Nuclear Waste Disposal

Proposed Appropriation Language

For nuclear waste disposal activities to carry out the purposes of Public Law 97-425, as amended, including the acquisition of real property or facility construction or expansion, [$240,500,000] *$325,500,000 to remain available until expended* and to be derived from the Nuclear Waste Fund: *Provided,* That not to exceed [$500,000] *$4,648,000* may be provided to the State of Nevada solely for expenditures[, other than salaries and expenses of State employees,] to conduct scientific oversight responsibilities pursuant to the Nuclear Waste Policy Act of 1982, (Public Law 97-425) as amended: *Provided further,* That not to exceed [$5,432,000] *$5,887,000* may be provided to affected units of local governments, as defined in Public Law 97-425, to conduct appropriate activities pursuant to the Act: *Provided further,* That the distribution of the funds as determined by the units of local government shall be approved by the Department of Energy: *Provided further,* That the funds shall be made available to the State and units of local government by direct payment: *Provided further,* That within 90 days of the completion of each Federal fiscal year, the State and each local entity shall provide certification to the Department of Energy, that all funds expended from such payments have been expended for activities [as defined in] *authorized by* Public Law 97-425 *and this Act.* Failure to provide such certification shall cause such entity to be prohibited from any further funding provided for similar activities: *Provided further,* That none of the funds herein appropriated may be: (1) used directly or indirectly to influence legislative action on any matter pending before Congress or a State legislature or for lobbying activity as provided in 18 U.S.C. 1913; (2) used for litigation expenses; or (3) used to support multi-state efforts or other coalition building activities: [inconsistent with the restrictions contained in this Act.] *Provided further, All proceeds and recoveries realized by the Secretary in carrying out activities authorized by the Nuclear Waste Policy Act of 1982 (Public Law 97-425), as amended, including but not limited to, any proceeds from the sale of assets, shall be available without further appropriation and shall remain available until expended.*

[RECISSION]

[Of the funds made available under the heading “Department of Energy - Energy Programs - Nuclear Waste Disposal Fund” in the Energy and Water Development Appropriations Act, 1998 (Public Law 106-62), $4,000,000 is rescinded, to be derived from the amount specified under such heading for the Nuclear Regulatory Commission to license a multi-purpose canister design.] (Energy and Water Development Appropriations Act, 2000.)

Explanation of Changes

The proposed change more fully explicates the intent of section 302 (c) (1) of the Nuclear Waste Policy Act (Public Law 97-425), as amended. That section directed that “all receipts, proceeds, and recoveries realized by the Secretary...shall be deposited in the Waste Fund immediately upon their realization.”

The proposed language would recover proceeds from sale of assets and make them available to the Program without further appropriation.

Office of Civilian Radioactive Waste Management
Executive Budget Summary

Program Mission

The Program's mission, as set out in the Nuclear Waste Policy Act of 1982, as amended, is to implement the Federal policy for permanent geologic disposal of high-level radioactive waste and spent nuclear fuel, in order to protect the public health and the environment. The Program provides leadership in developing and implementing strategies to accomplish this mission that assure public health and safety, protect the environment, merit public confidence, and are economically viable.

Program Goal

The Nuclear Waste Policy Act of 1982 established the Federal government's responsibility and statutory framework to provide for the permanent disposal of commercially generated spent nuclear fuel and the high-level radioactive waste, generated by the Nation's nuclear defense activities, in a geologic repository. As originally enacted, the Act also directed the Department to study the need for and feasibility of the development and operation of a monitored retrievable storage facility for spent nuclear fuel. The Department submitted a site-specific proposal for such a facility, but the siting action was nullified by the Nuclear Waste Policy Amendments Act of 1987.

The Department, as directed by the Act, initially undertook a national screening exercise to evaluate candidate repository sites. In 1986, at the conclusion of this scientific screening activity, the Department recommended three sites to the President for further study as potential geologic repositories. However, the Nuclear Waste Policy Amendments Act of 1987, directed the Department to investigate only one site, Yucca Mountain, Nevada, for possible development as a geologic repository.

Disposition in a geologic repository provides a final, permanent solution for the management of commercially generated spent nuclear fuel that is currently in temporary storage at reactor sites around the country. A geologic repository is also key to the disposition of the high-level radioactive wastes that resulted from operation of the Department's facilities that were key elements of the Nation's nuclear weapons complex (e.g., Hanford, Idaho National Laboratory, Rocky Flats, Savannah River). Continued progress by the Civilian Radioactive Waste Management Program is critical to the completion of the clean-up of those sites now under the jurisdiction of the Department's Office of Environmental Management. A permanent repository site will also enable the Nation to continue to demonstrate leadership and advance non-proliferation goals by moving forward with its plans for the disposition of weapons-grade materials (Highly Enriched Uranium and Weapons Grade Plutonium). Additionally, a permanent geologic repository site will enable the Department to dispose of spent fuel used in the Naval Nuclear Propulsion Program.

The Department, after a substantial investment of financial resources - on the order of $4 billion - and almost 18 years of cutting-edge, complex and intensive scientific and technical investigations at the Yucca Mountain site, would, upon completion of the work planned through the end of FY 2001, be prepared to make a decision whether to recommend the site to the President and Congress for development as a

permanent repository. If the Site Recommendation is accepted by the President and Congress and, based on other current schedule assumptions, the Department could have a repository operational by 2010.

Significant Accomplishments and Program Shifts

The Conference Report to the FY 1997 Energy and Water Appropriations Act directed the Program to complete a Viability Assessment for the Yucca Mountain site. This report was completed and submitted to Congress, in December 1998. The assessment stated that Yucca Mountain remains a promising site for a permanent geologic repository and work should proceed toward a decision on the suitability of the Yucca Mountain site.

In April 1999, the U.S. Nuclear Waste Technical Review Board published a report, *Moving Beyond the Yucca Mountain Viability Assessment*. The Board concurred that work to determine site suitability should proceed and that the planned studies are technically feasible and likely to produce useful information.

The Program continues to build on the success of the Viability Assessment and is pursuing actively the work scope identified in the report as well as continuing to focus on emerging issues raised by the Program's interactions with both the U.S. Nuclear Waste Technical Review Board and the Nuclear Regulatory Commission. Successful completion of the planned scope of work, on the schedule articulated in the Viability Assessment, will provide the Secretary of Energy with the essential information upon which to base a decision whether to recommend the Yucca Mountain site to the President for development as a repository, if the site is found to be suitable.

The Program's FY 2001 Budget Request that supports the Yucca Mountain Project continues to be based, in large measure, upon the work scope and funding requirements detailed in the Viability Assessment and the Total System Life Cycle Cost reports.

Program Objectives

The Program continues to build aggressively on the substantial momentum achieved in the last five years. There has been demonstrable and visible progress during that time period. The Program has acquired and analyzed the data and information that provide the foundation for the next critical step - the decision whether to recommend the site for development as a repository. That decision is one of a series of key technical and policy decisions that the Nation is on the verge of and that are at the core of the Program's principal objective - the permanent disposal of spent nuclear fuel and high-level radioactive waste.

The Program, in July 1999, completed and issued a *Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*. In FY 2001, the Program plans to:1) issue the Site Recommendation Consideration Report; 2) issue the Final Environmental Impact Statement contemporaneously with the Site Recommendation Report; and 3) develop the Site Recommendation Report. The Secretary will then make a decision whether to recommend the Yucca Mountain site to the President, if the site is found to be suitable. If the site recommendation is accepted by the President and Congress, submission of a

License Application for the construction of a repository to the Nuclear Regulatory Commission will follow in FY 2002.

The Program is continuing the transition begun in FY 1999; that is, shifting emphasis from construction/ operations to support data collection and testing to activities that support the remaining key near-term objectives articulated in the Nuclear Waste Policy Act - the preparation of materials to support a Site Recommendation to the President and the submission of a License Application to the Nuclear Regulatory Commission.

Key FY 2001 Activities

The Office of Civilian Radioactive Waste Management's FY 2001 Budget Request of $437.5 million supports the activities necessary to make a decision on the suitability of the Yucca Mountain site as a repository; develop the documentation needed for a Secretarial decision on the site recommendation to the President in FY 2001; and conduct other activities associated with the Federal government's waste acceptance obligations.

The Program, through the Yucca Mountain Site Characterization Office, will evaluate the repository system against the Department's suitability criteria; update process models using data from scientific tests and evolving designs; conduct an iteration of total system performance assessment for use in license application; continue to develop the draft license application and supporting documents; and, refine repository and waste package designs. The foregoing are elements of the Site Recommendation Report which will be finalized contemporaneously with the issuance of the Final Environmental Impact Statement. These activities will serve to support a decision by the Secretary whether to recommend the site to the President and, subsequently, prepare a License Application for submission to the Nuclear Regulatory Commission in FY 2002. Activities proposed to be undertaken at the Yucca Mountain site are essentially consistent with the description of the remaining work contained in the Viability Assessment.

The Program is working closely with the Russian Federation to complete a bilateral agreement that will facilitate the development of geologic repositories in the United States and the Russian Federation. A new initiative to advance the Department's non-proliferation objectives with Russia is included in the overall Department's budget request (in the request for the Office of Nonproliferation and National Security). If Russian law is amended to permit the storage and disposal of foreign spent fuel in Russia, funds may also be used for research and planning for international spent fuel storage and geologic repository cooperation.

The Office of Waste Acceptance, Storage and Transportation will continue to focus on development of implementation plans for achieving the legal and physical transfer of spent nuclear fuel from commercial reactor sites and Department-operated sites (e.g., Hanford, Idaho National Laboratory, Rocky Flats, Savannah River, etc.) once a receiving facility becomes available. The Department will also continue to develop acquisition plans for waste acceptance and transportation services utilizing private sector entities. This approach offers a market stimulus for commercial development of the equipment and management capabilities required for acceptance and transportation of the spent nuclear fuel and high-level waste.

Program Organization

The Program continues to utilize two business centers (Yucca Mountain Site Characterization Project and the Office of Waste Acceptance, Storage and Transportation) and a Program Management center. The Program Management center's responsibility focuses on providing overarching planning, regulatory compliance, program control and management functions to both business centers.

Sources of Funding

To provide funding for the Program's activities, our FY 2001 appropriation request draws upon two sources: the Nuclear Waste Disposal Appropriation and the Defense Nuclear Waste Disposal Appropriation. The Program is requesting $325.5 million from the Nuclear Waste Disposal Appropriation and $112 million from the Defense Nuclear Waste Disposal Appropriation for a total request of $437.5 million.

Major Issues

The recently issued Viability Assessment contained a funding profile that, at its core, supported a comprehensive suite of critical programmatic milestones. The Program has developed and costed a scope of work that is required to continue work activities to come to closure on significant data needs supporting those milestones.

The Program is no longer readily able to absorb any additional funding reductions without it having a potential impact to selected critical near-term milestones for the Yucca Mountain Site Characterization Project. The Program has, despite receiving 10% less than requested for the period FY 1998-FY 2000, been able to maintain the schedule for activities supporting the site recommendation milestone by focusing on critical scientific and technical work and by reducing some work supporting activities in the out-years. This budget request supports a body of work that will enable the Program to maintain an FY 2002 schedule for License Application. This would, in turn, continue to support the planned 2010 date for emplacement of waste.

Recompetition of Management and Operating Contract

The Program is currently supported by a Management and Operating (M&O) contractor whose contract was initially awarded in 1991. The Program is planning on recompeting the current M&O contract. A follow-on performance-based contract(s) will be awarded in FY 2001. Therefore, funds are requested for contractor transition, if the contractor selected is not the incumbent.

Performance Measures

The following product-oriented performance measures are planned for FY 2001 in support of the Site Recommendation and License Application: 1) complete the Site Recommendation Consideration Report and conduct public hearings on the Secretary of Energy's consideration of the possible recommendation of the site for development as a repository and complete a departmental review of the Site Recommendation Report; and 2) Issue the Final Environmental Impact Statement contemporaneously with the finalization of the Site Recommendation Report.

If the President and Congress accept the Site Recommendation, activities then will be focused on completing a License Application for submission to the Nuclear Regulatory Commission. This activity will complete the Site Characterization Phase and initiate the Licensing Phase of the repository program.

Funding Profile

(dollars in thousands)

	FY 1999 Current Appropriation [a]	FY 2000 Original Appropriation	FY 2000 Adjustments	FY 2000 Current Appropriation	FY 2001 Request
Nuclear Waste Fund/Defense Nuclear Waste:					
Yucca Mountain Site Characterization……..	281,879	282,238	-1,063 [b]	281,175	358,306
Waste Acceptance, Storage & Transportation.	1,850	1,795	0 [b]	1,795	3,800
Accelerator Transmutation of Waste……	4,000	0	0 [b]	0	0
Program Management Center……...	11,250	8,656	-35 [b]	8,621	11,766
Program Direction……	58,486	59,811	-227 [b]	59,584	63,628
Total, Program Budget Authority [c] ……	357,465 [a]	352,500	-1,325 [b]	351,175	437,500
Funding Sources:					
Nuclear Waste Disposal Account					
Nuclear Waste Fund, First Repository…..…..	105,979 [a]	180,689	-672 [b]	180,017	261,872
Nuclear Waste Fund, Program Direction……	58,486	59,811	-227 [b]	59,584	63,628
General Fund……	4,000	0	0	0	0
Subtotal, Nuclear Waste Disposal Account [c]	168,465	240,500	-899	239,601	325,500
Adjustments:					
Prior Year Recission (FY 1998) [d]	*0*	*-4,000 [d]*	*0 [b]*	*-4,000 [d]*	*0*
Total, Nuclear Waste Disposal Account…..……	168,465	236,500	-899 [b]	235,601	325,500
Defense Nuclear Waste Disposal……..	189,000	112,000	-426 [b]	111,574	112,000
Total, Funding Sources……	357,465 [a]	348,500 [d]	-1,325 [b]	347,175 [d]	437,500
Other Funding:					
Energy Supply					
Use of prior year balances……	-151 [e]	0	0	0	0
Total, Energy Supply	-151	0	0	0	0

Public Law Authorization:
P.L. 97-425, "Nuclear Waste Policy Act" (1982)
P.L. 100-203, "Nuclear Waste Policy Amendments Act" (1987)

[a] $535K was rescinded from the FY 1999 Nuclear Waste Disposal Fund per the Emergency Steel Loan Guarantee and Emergency Oil and Gas Guaranteed Loan Act of 1999 (H.R. 1664).

[b] Per P.L. 106-113, a general reduction of .038 percent was applied to the Nuclear Waste Fund ($899K) and the Defense Nuclear Waste Appropriation ($426K).

[c] Total budget authority available to the Program.

[d] The FY 2000 Energy and Water Development Appropriation Act rescinded $4M in FY 1998 funds for licensing a multi-purpose canister design. The recission DOES NOT affect the FY 2000 budget authority. Total budget authority available to the Program in FY 2000 was $351.2M.

[e] No funding has been appropriated to the Energy Supply, Research and Development Appropriation since FY 1995. The FY 1999 funding reduction represents the Office of Civilian Radioactive Waste Management's portion of the Departmental reduction of prior year balances in the Energy Supply account.

Projected Receipts and Funding[a]

	FY 1999	FY 2000	FY 2001	FY 2002 [e]	FY 2003 [e]	FY 2004 [e]	FY 2005 [e]
One mill/kWh Fee[b]	662	663	550	550	550	545	535
One-time Fee	0	0	0	0	0	0	0
Subtotal	662	663	550	550	550	545	535
Investment	106 [c]	695 [d]	767 [d]	880 [d]	948 [d]	960 [d]	918 [d]
Total Income	768	1,358	1,317	1,430	1,498	1,505	1,453
Program Budget Authority:							
Nuclear Waste Disposal							
Nuclear Waste Fund, First Repository	106 [f]	181	262	264	270	277	292
Nuclear Waste Fund, Program Direction.	58	60	63	61	60	61	62
General Fund	4	0	0	0	0	0	0
Nuclear Waste Fund, General Reduction.	0	-1 [g]	0	0	0	0	0
Total, Nuclear Waste Disposal	168	240	325	325	330	338	354
Defense Nuclear Waste Dispoal							
Defense Nuclear Waste Disposal	189	112	112	112	113	116	122
Defense Nuclear, General Reduction	0	0 [g]	0	0	0	0	0
Total, Defense Nuclear Waste Disposal	189	112	112	112	113	116	122
Total, Program Budget Authority	357 [f]	352 [g]	437	437 [e]	443 [e]	454 [e]	476 [e]

[a] Income and funding projections are subject to change based on the resolution of the 1998 waste acceptance obligation between DOE and contract holders, and prevailing market conditions.

[b] Estimated fee income is based on a forecast by EIA in September 1999.

[c] FY 1999 investment income reflects actual net interest collections, net premiums and discounts on non-zero securities, and change in market value of zero-coupon bonds from 10/01/98 through 09/30/99 and anticipated nterest collections on non-zero securities and straight-line amortization of discounts on zero-coupon bonds for the remainder of the fiscal year.

[d] The values represent "earnings available for appropriation", which consist of anticipated interest collections on bills, notes, and bonds and straight line amortization of discounts on zero-coupon bonds.

[e] The outyears shown here are preliminary, and do not necessarily reflect program requirements. Future budget requests for the program have yet to be established and will be determined through the annual executive and Congressional budget process.

[f] $535K was rescinded from the FY 1999 Nuclear Waste Disposal Fund per the Emergency Steel Loan Guarantee and Emergency Oil and Gas Guaranteed Loan Act of 1999 (H.R. 1664).

[g] Per P.L. 106-113, a general reduction of .038 percent was applied to the Nuclear Waste Fund ($899K) and the Defense Nuclear Waste Appropriation ($426K).

Funding by Site

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Chicago Operations Office					
Argonne National Laboratory	2,998	2,079	1,933	(146)	-7.0%
Oakland Operations Office	0	0	0		
Lawrence Berkeley Laboratory	8,293	9,137	8,680	-457	-5.0%
Lawrence Livermore National Laboratory	22,063	13,973	13,089	-884	-6.3%
Total, Oakland Operations Office	30,356	23,110	21,769	(1,341)	0.0%
Albuquerque Operations Office	0	0	0		
Sandia National Laboratory	13,888	10,988	10,439	-549	-5.0%
Los Alamos National Laboratory	14,327	9,947	9,450	-497	-5.0%
Total, Albuquerque Operations Office	28,215	20,935	19,889	(1,046)	-5.0%
Nevada Operations Office[a]	213,740	226,971	307,398	80,427	35.4%
Nevada Test Site	7,229	5,717	5,500	-217	-3.8%
Nevada (Yucca Mountain Project Office)	41,467	44,631	46,890	2,259	5.1%
Total, Nevada Operations Office	262,436	277,319	359,788	82,469	29.7%
Oak Ridge Operations Office	491	491	491	0	0.0%
Oak Ridge National Laboratory	672	374	348	-26	-7.0%
Total, Oak Ridge Operations Office	1,163	865	839	-26	-3.0%
Richland Operations Office	0	0	0		
Pacific Northwest Laboratory	3,133	730	679	-51	-7.0%
Washington Headquarters	29,164	26,137	32,603	6,466	24.7%
Total, Program	357,465 [b]	351,175 [c]	437,500	86,325	24.6%

[a] Includes Financial Assistance to the State of Nevada and Affected Units of Local Government and includes funding for contracts administered in Nevada (I.e. Management and Operating Contractor, USGS, National Academy of Science, Universities, etc.)

[b] $535K was rescinded from the FY 1999 Nuclear Waste Disposal Fund per the Emergency Steel Loan Guarantee and Emergency Oil and Gas Guaranteed Loan Act of 1999 (H.R. 1664).

[c] Per P.L. 106-113, a general reduction of .038 percent was applied to the Nuclear Waste Fund ($899K) and the Defense Nuclear Waste Appropriation ($426K).

Site Description

Argonne National Laboratory

In support of Design and Engineering, Argonne National Laboratory conducts waste form testing. The laboratory is also the custodian for new spent fuel approved test material.

Lawrence Berkeley Laboratory

In support of Core Science, Lawrence Berkeley National Laboratory conducts Unsaturated Zone flow and transport modeling, thermal hydrologic modeling activities, geophysics testing, and supports Drift Scale testing. LBNL also performs the seepage tests in the exploratory studies facility alcoves and niches. LBNL supports the abstraction activities needed to conduct the Total System Performance Assessment in support of Site Recommendation and Licensing Application.

Lawrence Livermore National Laboratory

In support of Core Science, Lawrence Livermore National Laboratory conducts experiments and modeling activities needed for the repository design and to predict responses of the engineered and natural barrier systems to the heat generated by radioactive waste. The experiments include the Single Heater and Drift Scale tests in the ESF, the proposed heater tests in the Cross drift, and the Large Block test on the Fran Ridge at the site. In support of Design and Engineering, LLNL conducts testing and modeling of the waste package environment, waste package materials and waste forms. LLNL also supports the abstraction activities needed to conduct Total System Performance Assessment in support of Site Recommendation and Licensing Application.

Sandia National Laboratory

In support of Core Science, Sandia National Laboratories conducts in-situ monitoring in the Exploratory Studies Facility and in the East-West drift, and performance confirmation testing. The laboratory conducts geoengineering and rock mechanics studies, and backfill analyses in support of Design and Engineering. The laboratory also supports Suitability/Licensing and Performance Assessment with performance assessment modeling.

Los Alamos National Laboratory

In support of Core Science, Los Alamos National Laboratory conducts geochemistry, mineralogy, and colloid transport studies. LANL conducts laboratory – and field-scale transport tests, including the Busted Butte Transport Test, and develops radionuclide transport models for the unsaturated and saturated zone groundwaters at the site. LANL corroborates with USGS on isotopic and groundwater chemistry investigations needed for transport models. In support of Operations/Construction, the laboratory coordinates testing at the Yucca Mountain site, including testing in the ESF. LANL also supports the abstraction activities needed to conduct Total System Performance Assessment in support of Site Recommendation and Licensing Application.

Nevada Operations Office

In support of the Yucca Mountain Project and the OCRWM Program Direction, the Nevada Operations Office administers disbursement of External Oversight and PETT funds to affected units of government, and also administers contracts/agreements with the OCRWM Management & Operating (M&O) contractor, support services contracts and all other financial/contract agreements associated directly with Yucca Mountain Site Characterization Office.

Nevada Test Site

In support of Core Science and Operations/ Construction at the Yucca Mountain Site, the Nevada Test Site, through Bechtel Nevada, provides NTS common site support such as: logistics, fire protection, security, emergency medical services, roads/grounds maintenance, environmental operations, vehicle/construction equipment maintenance, facility maintenance, bus transportation, janitorial and refuse services, and power usage.

Yucca Mountain Project Office in Nevada

The Yucca Mountain Project Office in Nevada has the primary responsibility for the characterization of the Yucca Mountain site, and if the site is suitable, for preparing and submitting a license application to the Nuclear Regulatory Commission for construction of the repository. As the future owner and licensee of the repository, DOE develops and implements policies and strategies for the work to be completed and oversees the management and operating contractor and the United States Geological Society in performing this work. YMSCO manages the contracts for the management and operating contractor and the support services contractors for work at Yucca Mountain.

Site characterization and license preparation activities include developing and conducting surface-based and underground data collection and testing; design of the repository and waste package subsystems; developing and implementing environmental, safety and health policies; preparing the environmental impact statement; interacting with oversight and regulatory groups; and providing the necessary management and site infrastructure to support these activities.

Oak Ridge Institute for Science and Education

In support of Program Management, the Oak Ridge Institute for Science and Education administers undergraduate and graduate educational programs.

Oak Ridge National Laboratory

In support of Design and Engineering, the Oak Ridge National laboratory provides support in analyzing commercial reactor criticality data, radiochemical assays and uncanistered fuel design. The laboratory also provides technical support for the disposal criticality topical report, thermal/neutronics model and criticality analysis process report.

Pacific Northwest Laboratory

In support of Design and Engineering, the Pacific Northwest Laboratory provides waste form testing support.

Five-Year Funding Profile

	FY 1999 Current Appropriation	FY 2000 Current Appropriation	FY 2001 Request	FY 2002 Request [c]	FY 2003 Request [c]
Yucca Mountain Site Characterization					
Suitability/Licensing & Performance Assessment	53,130	61,407	84,985	85,232	26,691
Core Science	74,832	70,624	69,432	44,634	32,000
Design and Engineering	77,859	66,275	111,234	140,914	89,024
National Environmental Policy Act	1,962	1,320	1,600	0	0
Operations/Construction	34,203	30,000	32,967	29,658	144,500
Project Management	28,234	35,177	36,253	34,404	32,000
External Oversight, Payments Equal to Taxes	11,659	16,372	21,835	23,075	24,900
Nevada Rail	0	0	0	0	0
Total, Yucca Mountain Site Characterization	281,879	281,175	358,306	357,917	349,115
Waste Acceptance, Storage and Transportation					
Spent Fuel Storage	320	0	0	0	0
Transportation	0	0	1,750	4,376	19,311
Waste Acceptance	916	1,268	1,523	1,302	1,399
Project Management	614	527	527	440	1,340
Total, Waste Acceptance, Storage & Transportation	1,850	1,795	3,800	6,118	22,050
Accelerator Transmutation of Waste	4,000	0	0	0	0
Program Integration					
Program Management	6,009	4,761	5,921	6,388	6,390
Human Resources & Administration	5,241	3,860	5,845	5,693	5,561
Subtotal, Program Integration	11,250	8,621	11,766	12,081	11,951
Program Direction	58,486	59,584	63,628	61,384	59,884
Total, Program Integration	69,736	68,205	75,394	73,465	71,835
Total, Program	357,465	351,175	437,500	437,500	443,000
Program Budget Authority:					
Nuclear Waste Disposal					
Nuclear Waste Fund, First Repository	105,979	180,689	261,872	264,116	270,116
Nuclear Waste Fund, Program Direction	58,486	59,811	63,628	61,384	59,884
General Fund	4,000	0	0	0	0
Nuclear Waste Fund, General Reduction	0	-899 [b]	0	0	0
Total, Nuclear Waste Disposal	168,465 [a]	239,601	325,500	325,500	330,000
Defense Nuclear Waste Disposal					
Defense Nuclear Waste Disposal	189,000	112,000	112,000	112,000	113,000
Defense Nuclear Waste, General Reduction	0	-426 [b]	0	0	0
Total, Defense Nuclear Waste Disposal	189,000	111,574	112,000	112,000	113,000
Total, Program Budget Authority	357,465 [a]	351,175 [b]	437,500	437,500	443,000

[a] $535K was rescinded from the FY 1999 Nuclear Waste Disposal Fund per the Emergency Steel Loan Guarantee and Emergency Oil and Gas Guaranteed Loan Act of 1999 (H.R. 1664).

[b] Per P.L. 106-113, a general reduction of .038 percent was applied to the Nuclear Waste Fund ($899K) and the Defense Nuclear Waste Appropriation ($426K).

[c] The outyears shown here are preliminary, and do not necessarily reflect program requirements. Future budget requests for the program have yet to be established and will be determined through the annual executive and Congressional budget process.

YUCCA MOUNTAIN SITE CHARACTERIZATION

Mission-Supporting Goals and Objectives

Substantial and demonstrable progress has been made toward reaching a decision on the suitability of the Yucca Mountain site. Over the past four years, the Yucca Mountain Site Characterization Project has focused its activities on site characterization, principally to develop subsurface laboratories, and on completing the necessary technical and scientific work at the Yucca Mountain site to maintain the long-term objective of initiating repository operations in 2010.

In FY 2001 the Department will issue a comprehensive Final Environmental Impact Statement contemporaneously with the finalization of the Site Recommendation to provide information on potential environmental impacts that could result from a Proposed Action to construct, operate and monitor, and eventually close a geologic repository for the disposal of spent nuclear fuel and high-level radioactive waste at the Yucca Mountain site. However, if public comments warrant or the Department determines that sufficient modifications have been made in the repository design, modeling or Total System Performance Assessment (TSPA), the Department may consider issuing supplemental analyses or documents defining these differences. These supplemental documents, if necessary, could be issued in FY 2001. In addition, Section 114(a) of the Nuclear Waste Policy Act requires the Secretary to hold public hearings in the vicinity of the site to inform the residents of the possible consideration of the site for recommendation. The Program will prepare a "Site Recommendation Consideration Report" to support the public hearings. It will be issued in FY 2001. Section 114(a) of the Act also states that if the Secretary decides to recommend the Yucca Mountain site for development, he "shall make available to the public, and submit to the President, a comprehensive statement of the basis" of a site recommendation.

In FY 2001, an investment of approximately $4 billion and almost 18 years of site investigations will culminate in a series of statutory decisions on whether a repository should be sited at Yucca Mountain. If the site is determined to be suitable and the Secretary of Energy decides to recommend the site for repository development, a Site Recommendation Report will be prepared and submitted to the President in FY 2001. If the President, and then Congress, accept the Site Recommendation, a License Application will be prepared and submitted to the Nuclear Regulatory Commission in FY 2002.

The work performed in FY 2001 and FY 2002 will bring to an end the site characterization phase of this Project.

Building on the Viability Assessment

This budget request supports the set of closely related tasks that builds on the Office of Civilian Radioactive Waste Management's *Viability Assessment of a Repository at Yucca Mountain*, which was submitted to the President and Congress in December 1998. The report stated that the site remained promising, and that further work was needed to determine its suitability.

In April 1999, the Nuclear Waste Technical Review Board published a report, *Moving Beyond the Yucca Mountain Viability Assessment*. The Board concurred that work to determine site suitability should

proceed and that planned studies are technically feasible and likely to produce useful information. The Board also recommended further work, including modifications to repository design that converged with alternatives the Project is evaluating.

In June 1999, the Nuclear Regulatory Commission provided its formal comments on the Viability Assessment to the Department. The commission agreed with the Department's decision to continue site characterization and with the work that should be completed.

The FY 2001 budget requests funding to support the scope of work identified by the Viability Assessment as well as activities suggested by the United States Nuclear Waste Technical Review Board and the Nuclear Regulatory Commission. The FY 2000 appropriation was less than the Program's request and, as a result, certain efforts, particularly design and engineering in support of the License Application, were deferred in order to maintain those critical to the Site Recommendation. This FY 2001 budget request seeks increases to support a License Application submittal to the Nuclear Regulatory Commission in FY 2002.

The Program is utilizing recognized cost saving evaluation methods, such as cost-benefit trade studies, in a continuous effort to determine how a reduction in the out-year baseline funding requirements may be achieved for the planned construction work prior to waste emplacement. Present evaluations included investigating unique approaches such as implementation of a "phased construction" and/or "modular designs," which initially show potential for significant cost savings.

FY 2000 Achievements

By the end of FY 2000, the Secretary's performance measures for that year will have been met. The Office of Civilian Radioactive Waste Management will have:

- Completed public hearings on the Draft Environmental Impact Statement;

- Selected the reference repository and waste package designs for Site Recommendation and License Application;

- Selected the reference models of natural systems that will support the Total System Performance Assessment for Site Recommendation and a License Application;

- Updated the Total System Performance Assessment; and used it to complete a preliminary evaluation of the site against the Department's site suitability guidelines, for the Site Recommendation Consideration Report; and

- Compiled and integrated information for the Site Recommendation Consideration Report and supporting documents, and planned public hearings.

Overview of FY 2001 Work

Performance measures proposed for FY 2001 are:

- Issue the Final Environmental Impact Statement;

- Complete the Site Recommendation Consideration Report and supporting documents; conduct public hearings, review comments, prepare a summary and response document;

- Using data from scientific tests and evolving designs, along with comments from a variety of sources, update all process models and conduct a total system performance assessment for use in the Site Recommendation.

- Complete a final evaluation of the repository system against DOE's site suitability guidelines;

- Implement the web-based network that will make the thousands of documents supporting a Site Recommendation and a License Application available electronically;

- If a decision is made to recommend the site for development as a repository, the Secretary will notify the State of Nevada of the decision to recommend the Yucca Mountain site for development as a repository; and

- Finalize a Site Recommendation Report for the Secretary of Energy to submit to the President.

Work Planned Subsequent to FY 2001

If Congress designates the site for development, DOE will:

- Submit a License Application to the Nuclear Regulatory Commission;

- Continue performance confirmation testing and monitoring;

- Continue design work to develop construction drawings and specifications and start procurement processes for long lead equipment;

- Start pre-construction activities to prepare the site for delivery of excavation equipment including tunnel boring machines.

Contract Recompetition

The current Management and Operating contract expires in February 2001. The Department of Energy has decided to conduct a competitive procurement to acquire contractor support for the future phases of the Office of Civilian Radioactive Waste Management Program. This action is consistent with Departmental policy on contract reform and Office of Management and Budget performanced-based

contracting objectives, which asserts that competition and use of performance-based service contracts is the preferred method for meeting the continuing Program requirements for contractor support.

Budget Structure

The Yucca Mountain Site Characterization budget submittal consists of seven subelements. To reflect the changing nature of the Project's work as site characterization ends, they are resequenced as follows: (1) Suitability/Licensing and Performance Assessment, (2) Core Science, (3) Design and Engineering, (4) National Environmental Policy Act (5) Operations/Construction, (6) Project Management Support, (7) External Oversight and Payments-Equal-to-Taxes.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Suitability/Licensing and Performance Assessment	53,130	61,407	84,985	23,578	38.4%
Core Science	74,832	70,624	69,432	-1,192	-1.7%
Design and Engineering	77,859	66,275	111,234	44,959	67.8%
National Environmental Policy Act	1,962	1,320	1,600	280	21.2%
Operations/Construction	34,203	30,000	32,967	2,967	9.9%
Project Management	28,234	35,177	36,253	1,076	3.1%
External Oversight and Payments Equal to Taxes	11,659	16,372	21,835	5,463	33.4%
Total, Yucca Mountain Site	281,879	281,175	358,306	77,131	27.4%

Detailed Program Justification

(dollars in thousands)

FY 1999	FY 2000	FY 2001

Suitability/Licensing and Performance Assessment

Overview

Ultimately, all work performed by the Yucca Mountain Project generates information that will support statutory decisions on whether a repository should be developed at the Yucca Mountain site. The work encompassed by this

(dollars in thousands)

FY 1999	FY 2000	FY 2001

budget subelement entails (1) completion and release of the Site Recommendation Consideration Report, completion of the Site Recommendation Report to support a decision by the Secretary on Site Recommendation, and analysis and compilation of information required for the Site Recommendation Report and for a License Application, (2) tasks required to manage the Project's vast technical data bases and licensing records, and (3) performance assessments that synthesize information from testing and design to model the performance of the repository system.

The Site Recommendation Consideration Report, Site Recommendation , License Application, and supporting documents will together total tens of thousands of pages.

Work in this area includes finalizing, publishing, and issuing two major documents, the Site Recommendation Consideration Report and the Site Recommendation. The Site Recommendation Consideration Report contains the scientific and engineering information that is to be used to support the Site Recommendation Report. The Site Recommendation Consideration Report and its supporting documents will be made available to the State of Nevada, the Nuclear Regulatory Commission, and stakeholders in FY 2001. Public hearings will be held and concerns from the public will be gathered and classified for inclusion into the Site Recommendation Report. The Site Recommendation Report will include comments from the State of Nevada, the Nuclear Regulatory Commission and the public.

Site Recommendation

In FY 2001, the Program will complete and release the Site Recommendation Consideration Report that will be used to:

- Present information required by Sec. 114 of the Nuclear Waste Policy Act including general background information and descriptions of the site characterization program and the site, repository design, and the waste form and waste package; discussion of data related to the safety of the site; and a description of the

(dollars in thousands)

FY 1999	FY 2000	FY 2001

performance assessment of the repository.

- Present preliminary evaluation of whether the repository system complies with the Department's site suitability guidelines.

Work associated with and pursuant to the report's release will include the following:

- Conduct public hearings in Nevada to inform residents of the area and receive their comments.

- Solicit the views and comments of the Governor and legislature of any state or the governing body of any affected Indian tribe, as determined by the Secretary, and assist the Secretary to respond to such views from the states on the possible recommendation.

- Solicit from the Nuclear Regulatory Commission preliminary comments concerning the extent to which the at-depth site characterization analysis and the waste form proposal seem sufficient for inclusion in the License Application. Interactions with the Nuclear Regulatory Commission would be conducted to ensure an adequate basis and facilitate the comment process.

- Review the anticipated thousands of comments from the public; review comments from States and the Nuclear Regulatory Commission.

- Prepare a summary of oral and written comments from the hearings, and a summary response to them.

- Provide Site Recommendation documentation to the Secretary as required by the NWPA including the results of the latest iteration of Total System Performance Assessment conducted for the evaluation of the site and a final evaluation of suitability against the Department's guidelines; revised as indicated by comments from the public, States and Indian tribes, and the Nuclear Regulatory Commission, as appropriate.

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
# Ensure the Site Recommendation Report is internally consistent and manage and support the report's review and release in support of a decision by the Secretary on Site Recommendation.			
The budget increase for Site Recommendation is primarily for the preparation and distribution of the Site Recommendation Consideration Report and, if the Secretary decides to recommend approval of the site to the President, completion of the Site Recommendation Report. This decision process includes conducting public hearings and a public comment period, receiving and responding to the views and comments of the Governors and legislatures of any of the States, and receiving the Nuclear Regulatory Commission's (NRC) comments on the sufficiency of information for inclusion in a License Application, all of which are required by the Nuclear Waste Policy Act..	1,004	1,613	17,068

License Application

The Act requires the Secretary to submit a License Application to the Nuclear Regulatory Commission once the site designation takes effect. To allow adequate time for final review within the Department, a draft application must be virtually completed in FY 2001. The scope, complexity, and duration of repository licensing will require a significant amount of critical-path work related to development and review of the draft License Application that can be completed in FY 2002 for submittal to the Nuclear Regulatory Commission should the site designation become effective.

The content of the License Application must be adequate to support acceptance by the Commission for review and to facilitate completion of the Commission's licensing process within the three-year time frame required by the Nuclear Waste Policy Act.

FY 2001 tasks will build on technical documentation compiled for the Site Recommendation Consideration Report and the Site Recommendation Report, and they will be conducted pursuant to the Project's License Application

(dollars in thousands)

FY 1999	FY 2000	FY 2001

Management Plan and Technical Guidance Document. The tasks include the following:

- Initiate preparation of the application and document the information base on which it will rest.

- Develop the safety case for the demonstration of compliance with the Commission's performance objectives for preclosure radiological safety. It will present discussions of potential hazards, analyses of events that might disrupt operations and affect safety, and an identification of structures, systems, and components of the repository that would assure safety before the repository is closed.

- Develop the safety case for the demonstration of compliance with the Commission's performance objectives for the period following repository closure. It will rely on a summary of the Total System Performance Assessment conducted to support licensing, including a discussion of the models, inputs, and assumptions used to demonstrate compliance with postclosure safety objectives; discussions of features, events, and processes that affect postclosure performance; and summaries of the contribution of engineered barriers to performance.

- Develop radiation protection program, emergency plan, and environmental monitoring program for a repository.

- Work with Nuclear Regulatory Commission staff to resolve issues that are key to postclosure safety; employ interaction on selected topics with the Nuclear Regulatory Commission to develop a shared understanding of the content and level of detail that will be provided in the Department's License Application.

- Throughout the year, continue interactions with the Nuclear Waste Technical Review Board and other oversight agencies. As required by the Nuclear Waste Policy Act, Section 113(b)(3), continue to submit semiannual progress reports to the Nuclear Regulatory

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Commission and the Governor and Legislature of the State of Nevada.			
# Ensure that the License Application will provide the information needed to meet Nuclear Regulatory Commission acceptance criteria and will demonstrate that the repository would be in compliance with Nuclear Regulatory Commission performance objectives.			
The License Application would provide the basis for Nuclear Regulatory Commission authorization to construct a repository at the Yucca Mountain site. For actual operations to begin, the License Application would be updated to reflect any new information that is material to repository system performance, and the Department would seek a Nuclear Regulatory Commission license to receive and possess radioactive materials	17,705	16,314	20,143

Technical Information Management

Managing and ensuring the integrity and traceability of the massive technical data base the Project has compiled will remain a high priority. It will support predictions of repository system performance and development of the Site Recommendation Report, License Application, and supporting documents.

FY 2001 tasks will include the following:

Managing technical data. Develop, populate, and maintain technical data bases, which hold (1) geologic and hydrologic field data, the results of laboratory tests, engineering analyses, geographic information, and inventories of wastes destined for geologic disposal, (2) information about the characteristics of waste forms, (3) data sets generated and used by the Department for specific purposes such as input to design, performance assessment, and development of the Site Recommendation Consideration Report, Site Recommendation Report, and License Application.

Managing documents. Capture project documents and

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
ensure that they are defensible, traceable, and retrievable, during development and after release, and that formats are compatible with Internet systems. Complete conversion of the over 640,000 records produced prior to 1996 to a format in which they are electronically searchable and retrievable.			
# **Licensing support network.** Complete development of and load documentary material onto the web-based Licensing Support Network. The Department must certify to the Commission that this system is operated in compliance with the Commission's requirements shortly after a decision to recommend the site. This technology will make the License Application and supporting documentary material available electronically to parties participating in the licensing proceeding and to the public. Continue to maintain and update documentary material on the Internet and the OCRWM Intranet.			
# **Managing information technology**. Ensure integrity of data and systems; ensure efficiency in data management. Support applications, data bases, operating systems, utilities, and software development. Continue to upgrade the system to improve search and retrieval capability.			
# **Managing comments, commitments, and decisions**. Develop, populate, and maintain the data bases which track our comments and commitments to regulators and oversight groups to ensure that information is readily retrievable, consistent, accurate, and traceable. Complete and implement data base systems for managing public comments on the Site Recommendation Consideration Report and comments from States and Indian Tribes, and for tracking formal commitments and actions.	13,022	26,340	25,267

Performance Assessment

The Site Recommendation Consideration Report will be supported by an update of Total System Performance Assessment conducted in FY 2000. Additional analyses for

(dollars in thousands)

FY 1999	FY 2000	FY 2001

the Total System Performance Assessment will be conducted in FY 2001 to support a Site Recommendation. Another iteration will be completed in early FY 2002 to support the License Application. All iterations will reflect increased understanding of how emplaced nuclear waste interacts with the natural and engineered barriers. FY 2001 work will build on the 9 process model reports (PMRs) and over 120 lower level analyses and models developed in FY 2000 to support the Site Recommendation Consideration Report. These documents provide the traceability, transparency, and defensibility of the data and models that the Total System Performance Assessment rests on. Because of the importance of Total System Performance Assessment to evaluation of postclosure safety, these reports are crucial to the credibility of the work.

The natural and engineered barrier process models and supporting analysis and modeling reports are the building blocks of Total System Performance Assessment. The process models are: the integrated site model; near-field environment report; engineered barrier system degradation report; waste package degradation report; waste form degradation report; unsaturated zone flow and transport disruptive events report; saturated zone flow and transport report; and the biosphere report. Data are also compiled in a comprehensive data base on features, events, and processes related to long-term performance, and tectonic hazards.

Process models draw on data from site investigations, lab testing, and repository and waste package design to simulate the physical processes that could affect repository performance. The process models reflect how the various physical processes affect the performance of the repository system. The Project uses the process-level modeling to develop a model of the total repository system (engineered and natural barriers). This Total System Performance Assessment model is then used to forecast the performance of the repository system over time. TSPA modeling is iterative with each run of the models factoring in new information obtained from site characterization and design studies. By FY 2001, we will have produced a set of reports synthesizing the modeling and analysis for all

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001

physical processes that affect repository performance. They will provide the technical basis for the Total System Performance Assessment used to evaluate the site against the Department's site suitability guidelines.

The work in FY 2001 includes:

- # Revise abstractions from the nine (9) process models and supporting models, as appropriate, to support the Site Recommendation . Revisions will reflect: comments from the Nuclear Regulatory Commission on the sufficiency of information for use in licensing; comments on the Total System Performance Assessment that support the Site Recommendation Consideration Report; comments on the Draft Environmental Impact Statement; comments from public hearings; new data from long-term testing; evolution of repository and waste package design; results of sensitivity studies; and issues raised by internal review groups or external parties.

- # Conduct analyses and produce a new iteration of the Total System Performance Assessment to support Site Recommendation.

- # Conduct analyses as needed to address Nuclear Regulatory Commission regulatory requirements and key technical issues identified by the Nuclear Regulatory Commission.

- # Begin refinement of abstracted models, as appropriate, to support development of Total System Performance Assessment for License Application.

- # Conduct independent peer reviews as needed to evaluate and validate the process models 20,639 17,140 22,507

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Total System Performance Assessment - Viability Assessment			
# This activity was completed in the first quarter of FY 1999	760	0	0
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY 2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($2.6M).			
Total, Suitability/Licensing and Performance Assessment . .	53,130	61,407	84,985

Core Science

Overview

This budget subelement encompasses surface and subsurface field tests and monitoring, laboratory tests, other research, and interpretation and analyses of resulting data. Testing to support the Site Recommendation will have been completed before FY 2001. Testing to support the License Application will be completed in FY 2001. To comply with the Nuclear Regulatory Commission's requirement for a Performance Confirmation Program, selected long term tests both above ground and underground will continue and data will be used to validate assumptions in the License Application that are the bases for conclusions about repository system performance.

Testing will be conducted at the locations described under Operations/Construction, below. Some studies are conducted under a cooperative agreement with the University and Community College System of Nevada and with Nye County, Nevada.

A comprehensive environmental monitoring and restoration program ensures compliance with local permits and regulatory requirements and produces data needed for scientific purposes.

(dollars in thousands)

FY 1999	FY 2000	FY 2001

Data Interpretation and Modeling

This work area involves the interpretation and modeling of data collected from the testing described below, to help confirm understanding of the natural features of the site and the processes that will be at work within it.

FY 2001 work will focus on: water - in what quantities, how fast, and by what pathways and mechanisms it could move through the unsaturated zone of the site and through the water table of the saturated zone beneath the repository; structural, chemical, and mechanical properties of rock formations; how heat emitted by waste packages would affect water and rock in the near-field environment immediately around waste packages and how this in turn would affect the release and transport of radionuclides; and, the potential for disruptive events such as earthquakes.

FY 2001 tasks include the following:

- Incorporate unsaturated and saturated zone hydrologic flow data; geochemical transport parameters, recent geologic information, and thermal test data on coupled processes into a revision of the comprehensive site description that will be completed in FY 2001 to support the License Application.

- Incorporate test data into models of the site's natural features and processes to refine the natural system process models on which performance assessment modeling is based. This interpretation and analysis will support the Site Recommendation, the License Application, and the Total System Performance Assessment. Analysis will also determine how further testing should proceed as part of the required performance confirmation program. Revise/refine the six (6) natural system process models and contribute to the revision of the process model reports for the engineered barrier system, to document and ensure the traceability of data used in models, document the qualification of software used for modeling and its procurement, and document and validate revisions to the process models.

(dollars in thousands)

FY 1999	FY 2000	FY 2001

Preparation of these process models will involve analysis and modeling activities of hundreds of data packages. The data packages will include data from several major new tests associated with the Cross Drift Nye County Early Warning Drilling Program, and the Alluvial Tracer Complex which started in FY 2000. The natural system process models to be refined are:

- an integrated site model that presents information on rock properties and mineralogy within a three-dimensional geometric representation of selected rock units and structures;

- a near-field environment model that presents information on how the natural and engineered barrier system responds to heat emitted by waste and how this response changes the environment in the drift and affects release and transport of radionuclides. The process model refinement will include the recent ambient condition and the thermally-driven coupled processes data collected in FY 2000 and FY 2001;

- the unsaturated-zone model includes the seepage and moisture monitoring data; isotopic data including chlorine-36 validation data; thermal, chemical and geochronology and fluid inclusion data. The thermal data include the data from laboratory tests on thermohydrology, thermochemistry and thermomechanical effects; and the ESF thermal tests data from the ongoing drift-scale heater test;

- the saturated-zone process model describes the groundwater flow through the volcanic and alluvium aquifer under the site to the accessible environment. The SZ flow and transport model for License Application will specifically include the flow data from the Nye County early drilling program; the available data from the Alluvium Tracer Complex which is started in FY 2000; the available radionuclide sorption data and groundwater chemistry data from these tests; and the other

(dollars in thousands)

FY 1999	FY 2000	FY 2001

existing data including those on colloidal transport. The improved regional groundwater flow model will constitute the basis for the site-scale SZ flow and transport model development. The natural, as well as the anthropogenic analogues data from other sites will be included in the model validation effort;

- a revised disruptive events report will be prepared which incorporates all new data available for License Application. The new data specifically includes information available from the on-going seismic and geodetic monitoring work being performed through the cooperative agreement with the University and Community College System of Nevada, and any new information on the current volcanism model;

- a biosphere model will be developed for incorporating the updated information on radionuclide transport in the biosphere. The model will include all new data, including the final dose conversion factors. The submodels and the model will be validated.

Several lower level groundwater flow and transport models needed for preparation of the unsaturated zone and saturated zone process models described above, are being developed and/or refined. They describe the flow of groundwater at the site and within the region. They are:

- a mountain-scale unsaturated-zone flow and transport model;

- a drift-scale (tunnel-scale) unsaturated-zone seepage model that covers the size of a waste-emplacement tunnel, approximately 5 meters by 40 meters;

- a site-scale flow and transport model of the saturated zone, approximately 30 by 40 kilometers;

- a regional-scale groundwater flow model of the saturated zone, approximately 245 by 230

(dollars in thousands)

FY 1999	FY 2000	FY 2001

kilometers;

- a near-field environmental model that presents information on how the natural and engineered barrier systems responds to heat emitted by waste and how this response changes the environment in the drift and affects release and transport of radionuclides.

Fund a cooperative agreement with the University and Community College System of Nevada to provide an independent body of scientific and engineering data. Scientists will continue to measure geodetic strain on the regional scale and in the ESF in order to confirm the tectonic stability of the site, maintain a seismic-monitoring network, continue a precarious rock study and build a regional hydrochemical model. Continue the alluvial tracer testing complex support for preparation and analyses of tracers; sampling and analyses of rare earth and other trace elements finger printing the regional groundwater source and flow paths.

Scientists will further the work initiated at anthropogenic- analogue sites where the collection of data and testing has been most successful and useful to Yucca Mountain. Implications for performance of Yucca Mountain over long periods, based on anthropogenic analogue predictions, will be addressed. Work will continue at Peña Blanca, Mexico where studies will provide analysis indicative of transport of radionuclides and fission products along fractures and sequestration of these radionuclides in minerals. Retention of radionuclides in fractures will also be evaluated using data from Oklo, Gabon. In addition to the Peña Blanca and Oklo studies, geothermal systems that have experienced changes in permeability due to thermal processes will be examined. Information on these systems, either from the original sources or collected for this task, will be applied to numerical models to predict whether and under what conditions similar processes may occur at Yucca Mountain and at

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
what spatial and temporal scales	22,100	30,292	33,051
Testing to Support Site Recommendation			
Data and analyses supporting the Site Recommendation Report will have been compiled before FY 2001	35,102	20,700	0

Testing to Support License Application

Numerous tests will support development of the documentation needed to prepare the License Application. FY 2001 work includes:

- Conduct seepage and fracture-matrix interaction tests in the lower lithophysal and non-lithophysal geologic units of the Topopah Spring Welded unit which is in the geologic horizon where the proposed repository will be located. Conduct fault testing at the Solitario Canyon fault in the cross-drift. Complete the moisture monitoring test of the cross drift environment.

- Conduct moisture distribution tests at ambient conditions within the cross-drift.

- Conduct thermal tests that generate data on the effects of heat on water, rock chemistry, and rock structure, and the relationships among them. Plan and conduct a thermal test in the cross drift in the Topopah Spring Welded lower lithophysal geologic unit. Data from the on-going Drift Scale Test, along with the data from the cross-drift test, will be used to evaluate bounding assumptions about the effects of heat on coupled processes.

- Provide funding to Nye County to drill the remaining boreholes used to test water characteristics and movement. Under this cooperative effort, Nye County's boreholes will be used by the Project to perform water flow tests in the alluvium that constitutes a potential flow path between the site and the Amargosa Valley.

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
# Analyze hydrologic tests and hydrochemical data from Nye County's Drilling Program to better understand water flow and transport in the saturated zone.			
# Complete laboratory tests on radionuclide transport using core samples from the Calico Hills formation that underlies the repository.	3,000	5,249	13,558

Testing for the Licensing Phase and Performance Confirmation

Throughout FY 2001, data collection under the Performance Confirmation Program will continue. This program defines critical repository system performance parameters, predicts values and variations in them, and defines and provides for testing to measure actual findings against predictions. The data base built during site characterization and throughout repository licensing, construction, and operation will be used to validate assumptions in the License Application that are to be the basis for Nuclear Regulatory Commission findings about repository system performance. The performance confirmation program would continue until repository closure is authorized by Nuclear Regulatory Commission.

Tasks will include the following:

# Conduct long-term tests and data collection above and below ground, including seismic and geodetic monitoring and monitoring of groundwater flow and quantity. The data gathered, termed *otherwise irretrievable data*, must be continuously gathered if the baseline is to be valid.			
# Continue seismic monitoring through an extensive network that includes approximately 30 surface locations on and around the site and instrumentation in the Exploratory Studies Facility	2,000	2,000	10,373

Environmental Monitoring and Compliance

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Environmental monitoring and compliance began with site characterization and will continue throughout licensing, construction, operation, closure, and decommissioning of the repository. These efforts span diverse activities:			
# Continue the comprehensive environmental compliance program that ensures that the Project can conduct site characterization and performance confirmation testing without interruption by maintaining continuous compliance with over 40 active environmental permits from the State of Nevada and numerous DOE directives and Federal laws. The program comprises other programs designed to achieve compliance with specific sets of regulations: Air Quality and Meteorology, Water Quality, Hazardous Materials Management/Pollution Control, Cultural Resources, Environmental Justice/ Socioeconomics, Biological Resources, and Land Access.			
# Conduct surveillances, audits, and assessments of site activities to ensure compliance; file quarterly and annual reports, as required.			
# Monitor weather and other environmental conditions to provide data for models that support design and engineering, Total System Performance Assessments, and analyses of potential radiological doses. Data on regional airflow patterns and extreme weather conditions in and around population centers support analyses of preclosure safety for licensing.			
# Collect data to develop the environmental baseline that would be used to monitor for potential impacts caused by repository construction and operation. Here, too, otherwise irretrievable data must be continuously gathered if the baseline is to be valid.			
# Monitor environmental and socioeconomic conditions to contribute to technical documentation needed for the Site Recommendation Consideration Report, Site Recommendation , and License Application.	12,630	12,383	12,450
Note: The Program is also planning on recompeting			

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
and awarding a follow-on contract(s) to the current M&O contract in FY 2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($2.8M)			
Total, Core Science	74,832	70,624	69,432

Design and Engineering

Overview

The budget request for the design and engineering element in FY 2001 will increase significantly over the funding level in FY 2000 to support a License Application submittal in FY 2002.

The design effort will confirm the design bases, parameters, concepts and specifications referenced in the Site Recommendation and will develop a level of detail in the License Application submittal which will provide the information required to:

- Ensure the protection of the public and worker health and safety.
- Demonstrate compliance with the regulatory requirements.
- Submit a docketable License Application for a repository at Yucca Mountain.

The design effort is prioritized using a process in which repository systems are categorized in terms of their importance to radiological safety, waste isolation, fire protection, and potential interaction with other systems. In FY 2001, those aspects of the design related to radiological safety and waste isolation will be developed to a level of detail that will allow the Nuclear Regulatory Commission to determine if the repository can adequately protect the public and worker health and safety.

(dollars in thousands)

FY 1999	FY 2000	FY 2001

The repository would house spent nuclear fuel (SNF) from commercial nuclear power plants, DOE-managed spent nuclear fuel (SNF) and high-level radioactive waste (HLW), Naval spent nuclear fuel (SNF), and immobilized plutonium. These waste forms have diverse characteristics with respect to radioactive materials, size, weight, configuration, temperature, and levels of radioactivity. DOE-spent nuclear fuel presents particular complexity because there are over 250 kinds.

To obtain an NRC license, DOE must demonstrate that a repository loaded with this inventory can perform safely. This requires an understanding of how each waste form would affect repository system performance.

The major areas of design work are waste package, subsurface, and surface design and system engineering. In FY 2001, work in these design areas will continue to build on and be consistent with the design submitted for the Site Recommendation Consideration Report.

FY 2001 efforts will include updating the Engineered Barrier System Degradation, Waste Package Degradation and the Waste Form Degradation process models and reports to document and ensure the traceability of data used in models, documenting the qualification of software used for modeling and its procurement, and documenting and validating revisions to the process models.

The Program will utilize cost-benefit trade studies, in a continuous effort to determine how a reduction in the future baseline funding requirements may be achieved for the planned construction work prior to waste emplacement. Present evaluations include investigating unique approaches

such as implementation of a “phased construction” and/or “modular design,” which initially show potential for significant cost savings in the future planned construction work.

(dollars in thousands)

FY 1999	FY 2000	FY 2001

Waste Package Design

The diverse inventory of waste forms to be disposed of in the geologic repository will require different waste packages.

During repository operations, the waste package must accommodate all handling conditions and design basis events for all waste forms. During the postclosure period the waste package must contain radionuclides for many thousands of years. The waste package must also provide safety with regard to criticality (a self-sustaining chain reaction) during both the pre- and postclosure periods.

Waste package design requires extensive structural, thermal, radiation shielding, preclosure and postclosure criticality analyses, development of fabrication and welding verification methods; and development of cost estimates. Specific tasks in FY 2001 include efforts to:

- Develop design basis waste form characteristics for selected waste forms in the Program's current and projected inventory. Design basis characteristics include geometric specifications, thermal output, burn-up credit. These characteristics define the conditions that waste packages and repository performance must satisfy.

- Develop a design analysis methodology such that different waste package designs can be shown to comply with design requirements derived from 10 CFR 63. The methodology will encompass structural, thermal, criticality, and shielding aspects.

- Develop waste package designs to accommodate these waste forms (commercial SNF, glass HLW, DOE SNF, and Navy SNF). The primary components of the waste package are (1) cylindrical shells with lids that provide structural protection and isolation from corroding environments and (2) an internal basket to arrange the waste to provide criticality safety and augment heat transfer out of the package. Specific designs will be analyzed for structural integrity, shielding, criticality, and

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
heat transfer. These analyses are necessary to perform the Integrated Safety Analysis to demonstrate radiological, nuclear (design basis events), and criticality safety. They also support Total System Performance Assessment by providing waste package temperatures as a function of time and source terms for radionuclide release and design configuration information.			
# Validate the neutronics models for criticality analysis. Validation includes comparing modeling results with experimental results and results from other models.			
# Develop fabrication/verification techniques to support the demonstration that waste packages can be fabricated and closed. The fabrication/verification program will conduct bench or reduced scale tests of manufacturing and welding technologies to demonstrate that large quantities of waste packages can be reliably manufactured and welded shut. Non-destructive examination techniques will be developed to verify that the package has been successfully welded shut through several centimeters of metal. This program will support development of a full-scale prototype that can be subjected to a variety of mechanical and thermal loads to demonstrate that it holds up against simulated accidents and expected repository conditions. This work will also serve as the basis for detailed cost estimates for loading, handling, and closing waste packages	14,855	10,170	17,954

Waste Forms and Waste Package Materials

Testing of waste forms and candidate materials for waste package fabrication, under anticipated repository conditions, provides the basis for developing performance models that predict degradation of waste forms and waste packages that delay the eventual release of radionuclides. These tests in turn support selection of materials for fabrication of waste packages that would isolate radionuclides for thousands of years.

FY 2001 testing will proceed along the following lines:

(dollars in thousands)

FY 1999	FY 2000	FY 2001

- Waste form degradation tests will include laboratory experiments subjecting commercial spent nuclear fuel and glass high-level radioactive waste samples to humid air, saturated drip conditions, and flow- through tests to determine how well radionuclides resist leaching out of the waste form in different temperature and water chemistry conditions. These tests will also examine the role that the cladding on commercial spent nuclear fuel plays in protecting the fuel material. In addition to radionuclide dissolution, tests will be performed to determine the extent to which plutonium can be mobilized from the waste form by colloids. Tests will also be performed to determine the integrity of commercial spent nuclear fuel cladding and how well cladding resists damage from hydrogen embrittlement, localized corrosion, mechanical loads, and other failure mechanisms.

- Engineers will use test data to develop detailed process models that describe the behavior of a given waste form through a degradation scenario.

- Waste package materials testing will focus on acquiring data on the performance of candidate materials and enhancing mathematical models describing their performance. Tests will include long-term corrosion tests and focused testing of nickel alloys, titanium, stainless steels, and other materials for comparative purposes. These materials will be considered for use in the waste package, drip shields, and other components of the engineered barrier system. Long-term tests include subjecting samples to water of varying chemistries and temperatures and measuring microscopic changes over time. Focused tests examine galvanic effects between two different materials, thermal stability, hydrogen embrittlement of titanium, stress corrosion cracking, localized corrosion, radiolysis enhanced corrosion, and corrosion influenced by microbes. Test data will be used to develop detailed process models that describe the behavior of a given material though a corrosion process . . . . . .

(dollars in thousands)

FY 1999	FY 2000	FY 2001
16,355	17,136	25,225

Subsurface Facilities Design

Subsurface engineering provides the design, description and integration of the emplacement, containment, and isolation of radioactive waste while providing compliance with thermal loading requirements, stability of excavations, a safe working environment, potential waste package retrieval, and decommissioning.

The set of subsurface design products needed to support the Site Recommendation and License Application submittal include the development of the safety analysis, the design products to support the development of the safety analyses, the design bases, and a general description of all underground systems.

FY 2001 work includes:

- Continue developing detailed subsurface design products to support the Site Recommendation and License Application. The subsurface design will include a description of the systems that are necessary to protect the health and safety of the public and workers and those systems that are required to meet postclosure repository performance objectives.

- Continue with the preparation of designs, calculations, specifications, technical reports, and analyses to support the development of the repository systems including:

  - Subsurface Facility System - Including the overall subsurface layout and thermal loading.

  - Ex-Container System - Including invert and invert support material properties; invert configuration and drip shield interface; and emplacement drift invert concept, invert construction methodology.

  - Ground Control System - Including ground control

(dollars in thousands)

FY 1999	FY 2000	FY 2001

analyses for emplacement and non-emplacement drifts; longevity of emplacement drift materials; earthquake analyses for ground control; rock mass classification analyses; identification and development of design parameters; maintenance analyses; and in situ test analyses.

- Subsurface Ventilation System - Including subsurface ventilation systems for development, emplacement and operations; monitoring and control systems; ventilation shaft siting; and radon and siliceous dust control.

- Subsurface Safety and Performance Confirmation Monitoring Systems - Including subsurface safety and monitoring design concepts; leak detection system design; radiological analysis of subsurface ventilation system; ventilation system radon control modeling; radiological exposure to subsurface workers from radon; impact of repository surface contamination; waste package surface contamination limits; area and airborne radiation monitor design analysis; subsurface shielding source term analysis; contamination and airborne source terms; radiation alarm system and set-point design; and design and testing of performance confirmation instrumentation.

- Waste Emplacement System - Including the emplacement gantry; transporter safety systems needed to mitigate the potential for accidents occurring during transportation and emplacement of waste in the subsurface area; shielding concepts; emplacement transportation system; and instrumentation and controls for waste emplacement.

- Backfill Emplacement System and Closure and Seals System - Including the backfill emplacement system; backfill configuration; backfill operations system; and determining the sealing approach and closure seals construction methods.

(dollars in thousands)

FY 1999	FY 2000	FY 2001

- Waste Retrieval System - Including analysis of the retrieval gantry; instrumentation and controls, and shielding concepts.

- Subsurface Excavation System - Including assessment and selection of suitable mechanical excavation methods for mains, airways, and emplacement drifts; examination of drill and blast excavation for shafts and secondary openings.

Develop the design products required to support the safety analyses. They include process flows (for systems involving the handling of radioactive materials), general arrangement diagrams, general system descriptions, and concepts of operations. Work will include the issuance of engineering designs and the analyses necessary to justify these designs (e.g., quality assurance packages). This includes:

- Identifying applicable codes and standards such as American Institute of Steel Construction (AISC) for ground control or American Concrete Institute (ACI) for seals.

- Identifying design criteria and regulatory design bases such as seismic, tornado and flooding criteria.

- Developing general system description that describes the function of and required safety actions for the installation.

- Developing piping and instrumentation diagrams to describe design of and controls for commodity flows such as air and water.

- Developing electrical one-line diagrams to show logic behind and distribution of power to subsurface facilities.

- Developing diagrams to show the sequence of

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
operations needed for selected handling systems such as waste or backfill emplacement or waste retrieval.			
# Perform testing of engineered barrier system materials and systems. Provide for full scale testing of engineered barrier systems, structures and components for demonstration of proof-of-concept. Testing includes both short and long term testing of systems and materials intended for subsurface construction. Testing activities include continuing the pilot scale tests, determining the thermal-hydraulic-chemical properties of backfill and their effects on backfill performance, determining the engineering mechanical/hydrological and diffusion characteristics of the invert materials, testing of physical and chemical effects from introduced materials on the engineered barrier system, testing of water contact with waste packages, testing the effects of the physical chemistry of cements on the engineered barrier system, and examining the constructability of the engineered barrier system and enhancement of the engineered barrier system.			
# In FY 2001, subsurface design activities (specification development and engineering trade-off analyses) will be initiated to provide the basis for procurement of long lead items such as tunnel boring machines and emplacement equipment	18,767	14,691	25,930

Surface Facilities Design

Surface facilities will occupy an area the size of 18 football fields and will include 22 major systems. Engineers will focus on designs that support key surface functions: (1) receive wastes transported to the site in shipping casks, (2) remove wastes from shipping casks and load them into waste packages within a handling building, (3) seal waste packages by welding, and (4) deliver the waste packages to a holding area in preparation for underground emplacement.

(dollars in thousands)

FY 1999	FY 2000	FY 2001

Other major facilities include a waste treatment building, transporter maintenance building, site utilities, warehouses, maintenance shops, and administrative facilities.

The waste handling facility and operations pose unique design considerations: the number of fuel assemblies handled each year would be approximately 300 times greater than at a nuclear power plant; and, the production rates for the waste handling facility hot cell would be significantly greater, with 60-ton casks remotely handled.

In FY 2001, the following tasks will be performed:

- Develop detailed designs for the waste handling building and associated systems which includes the carrier/cask transport, assembly transfer, canister transfer, disposal container handling system, and waste package remediation, HVAC, electrical, radiological and fire protection systems. Tasks include development of: process and instrumentation diagrams for the assembly transfer systems; pool water treating/cooling, drying system; process flow diagrams for the assembly transfer system pool water treating/cooling, drying system, nuclear, and non-nuclear; mechanical flow diagrams for the waste handling system, waste handling building, roof/floor framing, typical cross sections, and foundation plans; and schematics, general arrangements, floor plans, sections, and elevations.

- Develop preliminary designs for the waste treatment building and associated systems which include the mixed waste transfer, solid low-level waste processing, and liquid low-level waste processing subsystems; and radiological protection systems. Tasks include development of schematics, general arrangements, floor plans, sections, and elevations.

- Develop preliminary designs for the carrier preparation building, where shipping casks are prepared for removal from rail or truck carriers and prepared for return

(dollars in thousands)

FY 1999	FY 2000	FY 2001

shipment. Tasks include development of schematics, general arrangements, floor plans, sections, and elevations.

- Develop preliminary designs for sitewide systems, which include site electrical power, water, communications, compressed air, safety and security, management and administration, general site transportation, and site-generated hazardous and non-hazardous waste disposal. Tasks include development of plans and arrangements, control station arrangements, site safety and security plans, site non-radiological waste plans, and equipment arrangements.

- Design Off-Site Transportation Systems - Off-site transportation includes the rail lines and roads from the proposed Nevada transfer stations. Work will include the concept of construction and operations for rail and truck, cost and schedule baselines, site access road requirements, development of a conceptual design to complete the rail transportation system to the site surface facilities, and a transportation requirements document.

- Design Off-Site Utilities - Off-site utility design work includes all engineering and design for off-site utilities for Yucca Mountain. Off-site utilities include electric power, communications, water supply and any other system that functions as a utility, and that must be routed to the site from an off-site location. This work scope also covers utilities that are needed for the off-site functions within the State of Nevada such as transportation functions and the intermodal transfer station.

For each design above, applicable codes and standards will be identified, and design criteria, regulatory design bases, and general system descriptions will be developed.

To support these major design documents, design analyses and other technical products will be developed including radiological safety, facility layout, electrical, fire protection,

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
HVAC, mechanical systems, and assembly transfer and canister transfer analyses.			
Engineers will also continue to develop the following Surface Facility System Description Documents:			
# Performance Confirmation Data Acquisition			
# MGR Site Layout			
# Assembly Transfer System			
# Canister Transfer System			
# Waste Package Remediation System			
# Disposal Container Handling System			
# Waste Handling Building Electrical System			
# Waste Handling Building Ventilation System			
# Site Radiological Monitoring System			
# Emergency Response System			
# Site Communications System			
# Site Electrical Power System			
# Site Operation System			
# Site Fire Protection System			
# Site Compressed Gas System	8,871	6,093	23,347
Systems Engineering			
Systems engineers coordinate and integrate design functions to ensure that designs meet regulatory requirements for			

(dollars in thousands)

FY 1999	FY 2000	FY 2001

protecting workers, the public, and the environment; to demonstrate that designs as built will operate cost-effectively and efficiently; to ensure that changes to designs and specifications are documented and controlled in accordance with quality assurance requirements; and to verify that designs for all facilities and equipment meet acceptance criteria.

FY 2001 applications of systems engineering will include the following tasks:

- Conduct verification of the License Application design to ensure that the design documentation is adequate to support the draft License Application. Verification of the License Application design involves many tasks such as conducting a comprehensive review of several hundred design analyses to verify that the designs meet regulatory and design requirements, reviewing supporting design documentation for 60 major systems to ensure compatibility, and ensuring designs are consistent with the Final Environmental Impact Statement document.

- Update system-level design criteria for approximately 60 System Description Documents (SDDs) to maintain requirements baseline essential for development of the preliminary specifications for the License Application design. The maintenance and traceability of these requirements and criteria involve hundreds of performance and regulatory requirements. The verification of the data used to develop the design basis requires documented analyses to ensure the design requirements are well founded and meet the regulatory and program level requirements.

- Update over 20 Interface Control Documents that define the physical interfaces among structures, systems and components of the waste management system and ensure integration among the various design elements. As the design evolves, management of the intensive

(dollars in thousands)

FY 1999	FY 2000	FY 2001

exchanges of data and analyses will amount to thousands of interfacing parameters between various systems and organizations.

- # Perform preclosure design basis events analyses to ensure the internal and external hazards do not result in a release or exposure of radioactivity in excess of established safety limits. These analyses which evaluate the postulated hazards associated with the preclosure operations will be maintained and updated.

- # Perform integrated safety analysis for License Application to demonstrate that the repository design complies with preclosure requirements presented in 10 CFR 63.

- # Update the Test and Evaluation Plan as the design evolves. Required by Nuclear Regulatory Commission regulations, the development of the plan describes how the Department will conduct normal operations, surveillance, and periodic testing for systems operating in the repository operations area. The development of the test plan will identify the need for test and surveillance operational test procedures for the 20-30 major waste handling systems. The updates to the plan will define the test program requirements, types of tests, and establish a test schedule for the major system integration tests.

- # Revise the Performance Confirmation Plan to identify the confirmatory test program elements to ensure the long term performance of the waste disposal system can be monitored. The hundreds of essential site and engineered barrier performance parameters will be tested and modeled to ensure the behavior of the Monitored Geologic System is operating withing the prescribed limits.

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
# Update the description of the repository concept of operations to reflect design for the 20-30 major waste handling systems and the development of the preliminary operating procedures necessary for the License Application	19,011	18,185	18,778
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY 2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($4.2M).			
Total, Design & Engineering	77,859	66,275	111,234

National Environmental Policy Act

The Final Environmental Impact Statement is currently scheduled to be issued in FY 2001. (The costs in this subelement are for the M&O support to the Environmental Impact Statement preparation. The costs of preparing it are in the Program Direction budget account.) In FY 2001, the Project intends to develop and make available additional NEPA documentation. This documentation will present new or changed information for consideration in the decision making process.

In FY 2001, tasks pursuant to the issuance of the Final Environmental Impact Statement will include the following:

Complete the administrative record that supports the EIS.

Prepare the Final Environmental Impact Statement and initiate review by all appropriate Department of Energy organization, as needed, prior to being published and distribute to interested parties on a national basis to solicit comments.

(dollars in thousands)

FY 1999	FY 2000	FY 2001

The following FY 2001 activities will Support the issuance of the supplemental analyses or documents.

- # Complete preparation of supplemental analyses or documents.

- # Complete review by all appropriate Department of Energy organizations prior to being published.

- # Provide modified environmental impacts and consequences analyses for each technical discipline in the Environmental Impact Statement, if needed, based on comments received from the public during the public comment process for the Draft Environmental Impact Statement and, if required, supplemental materials as appropriate.

- # Develop the Mitigation Action Plan required by the National Environmental Policy Act, to mitigate adverse effects of repository construction and operation.

- # Respond to public comments. Consider additional, updated technical information and comments and incorporate them in the Final Environmental Impact Statement.

- # Prepare environmental assessment reports to identify changes in repository design, scientific or environmental information, or Total System Performance Assessment that could affect the impacts described in the Final Environmental Impact Statement, or in the Mitigation Action Plan. Topics include human health and safety, land use and ownership, potential repository land withdrawal, Native American issues, air quality, climate, geology, mineral and energy resources, hydrology, groundwater resources, biological resources and soils, flood zones, wetlands, and cultural resources.

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
# In prelicensing interactions with the Nuclear Regulatory Commission, supply any information they need to adopt the Department's Final Environmental Impact Statement, as provided for by the Nuclear Waste Policy Act	1,962	1,320	1,600
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY 2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($49K).			
Total, National Environmental Policy Act	1,962	1,320	1,600

Operations/Construction

Overview

This budget subelement encompasses the work required to provide the support systems, infrastructure, and utilities needed to operate the surface and underground facilities that support all on-site testing and to maintain stakeholder access.

The Yucca Mountain site and the adjacent support area occupies 195 square miles in a remote area and requires its own infrastructure. It includes a large facility to store drilling samples in a controlled environment that meet strict quality assurance requirements, laboratory facilities for testing geologic and hydrologic samples, the C-Well testing complex important to determining site saturated zone processes, buildings used to administer field operations, 20 miles of paved roads and 28 miles of unpaved roads, utilities, communication systems, approximately 800 separate test areas, including 451 boreholes many of them instrumented, 276 pits and trenches, environmental plots, and geologic exposures.

The underground facilities include the main loop of the Exploratory Studies Facility, which is 7.9 kilometers (5 miles) long and 7.6 meters (25 feet) in diameter and the

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
cross-drift, a tunnel 2.8-kilometers (1.7-miles) long and 5 meters (16 feet) in diameter that crosses the repository block from east to west. The 16 alcoves and niches within the Exploratory Studies Facility and the cross drift, the last of which is planned for completion in FY 2001, contain scientific equipment used for testing and monitoring.			
In addition to the hundreds of Project scientists and support personnel who work at the site, several thousand visitors including stakeholders tour it each year.			
Exploratory Studies Facility Operations			
# Maintain the twenty-five major support systems that ensure that scientists conducting tests in underground facilities can efficiently work in a safe environment. The support systems provide the utilities needed to conduct in situ experiments and protect complex scientific equipment within these facilities. The systems include ventilation, power distribution, water supply, compressed-air supply, haulage track, lighting, ground support, underground transportation, handling of materials and supplies, management of trash and refuse, sanitation, underground access control, data acquisition, fire protection, and communications	16,380	11,225	16,831
Exploratory Studies Facility Test Support and Construction			
Construction of the Cross-Drift Cross Over Alcove and Niche S-Phase I were completed in FY 1999. The Cross-Drift Thermal Alcove, Solitario Canyon Niche, and Niche S-Phase II were completed in FY 2000. With completion of excavation for the Cross-Drift Niche 6, planned for FY 2001, the construction program for major projects in support of site characterization activities will essentially come to an end	5,247	5,539	2,070
Site Operations and Test Support			
Project personnel will manage, operate, and maintain site			

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
facilities and systems essential to site operations and surface testing.			
Functions include providing communication services, electricity and water, collecting sewage and refuse, and janitorial services; controlling materials and property on the site and warehousing supplies; operating a motor pool, providing bus transportation for workers, and providing fuel for vehicles; providing staging for underground activities and providing utility feeds to underground operations; helping to calibrate scientific equipment; coordinating tours of the site; and ensuring site security.			
# Continue to provide access control to work areas to ensure safe operations and protect the integrity of the tests and data. Limiting access to the boreholes and a site maintenance program will maintain safety around pits and trenches.			
# This budget category also includes the cost of obtaining common field support services, such as roads, buildings, and electric power services, from the Nevada Test Site.			
# Site operations and test support are long-duration tasks that span site characterization, licensing, construction, and repository operations. Their cost will be fairly constant through submittal of a License Application and will be approximately $823,000 per month	9,876	10,058	10,666
Safety and Health			
To protect workers, visitors to the site, the environment, and site roads and structures from any hazards that may result from site characterization, the Project will continue its rigorous safety and health efforts:			
# To comply with Departmental orders and directives, the Federal Occupational Safety and Health Act, and State and local regulations and ordinances, the Project will continue to conduct medical emergency management,			

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
industrial safety and health, industrial hygiene, and fire prevention programs. Continue to communicate information about safety and health, training, assessing and reviewing program performance, reporting, accident investigation, and tracking compliance.			
# Under the Integrated Safety Management System required by the Department, the Project will continue to integrate safety and health considerations into work planning, implementation, and documentation, as detailed in our Functions, Responsibilities, and Authorities Manual. The Program will continue to carry out its integrated safety management system, which includes performance indicators, milestones for achieving continuous improvements, and performance assessments.			
# Within the Exploratory Studies Facility and cross-drift, safety and health personnel will continue to identify employee exposures to hazards; they will develop and document methods of mitigating those hazards; and they will determine how the methods can be improved.			
# Safety and health personnel will provide initial input into design and planning for repository construction and operations. This will include reviewing physical processes, requirements, and designs to determine safety and health consequences, and evaluating the controls intended to mitigate hazards to workers, the public, and the environment	2,700	3,178	3,400
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY 2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($1.4M).			
Total, Operations/Construction	34,203	30,000	32,967

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Project Management Support			
Overview			
This budget subelement encompasses the support that enables technical and scientific programs to plan for and fund the collection of data; to analyze, process, and manage it; and to compile and synthesize it into major products and decision documents. In FY 2001, project management activities will directly support the work of preparing the Site Recommendation Consideration Report and supporting documents, engaging in the intensive activities associated with their release, conducting public hearings, completing the Site Recommendation Report, and preparing a License Application.			
Management Support Activities			
# Work will include monitoring how tasks are performed to ensure compliance with applicable statutes, regulations, and DOE orders and directives; planning, scheduling, and measuring performance to ensure that program objectives are met; monitoring work to ensure it is accomplished in accordance with approved work scopes, authorized budgets, and scheduled milestones; providing project participants in Las Vegas with office space; providing participants in Las Vegas and at the Yucca Mountain site with equipment, a motor pool, and training they need to perform their duties; maintaining information technology and telecommunications systems for their use; maintaining records and technical references; conducting an outreach program; and supporting public hearings for the Secretary of Energy's consideration of the possible recommendation of the Yucca Mountain site for development as a repository .	28,234	29,377	31,653

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Lease Scoring			
# Current leases on office space in Las Vegas, Nevada, will be maintained. Those leases began to expire in FY 2000. FY 2001 funding supports the minimum extensions (1-year to 2-year, identified in the current contracts) until new leases are negotiated and awarded	0	5,800	4,600
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY 2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($1.5M).			
Total, Project Management Support	28,234	35,177	36,253

External Oversight and Payments-Equal-To-Taxes

This budget subelement includes financial assistance and payments equal to taxes that are made to units of government affected by site characterization activities.

External Oversight			
As required by the Nuclear Waste Policy Act [Section 116(c)(1)], financial assistance is being requested for eligible units of government for external oversight: the State of Nevada and affected units of local government (Churchill, Clark, Esmeralda, Eureka, Lander, Lincoln, Mineral, Nye, and White Pine Counties in Nevada and Inyo County in California)	5,930	7,072	10,535

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Payments-Equal-To-Taxes			
Under the Nuclear Waste Policy Act [Section 116(c)(3)], payments-equal-to-taxes are made to the State of Nevada and Nye and Clark Counties. They are intended as the equivalent of what the State and affected units of local government would receive if they were authorized to tax site characterization activities	5,729	9,300	11,300
Total, External Oversight and PETT	11,659	16,372	21,835

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Suitability/Licensing and Performance Assessment	

FY 2001 vs. FY 2000 ($000)

The budget increase for Site Recommendation is primarily for the preparation and distribution of the Site Recommendation Consideration Report and, if the Secretary decides to recommend approval of the site to the President, completion of the Site Recommendation Report. This decision process includes conducting public hearings and a public comment period, receiving and responding to the views and comments of the Governors and legislatures of any of the States, and receiving the Nuclear Regulatory Commission's (NRC) comments on the sufficiency of information for inclusion in a License Application, all of which are required by the Nuclear Waste Policy Act. Increased budget for Licensing will allow resumption of development of the License Application where work was deferred due to budget reductions in prior years. The budget for Technical Information Management slightly decreases with the development of the Licensing Support Network that is required by the NRC within 30 days of the Site Recommendation. The performance assessment budget must increase as the design alternative calculations are incorporated into the Total System Performance Assessment (TSPA) necessary for the Site Recommendation and work is initiated on the TSPA update required for the License Application. In contrast to previous iterations of the TSPA, the iterations for Site Recommendation and License Application must fulfill specific DOE and NRC regulatory requirements, some of which have only recently been proposed and promulgated. Data and computer model quality assurance requirements must also be completed for these iterations. . . . . +23,578

Core Science

The budget for Core Science decreases in FY 2001 as the testing is finalized and increased focus is placed on data analysis for site characterization in preparation for license application. The budget decrease is due to the completion of field tests associated with radionuclide flow and transport in the saturated zone, fracture matrix interactions, moisture distribution measurements under ambient conditions, and the small block thermal tests. The laboratory tests of radionuclide sorption, colloid transport, and small block thermal tests are also complete. Long term tests (e.g., drift scale heater tests, niche and alcove tests for hydrologic flow and moisture distribution, and Alluvial Tracer Complex tests) will continue, substantially as a part of the

performance confirmation effort. The cooperative agreement with the University and Community College System and the one-time expected contractor transition cost offset the cost reductions in the testing area . . . . . -1,192

	FY 2001 vs. FY 2000 ($000)

Design and Engineering

- # Waste forms and waste package testing and modeling costs increase to accommodate the need to complete model validation. The largest growth is in surface and subsurface designs that have been deferred in past years.

- # The upward trend from FY 2000 to FY 2001 reflects the increased design activity needed to accelerate the design work for the License Application to recover the work resulting from the reduced appropriation in FY 2000 and subsequent deferral of work. The design in prior years has been focused on those areas that have little or no regulatory precedent, such as the waste package and underground operations, leaving much of the surface and subsurface facilities with less design detail. In preparation for the License Application, efforts will be focused on providing more detail in the surface facilities design. The design that will be produced for the Site Recommendation in FY 2000 is an update of the Viability Assessment design, modified to accommodate results of the FY 1999 alternatives and options analyses. For the License Application, the design (which includes 35 complex surface systems and the underground facilities) must include a defensible regulatory analysis of system operations, accident analysis, mitigating features, analysis and a modular design approach. In addition, to support construction, preparation of procurement documents prior to issuance will need to be initiated in FY 2001. Activities include the development of procurement requirements, specifications, mechanical equipment, and controls. Waste package design activities will increase to accommodate needed License Application details. Waste forms and waste package testing and modeling costs increase to accommodate the need to complete model validation. The need for resources for systems engineering has peaked and is starting to taper off as the base case and supporting documentation has been developed . . . . . +44,959

National Environmental Policy Act

- # The Final Environmental Impact Statement will be issued in FY 2001. However, work continues to complete the administrative record and to develop the Mitigation Action Plan. The Project intends to develop and make available additional NEPA documentation. This documentation will present new or changed information for consideration in the decision making process +280

Operations/Construction

	FY 2001 vs. FY 2000 ($000)
# Exploratory Studies Facility Test Support and Construction continues with work toward the completion of all major underground construction efforts supporting the Yucca Mountain Site Characterization. Construction activities in FY 2001 include Alcove 6 in the cross drift, the cross drift Thermal Alcove, cross drift Niche 6, Phase II of Niche 5, and the Solitario Canyon Niche. There are also continuing operating costs associated with maintaining the tunnel and the facilities at the Nevada Test Site	+2,967
Project Management Support	
# The budget increase for Project Management Support is primarily for supporting the Public Hearings associated with the Site Recommendation Consideration Report and the Site Recommendation Report	+1,076
External Oversight and Payment-Equal-to-Taxes	
# The increase in FY 2001 is due to the new PETT agreement with Nye County and the request for funds for oversight support for the State of Nevada.	+5,463
Total Funding Change, Yucca Mountain Site Characterization Project	+77,131

Waste Acceptance, Storage and Transportation

Mission-Supporting Goals and Objectives

The primary responsibilities of the Waste Acceptance, Storage and Transportation (WAST) function are to develop a process for the legal and physical transfer of spent nuclear fuel to the Federal Government; create a private sector-based national transportation capability for waste acceptance and transportation; and resolve institutional issues with stakeholders.

Continuation of the core activities that will precede removal and transportation of spent nuclear fuel from reactor sites to a Federal facility will be provided for in the FY 2001 funding. These activities include: the collection and maintenance of spent nuclear fuel discharge information; development of procedures for verification of spent nuclear fuel parameters; maintenance and implementation of the Standard Contract; interactions with the Nuclear Regulatory Commission, contract holders, and others concerning nuclear materials safeguards; interactions with stakeholders; and the development of the acquisition process for waste acceptance and transportation equipment and services.

Spent Fuel Storage

This activity was suspended in FY 1999, following submittal to the Nuclear Regulatory Commission of the Topical Safety Analysis Report Phase I Centralized Interim Storage Facility.

Transportation

The transportation activity involves the development of a procurement process for the acquisition of a safe and cost-effective transportation capability. This procurement process will utilize private sector entities to accomplish the Department's commercial spent nuclear fuel waste acceptance and transportation requirements. The proposed procurement has been structured in a phased process to facilitate competition and limit contract risk to DOE. Development of the detailed plans for waste acceptance and transport, the fabrication of the transportation casks and related equipment, and the actual transportation services will proceed within the planned contract phases. The Department plans to complete development of the request for proposals for waste acceptance and transportation services in FY 2001, and issue it in FY 2002. This activity also includes the consideration and resolution of institutional issues and interactions with stakeholders.

Waste Acceptance

The Waste Acceptance activity requires the development of plans for achieving the legal and physical transfer of spent nuclear fuel (SNF) and high-level waste (HLW) to the Federal Government from the owners and generators of such SNF and HLW; the development of planning assumptions and recommendations for the Department's waste acceptance policy; and supporting the transportation, storage and disposal of SNF and HLW, once accepted. Activities required to facilitate waste acceptance include: 1) development of a process for the orderly transfer of SNF and HLW into the Federal system consistent with the needs of both the Federal Government and the owners and generators; 2) development of a plan to carry out the Program's waste acceptance responsibilities; 3) continuation of a collaborative dialogue with the Nation's nuclear utility companies as well as other SNF and HLW owners and interested stakeholders; 4) verification of the fees collected for commercial spent nuclear fuel; 5) maintenance and implementation of the provisions in the Standard Disposal Contract; and 6)

provision of contingency planning support, studies and analyses directed toward the private sector-based acceptance and transportation initiative.

Project Management

Project Management and Administration activities support each of the product areas for the Waste Acceptance, Storage and Transportation Project. Specifically, the Project Management and Administration area includes the traditional areas of project management, project control, and technical and programmatic integration of tasks and activities across the Project.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Spent Fuel Storage	320	0	0	0	0.0%
Transportation	0	0	1,750	1,750	100.0%
Waste Acceptance	916	1,268	1,523	255	20.1%
Project Management	614	527	527	0	0.0%
Total, Waste Acceptance, Storage and Transportation	1,850	1,795	3,800	2,005	111.7%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Spent Fuel Storage			
# Respond to the Nuclear Regulatory Commission questions and interact with the Commission during their review of the Centralized Interim Storage Facility Topical Safety Analysis Report Rev 0. The Nuclear Regulatory Commission's safety assessment report for the non-site-specific Centralized Interim Storage Facility Topical Safety Analysis Report was issued in FY 2000. No activity is planned for FY 2000 or FY 2001	310	0	0
# Submit an updated Actinide-only Burn-up Credit Topical Report to the Nuclear Regulatory Commission to take credit for the reductions in spent nuclear fuel reactivity as a result of fuel usage in a reactor. No activity is planned for FY 2000 or FY 2001.	10	0	0
Total, Spent Fuel Storage	320	0	0

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
Transportation			
# Prepare acquisition documents and technical specifications and issue for public comment the revised draft Request for Proposal (FY 2001), and support development during FY 2001 of the Request For Proposal for waste acceptance and transportation services including transport cask systems and auxiliaries (for issuance in FY 2002); develop procurement for market-driven waste acceptance and transportation services	0	0	1,550
# Review and revise Section 180(c) Notice of Policy and Procedures (for issuance in FY 2002) for implementing the Nuclear Waste Policy Act Section 180(c) and support preparation and evaluation of grant applications	0	0	200
Total, Transportation	0	0	1,750
Waste Acceptance			
# In FY 2001, manage interface/liaison with other affected elements of the Civilian Radioactive Waste Management System	30	175	250
# Develop Standard Disposal Contract modifications and/or deviations, as required, to support the waste acceptance process and Regional Servicing Contractor services acquisition processes. Maintain spent nuclear fuel storage data and assumptions; update Utility Storage Assessment model to include utility cost calculations, and industry forecasts to support Civilian Radioactive Waste Management System planning; and support development of waste acceptance criteria.	423	504	570

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
# Implement the Standard Disposal Contract and other agreements; validate and disseminate utility supplied spent nuclear fuel discharge/storage data; update and publish the Acceptance Priority Ranking and Annual Capacity Report; and, update and distribute the updated Utility Spent Nuclear Fuel Discharge Projections and Analysis. Update verification requirements as required, including commercial and DOE owned spent nuclear fuel and high level waste; and support the litigation process. Issue the Spent Nuclear Fuel Verification Plan in FY 2001.	193	239	353
# Implement the responsibilities established in the Memorandum of Agreement for acceptance of DOE spent nuclear fuel, high level waste and Navy spent fuel. This includes issuance of high level waste data needs; development of acceptance capacities for DOE and Navy materials requiring acceptance, transportation, disposal and establishment of fee payment schedules.	270	350	350
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY 2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($92K).			
Total, Waste Acceptance	916	1,268	1,523

Project Management

# Provide cost, schedule, planning, and integration related tools and services: cost and schedule baseline management; Strategic and Program Plan development/update; and project management documentation. Provide project control functions by monitoring cost, schedule and technical performance, performing variance analyses, and developing and implementing corrective actions	160	160	160
# Develop the Waste Acceptance, Storage and Transportation Annual Plan, and support the project validation review process; update the Long-Range Plan, as required	259	267	267

	(dollars in thousands)		
	FY 1999	FY 2000	FY 2001
# Maintain Waste Acceptance, Storage and Transportation life cycle cost estimate, support Total System Life Cycle Cost, and update Waste Acceptance, Storage and Transportation Project Life Cycle Cost Report; conduct/coordinate system studies and analyses including the Waste Acceptance, Storage and Transportation Operations Plan; and perform/support verification and design control.	195	100	100
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY 2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($32K).			
Total, Project Management	614	527	527
Total, Waste Acceptance, Storage and Transportation	1,850	1,795	3,800

Explanation of Funding Changes from FY 2000 to FY2001

	FY 2001 vs. FY 2000 ($000)
Transportation	
# The increase reflects the funds requested for the preparation of acquisition documents and technical specifications. In addition, the revised draft Request for Proposal for waste acceptance and transportation services will be issued for public comment.	+1,750
Waste Acceptance	
# The increase reflects the funds requested for implementation of requirements established in the Memorandum of Acceptance of DOE spent nuclear fuel, high level waste and Navy spent fuel.	+163
# Funds are requested for transition of the M&O contract if the contractor selected is not the incumbent.	+92
Subtotal, Waste Acceptance	+255
Total Funding Change, Waste Acceptance, Storage and Transportation	+2,005

Civilian Research and Development (ATW)

Mission Supporting Goals and Objectives

A future deployed Accelerator Transmutation of Waste (ATW) system has the potential to significantly reduce the radioactive toxicity and volume of civilian spent nuclear fuel (waste) and at the same time produce electricity to help off-set the cost of the overall program. Additionally, ATW technology could avoid the need to build a second repository. Equally important, ATW research would support the exploration of many new frontiers of scientific and engineering research in areas such as materials, high energy physics data, high powered accelerators, advance reactor coolants, and the unique area of coupled subcritical reactors driven by accelerators. While the long-term goal of this research is to find new technologies to deal with nuclear waste, these new areas of nuclear science and engineering can open the door to advances into new reactor technologies and have the potential to enhance the proliferation resistance of nuclear power.

In the *Fiscal Year 1999 Energy and Water Appropriation Act*, Congress directed the Department to study ATW and prepare a "roadmap" for developing this technology by the end of FY 1999. The Office of Civilian Radioactive Waste Management managed this task and developed a "Roadmap for Developing ATW Technology" Report which was submitted to Congress on November 1, 1999.

The FY 1999 ATW Roadmap identified issues and proposed a research, development, demonstration and deployment program to develop and implement ATW technology to treat spent commercial nuclear power plant fuel. The Roadmap report concluded that a "deployment driven" program has significant risk and that a short term (six year) program of trade studies and science based R&D, including engineering research, at a total cost of $281 million, would be required to increase the knowledge base, reduce costs, and support future ATW technology decisions. The ATW Roadmap steering committee recommended such a program be conducted with international collaboration and include attention to global issues of nonproliferation, ecology, energy and economics. The initial mission of the ATW program is to conduct science-based research focused on deriving system requirements, comparing options, collecting physics data, and addressing the major technical issues that were identified during the development of the ATW roadmap, and to analyze programmatic and institutional issues associated with the development, demonstration and deployment of an ATW system.

In FY 2000, Congress directed the Department to pursue ATW technology development. Congress provided $9 million to the Office of Nuclear Energy, Science and Technology (NE) under the Civilian Research and Development decision unit, to establish the ATW program in FY 2000. In the first year of the program, systems studies will begin in order to establish and evaluate a broad range of technology options and narrow the choices. The Department is, with the support a new subcommittee of the Nuclear Energy Research Advisory Committee chaired by Dr. Burton Richter, preparing a detailed program plan that will be used to guide the science and engineering based research program.

For FY 2001, the Department has requested no new funds for ATW research. While the Roadmap prepared by the Department last year provides a good basis to begin the program planning process, the Department plans to apply the funds provided for FY 2000 to complete critical trade studies (focusing on subjects such as the viability of lead-bismuth coolants), evaluate experimental data from test facilities in

the U.S. and Russia and complete its detailed program plan. Once this is done, the program will be well equipped to suggest the next stage of research. Once the program plan and its recommendations are prepared and have been reviewed by the NERAC, Nuclear Energy will submit it for consideration by DOE management, the Office of Management and Budget, the Office of Science and Technology Policy, and interested Congressional committees.

The FY 2000 work scope includes the following four elements:

- *System Studies:* In FY 2000, the first year of the ATW program (based on the roadmap developed during 1999), the main focus is to establish global system requirements. These system studies will begin the process of identifying the most promising options, from which technology choices could then be compared and reference options confirmed or changed based on the outcome of the studies. A "top-down" approach was used to start the investigation of ATW technical options, specifically; selection of the most promising options, setting performance objectives, and providing quantified goals for the R&D plan. Studies began the process to: 1) definition of system performance objectives, 2) definition of system size, layout, and deployment rate, 3) choice of ATW reference system, 4) choice of ATW technologies, and 5) choice of coolant.

- *Transmuter (Target/Blanket) Development*: In FY 2000, activities concentrated on trade studies and and began experimental testing to solve the major technical issues associated with components of the ATW system, specifically; the coolant, and heat removal system.

- *Separations Technologies:* In FY 2000, trade studies into aqueous and electrometallurgical separations technologies were started. Investigation, testing and demonstration of technologies required for the treatment of spent fuel were deferred to future years.

- *Accelerator Technology:* In FY 2000, activity concentrated on analyzing the causes of beam interrupts that occur frequently in current linear accelerators and began the identification of specific solutions.

In FY 2000, the following supporting objectives were established:

- Conduct systems studies to identify the most promising ATW technology options, from which technology choices could be compared and reference options confirmed or changed based on the outcome of the studies. Studies will include analysis of major institutional issues relevant to ATW implementation and overall system optimization.

- Conduct trade studies and plan research to develop and demonstrate an optimum transmuter for the ATW system, including spallation target, ATW fuel and blanket forms, coolant, and heat removal systems.

- Identify, investigate and plan the demonstration of optimum technologies for the chemical separations and treatment of commercial spent nuclear fuel, ATW spent fuel, and waste forms in a manner that maintains proliferation resistance and waste minimization.

Develop, test and demonstrate components and assemblies for an accelerator system optimized for meeting the ATW mission.

Complete a detailed program plan including recommendations.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Civilian Research and Development (ATW) . . .	0 [a]	8,956 [b]	0	-8,956	-100.0%
Total, Civilian Research and Development (ATW)	0 [a]	8,956 [b]	0	-8,956	-100.0%

[a] $4.0 million was provided to the Office of Civilian Radioactive Waste Management in FY 1999 to prepare a roadmap for development of ATW technology.

[b] Includes general reduction distributed to this program.

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Civilian Research and Development (ATW)			
# Defer ATW research activities pending completion of a detailed program plan.	0	8,720	0
# SBIR/STTR.	0	236	0
Total Funding Change, Civilian Research and Development (ATW)	0 [a]	8,956	0

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Civilian Research and Development (ATW)	
# Once the Department has evaluated the trade studies, and experimental data on the lead-bismuth loop, including test data on the performance of the Russian lead-bismuth target, a detailed program plan with recommendations will be generated. This plan will be reviewed by NERAC and provided to OMB, OSTP, and Congress. Until such time the Department will defer funding of the science and engineering based research on the ATW program.	-8,720
# SBIR/STTR.	-236
Total Funding Change, Civilian Research and Development (ATW)	-8,956

[a] $4.0 million was provided to the Office of Civilian Radioactive Waste Management in FY 1999 to prepare a roadmap for development of ATW technology.

Program Integration

Mission Supporting Goals and Objectives

Program Integration provides management support to the Program Director, the Yucca Mountain Site Characterization Project, and the Waste Acceptance, Storage and Transportation Project. Program Integration is comprised of Quality Assurance, Program Management, and Human Resources and Administration. These offices are responsible for quality assurance, system integration, regulatory integration, strategic planning, international waste management, program management, human resource and development, audits, education and information, and information management.

Quality Assurance

This element identifies and ensures implementation of federally mandated requirements for Nuclear Quality Assurance (QA) applicable to the Civilian Radioactive Waste Management System (CRWMS) program activities related to radiological health and safety and waste isolation. It establishes and maintains a Quality Assurance Program formulated to ensure quality in activity planning and performance through the developed end-products. Documented compliance with these quality requirements establishes confidence in the effective implementation of the CRWMS program to support the execution and eventual licensing and/or certification of high-level nuclear waste operation activities.

Activities associated with the QA function are performed by personnel not associated with the performer organization (NRC independence requirements), and are directly related to the acceptability of the technical products and services provided by the performer organization. The QA element achieves this independence by utilizing support service contract personnel who are independent of the Program's Management and Operations contractor. For this reason, all QA funding is displayed in the Program Direction element, and not in the budget elements where the substantive QA work is performed. Before technical products and services can be deemed acceptable, reviews, audits, and surveillance (as appropriate) by the QA organization must be performed. QA is not an administrative function, but rather a necessary step (per NRC regulation) to assure technical acceptability and confidence in fulfilling our mission to protect the public, workers, and the environment.

System Integration

The Systems Integration unit ensures development of an integrated waste management system, i.e., that the acceptance and transportation services component is compatible with the repository and waste package design activities and performs as a coordinated single system that meets mission requirements, and is safe, efficient, reliable, and cost-effective. System Integration also coordinates policy, interprets technical requirements, and manages Program requirement documents. The primary effort also includes maintaining current descriptions of the overall waste management system, its components, and interfaces to enhance communication among parties responsible for individual system components.

Systems Integration also provides support and strategic planning assistance to the Director and project offices. This unit annually determines the adequacy of the fee charged to generators of commercial Spent Nuclear Fuel (SNF), in accordance with the Nuclear Waste Policy Act of 1982. Periodically, the Department's recommendation requires the conduct of Total System Life-Cycle Cost (TSLCC) analyses to support the decision of whether program revenues are sufficient to cover the cost of the program. Additionally, this unit conducts systems studies, tradeoff studies, sensitivity studies, and contingency

analyses to ensure that the system-wide impacts of proposed changes are considered and alternative or contingency system configurations and concepts are evaluated.

Regulatory Integration

The mission of Regulatory Integration is to ensure that the activities leading to the final waste management system, including commercial and Department-owned nuclear materials, are consistent with the regulatory guidance provided by the governing authorities. This element ensures project activities are consistent with Departmental policy and environmental impact statements for other Department programs. The focus is on plans and strategies for compliance with applicable statutes and regulations. The approach to accomplishing this mission is to conduct regulatory reviews and continue interactions with several external oversight agencies, including the Nuclear Regulatory Commission (NRC), Environmental Protection Agency (EPA), and Nuclear Waste Technical Review Board (NWTRB). The external participation include addressing management and technical issues related to the repository project, interim storage, and transportation of spent fuel and high-level waste. Interactions with the NRC on licensing issues are critical to the success of the overall program schedule as they directly affect the NRC licensing process for program activities and facilities.

Strategic Planning

This element supports the Director's program planning requirements by integrating policy direction received from the Administration, Congress, and the Office of the Secretary into an overall program strategy. It provides resources for Program compliance with Departmental obligations resulting from the Government Performance and Results Act of 1993, the Government Management Reform Act of 1994, including the DOE Strategic Plan, Annual Performance Plan, and Annual Performance Report, and supports the development and maintenance of multi-year and annual planning documents. Strategic planning also provides funding for responses to program inquiries and links requirements with external program oversight parties and liaison activities within the Department.

International Waste Management

This element keeps the Program abreast of international developments and new ideas, and affords OCRWM the opportunity to influence international opinion and direction on strategies for disposition of nuclear materials. The unit assists in preparing for bilateral meetings and provides the Program's inputs to various international fact and information books.

The Program is working closely with the Russian Federation to complete a bilateral agreement that will facilitate the development of geologic repositories in the United States and the Russian Federation. The Office of Civilian Radioactive Waste Management is also leading a joint DOE-Minatom working group that includes participation of the Office of Nonproliferation and National Security and the State Department. The working group is evaluating issues associated with the management of radioactive waste and spent nuclear fuel, including shipment, storage, and direct disposal. A new initiative to advance the Department's non-proliferation objectives with Russia is included in the overall Department's budget request (in the request for the Office of Nonproliferation and National Security). If Russian law is amended to permit the storage and disposal of foreign spent fuel in Russia, funds may also be used for research and planning for international spent fuel storage and geologic repository cooperation. Funds to support this effort, while not included in the Office of Civilian Radioactive Waste Management's

(OCRWM) budget, would be co-managed by OCRWM and the Office of Nonproliferation and National Security.

Program Management

The key components of this element are business and management center planning, formulating and executing budgets and annual work plans, and establishing Program-level cost, schedule, and technical baselines. Program Management provides the basis for prioritizing, and allocating resources; defining, costing, and executing work scope and schedules; and monitoring, analyzing, and reporting Program performance.

Audits, Reports, Education and Information

The Audits, Reports, Education and Information element includes diverse activities that support the Program's mission and ensure compliance with legislative requirements to: (1) develop and submit an Annual Report to Congress; (2) develop and submit financial statements to the Department's Chief Financial Officer, (3) develop and submit the Annual Assurance Memorandum to the Secretary; and (4) develop and submit to Congress, OMB and GAO, Departmental responses to recommendations in GAO and DOE IG audit reports. Implementation of an appropriate investment strategy and the prudent management of the Nuclear Waste Fund investment portfolio are also essential to fulfilling the Program's fiduciary responsibility under the Nuclear Waste Policy Act. Public information and education activities conducted by the National Information Center support the Nuclear Waste Policy Act objective of keeping the public informed of Program activities, and assist in building customer, stakeholder, and public confidence in and support for the Program. The Program's Historically Black Colleges and Universities Undergraduate Scholarship and Radioactive Waste Management Graduate Fellowship Programs support the Department's compliance with Executive Order 12677 and the Secretary's science education initiative, as well as ensuring that the Program's goal for a diversified workforce of highly specialized scientists and engineers will be met in the future.

Information Management

This element encompasses the strategic application of information technology. It supports the accomplishment of the Program's mission by providing integrated information systems, solutions and services that enhance the productivity of human resources, drive business process improvement efforts, reduce overall Program costs, and affirms "reinventing government" and Departmental initiatives. Information management includes designing and developing information systems to ensure a reliable infrastructure for effective and timely access to, and communication of, information; integration and integrity of technical, regulatory, management, and financial information; streamlining Program work processes through automation to reduce the paperwork burden and increase the productivity and job satisfaction of human resources; promoting an organizational culture based on planning, compliance with Federal and Departmental regulations, and responsiveness to Program dynamics; and supporting the collection and storage of records required for licensing.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	Change	% Change
Quality Assurance	0	0	0	0	0.0%
Program Management					
Systems Integration	3,143	2,266	2,600	334	14.7%
Regulatory Integration	763	593	862	269	45.4%
Strategic Planning	1,127	712	1,179	467	65.6%
International Planning	313	627	627	0	0.0%
Program Management	663	563	653	90	16.0%
Total, Program Management	6,009	4,761	5,921	1,160	24.4%
Human Resources and Administration					
Human Resources Development	89	20	25	5	25.0%
Audits, Reports, Education and Information	1,149	1,190	1,247	57	4.8%
Information Management	4,003	2,650	4,573	1,923	72.6%
Total, Human Resources Administration	5,241	3,860	5,845	1,985	51.4%
Total, Program Integration	11,250	8,621	11,766	3,145	36.5%

Detailed Program Justification

(dollars in thousands)

FY 1999	FY 2000	FY 2001

Program Management and Integration

Systems Integration

- Revise the CRWMS Program baseline to incorporate updated policies, Administration/Congressional direction, and requirements.
- Support the development of Project technical baseline and interface control documentation. Establish initial technical, cost, and schedule baseline for CRWMS through repository closure. Update Total System Description for the Program.

(dollars in thousands)

FY 1999	FY 2000	FY 2001

Systems Analysis

Update CRWMS Total System Life Cycle Cost estimate and Report on Fee Adequacy to be consistent with repository Site Recommendation design and acceptance and transportation strategies. Conduct, review, and issue systems engineering logistics and waste stream analyses to support Program and project planning, project development, and design. Develop and review cost assumption packages in support of the Total System Life Cycle Cost (TSLCC) analyses; maintain and enhance, as necessary, detailed cost and logistics computer models; and update cost databases. Provide input on the development of fee payment schedules to ensure appropriate allocation of Congressional Defense Nuclear Waste Disposal Appropriations.

Configuration/Baseline Management

Manage all program-level Baseline Change Control Board activities. Monitor YMSCO project-level Baseline Change Control Boards' activities.

Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($244K).

Systems Integration	3,143	2,266	2,600

Regulatory Integration

Coordinate and participate in interactions with external agencies, such as: the Nuclear Regulatory Commission; the Environmental Protection Agency; and the Nuclear Waste Technical Review Board. These interactions include addressing management and technical issues related to the repository project, interim storage, and transportation of spent fuel and high-level waste

(dollars in thousands)

FY 1999	FY 2000	FY 2001

- Coordinate and integrate Program environmental, safety, and health activities to ensure compliance with Departmental directives and policies, EPA standards, NRC licensing requirements, and Occupational Safety and Health Act (OSHA) standards. Major activities include coordination of environmental impact statements from other Departmental Offices involving disposal of spent nuclear fuel, high-level waste and other Department-owned radioactive materials.

- Support project regulatory assessments and integration of storage, transportation, and disposal considerations for waste forms managed by other Departmental offices, such as Environmental Management, Fissile Materials Disposition, and Nuclear Energy (Naval Reactors), to ensure consistency with applicable interim storage, transportation, and repository requirements.

- Provide liaison with the Nuclear Waste Technical Review Board to address and resolve technical issues associated with site suitability activities.

- Analyze proposed regulatory changes to determine impact on the Program and ensure compliance with newly promulgated rules. Provide continued support on emerging regulatory issues that will arise as the projects continue to move forward.

- Support activities leading to issuance of the final rule revising the Department's guidelines for determining site suitability for a repository.

- Support project activities associated with development of the license application plan, including coordination of relevant interactions with the Nuclear Regulatory Commission, Advisory Committee on Nuclear Waste, Nuclear Waste Technical Review Board and Congress.

- Interface with Nuclear Regulatory Commission's Advisory Committee on Nuclear Waste.

- Coordinate Headquarters review and formal approval of the

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
final environmental impact statement for a repository at Yucca Mountain. Provide coordination with Nuclear Regulatory Commission on issues related to the environmental impact statement.			
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($107K).			
Regulatory Integration	763	593	862
Strategic Planning			
# Respond to program inquiries and links requirements with external program oversight parties and liaison activities within the Department. Provide technical, graphics, layout and editorial support in updating Program planning documents. Manage the Memorandum of Agreement with the U.S. Geological Survey for provision of analytical and technical support.			
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($163K).			
Strategic Planning	1,127	712	1,179
International Waste Management			
# Assist in preparing for cooperative bilateral meetings and Nuclear Energy Agency Radioactive Waste Management Committee Meetings. Provide input to the International Nuclear Waste Management Fact Book and update the document *Status of International High-Level Radioactive Waste Management Program*.			
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY2001. Therefore, this budget element includes funds for the transition if the contractor selected			

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
is not the incumbent ($13K).			
International Waste	313	627	627
Program Management			
# Improve program and project management systems. Maintain program management policy document, and support implementation of new Departmental project management policy and requirements.			
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($75K).			
Program Management	663	563	653
Subtotal, Program Integration	6,009	4,761	5,921
Human Resources and Administration			
Human Resources Development			
# Purchase needed supplies, non-computer equipment, publications, and services.			
Human Resources Development	89	20	25
Audits, Reports, Education and Information			
# Develop reports and other documents required by Congress or the Department, such as the Program's Annual Report to Congress, audited financial statements, annual Federal Managers' Financial Integrity Act (FMFIA) reports, responses to General Accounting Office (GAO) and DOE IG audit recommendations, and Freedom of Information Act (FOIA) requests. Manage the Nuclear Waste Fund investment portfolio by providing monthly investment instructions to the CFO for implementation. Comply with executive orders and support the Department's education initiatives by conducting			

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
a Historically Black Colleges and Universities (HBCU) Undergraduate Scholarship Program and the Radioactive Waste Management Graduate Fellowship Program. Provide Program information to customers/stakeholders/public through the OCRWM Home Page, prepare responses to public inquiries and publish *The OCRWM Enterprise*, a semiannual newsletter.			
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($25K).			
Audits, Education and Information	1,149	1,190	1,247
Information Management			
# Maintain existing information systems and networks. Validate Information Management (IM) Strategic Plan; revise/update IM Multi-Year Program Plan; develop integrated IM Annual Planning Guidance; conduct IM short-range planning and integrated IM budget planning.			
# Implement phase 2 of the Integrated Information and Infrastructure Project. This effort completes the re-engineering of the Records Management, Document Management, and Web Publishing processes and initiates the improved processes and associated technology solutions.			
# Upgrade telecommunications and basic computing infrastructures.			
# Continue the development and implementation of the Program's information architecture to ensure compatibility with the Department's information architecture.			
Note: The Program is also planning on recompeting and awarding a follow-on contract(s) to the current M&O contract in FY2001. Therefore, this budget element includes funds for the transition if the contractor selected is not the incumbent ($315K).			

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Information Management	4,003	2,650	4,573
Subtotal, Human Resources and Administration	5,241	3,860	5,845
Total, Program Integration	11,250	8,621	11,766

Explanation of Funding Changes from FY 2000 to FY 2001

	FY 2001 vs. FY 2000 ($000)
Program Management	
# The increase reflects the funds requested for transition of the Management and Operating contract if the contractor selected is not the incumbent	602
# The increase is required to assure that the major programmatic decision documents (i.e. Site Recommendation and License Application) are sufficiently integrated through the Program, comply with regulatory requirements and meet the extensive documentation needs of a nuclear-related license application	558
Total, Program Management	1,160
Human Resources and Administration	
# The increase reflects the funds requested for transition of the Management and Operating contract if the contractor selected is not the incumbent	340
# The increase in Information Management is required to maintain the Program's existing information management systems and networks. The increase supports the upgrade of basic computing infrastructure to ensure compliance with the Department's cyber-security initiatives. In addition, the telecommunications infrastructure will be upgraded to accommodate an anticipated increase in information between the sites, relative to the development and review of the Site Recommendation and License Application. Finally, the increase supports the implementation of phase 2 of the Integrated Information and Infrastructure Project which will result in a more effective and efficient ability to manage, retrieve and publish Program and Licensing information	1,645
Total, Human Resources and Administration	1,985

Total Funding Change, Program Integration	3,145

Program Direction

Mission Supporting Goals and Objectives

Program direction provides overall direction and administrative support for the Office of Civilian Radioactive Waste Program to manage and dispose of the Nation's spent nuclear fuel and high-level radioactive waste. Program Direction has been grouped into five categories: 1) Salaries and Benefits; 2) Travel; 3) Other Related Expenses; 4) Working Capital Fund; and 5) Support Services.

Salaries and Benefits

This element includes compensation for regular salaries and wages paid directly to federal civilian full-time permanent and other than full-time permanent employees, other payments that become a part of the employee's basic pay rate and other personnel compensation such as overtime, holiday pay and cash incentive awards. Benefits includes payments such as the employer's share of employee retirement, health and life insurance, accident compensation, Federal Insurance Contribution Act taxes, and Federal Retirement Thrift Savings Plan. Benefits also include payments for former employees such as severance pay to employees involuntarily separated, and voluntary separation incentives. This includes payments to the unemployment fund, payments of nine percent of final basic pay to the civil service retirement fund for employees who took the early-out or buy-out authority, and payments to the Employees health benefits fund for annuitants.

The Department of Energy has conducted detailed workforce analyses that have identified current and projected staffing disciplines. During 1999, DOE conducted a systematic analysis of critical staffing needs within the context of current and projected R&D program missions. The Department will develop a comprehensive plan that will focus on building and sustaining a talented and diverse workforce of R&D Technical Managers. The plan will include innovative recruitment strategies, retention incentives, comprehensive training and development programs for new and current employees, and succession planning. The FY 2001 program direction request for the Office of Civilian Radioactive Waste Management includes $100,000 for the Scientific Retention and Recruitment Initiative. This will enable the recruitment of experienced scientists and related support staff (full-time equivalents) in areas of emerging interest to the Department's science mission. Funds will also be used to motivate and retain highly skilled, top-performing technical managers with, for example, retention allowances and performance awards. Additionally, training in areas crucial for effective job performance will be a key element of the initiative.

Travel

This category provides funding for the transportation of Government employees, their per diem allowances while in authorized travel status, and other expenses incidental to travel that are to be paid by the Government either directly or by reimbursing the traveler.

Other Related Expenses

Other related expenses includes funding for building maintenance, rents, communications, utilities, computer/video support, printing and graphics, photocopying, postage, and supplies. The Working Capital Fund was established in FY 1997 by the Office of Human Resources to allocate the cost of common administrative services to the recipient organizations. Activities included in the Working Capital

Fund include automated office support, telephone services, postage, printing and graphics, supplies, photocopying, building occupancy, contract closeouts and contract audits.

Support Services

Support Services include the following:

Environmental Impact Statement Technical Support – Specific technical scope for the Environmental Impact Statement contractor includes preparing the draft and final Environmental Impact Statements using technical data developed by OCRWM and the Management and Operating contractor; and supporting public hearings.

The Nuclear Waste Policy Act, 1982, as amended, required that an Environmental Impact Statement be developed in accordance with the National Environmental Policy Act for inclusion in the Site Recommendation Statement.

The Environmental Impact Statement will evaluate three alternatives to help estimate the potential impacts of the proposed repository. These alternatives are based on how much heat the waste packages will generate once inside the repository and how this heat will be distributed (i.e., thermal load). Each assumption will reflect differences in the size of the subsurface repository, as well as the layout or configuration of the drifts and the spacing between them. These alternative conditions, in turn, will affect the prediction of the repository's long-term performance. In FY 2001, the Project intends to develop and make available additional NEPA documentation. This documentation will present new or changed information for consideration in the decision making process.

Quality Assurance Technical Support – Provide support in: complying with NRC requirements, developing and maintaining the OCRWM Quality Assurance Requirements and Description (QARD), developing Quality Assurance procedures, and maintaining QA databases. Conduct audits, surveillance, on-site inspections, tests, and reviews of participant and vendor activities.

Support ongoing Site Recommendation related scientific and engineering activities at Yucca Mountain.

Support continued revisions to the Technical Baseline and continue the overview of DOE/Environmental Management production runs for acceptance of defense vitrified waste and DOE/Environmental Management qualification of Spent Fuel Site quality assurance programs.

Support the Waste Acceptance Storage and Transportation (WAST) Program element issuance of draft RFP for Transportation, Storage Module, and Waste Acceptance services.

Support system integration, engineering activities, and continue to support EM vitrification and DOE and Navy owned spent fuel activities.

Management & Technical Support Services- Provides an independent technical review capability of the work accomplished by the DOE National Laboratories and the management and operations contractor conducting the characterization of Yucca Mountain and the design and licensing of the potential geologic repository. Technical support services include the review and analysis of technical studies and papers and regulatory documents and reports, such as contractor deliverables, the Viability Assessment, Site Recommendation, and License Application. Facilitates independent peer reviews of plans, processes, and predictive models. Provides construction support services to review and analyze the designs and documents supporting licensing and construction. Provides Management services including independent analysis of the managing and operating contractor work plans, schedules and cost estimates.

Specific technical expertise required by OCRWM include environmental, safety and health; NEPA statutory requirements; licensing and NRC statutory framework; design, engineering, design analyses, design basis documents, and process models; scientific programs relating to geology, hydrology, rock mechanics, tectonics, and performance assessments; operations and construction; and project control; procurement analysis, and information management.

Automated Data Processing Support - Provide services to assist in the operation and management of the Office of Civilian Radioactive Waste Management communications network and computer facilities, including Web page development, computer hot line and help desk support, software and hardware installation and maintenance, and early evaluations of enhanced software.

Quality Assurance Management Assessment - Assists OCRWM in the annual quality assurance management assessment to comply with NRC licensing regulations.

Department of Energy Support Services - Provide automated data processing support services for Headquarters.

Technical Analysis Support Services- Process and verify utility fee payment data and develop quarterly revenue projections.

Administrative Support Services - Provide administrative services to the Yucca Mountain Site Characterization Office, including coordination of mail, correspondence, records submittal, office supplies, and facilities management services.

Funding Schedule

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Nevada Operations Office					
Salaries and Benefits	470	491	510	19	3.9%
Total, Nevada Operations Office	470	491	510	19	3.9%
FTEs	6	6	6	0	0.0%
Other DOE Matrix Support					
Salaries and Benefits	1,087	1,136	1,179	43	3.8%
Travel	7	7	7	0	0.0%
Total, Other DOE Matrix Support	1,094	1,143	1,186	43	3.8%
FTEs	14	15	15	0	0.0%
Headquarters-OCRWM					
Headquarters					
Salaries and Benefits	6,605	6,034	6,380	346	5.7%
Travel	240	244	244	0	0.0%
Working Capital Fund	1,435	1,435	1,456	21	1.5%
Other Related Services	150	150	156	6	4.0%
Support Services	7,031	7,206	8,049	843	11.7%
Total, Headquarters	15,461	15,069	16,285	1,216	8.1%
FTEs	65	58	58	0	0.0%
YMSCO - Nevada					
Salaries and Benefits	10,300	12,265	13,421	1,156	9.4%
Travel	438	465	465	0	0.0%
Other Related Expenses	3,479	2,551	2,682	131	5.1%
Support Services	27,244	27,600	29,079	1,479	5.4%
Total, YMSCO	41,461	42,881	45,647	2,766	6.5%
FTEs	98	117	121	4	3.4%
Total Program Direction					
Salaries and Benefits	18,462	19,926	21,490	1,564	7.8%
Travel	685	716	716	0	0.0%
Other Related Expenses	3,629	2,701	2,838	137	5.1%
Working Capital Fund	1,435	1,435	1,456	21	1.5%
Support Services	34,275	34,806	37,128	2,322	6.7%
Total, Program Direction	58,486	59,584	63,628	4,044	6.8%
FTEs	183	196	200	4	2.0%

Detailed Program Justification

(dollars in thousands)

	FY 1999	FY 2000	FY 2001
Salaries and Benefits			
# Funds salaries, awards, lump sum leave payments, benefits and buyout compensation for full-time permanent and other than full-time permanent employees. The FY 2001 funding level provides for 200 FTEs which is an increase of four FTEs from the FY 2000 level of 196. The FY 2001 request for salaries and benefits includes $100,000 for the Scientific Retention and Recruitment Initiative.	18,462	19,926	21,490
Travel			
# Includes all costs of transportation of persons, subsistence of travelers, and incidental travel expenses in accordance with Federal travel regulations which are directly chargeable to OCRWM	685	716	716
Other Related Expenses			
# Includes funding for building maintenance, Yucca Mountain rents, communications, utilities, computer/video support, training, printing and graphics, photocopying, postage, supplies and common administrative services. . . .	3,629	2,701	2,838
Working Capital Fund			
# Includes funding for headquarters building maintenance, rents, communications, utilities, computer/video support, printing and graphics, photocopying, postage, supplies and common administrative services	1,435	1,435	1,456
Support Services			
# Includes all costs which are defined as advisory and assistance services acquired by contract from non-governmental services to support or improve the OCRWM organization. This element provides support for the following activities: preparing the Environmental			

Impact Statement, complying with NRC requirements, developing and maintaining the Quality Assurance Requirements and Description, developing Quality Assurance procedures, and conducting audits, surveillance, on-site inspections, tests, and reviews of participant and vendor activities. Support services also provide an independent technical review capability of the work accomplished by the DOE National Laboratories and the management and operations contractor. In addition, funds are provided for the operation and management of the communications network and computer facilities.. . . .	34,275	34,806	37,128
Total, Program Direction	58,486	59,584	63,628

Explanation of Funding Changes from FY 2000 to FY 2001

		FY 2001 vs. FY 2000 ($000)
Salaries and Benefits		
#	Increase in salaries and benefits is due to the four additional FTEs hired in accordance with the Workforce 21 Plan. In addition, the change reflects general pay increases, promotions, lump sum payments, awards and within-in grade increases	1,564
Other Related Expenses		
#	The 5.1% increase is due to inflation from the FY 2000 level	137
Working Capital Fund		
#	The 1.5% increase is due a general rise in price levels	21
Support Services		
#	The increase reflects a change in rates for the automated data processing contractor. Funds are required for computer hot line and help desk support, and software and hardware installation and maintenance.	966
#	The increase for the Environmental Impact Statement Technical Support reflects additional NEPA documentation that will support the Final Environmental Impact Statement. This documentation will present new or changed information for consideration in the decision making process.	417

		FY 2001 vs. FY 2000 ($000)
#	The remaining increases are due to the expanded workscope necessitated by the critical review requirements for the following FY 2001 activities and performance measures: Site Recommendation Characterization Report, Final Environmental Impact Statement and the documentation that will support a Secretarial decision on Site Recommendation.	939
	Total Funding Change, Program Direction	4,044

Support Services

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Headquarters Support Services					
Technical Support Services					
Quality Assurance	1,328	1,328	1,328	0	0.0%
Management & Technical Services	1,876	1,865	2,209	344	18.4%
Technical Analysis	450	270	450	180	66.7%
Subtotal,Technical Support Services	3,654	3,463	3,987	524	15.1%
Management Support Services					
Automated Data Processing (ADP)	2,660	3,026	3,345	319	10.5%
Quality Assurance Mgmnt Assessment	382	382	382	0	0.0%
Human Resources Support Services	335	335	335	0	0.0%
Subtotal, Management Support Services	3,377	3,743	4,062	319	8.5%
Total, Headquarters Support Services	7,031	7,206	8,049	843	11.7%
YMSCO Support Services					
Technical Support Services					
Quality Assurance	8,603	8,603	8,603	0	0.0%
Management & Technical Services	9,165	9,748	9,970	222	2.3%
Environmental Impact Statement (EIS)	6,000	5,583	6,000	417	7.5%
Subtotal, Technical Support Services	23,768	23,934	24,573	639	2.7%
Management Support Services					
Automated Data Processing (ADP)	2,508	2,698	3,345	647	24.0%
Administrative Support	968	968	1,161	193	19.9%
Subtotal, Management Support Services	3,476	3,666	4,506	840	22.9%
Total, YMSCO Support Services	27,244	27,600	29,079	1,479	5.4%
Total, Support Services	34,275	34,806	37,128	2,322	6.7%

Other Related Expenses

(dollars in thousands)

	FY 1999	FY 2000	FY 2001	$ Change	% Change
Headquarters Other Related Expenses					
Working Capital Fund	1,435	1,435	1,456	21	1.5%
Communications	100	100	103	3	3.0%
Training	50	50	53	3	6.0%
Total, Headquarters Other Related Expenses	1,585	1,585	1,612	27	1.7%
YMSCO Other Related Expenses					
Communications, Rent and Utilities	2,604	1,624	1,714	90	5.5%
Transportation of Things	30	30	32	2	6.7%
Training	75	75	78	3	4.0%
Other Services	770	822	858	36	4.4%
Total, YMSCO Other Related Expenses	3,479	2,551	2,682	131	5.1%
Total, Other Related Expenses	5,064	4,136	4,294	158	3.8%