cranes. This facility includes a small analytical lab, change rooms, storage, waste storage, fabrication shop, a small multipurpose room, an area for office cubicles, and the mechanical/electrical support spaces.

Fire protection for the vessel preparation facility will be provided throughout by a hydraulically designed automatic sprinkler system. Areas with the potential for contamination will drain to a storage tank to provide secondary containment of the sprinkler water. The areas with the potential for contamination will also be connected to a mitigating debris recycling system. Other plumbing systems will be potable hot and cold water, hot and cold circulating water, a double wall drain line for potentially contaminated water, and sanitary waste drainage. A natural gas-fired boiler will provide the hot water and a chiller will provide the chilled water. The HVAC system will include a HEPA filtration system to vent the vessels. The areas with potential contamination will be designed for seven air changes per hour with a once-through air handling system. The analytical lab will be equipped with a fume hood. The building will be equipped with communication systems that will include telephone, intercom, and broad-bank communications.

Site work for the vessel preparation facility will include a new concrete apron. The apron will be designed for vessel handling equipment and storage. Utilities extended to the site will include natural gas, water, sanitary sewer, electrical power, and communication services. Power will be supplied to the building from an existing 13.2-kV line.

This phase includes a vessel capable of containing a detonation which results in a reduction in testing emissions of at least 40 percent, when compared to the DARHT Baseline Alternative analyzed in the EIS, during the second 5-year period of facility operation. Containment goals will be met or exceeded through the use of a combination of techniques: containment, material replacement, post-shot recovery, and program management.

Experience gained during Phases 1 and 2 will allow the final containment techniques to be implemented that would result in at least 75 percent reduction in testing emissions when compared to the DARHT Baseline Alternative analyzed in the EIS for the remaining years of facility operation. The Department of Energy will meet the release reduction goals of this phase through the use of the combination of techniques discussed above.

Project Milestones:

FY 1999:	Phase 1:	HFS Construction Complete	3Q
		First Axis Machine Operational	3Q
		Complete First Axis Readiness Assessment	3Q
	Phase 2:	Deliver Accelerator Cells to LANL for Prototype Testing with the Beam	4Q
FY 2000:	Phase 1:	Complete	
	Phase 2:	Complete Second Axis Machine Accelerator Hardware Design	1Q
		Complete Confinement Vessel Design	2Q
FY 2001:	Phase 2	Complete Design for Vessel Preparation Facility	1Q
		Start Vessel Preparation Facility Construction	2Q
		Complete Detector Design	2Q
		Complete Accelerator Hardware Procurement	3Q

4. Details of Cost Estimate [a]

Phase 1	Current Estimate	Previous Estimate
	(dollars in thousands)	
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)	23,776	23,959
Total Design Costs (22.5% of TEC)	23,776	23,959
Construction Phase		
Buildings	24,048	23,814
Special Equipment	48,075	46,804
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	2,787	2,032
Project Management (6.2% of TEC) [b]	6,506	6,439
Total Construction Costs (77% of TEC)	81,416	79,089
Contingencies		
Construction Phase (.5% of TEC)	508	2,652
Total Contingencies (.5% of TEC)	508	2,652
Total, Line Item Costs (TEC)	105,700	105,700

[a] The Details of Cost Estimate section has been split between Phase 1 and Phase 2 to more accurately reflect costs under the categories required under the current data sheet format. It is not possible to identify all costs in the new categories since this project was established and tracked using cost categories in effect at the time of initial funding in FY 1988.

[b] Since the project was initially funded in FY 1988, all of the Phase 1 management effort has been tracked only as project management; consequently, all design and construction management is included as project management under the construction phase.

4. Details of Cost Estimate

(continued)

(dollars in thousands)

Phase 2	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design Costs (Design Drawings and Specifications)	30,310	17,337
Design Management Costs (0.2% of TEC) [a]	273	273
Project Management Costs (0.2% of TEC) [a]	382	382
Total Design Costs (20.1% of TEC)	30,965	17,992
Construction Phase		
Buildings	7,040	9,370
Special Equipment	91,745	101,103
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	162	336
Construction Management (0.4% of TEC) [a]	637	637
Project Management (4.9%of TEC) [a]	7,573	8,832
Total Construction Costs (69.6%of TEC)	107,157	120,278
Contingencies		
Design Phase (2.3% of TEC)	3,500	2,902
Construction Phase (8.0% of TEC)	12,378	12,828
Total Contingencies (10.3% of TEC)	15,878	15,730
Total, Line Item Costs (TEC) [b] (Phase 2)	154,000	154,000
Total, Line Item Costs (TEC) (Phase 1)	105,700	105,700
Total, Line Item Costs (Phase 1 and Phase 2)	**259,700**	**259,700**

5. Method of Performance

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

[a] Design and construction management only includes conventional facility design and construction. Design phase project management includes only conventional facility design phase management. Construction Phase project management includes both the conventional facility construction phase management and all of the special equipment project management. Special equipment does not have a traditional construction component with design, procurement and installation taking place concurrently among the various special equipment work elements. Attempting to separately track and report special equipment design and construction management would require establishing an additional 26 WBS elements and associated cost control elements. This is deemed to have greater cost than benefit. The intent to establish conventional facility construction design and construction management costs is supported, however, in this approach.

[b] Escalation rates taken from FY 1999 DOE escalation multiplier tables.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years*	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Costs						
Design	30,243	13,601	11,519	2,159	719	58,241
Construction	77,616	30,299	47,519	39,288	6,737	201,459
Total, Line item TEC	107,859	43,900	59,038	41,447	7,456	259,700
Operating expense funded equipment	1,105	0	0	0	0	1,105
Total Facility Costs (Federal and Non-Federal)	108,964	43,900	59,038	41,447	7,456	260,805
Other Project Costs						
R&D necessary to complete construction	1,471	0	0	0	0	1,471
Conceptual design costs	260	0	0	0	0	260
NEPA documentation costs	2,960	0	0	0	0	2,960
Other project-related costs [a]	2,803	461	0	0	1,040	4,304
Total, Other Project Costs	7,494	461	0	0	1,040	8,995
Total Project Cost (TPC)	116,458	44,361	59,038	41,447	8,496	269,800

7. Related Annual Funding Requirements

(FY 2002 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [b]	10,400	10,400
Programmatic operating expenses directly related to the facility [c]	8,000	8,000
Total related annual funding (operating from FY 2002 through FY 2031)	18,400	18,400

[a] These are the costs for (1) FY 1997 Technology Options Study to evaluate the alternative technologies for the second x-ray machine, (2) facility start-up including the Readiness Assessment, and (3) management of operating expense items.

[b] These are all direct and indirect costs associated with maintaining the facility readiness for programmatic purposes. It includes facility maintenance, utility costs, space tax, organizational support, janitorial services, and security with both axes operational and in the final containment phase. It includes the RSL, HFS, and Vessel Preparation Facility. On average, the related effort is 28.5 FTEs.

[c] The annual programmatic operating expense will fluctuate significantly from year to year depending on the programmatic effort. The $8,000,000 is an average based on the FY 1997 effort at PHERMEX.

97-D-123, Structural Upgrades, Kansas City Plant, Kansas City, Missouri

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

None.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1997 Budget Request (*Preliminary Estimate)*	2Q 1997	3Q 1999	3Q 1998	3Q 2003	18,000	19,800
FY 1998 Budget Request.	2Q 1997	3Q 1999	3Q 1998	3Q 2003	18,000	19,800
FY 1999 Budget Request [a]	1Q 1998	3Q 1999	3Q 1998	3Q 2003	18,000	19,800
FY 2000 Budget Request	1Q 1998	4Q 1999	2Q 1999	2Q 2003	18,000	21,200
FY 2001 Budget Request *(Current Baseline Estimate)*	1Q 1998	4Q 1999	2Q 1999	2Q 2003	18,000	21,200

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1997	1,400	0	0
1998	0	594	0
1999	6,400	1,540	817
2000	4,282 [b]	9,948	8,383
2001	2,918	2,918	3,500
2002	3,000	3,000	2,900
2003	0	0	1,700
2004	0	0	700

[a] Reflected baseline changes to ensure that all areas within the Stockpile Management Restructuring Initiative (SMRI) footprint are repaired/reinforced.

[b] Original appropriation was $4,800,000. This was reduced by $18,000 for the FY 2000 rescission enacted by P.L. 106-113, and by $500,000 for an FY 2000 general reduction.

3. Project Description, Justification and Scope

This project is required to correct structural overstress caused by gravity loads and will reinforce masonry walls to resist seismic loading within the DOE controlled portion of the Bannister Federal Complex to ensure life safety. On December 16, 1993, a Kansas City Susceptibility Review and Walkdown was held at the Kansas City Plant (KCP) by Albuquerque Operations Office, and Headquarters. This review was initiated as a result of a September 1993 report by an outside structural consulting firm that documented two principal areas of concern: existing structural overstresses and numerous unreinforced interior masonry walls. It was determined during the review that the structural overstresses and unreinforced masonry walls findings were an immediate concern.

To provide an immediate response to initiate risk reduction and potential loss of government assets, structural modifications were incorporated into all ongoing projects which appreciably renovated affected areas. Deficiencies in the remainder of the plant not affected by on-going projects are being addressed in this line item submission.

The first part of this line item is required to provide structural overstress relief in accordance with current building code and DOE Order requirements to ensure life safety. This type of overstress is caused by gravity loads (dead loads, live load and snow load) and wind loading only. Overstressed locations will be repaired to reduce the possibility of structural failure and bring the structure into compliance with DOE Orders and codes.

The second part of this line item is required to reinforce masonry walls to resist the seismic loading up to a "500 year event." The existing masonry walls will fall at a "100 year event." Approximately 40 percent of the masonry walls in the DOE controlled part of the Federal Complex (upon completion of the Stockpile Management Restructuring Initiative Line Item) are not reinforced to resist seismic loading. Seismic codes were not in place when the KCP was constructed. Potential seismic overstresses have been identified because of the presence of many unreinforced masonry walls added to the building for fire protection purposes. Failure of these walls would constitute a life safety hazard in the event of seismic activity.

The Federal Complex is currently occupied by several Federal Government Agencies. Corrective activities will be performed in DOE controlled areas only, unless an item is identified through the engineering study that would affect both DOE and the General Services Administration. This project will include the following upgrades:

- Column ribs will be post tensioned on end bays to increase bending moment capacity. This will be done by tensioning two steel rods underneath the subject ribs. The rods will be anchored into the end bay roof beam and bolted through to the interior roof beam.

- Selected rib ends will be supported with steel suspenders and long threaded rods through the roof shell or saddles and fastened to the roof beams to increase rib shear capacity and overcome the member strength loss due to existing cracking caused by excessive shear loading.

- Roof shell openings will be reinforced with steel straps adjacent to openings and parallel to the barrel axis. This provides a means of externally reinforcing the thin concrete shell.

- The mezzanine roof slab will be reinforced with intermediate steel beams supported by the concrete roof support beams.

Supplemental support will be provided to mezzanine concrete roof structure integrity. This would stop further deterioration of the shell.

Roof shell cracks will be injected with epoxy to reestablish roof structure integrity. This would stop further deterioration of the shell.

Structural steel blocking will be attached to the roof structure on each side of existing masonry walls. This will eliminate drift during seismic activity and ultimately failure of the walls independent of the remaining structure. This blocking would be spaced approximately 4 feet center to center. The blocking would consist of steel angles fastened to a horizontal surface with the vertical leg of the angle placed against the top of the masonry wall and flat plates fastened to vertical surfaces of the roof structure and lapped down over the top course of the masonry walls.

Steel strong-backs will be installed adjacent to masonry walls. This strong-back will be a structural tube fixed to the building floor at the bottom of the wall and roof structure at the top. The wall would be bolted to the strong-backs at approximately 4 feet centers. The strong-backs themselves would be on 8 foot centers. This would prevent a tall wall from collapse during a seismic event that produced lateral movement normal to the wall.

The top of free-standing masonry walls will be supported with roof structure mounted braces. These braces would then be mounted to a steel strut fastened to the roof.

Main Manufacturing Building Overstresses Under Gravity Loading:

Roof Ribs - 4 percent of the ribs are overstressed.

Roof Beams - < 1 percent of the beams are overstressed.

Roof Shell With Openings - 34 percent of the roof shells are overstressed.

Columns - 0 percent of the columns are overstressed.

Basement Level Supported Floor Slab - 5 percent of the floor slab is overstressed.

2nd Level Supported Floor Slab - 6 percent of the floor slab is overstressed

Seismic events at KCP can be generated by two faults. The New Madrid Fault is approximately 250 miles east of the KCP. The New Madrid fault system extends 120 miles from the area of Charleston, Missouri and Cario, Illinois through New Madrid, Missouri and to Marked Tree, Arkansas. It crosses five state lines and crosses the Mississippi River in three places and the Ohio River in two places. The fault is active, averaging more than 200 measured events per year (1.0 or more on the Richter scale). Tremors large enough to be felt (2.5-3.0 on the Richter scale) are noted annually. Every 18 months the fault releases a shock of 4.0 or more capable of local minor damage. Magnitudes of 5.0 or greater occur about once per decade, can do significant damage, and can be felt in several states. A damaging earthquake along the fault of 6.0 or greater occurs about every 80 years with the last one in 1895. A major earthquake along the fault of 7.5 of greater happens every 200-300 years, with the last one in 1812. A quake of this magnitude would be felt throughout half of the United States. This information is based on a document titled "About the New Madrid Fault" from Southeast Missouri State University Center for Earthquake Studies, David Stewart, Director. The document is undated.

The other fault that could affect the KCP is the Humbolt Fault Zone (Nehemma Ridge) located approximately 80 miles west of Kansas City in the Manhattan-Wamego, Kansas area. The largest earthquake that has occurred in Kansas is a probable Richter magnitude of about 5.2-5.3, which occurred in 1867 and events of this size can be expected to occur every 100 years. An earthquake of Richter magnitude 6.0-6.5 at this fault is likely to occur on average once in about 1000 years. This information is based on a document titled "Kansas Geological Survey" from the University of Kansas on October 10, 1990 by Don W. Steeples, Ph.D., Seismologist and Deputy Director.

In March 1994, the KCP was placed in performance Category 1, based on an extensive study of mission dependency of specific KCP operations, Production Risk Evaluation Program, and the hazard assessment in the Site Safety Assessment. This recommendation was agreed to by Kansas City Area Office (KCAO), Albuquerque (AL) Operations Office, DOE-HQ, and AlliedSignal. A site specific Seismic Hazard Analysis was performed during the first quarter of FY 1994 by DOE-HQ for the KCP. This resulted in a reduction of the seismic zone factor from 0.15g to 0.06g. The Design Basis Earthquake (DBE) of 0.06g is comparable to a 500-year event. The former values are required by the 1994 Uniform Building Code for Zone 2A where the KCP is located. The lower seismic zone factor resulted in significant reduction in the calculations used in the analysis and has been taken into account in the cost estimate. The existing masonry walls are currently protected to a 100-year event.

The applicable DOE Orders and Codes that apply to this project are as follows:

- DOE Order 420.1, "Facility Safety."
- Executive Order 12941 "Seismic Safety of Existing Federally Owned or Leased Buildings."
- The American Institute of Steel Construction (A.I.S.C.), American Concrete Institute (A.C.I.), and Uniform Building Code (UBC) define analysis and design requirements for corrective actions.

The consequence of not funding this line item is a continued life safety risk due to structural overstresses and, in the event of seismic activity, potential failure of unreinforced masonry walls. This project is in accordance with current mission needs and is being coordinated with the Stockpile Management Restructuring Initiative.

Project Milestones:

FY 1998:	A-E Work Initiated	1Q
FY 1999:	A-E Work Completed	4Q
	Physical Construction Starts	2Q
FY 2003:	Physical Construction Complete	2Q

4. Details of Cost Estimate

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)	1,626	1,626
Design Management Costs (2.8% of TEC)	504	504
Project Management Costs (0.3% of TEC)	49	49
Total, Design Costs (12.1% of TEC)	2,179	2,179
Construction Phase		
Buildings	10,830	10,830
Standard Equipment	360	360
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance	918	918
Construction Management (4.7% of TEC)	842	842
Project Management (1.1% of TEC)	195	195
Total, Construction Costs (73.0% of TEC)	13,145	13,145
Contingencies		
Design Phase (0.7% of TEC)	131	131
Construction Phase (14.1% of TEC)	2,545	2,545
Total, Contingencies (14.9% of TEC)	2,676	2,676
Total, Line Item Costs (TEC) [a]	18,000	18,000

5. Method of Performance

Design and inspection will be performed under a KCP negotiated architect-engineer subcontract. Construction will be accomplished by fixed-price contracts awarded on the basis of competitive proposals and administered by Allied Signal.

[a] The Conceptual Design Report was completed in June 1995. Escalation is calculated to the midpoint of each activity. Escalation rates were taken from the FY 1997 DOE escalation multiplier tables. Overhead rates were calculated at a factor of 14% for procurement and 77% for internal labor.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Cost						
Design	0	817	1,493	0	0	2,310
Construction	0	0	6,890	3,500	5,300	15,690
Total, Line item TEC	0	817	8,383	3,500	5,300	18,000
Total, Facility Costs (Federal and Non-Federal)	0	817	8,383	3,500	5,300	18,000
Other Project Costs						
Conceptual design cost	110	0	0	0	0	110
Other project-related costs	710	420	420	600	940	3,090
Total, Other Project Costs	820	420	420	600	940	3,200
Total, Project Cost (TPC)	820	2,420	8,803	4,100	6,240	21,200

7. Related Annual Funding Requirements [a]

(FY 2003 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	0	0
Annual facility maintenance/repair costs	0	0
Total related annual funding (operating from FY 2003 through FY 2032)	0	0

[a] This project is to repair the structural elements of the KC Plant and there is no associated annual operating or maintenance cost associated with this project.

96-D-111, National Ignition Facility (NIF), Lawrence Livermore National Laboratory, Livermore, California

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

In response to projected cost increases and schedule delays associated with the Department's National Ignition Facility Project, the Office of Defense Programs, Lawrence Livermore National Laboratory and NIF Project management have been working together to bring the Project back on track as directed by Secretary Richardson. The NIF Project has changed its method of execution to address cleanliness problems in assembling and installing the laser and target system infrastructure. Assembly and installation will be performed by industrial partners with proven records of constructing similarly complex facilities. The project is currently incorporating these changes into a new NIF baseline which will be certified by the Department and submitted to Congress by June 1, 2000. A revised Construction Project Data Sheet will be submitted to Congress with the Secretary's certification of the new NIF baseline. DOE plans to accommodate additional FY 2001 funding needs for the National Ignition Facility which result from the new baseline or related activities, if any, within the budgets for DOE Defense Programs and the Lawrence Livermore National Laboratory.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1996 Budget Request (*Preliminary Estimate*)	1Q 1996	1Q 1998	3Q 1997	3Q 2002	842,600	1,073,600
FY 1998 Budget Request (*Title I Baseline*)	1Q 1996	1Q 1998	3Q 1997	3Q 2003	1,045,700	1,198,900
FY 2000 Budget Request	1Q 1996	2Q 1998	3Q 1997	3Q 2003	1,045,700	1,198,900
FY 2001 Budget Request *(Current Baseline Estimate*)	1Q 1996	2Q 1998	3Q 1997	3Q 2003	1,045,700	1,198,900

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1996	37,400	37,400	33,990
1997	131,900	131,900	74,294
1998	197,800	197,800	165,389
1999	284,200	284,200	251,476
2000	247,158 [a]	247,158	TBD [b]
2001	74,100	74,100	TBD
2002	65,000	65,000	TBD
2003	8,142	8,142	TBD

3. Project Description, Justification and Scope

The Project provides for the design, procurement, construction, assembly, installation, and acceptance testing of the National Ignition Facility (NIF), an experimental inertial confinement fusion facility intended to achieve controlled thermonuclear fusion in the laboratory by imploding a small capsule containing a mixture of the hydrogen isotopes, deuterium and tritium. The NIF is being constructed at the Lawrence Livermore National Laboratory (LLNL), Livermore, California as determined by the Record of Decision made on December 19, 1996, as a part of the Stockpile Stewardship and Management Programmatic Environmental Impact Statement (SSM PEIS).

The mission of the National Inertial Confinement Fusion (ICF) program is to execute high energy density physics experiments for the Stockpile Stewardship program, an important part of which is the demonstration of controlled thermonuclear fusion in the laboratory. Technical capabilities provided by the ICF program also contribute to other DOE missions including nuclear weapons effects testing and the development of inertial fusion power. As a key element of the Stockpile Stewardship Program, the NIF is designed to achieve propagating fusion burn and modest (1-10) energy gain within 2-3 years of full operation and to conduct high energy density experiments, both through fusion ignitions and through direct application of the high laser power. This mission was identified in the NIF Justification of Mission Need, which was endorsed by the Secretary of Energy. Identification of target ignition as the next important step in ICF development for both defense and non-defense applications is consistent with the earlier (1990) recommendation of DOE's Fusion Policy Advisory Committee, and the National Academy of Sciences Inertial Fusion Review Group. In 1995, the DOE's Inertial Confinement Fusion Advisory Committee affirmed the program's readiness for an ignition experiment. A review by the JASONs in 1996 affirmed the value of the NIF for stockpile stewardship.

---

[a] Original appropriation was $248,100,000. This was reduced by $942,000 for the FY 2000 rescission enacted by P.L. 106-113.

[b] Revision to the NIF project baseline in progress at present will change the cost estimates for FY 2000 and the outyears. An updated cost estimate will be provided by June 1, 2000, when the Department certifies the new NIF baseline to Congress.

The NIF project supports the DOE mandate to maintain nuclear weapons science expertise required for stewardship of the stockpile. After the United States announcement of a moratorium on underground nuclear tests in 1992, the Department established the Stockpile Stewardship program to ensure the preservation of the core intellectual and technical competencies in nuclear weapons. The NIF is one of the most vital facilities in that program. The NIF will provide the capability to conduct laboratory experiments to address the high energy density and fusion aspects that are important to both primaries and secondaries in stockpile weapons.

At present, the Nation's computational capabilities and scientific knowledge are inadequate to ascertain all of the performance and safety impacts from changes in the nuclear warhead physics packages due to aging, remanufacturing, or engineering and design alterations. Such changes are inevitable if the warheads in the stockpile are retained well into the next century, as expected. In the past, the impacts of such changes were evaluated through nuclear weapon tests. Without underground tests, we will require better, more accurate computational capabilities to assure the reliability and safety of the nuclear weapons stockpile for the indefinite future.

To achieve the required level of confidence in our predictive capability, it is essential that we have access to near-weapons conditions in laboratory experiments. The importance of nuclear weapons to our national security requires such confidence. For detonation of weapon primaries, that access is provided in part by hydrodynamic testing. For secondaries and for some aspects of primary performance, the NIF will be a principal laboratory experimental physics facility.

The most significant potential commercial application of ICF in the long term is the generation of electric power. Consistent with the recommendations of the Fusion Policy Advisory Committee, the NIF will provide a unique capability to address critical elements of the inertial fusion energy program by exploring moderate gain (1 to 10) target designs, establishing requirements for driver energy and target illumination for high gain targets, and developing materials and technologies useful for civilian inertial fusion power reactors.

The ignition of an inertial fusion capsule in the laboratory will produce extremely high temperatures and densities in matter. Thus, the NIF will also become a unique and valuable laboratory for experiments relevant to a number of areas of basic science and technology.

The NIF is an experimental fusion facility consisting of a laser and target area, and associated assembly and refurbishment capability. The laser will be capable of providing an output pulse with an energy of 1.8 megajoules (MJ) and an output pulse power of 500 terawatts (TW) at a wavelength of 0.35 micrometers (μm) and with specified symmetry, beam balance and pulse shape. The NIF design provides an experimental facility to house a multibeam line, neodymium (Nd) glass laser capable of generating and delivering the pulses to a target chamber. In the target chamber, a positioner will center a target containing fusion fuel, a deuterium-tritium mixture, for each experiment. Diagnostics provided by this project will provide the test data to demonstrate subsystem performance and initial operations.

The NIF experimental facility, titled the Laser and Target Area Building, will provide an optically stable and clean environment. This laser building will be shielded for radiation confinement around the target chamber and will be designed as a radiological, low-hazard facility capable of withstanding the natural phenomena specified for the LLNL site. The baseline facility is for one target chamber, but the design shall not preclude future upgrade for additional target chambers.

The NIF project consists of conventional and special facilities.

- Site and Conventional Facilities include the land improvements (e.g., grading, roads) and utilities (electricity, heating gas, water), as well as the laser building, which has an approximately 20,300 square meters footprint and 38,000 square meters in total area. It is a reinforced concrete and structural steel building that provides the vibration-free, shielded, and clean space for the installation of the laser, target area, and integrated control system. The laser building consists of two laser bays, each 31 meters (m) by 135 m long, and a central target area--a heavily shielded (1.8 m thick concrete) cylinder 32 m in diameter and 32 m high. The laser building includes security systems, radioactive confinement and shielding, control rooms, supporting utilities, fire protection, monitoring, and decontamination and waste handling areas. Optics assembly and refurbishment capability is provided for at LLNL by incorporation of an optics assembly area attached to the laser building and minor modifications of other existing site facilities.

Special facilities include the Laser System, Target Area, Integrated Computer Control System, and Optics.

- The laser system is designed to generate and deliver high power optical pulses to the target chamber. The system consists of 192 laser beamlets configured to illuminate the target surface with a specified symmetry, uniformity, and temporal pulse shape. The laser pulse originates in the pulse generation system. This precisely formatted low energy pulse is amplified in the main amplifier. To minimize intensity fluctuation, each beam is passed through a pinhole in a spatial filter on each of the four passes through the amplifier and through a transport spatial filter. The beam transport directs each high power laser beam to an array of ports distributed around the target chamber where the frequency of the laser light is tripled to 0.35 µm, spatially modulated by phase plates and focused on the target. Systems are provided for automatic control of alignment and the measurement of the power and energy of the beam. Structural support and auxiliary systems provide the stable platform and utilities required.

- The target area includes a 10 m diameter, low activation (i.e., activated from radiation) aluminum vacuum chamber located in the Target Area of the laser building. Within this chamber, the target will be precisely located. The chamber and building structure provide confinement of radioactivity (e.g., x-rays, neutrons, tritium, and activation products). Diagnostics will be arranged around the chamber to demonstrate subsystem performance for project acceptance (TEC) and initial operations (TPC). Structural, utility and other support systems necessary for safe operation and maintenance will also be provided in the Target Area. The target chamber and staging areas will be capable of conducting experiments with cryogenic targets. The Experimental Plan indicates that cryogenic target experiments for ignition will be needed 2-3 years after completion of the project. Therefore, the targets and this cryogenic capability will be supplied by the experiments. The NIF project will make mechanical and electrical provisions necessary to position and align the cryogenic targets within the chamber. The baseline is for indirectly driven targets. An option for future modifications to permit directly driven targets is included in the design.

- The integrated computer control system includes the computer systems (note: no individual computer will cost over $100,000) required to control the laser and target systems. The system will provide the hardware and software necessary to support NIF operations. Also included is an integrated timing system for experimental control of laser and diagnostic operations. Safety interlocks and access control will also be provided.

- Thousands of optical components will be required for the 192 beamlet NIF. These components include laser glass, lenses, mirrors, polarizers, deuterated potassium dihydrogen phosphate crystals, pulse generation optics, debris shields and windows, and the required optics coatings. Optics includes quality control equipment to receive, inspect, characterize, and refurbish the optical elements.

Project Milestones [a]:

Project milestones for FY 2000 and FY 2001 include:

- FY 2000
  - Complete Optics Facilitization — 1Q
  - Complete Switchyard #2 Steel Structures — 2Q
  - Certification of new cost and schedule baseline — 6/1/00
  - Complete Conventional Construction and commission Switchyard #2 and Laser Bay #2 for installation of Special Equipment: — 4Q
- FY 2001
  - Final Safety Analysis Report (FSAR) — 3Q
  - End Conventional Construction — TBD [a]

[a] Project milestones and planned completion dates are being reevaluated as part of the baseline revision process.

4. Details of Cost Estimate

	(dollars in thousands)	
	Current Estimate [a]	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)		101,143
Design Management Costs (% of TEC)		21,900
Project Management Costs (% of TEC)		22,000
Total Design Costs (% of TEC)	TBD	145,043
Construction Phase		
Improvements to Land		1,800
Buildings		170,724
Special Equipment		520,802
Utilities		500
Inspection, Design and Project Liaison, Testing, Checkout and Acceptance		73,250
Construction Management (% of TEC)		22,800
Project Management (% of TEC)		31,500
Total Construction Costs (% of TEC)	TBD	821,376
Contingencies		
Design Phase (% of TEC)		1,000
Construction Phase (% of TEC)		78,281
Total Contingencies (% of TEC)	TBD	79,281
Total, Line Item Costs (TEC)	TBD	1,045,700

The cost estimate assumes a project organization and cost distribution consistent with the management requirements appropriate for a DOE Strategic System as outlined in the DOE Order 430.1, Life Cycle Asset Management and the NIF Project Execution Plan. Actual cost distribution will be in conformance with accounting guidelines in place at the time of project execution.

[a] Revision to the NIF project baseline in progress at present will change the cost estimates for FY 2000 and the outyears. An updated cost estimate will be provided by June 1, 2000, when the Department certifies the new NIF baseline to Congress.

5. Method of Performance

The NIF Laboratory Project Office (consisting of LLNL, LANL, SNL, and UR/LLE and supported by competitively-selected contracts with Architect Engineering firms, a Construction Manager, equipment and material vendors, and construction firms) will prepare the design, procure equipment and materials, and perform conventional construction, safety, system analysis, and acceptance tests. DOE will maintain oversight and coordination through the Headquarters Office of Inertial Fusion and the National Ignition Facility Project and the field office. DOE conducted the site selection and the NEPA determination. LLNL was selected as the construction site in the Record of Decision made on December 19, 1996. The method for procurement and installation and testing of special equipment is being reevaluated as part of the baseline revision. Inspection and Title III engineering contracts for the conventional systems will be competitively awarded. NIF start-up will be conducted by the NIF laboratory operations staff.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost [a]						
Facility Costs						
Design	143,043	29,755	TBD	TBD	TBD	TBD
Construction	130,630	221,721	TBD	TBD	TBD	TBD
Total, Line item TEC	273,673	251,476	TBD	TBD	TBD	TBD
Total Facility Costs (Federal and Non-Federal)	273,673	251,476	TBD	TBD	TBD	TBD
Other Project Costs						
R&D necessary to complete construction [b]	85,126	13,909	TBD	TBD	TBD	TBD
Conceptual design costs [c]	12,300	0	TBD	TBD	TBD	TBD
NEPA documentation costs [d]	3,754	601	TBD	TBD	TBD	TBD
Other project-related costs [e]	18,815	1,638	TBD	TBD	TBD	TBD
Total, Other Project Costs	119,995	16,148	TBD	TBD	TBD	TBD
Total Project Cost (TPC)	393,668	267,623	TBD	TBD	TBD	TBD
Budget Authority (BA) requirements						
TEC [f]	367,100	284,200	247,158	74,100	73,142	1,045,700
OPC [g]	132,300	6,800	5,900	5,900	2,300	153,200
Total, BA requirements [h]	499,400	291,000	253,058	80,000	75,442	1,198,900

[a] Prior year actuals are changed to reconcile with DOE Financial Information System (FIS) costs through FY 1999 Revision to the NIF project baseline in progress at present will change the cost estimates for FY 2000 and the outyears. An updated cost estimate will be provided by June 1, 2000, when the Department certifies the new NIF baseline to Congress.

[b] Costs include optics vendor facilitization and optics quality assurance.

[c] Includes original conceptual design report completed in FY 1994 ($12,000,000) and the conceptual design activities for the optical assembly and refurbishment capability and site infrastructure ($300,000).

[d] Includes preparation of the NIF portion of the Stockpile Stewardship and Management Programmatic Environmental Impact Statement and environmental monitoring and permits.

[e] Includes engineering studies (including advanced conceptual design) of project options; assurances, safety analysis, and integration; start-up planning, management, training and staffing; procedure preparation; operating spares; startup; and Operational Readiness Review.

[f] Specific long-lead procurements and contracts (e.g., building construction; major laser, optics, target area special equipment) require BA in advance of costs.

[g] Specific long-lead procurements and contracts (e.g., optics facilitization) require BA in advance of costs.

[h] Represents the current baseline. The revised NIF project baseline will be provided by June 1, 2000, when the Department certifies the new NIF baseline to Congress.

7. Related Annual Funding Requirements

(dollars in thousands)

	Current Estimate [a]	Previous Estimate
Annual facility operating costs [b]	TBD	21,200
Annual facility maintenance/repair costs [c]	TBD	33,200
Programmatic operating expenses directly related to the facility [d]	TBD	61,100
Capital equipment not related to construction but related to the programmatic effort in the facility [e]	TBD	200
GPP or other construction related to the programmatic effort in the facility [f]	TBD	200
Utility costs [g]	TBD	9,000
Other costs [h]	TBD	6,300
Total related annual funding (operating from FY 2004 through FY 2033)	TBD	131,200 [i]

[a] Revision to the NIF project baseline in progress at present will change the current estimate. An updated estimate will be provided by June 1, 2000, when the Department certifies the new NIF baseline to Congress

[b] Includes operator labor, engineering support and materials for upgrades and modifications, and consumables for operation of special equipment.

[c] Includes cost of labor, engineering support, and consumables for special equipment maintenance and refurbishment, including optics. Also includes maintenance for the laser building and support buildings.

[d] Compared to the NOVA experimental program, the annual direct NIF experimental program costs are estimated at $61,100,000 based on use of complex cryogenic targets, increased diagnostics support, and higher levels of three dimensional physics modeling. This primary experimental operating expense will be included in the base Inertial Confinement Fusion Program budget. Additional program costs will be associated with use of the facility.

[e] Fabrication accounts, procurements, such as small lasers and some laser parts, Computer-Aided Design systems, etc. to support upgrades.

[f] Minor additions and modifications to the facility related to programmatic effort.

[g] Electricity only. Gas, sewer, water, etc. are paid out of the General and Administrative budget.

[h] Nitrogen and argon for laser and transport beam tubes, stock inventory, and procurement support.

[i] In FY 2000 dollars.

95-D-102, CMR Upgrades Project, Los Alamos National Laboratory, Los Alamos, New Mexico

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

The Chemistry and Metallurgy Research (CMR) Upgrades Project has completed a revised baseline based on updated project objectives. In December 1997, a re-evaluation began to determine necessary upgrades, within allocated funding, to support safe operations of the facility through FY 2010. In March 1998, a DOE-Los Alamos National Laboratory (LANL) workshop focused on required upgrades driven by the facility Basis for Interim Operations/Technical Safety Requirements (BIO/TSRs). Subsequently, in July 1998 another DOE-LANL workshop was held that focused on risk reduction and operability/reliability improvements. The third and final workshop was held in May 1999 to finalize the revised scope of the CMR facility upgrades. The final list of upgrades and the revised baseline is based on BIO/TSR, public and worker safety, and programmatic requirements.

During the interim, the project proceeded with incremental authorizations to design and construct upgrades, identified as necessary in the first workshop, to address public safety risks and compliance until the finalization of the CMR facility upgrades scope and re-baselining effort was complete.

In January 1999, the DOE approved the "Strategy for Managing Risks at the CMR" documenting the risk mitigation measures (including the CMR Upgrades Project) required to safely operate the CMR through 2010. This strategy, along with the revised safety authorization basis, determined that certain upgrades within the approved 1995 baseline were no longer required and/or cost effective. This enabled the DOE to reduce the scope of this project and resulted in the TEC being reduced from $174,100,000 to $106,020,000. The bulk of the cost savings were achieved through the cancellation of several existing subprojects.

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	Title I & II A-E Work Initiated	Title I & II A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1995 Budget Request [a]	1Q 1992	1Q 1997	3Q 1993	4Q 2003	194,750	204,000
FY 1996 Budget Request	1Q 1992	1Q 1997	3Q 1993	4Q 2004	194,750	204,000
FY 1997 Budget Request	1Q 1992	1Q 1999	3Q 1993	4Q 2002	174,100	223,635
FY 1998 Budget Request [b]	1Q 1992	1Q 1999	3Q 1993	4Q 2002	174,100	223,635
FY 1999 Budget Request	1Q 1992	1Q 1999	3Q 1993	4Q 2002	174,100	223,635
FY 2000 Budget Request	1Q 1992	1Q 1999	3Q 1993	4Q 2004	174,100	223,635
FY 2001 Budget Request *(Revised Baseline Estimate)* [c]	1Q 1992	2Q 2001	3Q 1993	2Q 2002	106,020	128,568

[a] Prior to FY 1995, CMR Upgrades Phase I was a subproject within Nuclear Weapons Research Development and Testing Facilities Revitalization, Phase III (90-D-102). In FY 1995, Phase I was segregated and the scope of Phases 2 and 3 were added to create this stand alone Line Item project.

[b] The project was restarted to address safety and reliability requirements as an outcome of the facility Basis for Interim Operations (BIO) Review and Associated Technical Safety Requirements (TSRs).

[c] Re-baselining of the CMR Upgrades Project was completed on September 30, 1999. The FY 2001 Budget Request numbers have been modified to reflect this change.

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1992	18,250 [a]	18,250	2,757
1993	10,000	10,000	5,061
1994	10,250	10,250	10,504
1995	3,300	3,300	13,363
1996	10,940 [b]	10,940	14,909
1997	15,000	4,000	10,081
1998	5,000 [c]	10,800	2,813
1999	5,000 [d]	5,000	6,283
2000	14,943 [e]	14,943	15,729
2001	13,337 [f]	13,337	11,693
2002	0	5,200	12,827
2003	0	0	0

[a] $6,250,000 was reprogrammed to CMR, Phase 1 subproject of Nuclear Weapons Research, Development and Testing Facilities Revitalization Phase 3 (90-D-102) from Special Nuclear Materials Laboratory Replacement Project (88-D-105). Reprogramming 91-R-14 was executed in FY 1992.

[b] $1,000,000 was reprogrammed by DOE Internal Reprogramming to the CMR Upgrades Project (95-D-102) in the 1st Qtr. FY 1996 from Special Nuclear Materials Laboratory Replacement Project (88-D-105).

[c] Congress provided appropriations below the original request ($15,700,000) based on DOE input relating to estimated impact of project suspension.

[d] FY 1999 funding reduction from that presented in the FY 1998 CPDS is based on suspension and restart activities and Congressional reductions. Funding in FY 1999 was applied to design and construction of upgrades identified as necessary in the first workshop, to address public safety risks and compliance until the re-baselining effort was complete.

[e] Original appropriation was $15,000,000. This was reduced by $57,000 for the FY 2000 rescission enacted by P.L. 106-113.

[f] The FY 2001 funding request is based on the revised baseline issued on 9/30/99. The funding will be applied to subprojects supporting Basis for Interim Operations (BIO), address worker safety risks, and facility operability.

3. Project Description, Justification and Scope

The primary purpose of this project is to upgrade facility systems and infrastructure that have been in continuous operation for over 40 years and are near the end of their useful life. Such upgrading will ensure the continued safety of the public and LANL employees and increase the operational safety and reliability of essential activities. Increased safety, reliability, and security are critical to the continued operation of LANL's Stockpile Operations Programs and other national defense programs.

The CMR Upgrades Project was initiated in FY 1992 and re-baselined in FY 1995. The project was split into Phase 1 and Phase 2 subprojects, and the congressionally approved CMR Upgrades TEC was $174,100,000 and the TPC was $223,635,000. The majority of work completed between FY 1992 and FY 1997 addressed design and construction of Phase 1 subprojects. The project was suspended due to management concerns in April of 1997.

Project re-evaluations began in October 1997 to determine the minimum set of necessary upgrades to support safe operations through FY 2010. Workshops focused on required upgrades driven by the facility Basis for Interim Operations/Technical Safety Requirements (BIO/TSRs) implementation, as well as worker risk reduction and operability/reliability improvements. In the interim (October 1997 through September 1999), the project proceeded with design and construction of individual subprojects, under incremental authorizations, until the re-baselining effort was complete. The revised baseline has eliminated the distinction of Phase 1 and Phase 2 upgrades and reflects the updated project objectives of supporting safe operation through FY 2010 and accomplishing the minimum required upgrades. The TEC of $174,100,000 has been reduced to $106,020,000 and likewise, the TPC of $223,635,000 has been reduced to $128,568,000. The project will be completed by April of 2002.

The CMR Building is the largest structure at the Los Alamos National Laboratory (550,000 square feet). Construction of the CMR Building was completed in 1952. Most of the major mechanical and electrical equipment has reached the end of its design life. Since its construction over 40 years ago, the CMR Building has been used for research, development, and analytical work with plutonium, uranium and their alloys, and other materials in support of weapons, nuclear materials, and other LANL programs. This work continues to be essential to the nation's weapons program, with the principal activities in the building being in support of the plutonium research, development, and demonstration activities conducted at LANL's Plutonium Handling Facility at TA-55.

| Key CMR capabilities and their tie to DOE missions include:

| – Actinide analytical chemistry and materials characterization capabilities that support Defense Programs projects in pit surveillance, pit manufacturing, stockpile lifetime extension, and nuclear weapons certification.

| – Analytical chemistry, uranium processing, destructive/non-destructive analysis of nuclear material samples, actinide research, processing, and fabrication, and metallography that support DOE's Environmental Management, Nuclear Energy, Materials Disposition, Nonproliferation and National Security, and Defense Programs.

| – Waste characterization and remote handling of highly radioactive materials that support a variety of DOE nuclear materials management programs.

| The CMR Building's future role is also essential for support of several major Defense Programs and DOE programs. They are as follows:

-- Enhanced Safety and Reliability of Nuclear Weapons
-- Lead Technical Laboratory for Pu and U Processing
-- Weapons Dismantlement and Component Storage
-- Materials Disposition
-- Nonproliferation
-- Pit Production

| # **CMR Upgrades Completed, Canceled, or Rescoped Subprojects**

| **Continuous Air Monitor (CAM) Installations –** Completed.

| **Uninterruptable Power Supply (UPS) Installation –** Completed.

| **Sanitary Sewer Upgrades –** Completed.

| **Fire Hazard Analysis (Formerly Fire Protection Upgrades) –** Completed.

| **Safety Analysis Report –** Completed.

| **Engineering Assessments/CDR/EA –** Completed.

| **HVAC Blowers and Motors –** Canceled.

| **Acid Vents and Drains Upgrades –** Canceled.

| **Seismic and Tertiary Confinement (Wings 3, 5, 7, and 9) –** Canceled.

| **Wing 1 (HVAC) Upgrades/Wing 1 Interim Decontamination –** Canceled.

| **Process Chilled Water (Wings 3, 5, and 7) –** Canceled.

| **Main Vault –** Canceled.

| **ES&H Support Activities –** Canceled.

| **Electrical Upgrades –** Rescoped.

| **Stack Monitors Upgrade –** Rescoped.

| **Duct Modification –** Rescoped

| **Ventilation and Confinement Zone Separation (Wings 3, 5, 7, and 9) –** Rescoped.

| **Operations Center (Administration Wing) –** Rescoped.

| **Fire Protection Upgrades (Entire Facility) –** Rescoped.

.

| **#** **<u>CMR Upgrades Continuing Subprojects</u>**

| **Motor Control Centers**

| This scope of work included the construction, equipment installation, testing, acceptance, and
| turnover activities associated with specified MCCs to correct and prevent BUS connection failures.

| **Fire Alarm Control Panels**

| The scope of work included the replacement of the existing Fire Alarm Control Panels (FACP) in
| Wings 1, 2, 3, 4, 5, 7, 9 and the Administration area, installation of a new Master FACP, and

installation of a new concentrator.

Transient Combustible Loading

The scope of work included procurement and installation of metal furniture, cabinets, bins, and boxes in order to meet the requirements defined in the CMR Technical Safety Requirements regarding transient combustible control.

Air Compressor Replacement

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with the replacement of the main air compressor for the CMR Facility.

HVAC Differential Pressure Indicators

The scope of work includes design and construction activities to complete the installation and upgrades to the HVAC differential pressure indicators in Wings 2, 3, 4, 5, 7, and 9.

Duct Wash Down System (Wings 3, 5, & 7)

The scope of work includes the assessment, design, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with the modification of the Duct Wash Down System.

Stack Monitors FE 14, 19, 20, 23, 24, 28, & 32

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with the modification of the stack monitoring systems in order to be fully compliant with 40CFR 61.

Ventilation System Filter Replacement Assessment and Procurement

The scope of work includes procurement of replacement filters, development of procedures for construction, testing, and acceptance activities associated with assessing perchlorate salt contaminated filters and fire screens in the main exhaust plenums of Wings 2, 3, 5, and 7. Wings 2, 5, and 7 contain HEPA filters and Wing 3 contains cartridge filters.

| **Wing 9 Ventilation Assessment**

| The scope of work includes assessment of existing Wing 9 ventilation system and conceptual
| design of required modifications.

| **Emergency Personel Accounting System**

| The scope of work includes design, construction, procurement, equipment installation, testing,
| acceptance, and turnover activities associated with the installation of a system that will enable the
| expeditious accounting of personnel evacuating a specific wing or the entire facility.

| **Hood Wash Down**

| The scope includes design, construction, procurement, equipment installation, testing and
| acceptance activities associated with the replacement of one existing perchloric hood in Wing 5.
| Any future perchlorates will be eliminated through the use of an in-hood, water-aspirator scrubber
| system that will eliminate 90% of the perchlorates fumes and discharge the waste through the acid
| wash down system.

| **Stack Monitors FE 15, 29, & 33**

| The scope of work includes design, construction, procurement, equipment installation, testing,
| acceptance, and turnover activities associated with the modification of the stack monitoring
| systems in order to be fully compliant with 40CFR 61.

| **Interim Project Management**

| The scope of work includes the costs for staff and contracts associated with the overall
| management of the CMR Upgrades Project during the interim period from restart through
| September 30, 1999. The project personnel include LANL and subcontractor support in order to
| implement and operate the CMR Upgrades Project in compliance with current DOE Guidance.
| This includes: baseline development and maintenance; project scheduling; procedure maintenance;
| project reporting; training for project; procedure development; procurement functions; Quality
| Assurance support; development of project procedures; development of safety plans and design
| criteria; and project training. In addition, the scope includes labor for administrative and clerical
| personnel; material and supply costs for operation of the project; travel reimbursement,
| subcontractor costs for office machine maintenance costs, and computer maintenance.

Ventilation System Filter Replacement Design & Construct

The scope of work includes design, construction, equipment installation, waste treatment, acceptance, and turnover activities associated with replacing the perchlorate salt contaminated filters and fire screens in the main exhaust plenums of Wings 2, 3, 5, and 7. Wings 2, 5, and 7 contain HEPA filters and Wing 3 contains cartridge filters. The assessment and long-lead procurement portion of this project was initiated in June of 1999 and is currently on going. The design and construction of this scope will be initiated upon completion of the assessment.

Emergency Lighting

The scope of work will bring the facility into conformance with the Life Safety Code and address worker safety issues with regards to emergency lighting. This work will complete construction, testing, acceptance, and turnover activities that were in progress for Wing 1, 3, 5, 7, 9, and Administration, when the CMRU Project was suspended. It will provide design, construction, equipment installation, testing, acceptance, and turnover activities associated with the emergency and exit lighting system for Wings 2 and 4.

1952 Sprinkler Head Replacement

This scope of work includes the procurement, installation, testing, acceptance, and turnover activities associated with restoring the existing 1952 portion of the sprinkler system to a safe, fully operable, and reliable system.

West Bank Hot Cell Controls/Radiation Monitors

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with adding a high radiation door interlock and restoring the existing Hot Cell door and corridor door controls for the West bank of hot cells in Wing 9 to a safe, fully operable, and reliable system.

West Bank Hot Cell Differential Monitors

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover of differential pressure monitors for each of the eight hot cells in the West bank of Wing 9 utilizing existing pressure taps.

Fire Protection System

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover of various field devices associated with the facility's fire alarm system. The various field devices include: revised system test drains, replacement of speaker strobe units, and install pressure gauges on sprinkler risers.

Emergency Notification

The scope of work includes design, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with the installation of an Emergency Notification System (ENS) at the CMR Facility to notify CMR employees, visitors, and workstations of all facility emergencies.

Operation Center

The scope of work includes design, procurement, construction, equipment installation, testing, acceptance and turnover of a new facility monitoring system to replace the existing obsolete system. The new off-the-shelf system will interface with new and existing sensors and programmable logic controllers installed as part of this and other upgrade subprojects to integrate critical facility system data generated throughout the CMR Facility into a single facility operator display and reporting system. This upgrade is essential to effectively implement the facility emergency management plan.

Internal Power Distribution

The scope of work includes design modifications, construction, procurement, equipment installation, testing, acceptance, and turnover activities associated with the limited completion of the upgrade to the Internal Power Distribution system of Wings 3, 5, and 7 of the CMR Facility. This includes completing installation of MCCs and PLCs in Wings 3, 5, and 7; providing an individual uninterruptible power supply (UPS) for each PLC cabinet; removing and disposing of old MCC equipment, conduit, and cable; and in Wing 9, connecting and configuring each new PLC with a UPS to the manually operating MCCs.

Project Management

The scope of work includes the costs for staff and contracts associated with the overall management of the CMR Upgrades Project for FY 2000 through FY 2002. It is anticipated that this team funding and size will stay constant through FY 2000 and FY 2001, and will be reduced in FY 2002. The project personnel include LANL and subcontractor support in order to implement and operate the CMR Upgrades Project in compliance with current DOE Guidance. This includes all project controls support, quality assurance support, administrative support, material and supply costs for operation of the project; travel reimbursement, subcontractor costs for office machine maintenance costs, and computer maintenance. Rather than prorate the project management infrastructure support to the individual subprojects, a precedent has been set to fund this support as a core control account.

Project Milestones:

YEAR	MILESTONE	SUBPROJECT
FY98	Start	Motor Control Centers
		Fire Alarm Control Panels
		Transient Combustible Loading
		Duct Wash Down
	Complete	Motor Control Centers

YEAR	MILESTONE	SUBPROJECT
FY99	Start	Hood Wash Down
		Emergency Personnel Accountability System
		Stack Monitors FE 15, 29, & 33
		HVAC Delta P Indicators
		Air Compressors Replacement
		Stack Monitors FE 14, 19, 20, 23, 24, 28, & 32
		Ventilation System Filter Replacement Assessment and Long-Lead Procurement
		Wing 9 Ventilation Assessment
		Re-Baselining (part of Interim Project Management)
		Design Criteria (part of Interim Project Management)
	Complete	Fire Alarm Control Panels
		Transient Combustible Loading
		Wing 9 Ventilation Assessment
		Re-Baselining (part of Interim Project Management)
		Design Criteria (part of Interim Project Management)

YEAR	MILESTONE	SUBPROJECT
FY00	Start	Ventilation System Filter Replacement Design & Construction
		West Bank Hot Cell Delta P Indicators
		West Bank Hot Cell Controls/Radiation Monitors
		1952 Sprinkler Head Replacement
		Emergency Notification System
		Emergency Lighting
		Internal Power Distribution
		Fire Protection System Upgrades
	Complete	Stack Monitors FE 14, 19, 20, 23, 24, 28, & 32
		HVAC Delta P Indicators
		Ventilation System Filter Replacement Assessment and Long-Lead Procurement
		Air Compressors Replacement
		Duct Wash Down
		1952 Sprinkler Head Replacements

YEAR	MILESTONE	SUBPROJECT
FY01	Start	Operations Center
	Complete	Emergency Lighting
		Internal Power Distribution
		Emergency Personnel Accountability System
		Fire Protection System Upgrades
		Hood Wash Down
		Stack Monitors FE 15, 29, & 33
		Ventilation System Filter Replacement Design & Construction
		Emergency Notification System
		West Bank Hot Cell Delta P Indicators

YEAR	MILESTONE	SUBPROJECT
FY02	Complete	West Bank Hot Cell Control/Radiation Monitors
		Operations Center

4. Details of Cost Estimate

	(dollars in thousands)	
	Current Estimate	Previous Estimate
CMR Upgrades Prior to Project Suspension	56,874	N/A
Work Authorized from Project Restart October 1997 to Completion		
Design Phase		
Preliminary and Final Design Costs (Drawings and Specifications)	5,687	25,989
Design Management Costs (1.5% of TEC)	741	4,814
Project Management Costs (12.8% of TEC)	6,274 [a]	11,744
Total, Design Costs (25.9% of TEC)	12,702	42,547
Construction Phase		
Construction	20,017	77,640
Other Structures	0	4,174
Construction Management (1.7% of TEC)	818	5,391
Project Management (12.8% of TEC)	6,274	25,729
Total, Construction Costs (55.2% of TEC)	27,109	112,934
Contingencies		
Design Phase (4.8% of TEC)	2,334	5,031
Construction Phase (14.3% of TEC)	7,001	13,588
Total, Contingencies (18.9% of TEC) [b]	9,335	18,619
Total, Line Item Costs (TEC)	106,020	174,100

[a] Includes rebaselining costs.

[b] Contingencies represent approximately 8.8 % of TEC, and 18.9% of TEC for work authorized from project restart through completion.

5. Method of Performance

Procurement will be accomplished under fixed-price subcontracts awarded on the basis of competitive bidding. Consideration will be given to cost-plus-fixed fee on decontamination and refurbishment work on the CMR. Upgrades construction will be done by fixed price contractors and the Laboratory's support services subcontractor. The operating contractor and contracted Architect-Engineers will perform construction inspection.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Costs						
Facility Costs						
Design	29,128	4,695	9,583	1,576	370	45,352
Construction	30,360	1,588	6,146	10,117	12,457	60,668
Total, Line item TEC	59,488	6,283	15,729	11,693	12,827	106,020
Total, Facility Costs (Federal and Non-Federal)	59,488	6,283	15,729	11,693	12,827	106,020
Other Project Costs						
Other project-related costs	12,968	1,980	2,100	2,000	3,500	22,548
Total, Other Project Costs	12,968	1,980	2,100	2,000	3,500	22,548
Total, Project Cost (TPC)	72,456	8,263	17,829	13,693	16,327	128,568

7. Related Annual Funding Requirements

	(FY 2002 dollars in thousands)	
	Current Estimate	Previous Estimate
Annual facility operating costs	22,800	10,000
Annual facility maintenance/repair costs	10,500	2,500
Programmatic operating expenses directly related to the facility	2,250	30,000
Capital equipment not related to construction but related to the programmatic effort in the facility	1,125	1,000
GPP or other construction related to the programmatic effort in the facility	1,125	1,000
Utility costs	3,600	2,450
Total related annual funding (operating from 2002 through 2010)	41,400 [a]	36,960

[a] The increase in annual operating costs is attributed to the decision to maintain the current CMR Facility in a safe operating mode until a replacement facility is constructed and certified.

88-D-123, Security Enhancement, Pantex Plant, Amarillo, Texas

(Changes from FY 2000 Congressional Budget Request are denoted with a vertical line [|] in the left margin.)

Significant Changes

None; however, there is a correction in Section 1. The Physical Construction Complete date was erroneously listed as FY 2000 while at the same time requesting FY 2001 funding. This data sheet correctly lists the FY 2001 completion date.

1. Construction Schedule History [a]

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 1988 Budget Request *(Preliminary Estimate)*	1Q 1988	2Q 1992	2Q 1988	1Q 1994	109,700	114,700
FY 1989 Budget Request.	1Q 1988	2Q 1992	2Q 1988	3Q 1994	109,700	114,700
FY 1990 Budget Request	2Q 1988	2Q 1992	4Q 1988	4Q 1995	109,700	114,700
FY 1991 Budget Request	2Q 1988	2Q 1992	4Q 1988	3Q 1996	109,700	114,700
FY 1992 Budget Request	3Q 1988	3Q 1994	4Q 1988	3Q 1996	109,700	114,700
FY 1994 Budget Request	3Q 1988	1Q 1995	3Q 1990	4Q 1997	125,000	130,000
FY 1995 Budget Request	3Q 1988	4Q 1995	3Q 1990	4Q 1997	125,000	130,000
FY 1996 Budget Request	3Q 1988	4Q 1995	3Q 1990	4Q 1997	125,000	130,000
FY 2000 Budget Request	3Q 1988	3Q 1996	3Q 1990	4Q 2000	131,200	143,600
FY 2001 Budget Request *(Current Baseline Estimate)*	3Q 1988	3Q 1996	3Q 1990	2Q 2001	131,200	143,600

[a] No Construction project data sheet was included with the budget requests for FY 1993, FY 1997, FY 1998 and FY 1999.

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
1988	5,700	5,700	69
1989	7,500	3,500	2,586
1990	5,417	2,417	3,514
1991	18,244	23,701	8,407
1992	30,000	30,692	15,042
1993	0	372	9,700
1994	20,000	1,862	10,647
1995	15,000	21,707	20,015
1996	13,400	20,992	21,886
1997	9,739	5,922	14,867
1998	0	2,786	6,568
1999	0	0	2,594
2000	3,487 [a]	7,052	11,905
2001	2,713	4,497	3,400

3. Project Description, Justification and Scope

This project identifies subprojects required to enhance the Pantex security posture.

These subprojects reflect the best security enhancement from information and emphasis known to date. The scope and priority of each subproject is subject to subsequent revision to reflect the results of further vulnerability assessments, field exercises, and inspections and management direction. This is required to assure that the results of further threat scenario analysis are considered in the actual implementation of the subprojects. The project costs reflect this.

The Production Zone (Zone 12 South), the Special Nuclear Material (SNM) Isolation Area, the Staging Area (Zone 4 West), and the general site include projects which enhance Pantex physical protection, detection alarm assessment, SNM facilities, safeguards of SNM, access control, and security training.

Each subproject includes associated site work for drainage, roads, parking, and utilities. Also included are foundations, walls, roofs, doors, windows, water, sewer, HVAC mechanical equipment, fire protection, alarms, lights, and electrical power to make it functional and satisfy general facility design requirements.

---

[a] Original appropriation was $3,500,000. This was reduced by $13,000 for the FY 2000 rescission enacted by P.L. 106-113.

a. Subproject 01 - SNM Component Staging Facility

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$24,531 [a]	$0	$0	$0	$0	1st Qtr. FY 1991-2nd Qtr. FY 1998

This subproject is complete. Authorization for facility operation was issued July 1998.

b. Subproject 02 - Protected Area Enhancements

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$ 2,834 [a]	$0	$0	$0	$0	3rd Qtr. FY 1990-2nd Qtr. FY 1991

This subproject is complete. Key Decision 4 was issued September 1992.

c. Subproject 03 - Electronic Enhancements

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$81,183 [b]	$0	$3,487	$2,713	$0	4th Qtr. FY 1993-2nd Qtr. FY 2001

This subproject is for the replacement and enhancement of electronic security systems at the Pantex Plant. This subproject includes a Closed-Circuit Television Surveillance System, an Aircraft Detection System, and a Compartmentation and Security Alarm System Upgrade. Major systems to be included are: the Perimeter Intrusion Detection and Assessment System (PIDAS) in Zones 4 and 12, the Interior Security Alarm Systems (ISAS), the Compartmentation, and the ADS. Other systems required to support the above include: Closed-Circuit Television (CCTV) systems, telecommunications, computerized processing systems, and operator interface consoles located in the Security Command Center (SCC); and the Alternate Command Post (ACP). The other subprojects, integrated into the above security systems, are Radio Communications equipment, and procurement and installation of Positive Personnel Identification Verification (PPIV), both integrated with Security Alarm System upgrades (Argus Access Control).

This subproject is to accomplish several tasks. Upgrading and enhancing the alarm systems include the responsibility to integrate as well as to modernize. Secured radio broadcasts will add to the security effectiveness at Pantex. Following are the detailed justifications:

- PIDAS: The existing PIDAS in Zones 4 and 12 have been in place for several years. Both systems have aged and are increasingly difficult to maintain. As a first line of defense against intruders into

[a] Current TEC reflects final subproject costs.

[b] Estimated cost at project completion.

SNM areas and as a means of detecting insiders attempting to escape with stolen material, it is important for PIDAS to perform as well as possible.

ISAS: The ISAS are also several years old and are of many incompatible varieties. The ISAS will be replaced with a single integrated system providing a composite risk reduction of 2-3 orders of magnitude, a single-man-machine interface, a single maintenance program and the reliability of a redundant system.

ADS: The ADS is required in order to detect the intrusion of rotary or fixed wing aircraft into the plant. The topographical features of the Pantex Plant include flat, treeless terrain with no tall buildings. Such terrain does not inhibit low flying or landing aircraft.

Radio Communications: Construction of this activity was completed March 1998.

Compartmentation: Compartmentation provides additional protection against the outsider and reduces the risk against the insider. To the outside, Compartmentation offers another obstacle and at the very least an additional delay because each work area becomes a vault which is in a locked condition. To the insider, Compartmentation is a deterrent that makes it harder to accomplish his goal. To security, Compartmentation increases the delay time for the outsider and reduces the number of potential insiders possible in a particular area. Compartmentation also raises the number of insiders needed to accomplish successfully their goal, thus making detection of the insider easier. Compartmentation is an effective method of reducing the risks associated with the insider threat by limiting the number of personnel with access to production work areas. Independent, as well as "in-house," security analysis initiated Compartmentation, based on assessments of targets, insider vulnerability, and procedural noncompliance.

d. Subproject 04 - Central Shipping and Receiving Facility

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$ 5,865 [a]	$0	$0	$0	$0	3rd Qtr. FY 1992-4th Qtr. FY 1993

This subproject is complete. Key Decision 4 was issued December 1993.

[a] Current TEC reflects final subproject costs.

e. Subproject 05 - Perimeter Lighting System

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$ 265 [a]	$0	$0	$0	$0	3rd Qtr. FY 1994-4th Qtr. FY 1995

This subproject is complete. Key Decision 4 was issued January 1996.

f. Subproject 06 - Weapons Tactics and Training Facility

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$ 5,290 [a]	$0	$0	$0	$0	4th Qtr. FY 1996-4th Qtr. FY 1997

This subproject is complete. Key Decision 4 was issued March 1998.

g. Subproject 07 - Physical Training Facility

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$ 2,350 [a]	$0	$0	$0	$0	2nd Qtr. FY 1996-3rd Qtr. FY 1997

This subproject is complete. Key Decision 4 was issued August 1997.

h. Subproject 08 - Alternate Command Posts

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$ 2,550 [a]	$0	$0	$0	$0	3rd Qtr. FY 1994-4th Qtr. FY 1995

This subproject is complete. Key Decision 4 was issued October 1996.

[a] Current TEC reflects final subproject costs.

i. Subproject 09 - Upgrade Staging Magazine Headwalls

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$ 86 [a]	$0	$0	$0	$0	3rd Qtr. FY 1992-4th Qtr. FY 1992

This subproject is complete. Key Decision 4 was issued September 1992.

j. Subproject 10 - Isolation Area Fence Enhancement

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$ 2,396 [a]	$0	$0	$0	$0	4th Qtr. FY 1994-1st Qtr. FY 1996

This subproject is complete. Key Decision 4 was issued June 1996.

k. Subproject 11 - Protected Area Guard Towers

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$ 1,946 [a]	$0	$0	$0	$0	4th Qtr. FY 1994-4th Qtr. FY 1995

This subproject is complete. Key Decision 4 was issued October 1996.

l. Subproject 12 - Security Command Center Expansion

Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Construction Start-Completion Dates
$1,904 [a]	$0	$0	$0	$0	3rd Qtr. FY 1994-4th Qtr. FY 2000

This subproject will consist of two activities, facility expansion and facility renovation to the Security Command Center, Building 12-75, Computer Room.

Facility Expansion is complete. Key Decision 4 was issued October 1996.

Renovation of the existing computer room will be performed at the completion of the Pantex/Argus system cut-over.

---

[a] Current TEC reflects final subproject costs.

Project Milestones

FY 1999: Electronic Enhancements subprojects:
Aircraft Detection System (ADS): Design and Procurement
Perimeter Intrusion Detection & Assessment System (PIDAS): Complete system Cut-Over
Interior Security Alarm System (ISAS): Start System Cut-Over
Compartmentation: Start System Cut-Over
Positive Personnel Identification and Verification (PPIV): Start-up of booths located at Station A, B, 20, 26, 28, 30, 88 and Gate MW-20

FY 2000: Electronic Enhancements subprojects:
Interior Security Alarm System (ISAS): Complete System Cut-Over
Compartmentation: Complete System Cut-Over
Aircraft Detection System (ADS): Start-up

FY 2001: Renovation of Existing Computer Room
Clean-up and Complete All Remaining
Software/Hardware Issues Associated With Argus
Clean-up and Address All Remaining Problems Associated with ADS Start-up and Operations
Complete Project

4. Details of Cost Estimate

	(dollars in thousands) Current Estimate	Previous Estimate
Design Phase		
Preliminary and Final Design costs (Design Drawings and Specifications)	17,605	17,605
Design Management costs (0.5% of TEC)	694	694
Project Management costs (0.4% of TEC)	460	460
Total, Design Costs (14.3% of TEC)	18,759	18,759
Construction Phase		
Improvements to Land	3,242	3,242
Buildings	87,431	87,431
Special Equipment	5,803	5,803
Other Structures	961	961
Utilities	2,302	2,302
Standard Equipment	1,084	1,084
Construction Management (4.2% of TEC)	5,462	5,462
Project Management (4.2% of TEC)	5,533	5,533
Total, Construction Costs	111,818	111,818
Contingencies		
Construction Phase (0.5% of TEC)	623	623
Total, Contingencies (0.5% of TEC)	623	623
Total, Line Item Costs (TEC)	131,200	131,200

5. Method of Performance

The design services (Studies, Title I, Title II, and partial Title III) will be accomplished by outside A-E firms and will be administered by the Department of Energy or the Operating Contractor (Mason & Hanger-Silas Mason Co., Inc.).

The construction services of this project will be performed by outside construction contractors operating under fixed-price, lump-sum contracts to be awarded on the basis of competitive bids. These contracts will be administered by DOE, and/or the Operating Contractor. The construction contractors will perform all work in accordance with the construction documents.

All equipment not specified to be procured and/or installed by the construction contractors will be procured and/or installed by the operating contractor (Mason & Hanger-Silas Mason Co., Inc.).

Construction Management Services will be performed by the DOE, Operating Contractor, and/or by a construction management firm under contract to DOE or the Operating Contractor.

Final connections for new security alarms, fire alarms and specific communications equipment will be accomplished by the Operating Contractor.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 1999	FY 2000	FY 2001	Outyears	Total
Project Cost						
Facility Cost						
Design	18,083	249	412	15	0	18,759
Construction	95,218	2,345	11,493	3,385	0	112,441
Total, Line item TEC	113,301	2,594	11,905	3,400	0	131,200
Total, Facility Costs (Federal and Non-Federal)	113,301	2,594	11,905	3,400	0	131,200
Other Project Costs						
R&D necessary to complete construction	172	0	0	0	0	172
Conceptual design cost	233	0	0	0	0	233
NEPA documentation costs	15	0	0	0	0	15
Other project-related costs	8,100	2,000	1,500	380	0	11,980
Total, Other Project Ccosts	8,520	2,000	1,500	380	0	12,400
Total Project Cost (TPC)	121,821	4,594	13,405	3,780	0	143,600

7. Related Annual Funding Requirements

(FY 2003 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs [a]	1,000	1,000
Annual facility maintenance/repair costs	0	0
Programmatic operating expenses directly related to the facility	1,000	1,000
Total related annual funding (operating from FY 2003 through FY 2028)	2,000	2,000

[a] Estimated life of project–25 years.