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, [$169,000,000] *$258,000,000* to remain available until expended, [of which $165,000,000 is] to be derived from the Nuclear Waste Fund; and *in addition $39,000,000 shall be derived by transfer from funds appropriated to the Defense Nuclear Waste Disposal account in Public Law 104-46 to become available without regard to the limitations of Public Law 104-46 and to remain available until expended; Provided, That* [of which] not to exceed [$250,000] *$4,727,000* may be provided to the [Department of Energy to reimburse 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, [and] *(Public Law 97-425) as amended: Provided further, That* not to exceed [$5,540,000] $5,432,000 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 [to] *as determined by* the units of local government shall be [determined] *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 Public Law 97-425. 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.

Explanation of Change

The Budget requests a total of $409 million in budgetary resources for the Civilian Radioactive Waste Management Program in FY 2000. This sum includes a request for new budget authority totaling $370 million, as well as a request that an additional $39 million be provided from $85 million in unobligated balances remaining from the FY 1996 Defense Nuclear Waste Disposal Appropriation (Public Law 104-46) and transferred to the Nuclear Waste Disposal account in FY 2000. This funding will be used to carry out required scientific and technical studies identified in the Viability Assessment of the proposed repository at the Yucca Mountain Site. The FY 2000 Request is identical to the funding profile depicted in the Viability Assessment. Without the identified level of funding, the Program would have to be recast to attempt to hold the critical milestone for a decision whether to recommend the Site to the President in 2001.

The prohibition regarding the use of Nuclear Waste Disposal funds for salaries and expenses of State employees is proposed for elimination in the FY 2000 appropriations request.

Office of Civilian Radioactive Waste Management
Executive Budget Summary

Program Mission

The Office of Civilian Radioactive Waste Management is responsible for the management and disposal of the Nation's spent nuclear fuel and high-level radioactive waste. The office provides leadership in developing and implementing strategies to accomplish this mission that assure public and worker 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. 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 for spent nuclear fuel. The Department submitted a site-specific proposal for such a facility, but the siting action was nullified by Congress in 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. Congress, however, in 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 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 nonproliferation goals by moving forward with its plans for the disposition of weapons-grade materials (Highly Enriched Uranium and Plutonium). Additionally, a permanent geologic repository site will enable the Department to dispose of spent fuel used in the Naval Nuclear Propulsion Program.

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 Viability Assessment is the compilation of almost 16 years of intensive, scientific and technical work at the Yucca Mountain site. It is an unparalleled synthesis of information and data regarding the Yucca Mountain site s ability to contain spent nuclear fuel and high-level radioactive waste. The Viability Assessment describes the Yucca Mountain site, the repository and waste package s design and costs, and details the results of a quantitative Total System Performance Assessment that describes how the site s engineered and natural barriers work together as a system. The Viability Assessment also contains a plan for and costs associated with the submission of a License Application to the Nuclear Regulatory Commission and the costs to construct and operate a repository at the Yucca Mountain site.

The FY 2000 Budget Request is identical to the funding requirements in the Viability Assessment. Without the identified level of funding, the Program would have to be recast to attempt to hold the critical milestone for Site Recommendation to the President in 2001. In addition, the scheduled submission of the License Application to the Nuclear Regulatory Commission in 2002 would slip. This slippage would also affect the 2010 date for emplacement of spent fuel and initiation of operations of the repository.

The Viability Assessment now provides the foundation for the Program s current and planned set of activities.

Program Objectives

The Program continues to aggressively build on the momentum achieved in the last four years. In FY 1999, the Program is planning to complete the Draft Environmental Impact Statement for Yucca Mountain and, in FY 2000, issue the Final Environmental Impact Statement. The completion of these major Program objectives will be followed by: 1) a decision by the Secretary whether to recommend the Yucca Mountain site to the President in 2001, if the site is found to be suitable; and 2) if recommended, submission of a License Application for the construction of a repository to the Nuclear Regulatory Commission in 2002

We are continuing the transition begun in FY 1999; that is, to shift emphasis from the construction/operations arena and the collection of basic data 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. Those activities were described, in large part, in the *License Application Plan and Costs* (Volume 4) of the Viability Assessment. The work generally includes further refinement of repository and waste package designs, continued evaluation of repository behavior through total system performance assessment, refinement of the conceptual and numerical models used in evaluating repository performance, and continued scientific investigations to reduce key

uncertainty about the Yucca Mountain site. In addition, the Program will focus on assisting the Russian Federation in developing geologic repository alternatives to current radioactive waste management practices and use of Russian scientists and engineers for furthering nonproliferation objectives.

Key FY 2000 Activities

The Office of Civilian Radioactive Waste Management's FY 2000 budget request of $409 million supports the activities necessary to determine 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.

Following the issuance of the Viability Assessment and the Draft Environmental Impact Statement for the Yucca Mountain site in FY 1999, the Program, through its Yucca Mountain Site Characterization Office, will focus principally on completing the Final Environmental Impact Statement and on technical and scientific investigation activities and repository and waste package design activities. These activities will serve to support a decision whether to recommend the Site to the President in 2001 and prepare a License Application for submission to the Nuclear Regulatory Commission in 2002. Activities proposed to be undertaken at the Yucca Mountain site are fully consistent with the description of the remaining work contained in the Viability Assessment.

Submission of the License Application in 2002 will complete the Site Characterization Phase of the repository program. Scientific and technical work will, however, continue subsequent to the submission of the License Application for performance confirmation purposes.

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 reactor sites and Department-operated sites (e.g. Hanford, Idaho National Laboratory, Rocky Flats, Savannah River) once a Federal radioactive waste management 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 transportation and storage 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 Waste Acceptance, Storage and Transportation Office) and a management center. The management center s responsibilities focus on providing overarching regulatory compliance, program control and management functions to both business centers.

Sources of Funding

To provide funding for the Program's activities, our FY 2000 appropriations request is principally from two sources: the Nuclear Waste Disposal Appropriation and the Defense Nuclear Waste Disposal Appropriation. The Budget requests a total of $409 million in budgetary resources for the Civilian Radioactive Waste Management Program in FY 2000. This sum includes a request for new budget authority totaling $370 million, as well as a request that an additional $39 million be provided from $85 million in unobligated balances remaining from the FY 1996 Defense Nuclear Waste Disposal Appropriation (Public Law 104-46) and transferred to the Nuclear Waste Disposal account in FY 2000.

Major Issues

Prior Year Reductions in Funding

As a result of a comprehensive reassessment of the Program undertaken in 1994, a new program approach was prepared. This program approach was described in detail in the *Civilian Radioactive Waste Management Program Plan* (December 1994). To support the Program s activities, a funding profile was also developed. However, beginning in FY 1996, the Program received substantially less funding than was required to implement the program approach. As a consequence, the approach outlined in the Program Plan was no longer sustainable. The Program revised its approach to preserve the most critical activities and milestones. That approach was described in the *draft Civilian Radioactive Waste Management Program Plan, Revision 1 (May 1996).* Furthermore, despite streamlining its approach to meeting the objectives of the Nuclear Waste Policy Act and achieving considerable efficiencies and undertaking additional, unplanned work, such as the cross-drift, the Program has received less funding than the funding profile contained in the 1996 Program Plan. A new funding profile was developed and was included in the Civilian Radioactive Waste Management Program Plan, Revision 2, dated July 1998. This had the effect of increasing programmatic, scientific and technical risk.

The recently issued Viability Assessment contains a revised funding profile that supports the critical programmatic milestones. We have developed and costed a scope of work that is required to meet the established milestones. The Program now finds itself at the point of not being able to absorb any additional funding reductions without having impacts on the critical near-term milestones for the Yucca Mountain Site Characterization Project. Obviously, any near-term milestone slippage would also affect the planned 2010 date for emplacement of waste at that site.

Performance Measures

FY 2000 efforts will focus on development of the technical bases and draft documents that will support a Site Recommendation Statement in FY 2001. The following product-oriented performance measures are planned for FY 2000 in support of the Site Recommendation Statement and License

Application: complete and issue the final Environmental Impact Statement; select the reference design for a decision whether to recommend the Site and the License Application; and, select the natural system reference models for Site Recommendation and License Application.

_____ _____

Signature of Assistant Secretary Date

Funding Profile

(dollars in thousands)

	FY 1998 Current Appropriation	FY 1999 Original Appropriation	FY 1999 Adjustment	FY 1999 Current Appropriation	FY 2000 Request
Nuclear Waste Fund/Defense Nuclear Waste:					
Yucca Mountain Site Characterization……	267,710	282,414	0	282,414	331,667 [a]
Waste Acceptance, Storage & Transportation..	5,947	1,850	0	1,850	5,730
Accelerator Transmutation of Waste……	0	4,000	0	4,000	0
Program Management Center……	72,343	69,736	0	69,736	71,603
Subtotal, Nuclear Waste/Defense Waste…….	346,000	358,000	0	358,000	409,000 [a b]
Less Transfer from Previous Appropriation	0	0	0	0	-39,000 [a b]
Use of prior year balances……..	-304	0	0	0	0
Total, Civilian Radioactive Waste Management…	345,696	358,000	0	358,000	370,000 [a]
Funding Sources:					
Nuclear Waste Disposal					
Nuclear Waste Fund……	156,000	165,000	0	165,000	258,000 [a b]
General Fund……	0	4,000	0	4,000	0
Plus Transfer from Previous Appropriation….	0	0	0	0	39,000 [a b]
Total, Nuclear Waste Disposal……	156,000	169,000	0	169,000	297,000 [a b]
Gross Defense Nuclear Waste Disposal					
Defense Nuclear Waste Disposal……	190,000	189,000	0	189,000	112,000 [a b]
Less Transfer from Previous Appropriation….	0	0	0	0	-39,000 [a b]
Net, Defense Nuclear Waste Disposal……	190,000	189,000	0	189,000	73,000 [a b]
Total, Program Funding……	346,000	358,000	0	358,000	370,000 [a]

Public Law Authorization:

P.L. 97-425, "Nuclear Waste Policy Act" (1982)

P.L. 100-203, "Nuclear Waste Policy Amendments Act" (1987)

[a] The Budget requests a total of $409 million in budgetary resources for the Civilian Radioactive Waste Management Program in FY 2000. This sum includes a request for new budget authority totaling $370 million, as well as a request that an additional $39 million be provided from $85 million in unobligated balances remaining from the FY 1996 Defense Nuclear Waste Disposal Appropriation (Public Law 104-46) and transferred to the Nuclear Waste Disposal account in FY 2000.

[b] Of the $370 million in new budget authority requested, $112 million is requested for the Defense Nuclear Waste Disposal account in FY 2000. Under the scorekeeping guidelines adopted under the Budget Enforcement Act, the $39 million transfer of unobligated balances to the Nuclear Waste Disposal account will be scored as a reduction in current budget authority in the Defense Nuclear Waste Disposal account , resulting in net budget authority of $73 million.

In addition, $258 million in new budget authority is requested from the Nuclear Waste Disposal Fund for the Nuclear Waste Disposal account. Under the scorekeeping guidelines adopted under the Budget Enforcement Act, the $39 million transfer will be scored as an increase in current budget authority in the Nuclear Waste Disposal account, resulting in net budget authority of $297 million.

Projected Receipts and Funding[a]

(dollars in millions)

	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
One mill/kWh Fee[b]	600	642	632	632	631	632	632
One-time Fee	0	0	0	0	0	0	0
Subtotal	600	642	632	632	631	632	632
Investment	743 [c]	692 [d]	839 [d]	917 [d]	1,008 [d]	1,080 [d]	1,129 [d]
Total Income	1,343	1,334	1,471	1,549	1,639	1,712	1,761
Funding Sources:							
Nuclear Waste Disposal							
Nuclear Waste Fund	156	165	258 [e f]	180	180	180	180
General Fund	0	4	0	0	0	0	0
Plus Transfer from Previous Approp.	0	0	39 [e f]	0	0	0	0
Total, Nuclear Waste Disposal	156	169	297 [e f]	180 [g]	180 [g]	180 [g]	180 [g]
Defense Nuclear Waste Disposal							
Defense Nuclear Waste Disposal	190	189	112 [e f]	190	190	190	190
Less Transfer from Previous Approp.	0	0	-39 [e f]	0	0	0	0
Total, Defense Nuclear Waste Disposal	190	189	73 [e f]	190 [g]	190 [g]	190 [g]	190 [g]
Total, Program Funding	346	358	370 [e]	370 [g]	370 [g]	370 [g]	370 [g]

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

[b] As forecast by EIA in Dec 1998.

[c] The values represent "earnings available for appropriation", which consist of coupon payments received; net discounts and premiums on bills, notes, and bonds. Discounts on zero-coupon bonds have been amortized using the market value approach. Under the straight line basis, the value is $569 million.

[d] The values represent "earnings available for appropriation", which consist of coupon payments received; net discounts and premiums on bills, notes, and bonds. Discounts on zero-coupon bonds have been amortized on a straight line basis.

[e] The Budget requests a total of $409 million in budgetary resources for the Civilian Radioactive Waste Management Program in FY 2000. This sum includes a request for new budget authority totaling $370 million, as well as a request that an additional $39 million be provided from $85 million in unobligated balances remaining from the FY 1996 Defense Nuclear Waste Disposal Appropriation (Public Law 104-46) and transferred to the Nuclear Waste Disposal account in FY 2000.

[f] Of the $370 million in new budget authority requested, $112 million is requested for the Defense Nuclear Waste Disposal account in FY 2000. Under the scorekeeping guidelines adopted under the Budget Enforcement Act, the $39 million transfer of unobligated balances to the Nuclear Waste Disposal account will be scored as a reduction in current budget authority in the Defense Nuclear Waste Disposal account , resulting in net budget authority of $73 million.

In addition, $258 million in new budget authority is requested from the Nuclear Waste Disposal Fund for the Nuclear Waste Disposal account. Under the scorekeeping guidelines adopted under the Budget Enforcement Act, the $39 million transfer will be scored as an increase in current budget authority in the Nuclear Waste Disposal account, resulting in net budget authority of $297 million.

[g] 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.

Funding by Site

(dollars in thousands)

	FY 1998	FY 1999	FY 2000	$ Change	% Change
Chicago Operations Office					
Argonne National Laboratory	2,526	2,783	3,369	586	21.1%
Oakland Operations Office					
Lawrence Berkeley Laboratory	9,785	7,648	6,066	-1,582	-20.7%
Lawrence Livermore National Laboratory	18,947	22,834	22,057	-777	-3.4%
Total, Oakland Operations Office	28,732	30,482	28,123	-2,359	-7.7%
Albuquerque Operations Office					
Sandia National Laboratory	11,306	13,546	11,172	-2,374	-17.5%
Los Alamos National Laboratory	14,130	12,536	11,204	-1,332	-10.6%
Total, Albuquerque Operations Office	25,436	26,082	22,376	-3,706	-14.2%
Nevada Operations Office[a]	217,641	235,378	289,782	54,404	23.1%
Nevada Test Site	8,000	4,690	4,914	224	4.8%
Nevada (Yucca Mountain Project Office)	12,512	12,668	10,939	-1,729	-13.6%
Total, Nevada Operations Office	238,153	252,736	305,635	52,899	20.9%
Oak Ridge Operations Office	254	264	275	11	4.2%
Oak Ridge Institute for Science & Education	27	28	29	1	3.6%
Oak Ridge National Laboratory	295	754	292	-462	-61.3%
Total, Oak Ridge Operations Office	576	1,046	596	-450	-43.0%
Richland Operations Office					
Pacific Northwest Laboratory	1,244	1,264	779	-485	-38.4%
Washington Headquarters	49,333	43,607	48,122	4,515	10.4%
Total, Program	346,000	358,000	409,000 [b]	51,000	14.2%

[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] The Budget requests a total of $409 million in budgetary resources for the Civilian Radioactive Waste Management Program in FY 2000. This sum includes a request for new budget authority totaling $370 million, as well as a request that an additional $39 million be provided from $85 million in unobligated balances remaining from the FY 1996 Defense Nuclear Waste Disposal Appropriation (Public Law 104-46) and transferred to the Nuclear Waste Disposal account in FY 2000.

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: TRW Environmental Safety Systems as the OCRWM Management & Operating (M&O) contractor, the United States Geological Survey, the National Academy of Sciences, the University and Community College System of Nevada, Atomic Energy Canada Limited, Jason Technologies Corporation, Alpha Services , Science Applications International Corporation, Bechtel Nevada , and Wackenhut Services, Inc.

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

(dollars in thousands)

	FY 1998 Current Appropriation	FY 1999 Current Appropriation	FY 2000 Request	FY 2001 Request [a]	FY 2002 Request [a]
Yucca Mountain Site Characterization					
Core Science	73,669	74,832	73,959	52,300	50,771
Design and Engineering	62,888	78,394	91,539	91,903	102,122
Licensing/Suitabilty & Perf Assessment	31,143	53,130	61,192	51,237	43,225
NEPA	4,254	1,962	2,343	2,200	1,155
Operations/Construction	47,814	34,203	42,705	29,200	29,304
Project Management	36,042	28,234	37,600	32,358	21,304
External Oversight, PETT & Closeout	11,900	11,659	22,329	20,500	20,030
Total, Yucca Mountain Site Characterization	267,710	282,414	331,667 [b]	279,698	267,911
Waste Acceptance, Storage and Transportation					
Spent Fuel Storage	1,549	310	0	0	0
Transportation	3,180	10	4,100	19,311	31,111
Waste Acceptance	523	916	1,030	1,579	1,939
MPC Subsystem	0	0	0	0	0
Project Integration	695	614	600	1,340	1,500
Total, Waste Acceptance, Storage & Transportation	5,947	1,850	5,730	22,230	34,550
Accelerator Transmutation of Waste	0	4,000	0	0	0
Program Integration					
Quality Assurance	0	0	0	0	0
Program Management	5,049	6,009	6,260	6,260	6,390
Human Resources & Administration	4,814	5,241	5,532	5,532	5,402
Subtotal, Program Integration	9,863	11,250	11,792	11,792	11,792
Program Direction	62,480	58,486	59,811	56,280	55,747
Total, Program Integration	72,343	69,736	71,603	68,072	67,539
Total, Program	346,000	358,000	409,000 [b c]	370,000 [a]	370,000 [a]
Funding Sources:					
Nuclear Waste Disposal					
Nuclear Waste Fund	156,000	165,000	258,000 [b c]	180,000	180,000
General Fund	0	4,000	0	0	0
Plus Transfer from Previous Appropriation	0	0	39,000 [b c]	0	0
Total, Nuclear Waste Disposal	156,000	169,000	297,000 [b c]	180,000 [a]	180,000 [a]
Gross Defense Nuclear Waste Disposal					
Defense Nuclear Waste Disposal	190,000	189,000	112,000 [b c]	190,000	190,000
Less Transfer from Previous Appropriation	0	0	-39,000 [b c]	0	0
Net, Defense Nuclear Waste Disposal	190,000	189,000	73,000 [b c]	190,000 [a]	190,000 [a]
Total, Program Funding	346,000	358,000	370,000 [b]	370,000 [a]	370,000 [a]

[a] 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.

[b] The Budget requests a total of $409 million in budgetary resources for the Civilian Radioactive Waste Management Program in FY 2000. This sum includes a request for new budget authority totaling $370 million, as well as a request that an additional $39 million be provided from $85 million in unobligated balances remaining from the FY 1996 Defense Nuclear Waste Disposal Appropriation (Public Law 104-46) and transferred to the Nuclear Waste Disposal account in FY 2000.

Five-Year Funding Profile (continued)

- Of the $370 million in new budget authority requested, $112 million is requested for the Defense Nuclear Waste Disposal account in FY 2000. Under the scorekeeping guidelines adopted under the Budget Enforcement Act, the $39 million transfer of unobligated balances to the Nuclear Waste Disposal account will be scored as a reduction in current budget authority in the Defense Nuclear Waste Disposal account , resulting in net budget authority of $73 million.

In addition, $258 million in new budget authority is requested from the Nuclear Waste Disposal Fund for the Nuclear Waste Disposal account. Under the scorekeeping guidelines adopted under the Budget Enforcement Act, the $39 million transfer will be scored as an increase in current budget authority in the Nuclear Waste Disposal account, resulting in net budget authority of $297 million.

Yucca Mountain Site Characterization

Mission-Supporting Goals and Objectives

Our Nation's commitment to geologic disposal as the basic goal of its waste management policy is essential not only for addressing the problem of disposition of commercial spent fuel, but also for cleaning up the nuclear weapons complex, complying with the international nonproliferation policy, supporting the international consensus on permanent disposal of nuclear waste, and fulfilling the national defense mission. Permanent disposal of civilian- and defense-related high-level radioactive waste will enable the Nation to continue to demonstrate leadership and advance nonproliferation goals by moving forward with its plans for the disposition of fissile materials, as well.

Substantial and demonstrable progress has been made toward reaching a decision on the suitability of the Yucca Mountain site. In FY 1996, the *draft Civilian Radioactive Waste Management Program Plan, Revision 1, issued May 1996,* placed the focus of the Program 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. Over the past four years, the Yucca Mountain Site Characterization Project has focused its activities on site characterization, principally to develop subsurface laboratories. If the site proves suitable and the Secretary of Energy decides to recommend the site for repository development, a Site Recommendation Statement will be prepared and submitted to the President in 2001. If the President, and then Congress, approve the Site Recommendation, a License Application will be prepared and submitted to the Nuclear Regulatory Commission in mid-2002.

The *revised Program Plan* outlined the steps necessary to streamline and focus the repository program at Yucca Mountain. The refocused set of activities enabled the Program to retain the schedule for completing a License Application while increasing funding needs in the post-FY 1996 time frame only moderately. The Program is implementing the scientific and technical activities at the Yucca Mountain Site Characterization Project in accordance with the recently issued Viability Assessment.

In addition, the Program will focus on assisting the Russian Federation in developing geologic repository alternatives to current radioactive waste management practices and use of Russian scientists and engineers for furthering nonproliferation objectives.

The focus in FY 2000 is on completing the technical work necessary to determine whether the Yucca Mountain site is suitable for development as a geologic repository and on developing the documentation needed to support a Secretarial decision on Site Recommendation. The Program has made significant progress and is well poised to complete the technical work necessary to support a decision by the Secretary of Energy on whether to recommend approval of the site in FY 2001. This work includes an evaluation of compliance with 10 CFR 960, the Department of Energy's siting guidelines. Additionally, the FY 2000 activities include a major international component.

In FY 1999, the Program continues to gain momentum toward a Secretarial decision on a Site Recommendation and License Application by:

- Publishing the Viability Assessment of a Repository at Yucca Mountain to support policy decisions on proceeding toward Site Recommendation and License Application.
- Completing a draft Environmental Impact Statement.

- Completing the formal, independent peer review of the Total System Performance Assessment documentation for the Viability Assessment to support development of the Total System Performance Assessment for a Site Recommendation Statement and License Application.
- Completing repository and waste package designs for use in developing the Total System Performance Assessment and other documentation for a Site Recommendation Statement and License Application.

In FY 2000, the Yucca Mountain Site Characterization Project will continue to build on these achievements. The Nuclear Waste Policy Act of 1982, as amended, prescribes the steps and contents for the statement that must accompany a Site Recommendation. Efforts will focus on development of the technical bases and draft documents that the Department of Energy will incorporate into a Site Recommendation Statement in FY 2001.

The following product-oriented performance measures are planned for FY 2000 in support of a Site Recommendation Statement and License Application:

- Select the natural system reference models to support a decision to recommend the Site and the License Application.
- Select the reference design to support a decision to recommend the Site and the License Application.
- Complete and issue the final Environmental Impact Statement.

In addition to these performance measures, the following key accomplishments also are planned for FY 2000 in support of a Site Recommendation Statement and License Application:

- Evaluate the Yucca Mountain site for compliance with 10 CFR Part 960, the Department of Energy's repository siting guidelines.
- Initiate development of the documentation that will support a Secretarial decision on Site Recommendation.
- Complete an internal review of the Working Draft License Application.
- Initiate development of the Acceptance Draft License Application to incorporate new design information and feedback from review of the Working Draft License Application.

Other key activities will continue beyond FY 2000, as follows:

- In FY 2001, hold public hearings on the Secretary of Energy's consideration of the possible recommendation of the site for development as a repository.
- Complete the final 10 CFR Part 960 compliance evaluation to document whether the site meets the specified siting guidelines, as input to a Site Recommendation Statement.
- In FY 2001, complete a departmental review of the Site Recommendation Report that will provide the technical bases for a Site Recommendation Statement.
- In FY 2001, finalize a Site Recommendation Statement for the Secretary of Energy to submit to the President and then Congress (if the Secretary decides to recommend the site). The Site Recommendation Statement will include the Site Recommendation Report, final Environmental Impact Statement, and other information required by the Nuclear Waste Policy Act of 1982, as amended.

- In FY 2002, submit a License Application to the Nuclear Regulatory Commission (if the President and Congress approve the Site Recommendation). This activity will initiate the Licensing Phase of the repository program. Formal licensing activities will continue for the remainder of FY 2002 through FY 2005.

Funding Schedule[a]

(dollars in thousands)

	FY 1998	FY 1999	FY 2000[a]	$ Change	% Change
Core Science	73,669	74,832	73,959	-873	-1.2%
Design and Engineering	62,888	78,394	91,539	13,145	16.8%
Suitability/Licensing and Performance Assessment	31,143	53,130	61,192	8,062	15.2%
National Environmental Policy Act	4,254	1,962	2,343	381	19.4%
Operations/Construction	47,814	34,203	42,705	8,502	24.9%
Project Management	36,042	28,234	37,600	9,366	33.2%
External Oversight and Payments Equal to Taxes	11,900	11,659	22,329	10,670	91.5%
Total, Yucca Mountain Site	267,710	282,414	331,667 [a]	49,253	17.4%

Detailed Program Justification

(dollars in thousands)

FY 1998	FY 1999	FY 2000

Core Science

The Core Science activities focus on investigating the geologic conditions of the Yucca Mountain site and determining the ability of Yucca Mountain to act as a natural barrier to radionuclide release into the environment. Core Science activities include collecting and testing geologic, hydrologic, geochemical, and geomechanical site characterization and performance confirmation data from the subsurface and surface. The ongoing collection of data through FY 2001 will include data from short- and long-term testing programs (both on the surface and underground) that produce quality field and laboratory measurements for use in conceptual and

[a] The Budget requests a total of $409 million in budgetary resources for the Civilian Radioactive Waste Management Program in FY 2000. This sum includes a request for new budget authority totaling $370 million, as well as a request that an additional $39 million be provided from $85 million in unobligated balances remaining from the FY 1996 Defense Nuclear Waste Disposal Appropriation (Public Law 104-46) and transferred to the Nuclear Waste Disposal account in FY 2000.

(dollars in thousands)

FY 1998	FY 1999	FY 2000

numerical process models and engineering design calculations. These data will provide an increased understanding of the hydrology, geology, and geochemistry of the site and supply information on how thermal, hydrologic, chemical, and mechanical processes behave in the immediate natural environment. Other Core Science activities include collecting and monitoring environmental data to ensure compliance with regulatory requirements; testing material performance; planning, formulating, modeling, and testing scientific hypotheses; completing models and reports and collaborating with Russian scientists and engineers on characterization issues of mutual interest. The data collected will be used in the documentation that supports the major program products (e.g. Environmental Impact Statement, Site Recommendation Statement, License Application). The nonproliferation objective is to promote the concept of geologic disposition alternatives in Russia for Russian-generated spent nuclear fuel, high-level radioactive wastes, and post-cold war surplus materials.

Additionally, under a cooperative agreement, the University and Community College System of Nevada will continue to provide the public and the Yucca Mountain Site Characterization Office with an independent, unbiased body of scientific and engineering data concerning the study of Yucca Mountain as a potential high-level waste repository.

The key activity for Core Science in FY 2000 involves selecting natural system reference models used to support development of the Site Recommendation Report and License Application. To successfully complete this activity, we will:

- Select the near field environment (NFE) model
- Select the unsaturated zone (UZ) flow and transport model
- Select the saturated zone (SZ) flow and transport model

The Core Science subelement is divided into five key areas: Data Interpretation and Modeling, Testing to support a Site Recommendation, Testing for License Application, Testing for Licensing Phase and Performance Confirmation, and Environmental Monitoring and

(dollars in thousands)

FY 1998	FY 1999	FY 2000

Compliance.

- **Data Interpretation and Modeling**—Data interpretation and modeling are essential end products of the site characterization activities. Nuclear Regulatory Commission regulations require numerical predictions of the effectiveness of the multiple barrier concept to mitigate a potential release to the natural environment and minimize radionuclides transport to potential human receptors. Both conceptual and numerical models of the natural barriers surrounding the waste packages have been developed for three increasingly larger areas—drift-scale, site-scale, and regional-scale. The drift-scale covers the size of a waste emplacement drift, which is five meters in diameter by approximately 40 meters in length. The site-scale is approximately 30 by 40 kilometers and is correlated to the repository operations area; and the regional-scale is approximately 245 by 230 kilometers. These models will be updated and refined as new information is collected through Site Recommendation, License Application, and performance confirmation testing.

  Specific performance measurement goals include data interpretation and modeling of the unsaturated zone, saturated zone, and near field (including approximately 10 process models, 8 abstraction models, and input data sets) for selection of the natural system reference models for the near-field environment and flow and radionuclide transport in the unsaturated and saturated zones. The input data sets for equivalent continuum models of lumped fracture parameters in the host rock are obtained from inverse modeling of the calibrated mountain-scale (i.e., hundreds to thousands of meters) simulation. The input data sets are adjusted for model scales and model codes.

  We will continue with the cooperative agreement ($10M) between the Department of Energy and the University and Community College System of Nevada to collect scientific and engineering data on Yucca Mountain. These scientific research activities will investigate areas of seismic activity, regional water resources, regional groundwater modeling, and moisture migration in the mountain.

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
We will continue to work with Russian scientists and engineers at the closed city of Krasnoyarsk-26 to study the thermal effects analogue for Yucca Mountain. In addition, we will conduct exchanges of world-class expertise in system analyses, performance assessment, and risk assessment modeling for geologic disposal with former Russian weapons scientists and engineers from closed nuclear cities ($1.9M). Some work ($2.4M) originally planned for FY 1999 has been deferred to FY 2000, including collecting data to verify and supplement the data used in the UZ, SZ, NFE transport models; and precipitation and infiltration into the mountain	9,000	22,100	24,400
▪ **Testing to Support the Site Recommendation Report**— This testing provides the technical foundation for data and analyses of the natural system relating to the safety and the relationship between the geologic environment and the waste packages. Data available by the first quarter of FY 2000 will be used for analyses in the Site Recommendation Report. For the remainder of FY 2000, several of the same information networks will continue to acquire new data for use in the next phase of the Project (License Application) under Testing for License Application. Therefore, no funding will be necessary for testing to support a site recommendation in FY 2000 due to the transfer of activities to License Application testing. FY 2000 also includes $1.5 million in work originally planned for FY 1999 but deferred to FY 2000……..	15,000	35,102	7,000
▪ **Testing for License Application**—License Application testing, including enhanced characterization of the repository block, builds on the data acquired for the Site Recommendation Report. Data available by the end of FY 2000 will be used in the License Application. However, data-gathering activities will continue for performance confirmation testing. Results of subsurface investigations will support the hydrologic process models, Total System Performance Assessment for the decision whether to recommend the Site and the License Application, and repository design. Subsurface activities will complete the analyses of secondary minerals sampled in the			

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
tunnel walls and estimate past percolation flux. Surface-based activities will include tracer-complex testing to acquire additional data on groundwater flow and radionuclide transport in the saturated zone. FY 2000 also includes $2.6 million in work originally planned for FY 1999, but deferred to FY 2000. This work includes testing in the Enhanced Characterization of the Repository Block (ECRB) Crossover and Infiltration alcoves and niches. This testing will provide data on hydrology in the unsaturated zone, infiltration and interaction of the geologic fracture and matrix…….….	22,753	3,000	27,600
▪ **Testing for Licensing Phase and Performance Confirmation—**Licensing Phase testing activities include gathering data from an existing monitoring network that will gradually expand as testing for a decision regarding the Site and License Application come to a close. Measurement devices installed during these test periods will become part of the Testing for Licensing Phase network. Currently, Licensing Phase monitoring includes the extensive measurement network used to monitor seismic activity at approximately 24 locations on and around the Yucca Mountain site, as well as some of the underground instrumentation in the alcoves and niches associated with the Exploratory Studies Facility. Testing for Licensing Phase testing does not include the additional environmental monitoring covered under Environmental Monitoring and Compliance. Performance Confirmation is required by 10 CFR 960 to confirm that subsurface conditions and changes in those conditions are within the limits stated in the License Application and that natural and engineered systems and components are as anticipated. Performance confirmation activities will assist in defining the performance confirmation baseline, predicting values and variations of critical performance parameters, establishing limits on deviations from predicted performance, conducting tests, and collecting data. Performance confirmation activities include long-term testing and monitoring, drift-scale thermal testing,			

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
confirmation testing, subsurface testing, and surface-based testing. These activities will continue through repository analyses, which may be necessary for an updated License Application prior to repository operations.			
The budget request for Licensing Phase testing and performance confirmation may increase as monitoring points are added at the end of the testing periods and other testing requirements are identified by the Nuclear Regulatory Commission.....	13,416	2,000	2,000

- **Environmental Monitoring and Compliance**—Environmental monitoring and compliance activities, as regulated by various statutes and regulations (e.g., Clean Water Act; Endangered Species Act; Federal Land Policy Management Act; Comprehensive Environmental Response, Compensation, and Liability Act), provide environmental and socioeconomic baselines through ongoing monitoring activities and ensure that site characterization continues by acquiring and maintaining the required permits. These activities also ensure regulatory compliance by conducting surveillances, audits, and assessments of site activities.

  Environmental monitoring and compliance activities provide scientific support for preparation of the Environmental Impact Statement. Data gathering and reporting of meteorological conditions provide direct support to design and engineering, Total System Performance Assessments, and analyses of potential radiological doses. These same meteorology data also are necessary to demonstrate that the requirements of preclosure radiological safety, regional airflow patterns, and extreme weather conditions relative to population centers can be met. It is anticipated that environmental monitoring and compliance activities will remain level through FY 2001 and then decline somewhat with decreased overall project activities prior to submitting the License Application.

  Additional environmental monitoring and compliance activities planned for FY 2000 through FY 2002 include scientific and engineering reviews of hazardous and solid waste handling and repository designs to ensure regulatory compliance; comment resolution support for environmental and

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
socioeconomic issues on the draft Environmental Impact Statement from the State of Nevada, affected units of local government, affected Indian tribes, and the public; and support for preparation of the final Environmental Impact Statement and technical documentation for the proposed Site Recommendation Statement and License Application.			
FY 2000 also includes $600 thousand in work for biosphere modeling originally planned for FY 1999, but deferred to FY 2000……	13,500	12,630	12,959
Total, Core Science	73,669	74,832	73,959

Design and Engineering

In FY 1999 and FY 2000, refinement of the preliminary repository and waste package designs will continue to provide more detail. In addition, a quality assurance verification of the design to be used in the Total System Performance Assessment for License Application will be completed. Three key design options that would enhance repository performance will be evaluated for the Working Draft License Application. These options include: backfilling the emplacement drifts; installing drip shields over the waste packages to keep water from contacting the waste packages; and coating the waste packages with a ceramic material. In addition, several key design alternatives will be evaluated for the Working Draft License Application as proposed in the Viability Assessment, Volume II. These alternatives include continuous ventilation of the wastes, both pre- and post-closure; different waste package designs and materials (depending on the waste type); lower thermal loads in the underground emplacement drifts; self-shielded waste package designs that eliminate most underground remote handling operations; and different waste package emplacement configurations (in-drift, in-floor emplacement).

In FY 2000, the reference design to support the Site Recommendation Report and License Application will be selected and documented. These design documents will include safety and accident analyses and will describe the design in sufficient detail to show whether the repository can be operated safely during waste emplacement in

(dollars in thousands)

FY 1998	FY 1999	FY 2000

Yucca Mountain and after all waste packages have been emplaced (i.e., preclosure period).

The design will progress and culminate in a License Application design submittal. The design will continue to be developed after the responses to the Nuclear Regulatory Commission's comments on the License Application have been incorporated. The design effort will support procurement of construction contractors and materials, as well as actual construction of the repository facilities and fabrication of the waste packages. These activities currently are scheduled to begin in FY 2005.

Important areas of ongoing design emphasis include waste package materials; waste form testing and analyses; waste handling system and emplacement operations; a description of how the Monitored Geologic Repository would operate (i.e., repository concept of operations); a demonstration of design compliance with codes, standards, and regulatory requirements (i.e., design verification); assurance that the technical work being performed within the individual engineering specialties is integrated (i.e., interface control); and detailed engineering for these elements of the repository system that show no similarities to systems licensed previously in commercial nuclear power plants.

The ongoing Monitored Geologic Repository design alternatives evaluation (planned for completion in 1999) will result in the selection of a repository/waste package design concept for the License Application. The design concept will, most likely, result in additional features that will require detailed design analyses, as necessary, for licensing. The key activity for FY 2000 in design and engineering involves decisions on the design and options that will be presented in the License Application. In addition, the materials selected for potential new waste packages or engineered barrier system components may require additional testing and fabrication or weld development.

Waste forms that we plan on placing in the repository include spent nuclear fuel from commercial nuclear power plants, spent nuclear fuel and high-level waste from the Department of Energy, fuel and mixed oxide spent nuclear fuel from the Navy, and immobilized plutonium. The repository design must accommodate the varied

(dollars in thousands)

FY 1998	FY 1999	FY 2000

characteristics (e.g., size, weight, radioactivity, heat) of these fuels in the repository design. Development of repository acceptance criteria (e.g., disposal interface specifications) for noncommercial spent fuel will continue.

The design and engineering subelement consists of three major areas—Waste package development, Repository Design, and Systems Engineering. Waste Package development includes two very distinct areas of technical activity—waste package design and waste forms and waste package materials testing. Repository design also includes two distinct areas of technical activity—subsurface facilities design and surface facilities design. Systems engineering integrates all aspects of design and demonstrates that the Monitored Geologic Repository (as designed) will perform safely and efficiently.

- **Waste Package Design**—Spent nuclear fuel and high-level waste—the primary waste forms planned for disposal in a deep geologic repository—contain highly radioactive materials (i.e., radionuclides). To safely and consistently handle these materials and other types of waste forms, the high-level waste will be sealed in containers (i.e., waste packages) prior to disposal in a Monitored Geologic Repository. Waste packages are being designed primarily to provide a way to safely handle waste during repository operations, contain and isolate the waste from the environment while in the repository, and prevent criticalities (e.g. nuclear chain reactions) from occurring during repository operations and after permanent closure of the repository.

  The waste packages are especially complex because they are first-of-a-kind designs that must safely contain the waste in the repository environment for thousands of years. The Nuclear Regulatory Commission has never licensed such a container.

  This activity provides structural, thermal, radiation shielding, criticality, and operational analyses to demonstrate viable waste package designs and new concepts for all waste forms; provides support for resolution of waste package viability issues and evaluation of waste package design licensing issues; develops engineering/design requirements; conducts short-term corrosion experiments and initiation of long-term corrosion tests to support development of

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
materials process models for new or modified waste package and engineered barrier system components; develops fabrication and welding verification methods; prepares cost estimates; evaluates alternative design concepts and selects the preferred design; provides waste package design information to the Total System Performance Assessments; and initiates designs to support waste package procurement. Hundreds of distinct activities (e.g. structural, thermal, radiation shielding analyses) to demonstrate viable waste package designs will be conducted. The increase from FY 1999 to FY 2000 reflects increased design activities to complete the Site Recommendation Statement and begin final design activities for License Application.			
FY 2000 also includes $1.5 million in work originally planned for FY 1999 but deferred to FY 2000. This work includes design of the waste package prototype, testing and fabrication	11,200	14,855	17,800

- **Waste Forms and Waste Package Materials Testing**—The materials selected for fabricating the waste packages must be capable of isolating waste forms for thousands of years from water that may seep into the underground openings where the waste packages are located (i.e., emplacement drifts). Long-term containment of the waste will allow most of the radionuclides to decay into stable elements before potential release to the surrounding rock. Waste forms and waste package materials testing activities are conducted primarily to provide input to models that will predict how waste package materials and waste forms will eventually degrade and allow the release of radionuclides into the natural barriers of the repository rock. These process models provide important tools to help select waste package materials and conduct performance assessment radionuclide release evaluations.

  This activity provides support for and development of process models; performs long-term degradation experiments and analytical studies; conducts performance confirmation testing of waste package materials and waste forms; performs long-term corrosion tests (24 test vessels); conducts design-specific tests (e.g., effects of machining, behavior of

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
the weld/material interface); determines the adhesion and protection characteristics of ceramic coatings; conducts stress-corrosion cracking tests; and develops models that describe and predict actual corrosion phenomena at the material/environment interface under various conditions. A significant number of test vessels will be used to perform hundreds of long-term tests and experiments.	11,200	16,355	16,400

- **Subsurface Facilities Design**—A subsurface repository would be exposed to environmental conditions significantly different from those encountered in standard mining practices (e.g., expected temperatures due to thermal radiation from the spent nuclear fuel would exceed the boiling temperature of water). Since there are no operating geologic repositories for high-level nuclear waste anywhere in the world, in this type of geologic medium, the subsurface design is a first-of-a-kind. The subsurface design consists of drawings and specifications for structures, systems, and components supported by analyses and trade-off studies. Subsurface structures include the ventilation shafts, access ramps, access tunnels, and emplacement drifts. Subsurface systems include ground support, ventilation, fire protection, data gathering and monitoring, communications, enunciated alarm systems, and performance confirmation. Major subsurface components include the waste transporter and emplacement gantry crane.

  Because of the nature of radioactivity, design efforts also focus on structures, systems, or components that serve to protect worker or public health and safety. Aspects of the repository design that contribute to the prevention or limitation of the potential release of radioactivity to the environment are identified as "safety-related." Subsurface design work is prioritized first on unique-to-a-repository, safety-related items that have no regulatory precedent; second on safety-related items that the Nuclear Regulatory Commission is familiar with because they have licensed similar items at nuclear power plants; and third on nonsafety-related structures, systems, and components that are necessary for operation.

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
This activity provides subsurface facilities design support, including developing several thousand designs, drawings, and analyses for safety-related systems with and without previous Nuclear Regulatory Commission licensing precedence; evaluates waste package transport system and engineered barrier system enhancements and modifications; evaluates and selects multiple design alternatives to be presented in the License Application; resolves subsurface design viability issues; evaluates subsurface facility design licensing issues; and prepares input to the Total System Performance Assessments. The budget request increases in FY 2000 as design activities increase to complete the design products for Site Recommendation Statement and begin final design for License Application. FY 2000 also includes $1.0 million in near field design work originally planned for FY 1999 but deferred to FY 2000.....	13,000	19,302	21,489

- **Surface Facilities Design**—Surface facilities are being designed to receive spent nuclear fuel and high-level waste transported to the Yucca Mountain site in shipping casks, remove these wastes from the shipping casks and place them into disposal containers (i.e., waste packages), seal the disposal containers by welding, and deliver the filled waste packages to a holding area in preparation for underground emplacement for a potential Monitored Geologic Repository.

  Major surface facilities include the carrier preparation building, waste handling building, waste treatment building, transporter maintenance building, site utilities, and other support facilities (e.g., warehouses, maintenance shops, administrative facilities). The shipping casks will be received from the rail or truck carriers at the carrier preparation building where they will be prepared for removal. Nuclear waste will be removed from the shipping casks and loaded into waste packages in the waste handling building. The low-level waste generated during waste handling operations will be prepared for disposal at the Nevada Test Site. Vehicles used to transport and emplace waste packages will be serviced at the transporter

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
maintenance building. The waste handling facility and operations have some unique design considerations. Although some of the waste handling operations are similar to those of a nuclear facility, such as handling spent nuclear fuel, the number of fuel assemblies to be handled is approximately 400 times greater than in a nuclear facility. The production rates for the repository waste handling facility hot cell activities are significantly greater, with 60-ton casks being remotely handled in hot cells. Package closure operations include welding a large number of disposal containers to remain competent for thousands of years. This activity provides surface facilities design enhancements or modifications, including developing thousands of design drawings and analyses for safety-related systems with and without previous Nuclear Regulatory Commission licensing precedence; resolves multiple surface facility design viability and licensing issues; and prepares input to the Total System Performance Assessments. The budget request increases in FY 2000 as design activities increase to complete the design products for the Site Recommendation Statement and begin final design for License Application. FY 2000 also includes $1.0 million in work originally planned for FY 1999 but deferred to FY 2000. This work includes waste handling building design and operation	8,488	8,871	11,550

- **Systems Engineering**—The potential Monitored Geologic Repository is a large, technically complex combination of scientific, engineering, and construction activities. Systems Engineering is used to coordinate and integrate these diverse activities to ensure that the License Application design meets the regulatory requirements to safely contain and isolate waste from the public and the environment.

  Systems engineering has four major roles in the development of a geologic repository. The first role is to translate the regulatory requirements into design criteria so the repository and waste packages can be designed to meet these requirements. This results in a hierarchy of requirements that must be complied with

(dollars in thousands)

FY 1998	FY 1999	FY 2000

when developing detailed designs and specifications, as well as during construction. The second role is to review the repository and waste package designs as they progress from the conceptual through the preliminary and on to the final stages to ensure that the designs included in the License Application meet the regulatory requirements and are properly integrated throughout the design process. This activity is referred to as requirements and design verification. The third role is to assure the Department of Energy and Nuclear Regulatory Commission that the designs, as built, will operate in a cost-effective and efficient manner and that changes to the designs and specifications are documented and controlled in accordance with the approved quality assurance program. The fourth role is to develop an operations test program to demonstrate that the designs will operate as intended. This program, intended to test the operations of the actual facility, is developed during the design process and continues through the start-up phase.

Successful application of the systems engineering principles ensures that the performance of a Monitored Geologic Repository, as included in the License Application, is balanced against the construction and operation costs of the repository. This is accomplished through the use of benefit/cost analyses, design alternative evaluations, engineering trade-off studies, and operations analyses that support the development of the design and Total System Life Cycle Cost estimates. These activities are performed throughout the life of the Project to provide the proper balance between repository performance and cost, and they are documented to provide the technical bases that support the Nuclear Regulatory Commission licensing process. Professional estimators are also used to support engineering and construction planning activities.

This activity provides systems engineering and training support, includes preparing descriptions of how a Monitored Geologic Repository should operate; develops system description documents; conducts hundreds of design reviews to ensure that the designs are integrated and consistent with regulatory requirements; develops thousands of the technical bases (i.e., records) for the designs; determines the

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
completeness and cost-effectiveness of the designs through cost/benefit analyses and Total System Life Cycle Cost estimates; conducts hundreds of design analyses; and prepares plan descriptions to start and test the facilities' operations. Systems Engineering processes support the development of the technical basis for the License Application Design. FY 2000 also includes $1.5 million in work originally planned for FY 1999 but deferred to FY 2000. This work includes Site Recommendation/License Application design criteria and the Exploratory Studies Facility nuclear safety analysis.....	19,000	19,011	24,300
Total, Design and Engineering	62,888	78,394	91,539

Suitability/Licensing and Performance Assessment

The objective of the suitability/licensing and performance assessment activity is to first compile the technical documentation that will support a Site Recommendation Statement, and second, if the Secretary of Energy decides to recommend the site and the President and Congress approve the recommendation, to complete the License Application for repository construction, which will be submitted to the Nuclear Regulatory Commission by the Secretary of Energy. A draft Site Recommendation Report will be developed during FY 2000 to provide the technical bases required under the Nuclear Waste Policy Act of 1982, as amended, as part of the Site Recommendation Statement. This report, the final Environmental Impact Statement, and other information required by the Nuclear Waste Policy Act of 1982, as amended, will be considered by the Secretary of Energy in deciding whether to recommend the site to the President in FY 2001.

Before the License Application is submitted, the Department of Energy will work with the Nuclear Regulatory commission to resolve procedural and technical issues. The licensing process can be facilitated further by coordinating and participating in prelicensing interactions with the Nuclear Regulatory Commission to determine and agree on the content and level of detail required for the License Application. These interactions will enable the Nuclear Regulatory Commission to accept

(dollars in thousands)

FY 1998	FY 1999	FY 2000

the License Application for review upon submittal in FY 2002 and, if warranted, approve a construction authorization by FY 2005.

This budget subelement includes interactions with the Nuclear Regulatory Commission, Nuclear Waste Technical Review Board, and other external organizations that are intended to facilitate an understanding of the bases for the Site Recommendation Statement and License Application.

Complete program records are critical to the preparation of the Environmental Impact Statement, reports supporting a Site Recommendation Statement and License Application and for the Nuclear Regulatory Commission's license review process. All technical data used for the repository design, Total System Performance Assessment, and models for site processes and conditions must be traceable and electronically retrievable in accordance with 10 CFR 960 Part 2, Subpart J. The latest web-based technologies will be utilized to ensure that program data and records are quickly and easily retrievable at the time that the Secretary of Energy decides to recommend the site to the President.

Performance assessments are important in evaluating site suitability to support a Site Recommendation Statement and License Application. Performance assessments are needed to quantitatively evaluate the ability of the natural system and engineered barriers to meet postclosure performance objectives. Performance assessments are conducted to provide information on the performance of the total repository system in the postclosure period by making calculations to evaluate physical processes that affect potential migration of radionuclides and the potential doses to individuals living in the vicinity of Yucca Mountain in the distant future.

The key activity for suitability/licensing and performance assessment in FY 2000 is documentation of the base case for the Total System Performance Assessment that will support the Site Recommendation Statement and License Application.

The suitability/licensing and performance assessment subelement consists of four major areas: to support a decision on the Site; Licensing; Technical Information Management; and Performance Assessment. The performance assessments for closing out issues in the

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000

Viability Assessment and Site Recommendation/License Application are discussed separately.

- **Site Recommendation**—The Office of Civilian Radioactive Waste Management will develop a Site Recommendation Report to support a Statement and submit it to the Secretary of Energy in FY 2001. The Report and a proposed Site Recommendation Statement will be based on an integrated description of the site characterization and design information developed by core science and design and engineering through mid-FY 2000 and the Total System Performance Assessment Site Recommendation/License Application that will be completed in early FY 2001. The Site Recommendation Statement will be supported by the results of an evaluation of the Yucca Mountain site's suitability for development as a repository under 10 CFR 960, the Department of Energy's siting guidelines. This suitability evaluation will begin in FY 2000 and be completed in FY 2001 to support the Site Recommendation Statement. The final Environmental Impact Statement, as well as other inputs required by the Nuclear Waste Policy Act of 1982, as amended, will be included as part of the Site Recommendation Statement. The Program will coordinate preparation and issuance of two Site Characterization Progress Reports.

  The estimate for FY 2000 reflects the staff hours that are expected to accomplish the planned work scope. This estimate is based on experience gained from developing and reviewing the Viability Assessment in FY 1998 and coordinating the development of the Working Draft License Application in FY 1999 for review in FY 2000, as well as previous experience in developing Site Characterization Progress Reports.. ..... 1,500 1,004 1,500

- **Licensing**—Licensing activities focus on compliance with statutory and regulatory requirements, interacting with the Nuclear Regulatory Commission and oversight groups, and developing the License Application. The License Application will be developed iteratively between FY 1999 and FY 2002.

  In FY 2000, the Program will coordinate the review of

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000

the Working Draft License Application and development of the Acceptance Draft License Application to provide the required information to support the licensing review by the Nuclear Regulatory Commission beginning in FY 2002 (the License Application is expected to comprise several tens of thousands of pages). Ongoing activities include publishing Semiannual Site Characterization Progress Reports, which are required by the Nuclear Waste Policy Act of 1982, as amended, and Nuclear Regulatory Commission regulations; tracking agreements and commitments made with the Nuclear Regulatory Commission; and observing and commenting on proposed regulatory revisions being considered by the Environmental Protection Agency and Nuclear Regulatory Commission.

The estimate for FY 2000 reflects the staff hours that are expected to accomplish the planned work scope. This estimate is based on experience gained from developing and reviewing the Viability Assessment in FY 1998 and coordinating the development of the Working Draft License Application in FY 1999 for review in FY 2000, as well as several years of interactions with the Nuclear Regulatory Commission, its staff, the Advisory Committee on Nuclear Waste, with the Nuclear Waste Technical Review Board and other external groups.

The budget request for Licensing increases in FY 2000 to accommodate the review of the Working Draft License Application that will be developed during FY 1999 and to coordinate development in FY 2000 of the Acceptance Draft License Application, which must fully address the information required under Nuclear Regulatory Commission regulations and the comments resulting from the review of the Working Draft License Application. 4,680 17,705 19,492

- **Technical Information Management**—Technical information management activities consist of developing, maintaining, and enhancing an Integrated Electronic Information System, including hardware, software, and administrative controls. This system will support the development, documentation, and archiving of licensing information. The Integrated Electronic Information System will be a controlled

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
system for storing, disseminating, and archiving scientific and design data and controlling model development and design analyses by ensuring the accuracy and consistency of the technical information used. The Integrated Electronic Information System includes the Web-based information system, project electronic licensing document development and management system, records management system, and technical data management system. The records management system equates to the Licensing Support Network required by 10 CFR 960, Part 2, Subpart J. Each of these component systems will be fully linked so that licensing and supporting documentation is traceable and transparent to the references and data. The Web-based information system will be deployed to support development of the Working Draft License Application, and the technical data management system will be fully functional in FY 1999. The Licensing Support Network will be certified by the Department of Energy and ready for use in licensing proceedings prior to submittal of the License Application in FY 2002. This estimate is based on experience gained during FY 1998 and FY 1999 in processing existing and new records for electronic access. It also is based on the FY 1999 development and deployment for internal use of the Web-based information system to support development of the Working Draft License Application and the technical data management system. The budget for technical information management increases in FY 2000 because the Nuclear Regulatory Commission requires the delivery of an electronic docket at the time the site is recommended (planned for FY 2001). FY 2000 also includes $2.2 million in work originally planned for FY 1999 but deferred to FY 2000. This work includes processing data into the Technical Data Management System, increasing the efficiency in document development and control by developing an Electronic Data Management System and records reprocessing.	10,900	13,022	17,100

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
▪ **Total System Performance Assessment—Site Recommendation/License Application**—Total System Performance Assessment—Site Recommendation/License Application will be developed based on the results of the Total System Performance Assessment—Viability Assessment and the final component of the peer review completed in FY 1999. The Total System Performance Assessment process will continue to serve as an integration tool for models and analyses produced by core science and design and engineering. This process, and the Total System Performance Assessment resulting from it, will be a key source of information critical to the FY 2001 decision whether to recommend the Site and FY 2002 License Application. In the Total System Performance Assessment-Site Recommendation/License Application, relevant abstracted model results, simplified process models, and design information will be combined with a reference case set of parameters to determine expected repository performance. The analyses will present the base case results showing the estimated dose to a human receptor at 20 kilometers downgradient from a hypothetical repository release. The release scenario is an occurrence of moisture in the unsaturated zone contacting the waste package for a sufficiently long time to corrode the metal container and carry the radionuclides to the water table (about 800 feet below the proposed repository horizon). This type of scenario is needed to evaluate potential impacts to human health and safety and to the environment to support the evaluation of site suitability, development of the remaining bases for the Site Recommendation Statement, and preparation of the License Application. This activity is labor-intensive with several computer simulations and interpretation of results. The budget request is estimated at $750,000 per month based on experience in developing the Total System Performance Assessment—Viability Assessment. FY2000 also includes $1.0 million in work originally planned for FY 1999 but deferred to FY 2000.	7,063	20,639	23,100
▪ **Total System Performance Assessment—Viability Assessment**—Total System Performance Assessment was a key component of the Viability Assessment in FY 1998. It served as an integration tool for models			

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
and analyses produced by core science and design and engineering. Performance measures included simulated doses to affected populations and/or releases at specified boundaries. Total System Performance Assessment—Viability Assessment also presented sensitivity and uncertainty analyses to define key parameters that impact total system performance and to evaluate the significance of alternative assumptions in the overall prediction. Impacts of the Total System Performance Assessment—Viability Assessment on the scientific process models and design products were described, and recommendations were made for modifications that could significantly reduce uncertainty in the final dose calculations in the next performance assessment iteration. Results of the Total System Performance Assessment—Viability Assessment peer review, which will be completed in FY 1999, will be considered in the Total System Performance Assessment—Site Recommendation/ License Application.			
This activity was completed in the first quarter of FY 1999. The budget requirements in FY 2000, because all work related directly to this phase of performance assessment, will be finished with completion of and responses to the final report of the peer review panel in FY 1999.	7,000	760	0
Total, Suitability/Licensing and Performance Assessment..	31,143	53,130	61,192

National Environmental Policy Act

This subelement addresses the environmental data that will form the basis of the 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.* The Nuclear Waste Policy Act of 1982, as amended, requires that an Environmental Impact Statement be included in a Site Recommendation Statement and that the Nuclear Regulatory Commission, in granting repository construction authorization, adopt the Department of Energy's Environmental Impact Statement to the extent practicable. The National Environmental Policy Act process began in FY 1995 with the publication of a Notice

(dollars in thousands)

FY 1998	FY 1999	FY 2000

of Intent in the Federal Register, which initiated the public comment period on the proposed scope of the Environmental Impact Statement. As part of the scoping effort, 15 public meetings were conducted across the nation. Comments made at the scoping hearings were documented formally in a Comment Summary Document, which was issued in FY 1997. In FY 1999, the draft Environmental Impact Statement will be completed and issued for public review and comment. The public comment period will end in FY 2000. The final Environmental Impact will be published in late FY 2000. The final Environmental Impact Statement will evaluate potential environmental impacts associated with building, operating, and eventually closing a repository at Yucca Mountain. Data to support the Environmental Impact Statement will be generated by Core Science, Design and Engineering, and Suitability/Licensing and Performance activities.

This subelement includes three major activities to support development of the Environmental Impact Statement. The first activity involves performing environmental impacts and consequence analyses for each technical discipline in the Environmental Impact Statement (e.g., ecology, archeology, biology, meteorology, economics, and sociology). These impact analyses consider the results of the Total System Performance Assessment of the repository, estimate environmental consequences, and identify mitigation measures. The second activity involves conducting analyses in the technical areas that form the basis for and justification of the Environmental Impact Statement's conclusions. This process focuses on matters involving socioeconomic impacts, sensitive ecosystems, analysis of transportation impacts, issues of environmental justice, and analysis of repository performance and resulting environmental impacts during the preclosure and postclosure periods. The third activity involves further refining the technical analyses that support the Environmental Impact Statement after receiving public, agency, and tribal comments, as appropriate; supporting interdepartmental reviews; managing efforts to publish and distribute the document to all interested parties on a national basis in FY 2000; and continuing to maintain the administrative record.

The key activity for the National Environmental Policy

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
Act in FY 2000 is publishing the final Environmental Impact Statement.			
▪ **National Environmental Policy Act**—To support the development of the Environmental Impact Statement, we will perform a environmental impact and consequence analyses; support Total System Performance Assessment analyses; identify mitigation measures; review draft and final text developed by the Environmental Impact Statement contractor; and interface with Department of Energy sites, headquarters organizations, regulatory and oversight organizations, and Department of Energy management on issues related to data collection and analyses for the Environmental Impact Statement. *Note that the cost of actually writing the Environmental Impact Statement is not included in this subelement. Those costs are included in Program Direction under support contractor scope.. . .*	4,254	1,962	2,343
Total, National Environmental Policy Act	4,254	1,962	2,343

Operations/Construction

Operations/Construction activities include providing, maintaining, and managing the operating systems, structures, and construction necessary to support the Yucca Mountain site characterization effort. Operations activities include maintaining facilities and systems constructed to gather site characterization data; maintaining facilities in the central support area at the site; providing and maintaining site utilities and communications; and providing transportation for site workers. Construction activities include constructing and modifying test areas; changing the configuration of the ESF to provide a fully functional underground scientific research facility; and providing direct support for test setup and execution. Scientific and technical support facilities constructed to support testing include the Exploratory Studies Facility, Busted Butte Facility, Fran Ridge Facility, and various surface test drilling sites (boreholes). The Exploratory Studies Facility, which is the cornerstone of the underground characterization effort, includes the 5-mile Main-Loop, 1.7 mile Cross Drift, and 11 large test areas. These underground facilities are used

(dollars in thousands)

FY 1998	FY 1999	FY 2000

for scientific testing to enhance our understanding of the repository block; reduce characterization uncertainties ; confirm data; and support the Environmental Impact Statement, Site Recommendation Statement, and License Application. In FY 1998, the Cross Drift was excavated above the repository block to provide access to the western portion of the repository block. Construction of all major test areas to provide locations for scientific testing and data collection will be completed in FY 2000. This includes $3.5 million for cross-drift niches and alcove construction and Exploratory Studies Facility configuration modification originally planned for FY 1999. These test areas provide access for collection of observational and confirmatory data to support the data in the Viability Assessment and for the Site Recommendation Statement. The Central Support Area, originally constructed in the late 60s and early 70s, consists of existing buildings, roads, utilities, and communication systems that have been rehabilitated and are maintained to provide the necessary base of operations.

Out-year operations, including general test support and upgrading of the major Exploratory Studies Facility systems to provide and maintain a fully functional underground scientific research facility, will continue. In addition, minor construction will continue, as necessary, to upgrade existing testing areas. Safety and health programs also will continue to protect employees and the public, as will field support services provided by the Nevada Test Site.

The Operations/Construction subelement is composed of four key areas—Exploratory Studies Facility Operations, Exploratory Studies Facility Test Support and Construction, Site Operations and Test Support, and Safety and Health.

- **Exploratory Studies Facility Operations**—Exploratory Studies Facility operations ensure that this underground and other subsurface test locations, including the Busted Butte Unsaturated Zone Test Facility, are available for scientific study and ensure that the testing environment is consistent with programmatic and institutional requirements and continued site characterization. The Exploratory Studies Facility includes 25 major support systems that provide the necessary utilities to sustain life ,conduct

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
complex in situ laboratory experiments, and protect complex scientific equipment. The major support systems include ventilation, power, water, communications, ground support, underground transportation, and material and supplies handling. Continue provisions of the Exploratory Studies Facility support services (e.g., trash and refuse management, janitorial, drinking water, sanitation, vehicle fueling, access control, and underground transportation. Based on past experience, the average monthly cost to provide these services is $1.5 million. Costs associated with operations of the major support systems is expected to remain somewhat constant through License Application submittal.....	18,314	16,380	17,500

- **Exploratory Studies Facility Test Support and Construction**—Construction activities include constructing and modifying test areas; modifying the configuration of Exploratory Studies Facility systems to provide a fully functional underground scientific research facility; resolution of Exploratory Studies Facility Title III engineering reports, and providing direct support for test setup and execution. All major site characterization construction was completed at the beginning of FY 1999 with completion of the Cross Drift. FY 1999 construction activities include resolution of Exploratory Studies Facility as-built issues, archival of Exploratory Studies Facility configuration files, and upgrading of Exploratory Studies Facility systems to provide a full functional underground scientific research facility. Planned Exploratory Studies Facility system work includes alignment of the Exploratory Studies Facility rail system and upgrade of critical electrical systems. Other activities will include technical support to construction tasks and construction support to the surface-based drilling program.

  FY 2000 also includes $3.5 million in work originally planned for FY 1999. This work includes cross-drift niches and alcove construction and replacement and upgrading of some of the Exploratory Studies Facility (which includes the electrical switch gear building, drainage channel, fencing, lighting, fire protection,

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
power distribution, and communications. As the level of construction and testing activities decreases, the support requirements also will decrease……	15,200	5,247	10,500
▪ **Site Operations and Test Support**—Site operations and test support activities provide the laboratories, buildings, and services to support the 500 scientists and engineers working on site at Yucca Mountain, as well as approximately 3,500 visitors who tour the site each year. On-site facilities consist of buildings and associated utilities, motor pool, site roads, power, fuel, water distribution, and sewage collection. Support services include janitorial, refuse management, bus transportation, emergency medical services, field surveying, site security, tour coordination, material and property control, communications, and fleet operations. Site operations and test support also includes common field support services provided by the Nevada Test Site. Other surface and subsurface testing sites that are maintained on an ongoing basis include the C-Well Complex, Fran Ridge, and approximately 350 boreholes and 200 trenches and test pits. Site operations and test support is a long-duration task that spans the site characterization, licensing, construction, and operations phases. Site Operations and test support is expected to remain fairly constant through License Application submittal. The cost to provide surface operations and test support will be approximately $823 thousand dollars per month.	11,600	9,876	11,250
▪ **Safety and Health**—Safety and health programs prevent or mitigate potential hazards during core science data collection, construction, and testing activities that form the scientific bases for the Site Recommendation Statement and License Application. These activities also are conducted to comply with the statutory and regulatory requirements of the Occupational Safety and Health Act and will continue through all phases of the repository program. Ongoing activities focus on protecting employees, members of the public, environment, and site workers from hazards that may result from the site			

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
characterization activities. All aspects of the activities at the Yucca Mountain site recently completed the transition to the Office of Civilian Radioactive Waste Management Integrated Safety Management System. The Exploratory Studies Facility continues to be monitored for occupational health compliance with ventilation and air quality requirements for dust abatement and silica exposure mitigation. Medical emergency services, emergency management programs, fire prevention programs to support field activities, and safety and health programs complying with applicable requirements also are ongoing.			
As the level of operations/construction activities decrease, the cost of safety and health activities will decrease. However, specific safety and health activities planned for FY 2000 through FY 2002 will be expanded or reduced based on the hazard potentials and potential environmental risks in each phase of the project.	2,700	2,700	3,455
Total, Operations/Construction	47,814	34,203	42,705

Project Management Support

Project management provides support to technical and scientific programs allowing for the planning, funding, managing, measuring, and processing of data. Most importantly, project management activities support the program goals to complete the Site Recommendation Report to support a decision whether to recommend the Site and submit a License Application (if the site is determined to be suitable) by providing the systems and processes necessary to conduct institutional, scientific and technical activities. Specific project management activities include planning, scheduling, and measuring performance for all of the Yucca Mountain Site Characterization Project elements, as well as information technology and telecommunications management; lease scoring; office services, training, security, and procurement; facilities management and motor pool operations; records management; and technical document control. Project management also includes conducting public information and outreach programs to ensure that open and informative interactions with the public and program stakeholders are

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000

continued.

- **Management Support Activities—**Project Management activities that were completed in FY 1998 and are planned for FY 1999 through FY 2002 support the development of the Environmental Impact Statement, Site Recommendation Report, and License Application. Project management will include monitoring program activities to ensure compliance with applicable statutes, regulations, and Department of Energy orders and directives; planning, scheduling, budgeting, and measuring the performance of program activities to ensure that the Office of Civilian Radioactive Waste Management program objectives are met; monitoring program activities to ensure that they are accomplished in accordance with approved work scopes, authorized budgets, and scheduled milestones; providing program participants with facilities, equipment, systems, training, security, and support services needed to perform their approved activities; maintaining the information technology and telecommunications systems; maintaining records and technical references; managing the outreach program; and supporting public hearings on the Environmental Impact Statement and a decision to recommend the site, if determined suitable.

  Management support activities average 10 percent or less of the program budget.

  FY 2000 also includes $2.2 million in work originally planned for FY 1999 but deferred to FY 2000. This work includes information technology and telecommunications support 36,042 28,234 29,900

- **Lease Scoring**—Maintain current leases on office space, the current leases for office space in Las Vegas, Nevada begin to expire in FY 2000. Funding supports the minimum extensions (one-year to three-year, identified in the current contract) until new leases are negotiated and awarded. 0 0 7,700

Total, Project Management 36,042 28,234 37,600

External Oversight and Payments-Equal-to-Taxes

Financial assistance activities within the external oversight and payments-equal-to-taxes subelement provide the eligible units of government funds for conducting oversight and monitoring activities for the Yucca Mountain site characterization and offsetting lost tax revenues. Financial assistance for external oversight and payments-equal-to-taxes is required by the Nuclear Waste Policy Act of 1982, as amended. External oversight activities consist of financial and technical assistance to the State of Nevada and affected units of local government (i.e., Churchill, Clark, Esmeralda, Eureka, Lander, Lincoln, Mineral, Nye, and White Pine Counties in Nevada and Inyo County in California).

Payments-equal-to-taxes are made to the State of Nevada and Nye, Clark, and Inyo Counties.

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
▪ **External Oversight**—Financial assistance will be provided to the State of Nevada, Nye County, and nine counties adjacent to Nye County to allow participation in activities required under the Nuclear Waste Policy Act of 1982, as amended, [Section 116(C)(1)(A)].	5,000	5,930	12,329
▪ **Payments-Equal-to-Taxes—**Payments-equal-to-taxes will be provided to the State of Nevada, Nye, Clark, and Inyo Counties. The increase in FY 2000 is due to an expected increase in payments-equal-to-taxes to Nye County.	6,900	5,729	10,000
Total, External Oversight and Payments-Equal-to-Taxes…	11,900	11,659	22,329
Total Yucca Mountain Site Characterization……..	267,710	282,414	331,667

Explanation of Funding Changes from FY 1999 to FY 2000

	FY 2000 vs. F Y 1999 ($000)

Core Science

- The budget projected for Core Science stays relatively level in FY 2000 as the testing activities to support a decision whether to recommend the site draw to a close and testing for License Application increases. The funding for site characterization decreases but is affected by increases in external research under the cooperative agreement with the University and Community College System of Nevada and support for Russian Scientists and engineers on site characterization activities. ..... -873

Design and Engineering

- The upward trend from FY 1999 to FY 2000 reflects increased design activity to complete to support a site recommendation report input and start final design activities for License Application. These activities include surface and subsurface design development, waste package design, waste forms, and waste package materials testing. Systems engineering functions support the development of the technical basis for the License Application design. ..... +13,145

Suitability/Licensing and Performance Assessment

- The budget to support a decision on the site increases in FY 2000 to accommodate the effort required to coordinate preparation of the Site Recommendation Report and to initiate the review of this major statutory product. The budget for licensing increases in FY 2000 to accommodate the significant effort associated with the review of the Working Draft License Application that will be developed during FY 1999. The increase also covers additional staff resources necessary to coordinate development in FY 2000 of the Acceptance Draft License Application, which must fully address the information required under Nuclear Regulatory Commission regulations and the comments resulting from the review of the Working Draft License Application. The budget increases for Technical Information Management for FY 2000 to address the significant effort and staff resources necessary to satisfy the Nuclear Regulatory Commission's

	FY 2000 vs. F Y 1999 ($000)
requirement for electronic docketing for License Application. The budget increases for Performance Assessment in FY 2000 for two reasons. FY 2000 includes $1 million in Performance Assessment work originally planned for FY 1999 by deferred to FY 2000. The increase is also due to increased resource requirements needed to support Site Recommendation. Development and deployment of the Web-based information system for internal use will be completed in FY 1999. In FY 2000, this system will be available for use in developing the Acceptance Draft License Application and for eventual use in the Licensing Support Network being developed to provide the Integrated Electronic Information Management System, which is required under Nuclear Regulatory Commission regulations to provide electronic access to the records needed to support the licensing process.....	+8,062

National Environmental Policy Act

▪ The budget for this subelement increases in FY 2000 to provide additional support for the public hearing during coordination of the final Environmental Impact Statement	+381

Operations/Construction

▪ Cross-Drift construction (the last major construction project required for site characterization), north portal upgrade, and the unsaturated zone testing facility as part of the Exploratory Studies Facility underground laboratory will be completed in FY 1999. Emphasis in FY 2000 shifts to completing the testing activities.	+8,502

Project Management

▪ Current lease agreements on facilities for Yucca Mountain begin to expire in FY 2000. The Project Management increase of $9.4 million is due a $7.7 million lease scoring requirement for one to three year extension of the current leases of approximately 206,000 square feet of office space and a $1.7 million increase in information technology in support of licensing activities.....	+9,366

External Oversight and Payments-Equal-to-Taxes

▪ External oversight is budgeted for the State of Nevada, Nye County, and nine counties adjacent to Nye County. Payments-equal-to-taxes	

	FY 2000 vs. F Y 1999 ($000)
are provided to the eligible government units. The increase in FY 2000 is due to a planned increase in payments-equal to taxes to Nye County as a result of site improvements and funding for the state which was not appropriated fully in FY 1999	+10,670
Total Funding Change, Yucca Mountain Site Characterization	+49,253

Waste Acceptance, Storage and Transportation

Mission-Supporting Goals and Objectives

The Waste Acceptance, Storage and Transportation (WAST) activities include: the development of processes for the legal and physical transfer of commercial spent nuclear fuel to the Federal Government; creation of a national transportation capability for waste acceptance and transportation; burn-up credit studies to take credit for the reductions in spent nuclear fuel reactivity resulting from fuel usage in a reactor; and resolution of institutional issues with Program stakeholders and the phasing out of discussions with the Nuclear Regulatory Commission for a storage facility design. The national transportation capability necessary to accept and transport spent nuclear fuel will utilize a market-driven initiative. This initiative involves a procurement process for contracts with the private sector to acquire needed waste acceptance and transportation services; it begins with the development of business plans, and includes a phase for mobilization and fabrication of canister, transport cask and storage modules, and a transportation operations phase. This approach offers a market stimulus for the commercial development of the equipment and management capabilities required for the transportation and storage of spent nuclear fuel.

The FY 2000 funding will provide for continuation of the core activities that will precede removal and transportation of spent nuclear fuel from reactor sites to a Federal facility. These activities include: 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 International Atomic Energy Agency, the Nuclear Regulatory Commission, contract holders, and others concerning nuclear materials safeguards; interactions with stakeholders; and the development activities associated with the procurement initiative for waste acceptance and transportation equipment and services.

Spent Fuel Storage

This activity will be suspended in FY 1999, following receipt from the Nuclear Regulatory Commission of a safety assessment report for the Phase I Centralized Interim Storage Facility Topical Safety Analysis Report.

Transportation

This activity, which includes planning for the acquisition of a safe and cost-effective transportation capability, is being developed to 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 minimize 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 2000, and issue it in FY 2001. This activity also includes the consideration and resolution of institutional issues and interactions with stakeholders, and technical assistance (Nuclear Waste Policy Act Section 180(c)) to states and tribes.

Waste Acceptance

The Waste Acceptance activity includes developing plans for achieving the legal and physical transfer of waste to the Federal Government from the owners and generators of spent nuclear fuel and high-level waste, once a Federal facility is ready to begin operations; supporting the transportation, storage and disposal of waste, once accepted; and developing recommendations for the Department's waste acceptance policy. Activities required to facilitate waste acceptance include: 1) development of a process for the orderly transfer of spent nuclear fuel and high level waste 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 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 market-driven initiative.

Project Management

Project Management and Administration consists of activities and tasks that 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 1998	FY 1999	FY 2000	$ Change	% Change
Spent Fuel Storage……	1,549	310	0	-310	-100.0%
Transportation……	3,180	10	4,100	4,090	40900.0%
Waste Acceptance……..	523	916	1,030	114	12.4%
Project Management……	695	614	600	-14	-2.3%
Total, Waste Acceptance, Storage and Transportation.	5,947	1,850	5,730	3,880	209.7%

Detailed Program Justifications

(dollars in thousands)

	FY 1998	FY 1999	FY 2000
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 receipt of the Nuclear Regulatory Commission's safety assessment report for the non-site-specific Centralized Interim Storage Facility Topical Safety Analysis Report is expected in FY 1999. No activity is planned for FY 2000……..	1,349	310	0

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
▪ Perform non-site-specific contingency planning for a Centralized Interim Storage Facility; maintain and update the database on industry developments for storage and transportation technology……..	200	0	0
Total, Spent Fuel Storage	1,549	310	0
Transportation			
▪ Prepare acquisition documents and technical specifications and issue for public comment the revised draft Request for Proposal (FY 1998), and support development during FY 2000 of the RFP for waste acceptance and transportation services including transport cask systems and auxiliaries (for issuance in FY 2001); develop procurement for market-driven waste acceptance and transportation services……	1,855	0	3,700
▪ Review and revise Section 180(c) Notice of Policy and Procedures for implementing the Nuclear Waste Policy Act Section 180(c) and support preparation and evaluation of grant applications……	200	0	200
▪ Continue stakeholder interactions…….…….	200	0	200
▪ Support ten cooperative agreements……..	625	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.……	300	10	0
Total, Transportation……	3,180	10	4,100
Waste Acceptance			
▪ Address Civilian Radioactive Waste Management System safeguards and security issues, implementing associated policies and procedures, and maintaining interface/liaison with other affected elements of the Civilian Radioactive Waste Management System……..	80	30	175

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
▪ Process and verify utility fee payment data and develop quarterly revenue projections……..	270	270	270
▪ 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 in FY 2000……..……...	73	423	379
▪ 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, prepare 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……	100	193	206
Total, Waste Acceptance	523	916	1,030
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…..	130	160	160
▪ Develop the Waste Acceptance, Storage and Transportation Annual Plan, and support the project validation review process; update the Project Cost & Schedule Baseline Project Summary Schedule work breakdown structure and dictionary and Long-Range Plan, as required…….	370	259	340

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
▪ 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; maintain and manage the technical baseline; conduct/coordinate system studies and analyses including the Waste Acceptance, Storage and Transportation Operations Plan; and perform/support verification and design control The Total System Life Cycle Cost Report will be issued in FY 1999 and updated in FY 2000	195	195	100
Total, Project Management	695	614	600
Total, Waste Acceptance, Storage and Transportation…	5,947	1,850	5,730

Explanation of Funding Changes from FY 1999 to FY 2000

	FY 2000 vs. FY 1999 ($000)
Spent Fuel Storage	
▪ No Activity planned for FY 2000……	-310
Transportation	
▪ The FY 2000 Budget Request assumes the Program will support issuance of a Request for Proposal for waste acceptance and transportation services, consistent with the Site Recommendation milestone……...	+4,090
Waste Acceptance	
▪ Increase is required to address Civilian Radioactive Waste Management System safeguards and security issues……..	+114
Project Management	
▪ Decrease reflects reduced system studies and analyses……	-14
Total Funding Change, Waste Acceptance, Storage and Transportation……	+3,880

Accelerator Transmutation of Waste

Mission Supporting Goals and Objectives

In FY 1999, funding was provided to assess the application of advanced accelerator technology to the transmutation of high-level defense waste. This work was coordinated with the activities being done in other offices on the development of high power accelerator technology.

Funding Schedule

(dollars in thousands)

	FY 1998	FY 1999	FY 2000	$ Change	% Change
Accelerator Transmutation of Waste……	0	4,000	0	-4,000	-100.0%
Total, Waste Acceptance, Storage and Transportation.	0	4,000	0	-4,000	-100.0%

Detailed Program Justification

(dollars in thousands)

	FY 1998	FY 1999	FY 2000
▪ In FY 1999, the Department conducted a road mapping activity to identify the critical technical issues which must be resolved in order to establish the technical feasibility of the accelerator transmutation of waste (ATW). The study involved the design of an R&D program to address those issues, including schedule and cost. Opportunities for collaborative programs with foreign ATW efforts, as well as possible cooperative activities with other DOE accelerator programs, were identified. Institutional challenges were evaluated, and the impact on civilian radioactive waste management and other related programs was determined. Finally, the total life cycle cost to treat civilian spent nuclear fuel by ATW was estimated			
Total, Accelerator Transmutation of Waste…….	0	4,000	0

Explanation of Funding Changes from FY 1999 to FY 2000

	FY 2000 vs. FY 1999 ($000)
Accelerator Transmutation of Waste	
▪ The FY 2000 Budget request no funding. Activities related to the identification of critical technical issues needed to determine the technical feasibility of this technology were completed…….	-4,000
Total Funding Change, Accelerator Transmutation of Waste……...	-4,000

Program Integration

Mission Supporting Goals and Objectives

Program Integration provides management support and program integration to the Program Director, the Yucca Mountain Site Characterization Project, and the Waste Acceptance, Storage and Transportation Project. Program Integration is comprised of the Office of Quality Assurance, Program Management and Human Resources and Administration. These offices are responsible for Program planning and management, Program integration, regulatory coordination, quality assurance, institutional activities, resources and information management, and international waste management activities.

Quality Assurance

This Program 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, thereby ensuring quality of the 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, while performed by personnel not associated with the performer organization (NRC independence requirements), are directly related to the acceptability of the technical products and services provided by the performer organization. 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 such that we are confident in fulfilling our mission to protect the public, workers, and the environment. To maintain the high level of objectivity necessary to satisfy NRC requirements, the contractor support relied upon by the QA function must be independent of the Program's principal site investigators. 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.

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. This element coordinates policy, interprets technical requirements, and manages Program requirements documents. It maintains current descriptions of the overall waste management system, its components, and interfaces to enhance communication among parties responsible for individual system components assuring smooth flow at

interfaces. The unit operates and maintains the program-wide Configuration Information System (CIS) to track changes to baselined and controlled documents.

This element leads and coordinates interface activities with other Departmental organizations, including: Environmental Management (EM), Fissile Materials Disposition (MD), Nuclear Energy (NE), and Naval Reactors (NR). It also evaluates and defines criteria for acceptance of other waste forms for disposal; facilitates and implements Memoranda of Agreement (MOA) with Departmental waste generators; and identifies and assigns technical interfaces to appropriate Program elements.

The Systems Integration unit provides support and strategic planning assistance to the project offices and to the Director. 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 determination 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 the Regulatory Integration unit 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. Regulatory activities include helping to ensure that 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). Interactions 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 because they directly impact 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 and 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. This element also provides funding for responses to program inquiries, interface requirements with external program oversight parties and liaison activities with other related offices and programs with the Department.

International Waste Management

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

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- and project-level cost, schedule, and technical baselines. Program Management provides the basis for: determining, prioritizing, and allocating Program resources; defining, costing, and executing work scope and schedules; and monitoring, analyzing, and improving Program performance.

Human Resources and Development

This activity supports the quality assurance training program at Headquarters and the review of quality assurance procedures impacting training and personnel verification activities.

Audits, Education and Information

This element encompasses diverse activities that support the Program's mission, including compliance with legislative requirements to develop and submit an Annual Report to Congress, develop and submit financial statements to the Department's Chief Financial Officer, develop and submit the Annual Assurance Memorandum to the Secretary, and 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 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 Program and Radioactive Waste Management Graduate Fellowship Program support the Department's compliance with Executive Order 12677 and the Secretary's science education initiative, as well as ensuring that the Program's future need for a diversified workforce of highly specialized scientists and engineers will be met.

Information Management

This activity encompasses the strategic application of information technology to: support 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 support "reinventing government" and Departmental strategic alignment initiatives. Information management activities include designing and developing information systems; providing a reliable infrastructure for effective and timely access to, and

communication of, information; ensuring integration and integrity of technical, regulatory, management, and financial information; streamlining of Program work processes through automation to reduce the paperwork burden and increase the productivity and job satisfaction of human resources; and promoting an organizational culture based on proactive 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 1998	FY 1999	FY 2000	Change	% Change
Quality Assurance	0	0	0	0	0%
Program Management					
Systems Integration	2,719	3,143	3,265	122	3.9%
Regulatory Integration	364	763	763	0	0.0%
Strategic Planning	1,026	1,127	1,208	81	7.2%
International Waste	277	313	313	0	0.0%
Program Management	663	663	711	48	7.2%
Total, Program Management	5,049	6,009	6,260	251	4.2%
Human Resources & Administration					
Human Resources Development	90	89	93	4	4.5%
Audits, Education and Information	1,162	1,149	1,195	46	4.0%
Information Management	3,562	4,003	4,244	241	6.0%
Total, Human Resources Administration	4,814	5,241	5,532	291	5.6%
Total, Program Integration	9,863	11,250	11,792	542	4.8%

Detailed Program Justification

(dollars in thousands)

FY 1998	FY 1999	FY2000

Program Management and Integration

Systems Integration

- Revise the CRWMS Program baseline to incorporate updated policies, Administration/Congressional direction, and requirements, such as incorporation of plutonium waste forms.

	(dollars in thousands)		
	FY 1998	FY 1999	FY2000

- 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. Coordinate Program-level System Integration Design Reviews.

Systems Analysis

- Update CRWMS Total System Life Cycle Cost estimate and Report on Fee Adequacy to be consistent with repository License Application design and acceptance and transportation strategies. Conduct, review, and issue systems engineering logistics and waste stream analyses to support Program and project planning and project development. 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.

DOE Nuclear Materials

- Implement required responsibilities established in the Memoranda of Agreement for acceptance of DOE SNF, DOE HLW, and Navy Spent Fuel. This includes support to the MOA Administrator, issuance of SNF and HLW data needs; development of acceptance capacities for DOE and Navy materials requiring acceptance, transportation, and disposal; establishment of fee payment schedules to ensure appropriate allocation of Congressional Defense Nuclear Waste Disposal Appropriations; and evaluation of credits for tax-payer expenditures which benefited. Develop, review, and publish technical baseline documentation and acceptance criteria for DOE Nuclear Materials, including system engineering requirements documents and interface control documents. Support control and distribution of Program level controlled documents.

Configuration/Baseline Management

- Monitor project level Baseline Change Control Boards' activities. Provide operations and maintenance support including training for the Program-wide CIS. Provide operations and maintenance support including training for the Program-wide CIS.

Systems Integration……	2,719	3,143	3,265

(dollars in thousands)

FY 1998	FY 1999	FY 2000

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

- 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.

- Provide 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.

- 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.

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
▪ Provide oversight of and guidance on Program Safeguards and Security activities, including interface with Nuclear Regulatory Commission, Advisory Committee on Nuclear Waste and International Atomic Energy Agency.			
▪ Coordinate Headquarters review and formal approval of the draft and final environmental impact statement and Records of Decision, for a repository at Yucca Mountain. Provide coordination with Nuclear Regulatory Commission on issues related to the environmental impact statement.			
Regulatory Integration…….	364	763	763
Strategic Planning			
▪ Provide liaison with the Nuclear Waste Technical Review Board to address and resolve technical issues associated with site suitability activities. 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.			
Strategic Planning…….……..	1,026	1,127	1,208
International Waste			
▪ Assist in preparing for cooperative bilateral meetings and Nuclear Energy Agency Radioactive Waste Management Committee Meetings. Provide input to International Nuclear Waste Management Fact Book and update the Foreign Waste Management Programs Information Book.			
International Waste……..…….	277	313	313

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000

Program Management

- Improve program and project management systems. Finalize the integrated management policy document, and implement new policies accordingly. Support implementation of improved Departmental management policies

Program Management…….	663	663	711
Subtotal, Program Integration…….……..	5,049	6,009	6,260

Human Resources and Administration

Human Resources Development

- Update course outlines, instruction guides and lesson plans for quality assurance training; develop training courses for new Administrative Procedures or Headquarters Local Procedures approved by the Office of Quality Assurance; and assist in the review of quality assurance procedures and documents that impact the training and personnel qualifications program. Assist in responding to Corrective Active Reports, Deficiency Reports, and the Quality Assurance Management Assessment. Purchase needed supplies, non-computer equipment, publications, and services.

Human Resources Development…….……	90	89	93

Audits, Education and Information

- Produce reports and other documents required by Congress or the Department, such as the Program's Annual Report to Congress, audited financial statements, annual Federal Manger's 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 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

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
Program's Home Page, direct responses to public inquiries and *The OCRWM Enterprise*, a semiannual newsletter.			
Audits, Education and Information……	1,162	1,149	1,195

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.

- Provide essential user support, training, Help Desk support, and records processing services.

Information Management……..	3,562	4,003	4,244
Subtotal, Human Resources and Administration……	4,814	5,241	5,532
Total, Program Integration…….	9,863	11,250	11,792

Explanation of Funding Changes from FY 1999 to FY 2000

	FY 2000 vs. FY 1999 ($000)
Program Management	
▪ The slight increase in Program Management is required to assure that the major programmatic decision documents (i.e. Environmental Impact Statement, 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……	+251
Human Resources and Administration	
▪ The slight increase in the Human Resources and Administration is required to maintain the Program's existing information management systems and networks……	+291
Total Program Integration……..	+542

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 four categories: 1) Salaries and Benefits; 2) Travel; 3) Other Related Expenses; and 4) 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.

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.

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, maintaining QA databases, developing and conducting OCRWM QA training and maintaining QA training records. Conduct audits, surveillance, on-site inspections, tests, and reviews of participant and vendor activities.

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 non-site specific design and engineering for an Interim Storage Facility (ISF) and 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- Provide analysis of spent fuel 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 1998	FY 1999	FY 2000	$ Change	% Change
Nevada Operations Office					
Salaries and Benefits	375	470	491	21	4.5%
Total, Nevada Operations Office	375	470	491	21	4.5%
FTE's	5	6	6	0	0.0%
Other DOE Matrix Support					
Salaries and Benefits	1,263	1,087	1,136	49	4.5%
Travel	7	7	7	0	0.0%
Total, Other DOE Matrix Support	1,270	1,094	1,143	49	4.5%
FTE's	17	14	14	0	0.0%
Headquarters-OCRWM					
Headquarters					
Salaries and Benefits	8,579	6,605	6,159	-446	-6.8%
Travel	257	240	235	-5	-2.1%
Other Related Expenses	2,679	1,750	1,803	53	3.0%
Support Services	8,014	7,031	7,117	86	1.2%
Total, Headquarters	19,529	15,626	15,314	-313	-2.0%
FTE's	74	65	58	-7	-10.8%
YMSCO - Nevada					
Salaries and Benefits	10,363	11,387	12,265	878	7.7%
Travel	442	438	443	5	1.1%
Other Related Expenses	2,641	2,227	2,333	106	4.8%
Support Services	27,860	27,244	27,822	578	2.1%
Total, YMSCO	41,306	41,296	42,863	1,567	3.8%
FTE's	106	111	117	6	5.4%
Total Program Direction					
Salaries and Benefits	20,580	19,549	20,051	502	2.6%
Travel	706	685	685	0	0.0%
Other Related Expenses	5,320	3,977	4,136	159	4.0%
Support Services	35,874	34,275	34,939	664	1.9%
Total, Program Direction	62,480	58,486	59,811	1,325	2.3%
FTE's	202	196	195	-1	-0.5%

Detailed Program Justification

	(dollars in thousands)		
	FY 1998	FY 1999	FY 2000
Salaries and Benefits			
▪ Provides salaries and benefits for 202 FTE's in FY 1998, 196 FTE's in FY 1999 and 195 FTE's in FY 2000……	20,580	19,549	20,051
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……	706	685	685
Other Related Expenses			
▪ Includes funding for building maintenance, rents, communications, utilities, computer/video support, printing and graphics, photocopying, postage, supplies and common administrative services.	5,320	3,977	4,136
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……	35,874	34,275	34,939
Total, Program Direction……	62,480	58,486	59,811

Explanation of Funding Changes from FY 1999 to FY 2000

	FY 2000 vs. FY 1999 ($000)
Salaries and Benefits	
▪ Increase in salaries and benefits is due to general pay increases, promotions and within-in grade increases…….	+502
Other Related Expenses	
▪ The 4% increase is due to inflation from the FY1999 level……..	+159

	FY 2000 vs. FY 1999 ($000)
Support Services	
▪ The Support Services increase is due to the expanded workscope necessitated by the critical review requirements for the following activities and performance measures: Yucca Mountain site compliance with 10 CFR Part 960; the documentation that will support a Secretarial decision on Site Recommendation; review of the Working Draft License Application; and, the development of the Acceptance Draft License Application……..	+664
Total Funding Change, Program Direction…….	+1,325

Support Services

(dollars in thousands)

	FY 1998	FY 1999	FY 2000	$ Change	% Change
Headquarters Support Services					
Technical Support Services					
Quality Assurance	1,195	1,328	1,328	0	0.0%
Management & Technical Services	2,755	1,876	1,876	0	0.0%
Technical Analysis	450	450	270	-180	-40.0%
Subtotal,Technical Support Services	4,400	3,654	3,474	-180	-4.9%
Management Support Services					
Automated Data Processing (ADP)	2,743	2,660	2,926	266	10.0%
Quality Assurance Mgmnt Assessment	344	382	382	0	0.0%
Human Resources Support Services	527	335	335	0	0.0%
Subtotal, Management Support Services	3,614	3,377	3,643	266	7.9%
Total, Headquarters Support Services	8,014	7,031	7,117	86	1.2%
YMSCO Support Services					
Technical Support Services					
Quality Assurance	8,513	8,603	8,603	0	0.0%
Management & Technical Services	9,814	9,165	9,970	805	8.8%
Environmental Impact Statement (EIS)	5,899	6,000	5,583	-417	-7.0%
Subtotal, Technical Support Services	24,226	23,768	24,156	388	1.6%
Management Support Services					
Automated Data Processing (ADP)	2,698	2,508	2,698	190	7.6%
Administrative Support	936	968	968	0	0.0%
Subtotal, Management Support Services	3,634	3,476	3,666	190	5.5%
Total, YMSCO Support Services	27,860	27,244	27,822	578	2.1%
Total, Support Services	35,874	34,275	34,939	664	1.9%

Other Related Expenses

(dollars in thousands)

	FY 1998	FY 1999	FY 2000	$ Change	% Change
Headquarters Other Related Expenses					
Working Capital Fund	2,529	1,600	1,653	53	3.3%
Communications	100	100	100	0	0.0%
Training	50	50	50	0	0.0%
Total, Headquarters Other Related Expenses	2,679	1,750	1,803	53	3.0%
YMSCO Other Related Expenses					
Communications, Rent and Utilities	1,300	1,352	1,406	54	4.0%
Transportation of Things	40	30	30	0	0.0%
Training	75	75	75	0	0.0%
Other Services	1,226	770	822	52	6.8%
Total, YMSCO Other Related Expenses	2,641	2,227	2,333	106	4.8%
Total, Other Related Expenses	5,320	3,977	4,136	159	4.0%