

Office of Civilian Radioactive Waste Management

Executive Budget Summary

Mission

The Program's mission, as established by the Nuclear Waste Policy Act of 1982, as amended, is to implement the Federal policy for permanent geologic disposal of commercial spent nuclear fuel and high-level radioactive waste resulting from the Nation's atomic energy defense activities. The Office of Civilian Radioactive Waste Management provides leadership in developing and implementing strategies to accomplish this mission that assures public and worker health and safety, protect the environment, merit public confidence, and are economically viable.

Strategy

The licensing and construction of a permanent geologic repository — leading to initiation of repository operations in 2010 — are the overriding program goals of the Office of Civilian Radioactive Waste Management. Disposition in a geologic repository provides a final, permanent solution to manage commercially generated spent nuclear fuel that is currently in temporary storage at commercial utility sites. A geologic repository is also key to the disposition of high-level radioactive wastes that resulted from operation of the Department's facilities that were key elements of the Nation's nuclear weapons complex. Additionally, a permanent repository site will also enable the Nation to: 1) advance non-proliferation goals by moving forward with plans for disposition of weapons-grade materials; and 2) dispose of spent fuel used in the Naval Nuclear Propulsion Program.

Significant Accomplishments

The Department issued for public review in FY 2001, the scientific and technical documents and necessary National Environmental Policy Act (NEPA) document that provides the basis for a possible site recommendation. The Secretary will use these documents to support a decision in FY 2002 on whether or not to recommend the Yucca Mountain site to the President for further development as a permanent geologic repository. Accompanying the Secretary of Energy's Site Recommendation to the President will be another key Program document - the *Final 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 Department identified additional scientific and engineering work necessary to strengthen the technical basis for a site recommendation decision. The Nuclear Waste Technical Review Board has also expressed the need for additional work. In FY 2001, the Department initiated additional technical work mainly in the Core Science and Waste Package Material Testing areas that will continue in FY 2002. As a consequence, the Secretary's decision on whether to make a site recommendation to the President has been rescheduled to early FY 2002. To support this effort, some of FY 2001 funds were reallocated, and, if the site is recommended and approved, the submittal of the License Application

would be delayed until 2003.

Program Objectives

The Program continues to build aggressively on the substantial momentum achieved over the last several years, and in particular, since the issuance of the Viability Assessment. The Program continues to work toward its initial critical objective by conducting the necessary scientific and technical work to support a determination regarding the suitability of the Yucca Mountain site for development as the Nation's first permanent geologic repository. The decision to recommend the site for development as a repository is one of a series of key technical and policy decisions that are at the core of the Program's principal mission - the permanent disposal of spent nuclear fuel and high-level radioactive waste.

The cumulative effect of budget shortfalls of \$153.5 million from FY 1998 - FY 2001 has been to prioritize funds to support the scientific and technical analysis for site characterization activities, while deferring engineering and design work associated with the License Application. As a result, in 2002, the Program will complete information required for a site recommendation report and reprioritize and accelerate the development of the License Application for repository construction which is now scheduled for submittal to the Nuclear Regulatory Commission in 2003 if the site is deemed scientifically suitable, recommended by the Secretary to the President, and approved by Congress. The License Application is the basis for the Nuclear Regulatory Commission's determination to grant the Department authority to begin construction of a surface and subsurface infrastructure. It will be supported by a safety case that documents the analyses and demonstrate compliance to the Commission's licensing requirements.

The FY 2002 Program activities reflect the continuing transition, begun in FY 1999, from predominately investigative science to engineering and design, which includes data synthesis, model development and performance assessment, refinement of repository and waste package designs, and finally, preparation for the start of repository construction if the Commission grants the construction authorization.

Key FY 2002 Activities

The Office of Civilian Radioactive Waste Management's FY 2002 Budget Request of \$444.9 million supports the activities necessary to proceed further with the Yucca Mountain Site Characterization project, complete the *Site Recommendation Report*, accelerate engineering and design work to develop a License Application, and conduct other activities associated with the Federal government's waste acceptance obligations.

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

Department will also issue a draft Nuclear Waste Policy Act Section 180(c) Notice of Revised Proposed Policy and Procedures for public comment.

Addressing technical issues raised by the Nuclear Waste Technical Review Board (NWTRB) in FY 2001 will also require attention during FY 2002.

Program Organization

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

Sources of Funding

To provide funding for the Program's activities, the FY 2002 Budget Request draws upon two sources: the Nuclear Waste Fund and the Defense Nuclear Waste Disposal Appropriation. The Program is requesting \$134.9 million from the Nuclear Waste Fund and \$310 million from the Defense Nuclear Waste Disposal Appropriation, totaling \$444.9 million.

Major Issues

The Nuclear Waste Technical Review Board (TRB) has identified technical issues associated with repository design and the basis for determining long-term repository performance. This required the replanning of resources in FY 2001 and the request for additional resources in FY 2002 to address these issues.

The Office of Civilian Radioactive Waste Management will, at the time of site recommendation to the President in FY 2002, reach the end of the site characterization phase of the Yucca Mountain Project. Upon submission of the License Application to the Nuclear Regulatory Commission, the Program will complete the pre-licensing phase. If the Yucca Mountain site is found suitable and a decision is made to proceed with the repository development, funding for the Program will need to be reviewed and adjusted appropriately to accomplish the next phase of the repository construction and development of a national transportation capability. The Program continues to evaluate and refine modular surface and subsurface design scenarios and other step-wise options to possibly provide some relief for near-term construction costs.

Performance Measures

The following product-oriented performance measures are planned for FY 2002:

- Complete the Site Recommendation Report.
- Issue the Final Environmental Impact Statement.

- Continue the development of a License Application for authorization to construct a repository at the Yucca Mountain site for submittal to the Nuclear Regulatory Commission in 2003.
- Complete safety analyses to support the repository license application regarding:
 - Department-owned spent nuclear fuel and high-level radioactive waste;
 - Naval spent nuclear fuel; and
 - Plutonium waste forms.
- Issue Nuclear Waste Policy Act Section 180(c) Notice of Proposed Policy and Procedures for public comment.
- Issue draft request for proposals for waste acceptance and transportation services.

Lake Barrett, Acting Director
Office of Civilian Radioactive
Waste Management, RW-1

Date: _____

Funding Profile

(Dollars in Thousands)

	FY 2000 Comparable Appropriation	FY 2001 Original Appropriation	Adjustments	FY 2001 Comparable Appropriation	FY 2002 Budget Request
Nuclear Waste Fund:					
Yucca Mountain Site Characterization	270,595	313,542	-557	312,985	355,465
Waste Acceptance, Storage & Transportation	1,795	2,661		2,661	5,868
Program Integration	8,621	12,071		12,071	19,244
Program Direction	59,500	62,800	-138	62,662	64,402
Total, Program Budget Authority	340,511	391,074	-695 ^a	390,379	444,979
Funding Sources:					
Nuclear Waste Disposal Account					
Nuclear Waste Fund, First Repository	173,437	135,200	-7,208	127,992	70,577
Nuclear Waste Fund, Program Direction	59,500	62,800	-138	62,662	64,402
Rescission	-4,000				
General Reduction S&S	0	-6,926	6,926		
Total, Nuclear Waste Disposal Account	228,937	191,074	-420 ^a	190,654	134,979
Defense Nuclear Waste Disposal	111,574	200,000	-275 ^a	199,725	310,000
Total, Funding Sources	340,511	391,074	-695 ^a	390,379	444,979

Public Law Authorization:

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

^a Public Law 106-654, a general reduction of .022 was applied to the Nuclear Waste Fund (\$420K) and the Defense Nuclear Waste Appropriation (\$275K).

Five-Year Funding Profile

(Dollars in Thousands)

	FY 2000 Comparable Budget	FY 2001 Comparable Appropriation	FY 2002 Request	FY 2003 Request ^a	FY 2004 Request ^a
Yucca Mountain Site Characterization					
Suitability/Licensing & Performance Assessment	57,936	85,442	84,945	25,000	24,000
Core Science	67,070	65,821	75,643	30,000	33,000
Design and Engineering	62,720	73,943	104,390	75,000	75,000
National Environmental Policy Act (NEPA)	1,320	2,192	1,600	0	0
Operations/Construction	30,000	31,656	35,050	75,000	75,000
Project Management	35,177	34,090	34,150	25,000	25,000
External Oversight, Payments Equal to Taxes	16,372	19,841	19,687	20,000	22,000
Nevada Rail	0	0	0	113,000	113,000
Total, Yucca Mountain Site Characterization	270,595	312,985	355,465	363,000	367,000
Waste Acceptance, Storage and Transportation					
Transportation	0	520	3,100	9,000	9,000
Waste Acceptance	1,268	1,614	2,328	2,500	2,500
Project Management	527	527	440	500	500
Total, Waste Acceptance, Storage & Transportat	1,795	2,661	5,868	12,000	12,000
Program Integration					
Quality Assurance	0	0	6,384	5,000	5,000
Program Management	4,761	6,233	7,204	3,000	3,000
Human Resources & Administration	3,860	5,838	5,656	3,000	3,000
Subtotal, Program Integration	8,621	12,071	19,244	11,000	11,000
Program Direction	59,500	62,662	64,402	68,000	71,000
Total, Program Integration	68,121	74,733	83,646	76,000	86,000
Total, Program	340,511	390,379	444,979	451,000	465,000
Program Budget Authority:					
Nuclear Waste Disposal					
Nuclear Waste Fund, First Repository	173,437	127,992	70,577	70,000	70,000
Nuclear Waste Fund, Program Direction	59,500	62,662	64,402	68,000	71,000
Rescission	-4,000				
Safeguards and Security Reduction	0			0	0
Total, Nuclear Waste Disposal	228,937	190,654	134,979	138,000	141,000
Defense Nuclear Waste Disposal					
Defense Nuclear Waste Disposal	111,574	199,725	310,000	313,000	324,000
Total, Defense Nuclear Waste Disposal	111,574	199,725	310,000	313,000	324,000
Total, Program Budget Authority	340,511	390,379	444,979	451,000	465,000

^a The outyears shown here are preliminary, and do not necessarily reflect program requirements. Future budget requests for the Program has yet to be established and will be determined through the annual Executive and Congressional budget process.

Projected Receipts and Funding ^a Effective Yield

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006
One mill/kWh Fee ^b	702	620	640	625	612	637	621
One-time Fee.....	0	0	0	0	0	0	0
Subtotal.....	702	620	640	625	612	637	621
Investment.....	883 ^c	624 ^d	688 ^d	742 ^d	791 ^d	838 ^d	880 ^d
Total Income.....	1,585	1,244	1,328	1,367	1,403	1,475	1,501
Program Budget Authority:							
Nuclear Waste Disposal							
Nuclear Waste Fund, First Reposit	173	127	70	70	70	71	71
Nuclear Waste Fund, Program Dire	59	63	65	68	71	73	76
Rescission	-4						
Total, Nuclear Waste Disposal.....	228	190	135	138	141	144	147
Defense Nuclear Waste Disposal							
Defense Nuclear Waste Disposal...	112	200	310	313	324	331	339
Total, Defense Nuclear Waste Dispo:	112	200	310	313	324	331	339
Total, Program Budget Authority.....	340	390	445	451 ^e	465 ^e	475 ^e	486 ^e

^a Income and funding projections are subject to change based on the resolution of the 1998 waste acceptance obligation between DOE and contract holders, and prevailing market conditions. Market conditions are inherently unpredictable and will affect the market value at which all securities are bought and sold, discounts and premiums paid or received, and coupon payments.

^b FY 2000 fee income is based on actual data. The estimated fee for FY 2001-2011 is based on EIA projections as of 9/30/2000 with adjustments made for potential litigation settlements.

^c Estimated FY 2000 investment income consists of coupon income, net premiums and discounts, and change in market value of zero coupon investments. Coupon interest includes \$357.750M in actual coupon interest received through 9/30/2000. Actual net premiums and discounts received through 9/30/2000 were \$-16.329M. The actual change in market value of zero coupon investments through 9/30/2000 was \$541.794M.

^d The projected values consist of anticipated effective interest earnings on all securities from the date of purchase. DRI-McGraw Hill forecasts are used for future interest rates.

^e The outyears shown here are preliminary, and do not necessarily reflect program requirements. Future budget requests for the Program has yet to be established and will be determined through the annual Executive and Congressional budget process.

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 National 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. Lawrence Berkeley National Laboratory also performs the seepage tests in the exploratory studies facility alcoves and niches. Lawrence Berkeley National Laboratory 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 Drift Scale tests in the Exploratory Studies Facility, and the heater tests in the Cross drift. In support of Design and Engineering, Lawrence Livermore National Laboratory conducts testing and modeling of the waste package environment, waste package materials and waste forms. Lawrence Livermore National Laboratory 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 Cross 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. Los Alamos National Laboratory conducts laboratory and field-scale transport tests, including the Busted Butte Transport Test, and develops radionuclide transport properties models for the unsaturated and saturated zone groundwaters at the site. Los Alamos National Laboratory corroborates with United States Geologic Survey on isotopic and groundwater

chemistry investigations needed for transport models. Los Alamos National Laboratory interacts with Lawrence Berkeley National Laboratory in preparation of the Unsaturated-Zone Flow and Transport Process Model Report, and participates with Sandia National Laboratory in preparation of the Saturated-Zone Flow and Transport Process Model Report. In support of Operations/Construction, the laboratory coordinates testing at the Yucca Mountain site, including testing in the Exploratory Studies Facility and the Cross drift. Los Alamos National Laboratory 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 Site Characterization Project and the Office of Civilian Radioactive Waste Management Program Direction, the Nevada Operations Office administers disbursement of External Oversight and Payments-Equal-To-Taxes funds to affected units of government, and also administers contracts/agreements with the Office of Civilian Radioactive Waste Management Management & Operating (M&O) contractor, support services contracts and all other financial/contract agreements associated directly with Yucca Mountain Site Characterization Office.

Nevada Test Site

In support of Core Science and Operations/ Construction at the Yucca Mountain Site, the Nevada Test Site, through Bechtel Nevada, provides Nevada Test Site 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 Site Characterization Project Office in Nevada has the primary responsibility for the characterization of the Yucca Mountain site, and if the site is found suitable, 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, the Development of Energy develops and implements policies and strategies for the work to be completed and oversees the management and operating contractor and the United States Geological Survey in performing this work. The Yucca Mountain Site Characterization Project Office manages the contracts for the management and operating contractor and the support services contractors for work at Yucca Mountain.

License preparation activities include developing a description of the site; design of the repository and waste package subsystems; writing the License Application; developing and implementing environmental, safety and health policies; 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.

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, [\$191,074,000] \$134,979,000, to remain available until expended and to be derived from the Nuclear Waste Fund: *Provided*, That not to exceed \$2,500,000 may be provided to the State of Nevada solely for expenditures, [other than salaries and expenses of State employees,] to conduct scientific oversight responsibilities pursuant to the Nuclear Waste Policy Act of 1982, Public Law 97-425, as amended: *Provided further*, That [\$6,000,000] \$5,887,000 shall be provided to affected units of local governments, as defined in Public Law 97-425, to conduct appropriate activities pursuant to the Act: *Provided further*, That the distribution of the funds as determined by the units of local government shall be approved by the Department of Energy: *Provided further*, That the funds for the State of Nevada shall be made available [solely] to the Nevada [Division of Emergency Management by direct payment] *Office of Science, Engineering and Technology* and the units of local governments by direct payment: *Provided further*, That within 90 days of the completion of each Federal fiscal year, the Nevada [Division of Emergency Management and the Governor of the State of Nevada] *Office of Science, Engineering and Technology* and each local entity shall provide certification to the Department of Energy that all funds expended from such payments have been expended for activities authorized by Public Law 97-425 and this Act. Failure to provide such certification shall cause such entity to be prohibited from any further funding provided for similar activities: *Provided further*, That none of the funds herein appropriated may be: (1) used directly or indirectly to influence legislative action on any matter pending before Congress or a State legislature or for lobbying activity as provided in 18 U.S.C. 1913; (2) used for litigation expenses; or (3) used to support multi-State efforts or other coalition building activities [inconsistent with the restrictions contained in this Act]: *Provided further*, That all proceeds and recoveries *realized* by the Secretary in carrying out activities authorized by the Nuclear Waste Policy Act of 1982 in Public Law 97-425, as amended, including but not limited to, any proceeds from the sale of assets, shall be available without further appropriation and shall remain available until expended. (*Energy and Water Development Appropriations Act, 2001, as enacted by section 1(a)(2) of P.L. 106-377.*)

Explanation of Change

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

Yucca Mountain Site Characterization

Mission Supporting Goals and Objectives

The Yucca Mountain Site Characterization Office's mission is to implement the Federal policy for permanent disposal of high-level radioactive waste and spent nuclear fuel, in order to protect public health and the environment. Our nation's policy for managing its inventory of spent nuclear fuel and high-level radioactive waste is to dispose of it in a geologic repository.

In FY 2001 the Yucca Mountain Site Characterization Office will complete the scientific and technical documents that provide the technical basis for a possible site recommendation. The Department believes the information presented in these reports will provide an appropriate and adequate basis for public comment on the possible recommendation of the Yucca Mountain site. The Secretary will also hold public hearings in the vicinity of the Yucca Mountain site to inform residents of a possible site recommendation and receive their comments, as required by statute.

The Department has identified additional scientific and engineering work necessary to strengthen the technical basis for a decision on site recommendation, and if the site is recommended and approved, strengthen the license application. The Nuclear Waste Technical Review Board has also noted the need for additional work. This work generally falls into four categories: 1) additional testing and analyses to further characterize and quantify the uncertainties in the assessments of the long term performance of the repository; 2) work to evaluate modifications to the operations and/or design of the potential repository to reduce the maximum temperatures reached after closure of the repository; 3) additional studies of waste package materials to improve understanding of corrosion processes; and 4) more work on the development of multiple lines of evidence for a safety case. The Department has planned additional specific technical work, mainly in the Core Science and Waste Package Materials Testing budget areas, for FY 2001 and FY 2002 and reallocated some of its FY 2001 funds to address this work. This reallocation caused the work on the development of the license application to be rescheduled from FY 2002 into later years. As a consequence, the Secretary's decision whether to make a site recommendation to the President has been rescheduled to early FY 2002 and, if the site is recommended and approved, the submittal of the license application would be delayed until 2003. The Department is requesting funds in FY 2002 to continue confirmatory work that was initiated in FY 2001 related to the reduction of uncertainties in process models and total system performance assessment, additional waste package corrosion testing, as well as the evaluation of alternative concepts for operating the repository at lower temperatures that could potentially reduce modeling uncertainties.

The FY 2002 budget is based on the presumption that the Secretary will decide, based on information obtained from site characterization and after considering the views and comments of the public, the State, and the Nuclear Regulatory Commission, to recommend the site to the President early in FY 2002. The decision to recommend approval of the site for development as a repository is one of a series of key technical and policy decisions that are at the core of the Office of Civilian Radioactive Waste Management's principal objective—the permanent safe disposal of spent nuclear fuel and high-level radioactive waste. The potential site recommendation will be accompanied by the *Final 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, and other information required under section 114 of the Nuclear Waste Policy Act, as amended.

In FY 2002, the Yucca Mountain Site Characterization Office will start the development of a license application for submittal to the Nuclear Regulatory Commission in 2003. The License Application is the document upon which the Nuclear Regulatory Commission will base its decision whether to authorize the Department to begin construction of the potential repository. The information in the license application must be sufficient for the Nuclear Regulatory Commission to independently reach a construction authorization decision. The license application must, therefore, present a defensible position that there would be reasonable assurance that the repository can be constructed and operated without unreasonable risk to the health and safety of the public. The Nuclear Regulatory Commission has proposed a site specific licensing regulation (10 Code of Federal Regulations Part 63) that is risk-informed and performance-based. It would require the Department of Energy to demonstrate in the license application that the repository will meet the specified performance objectives while it is being operated (pre-closure) and long after it is closed (post-closure.)

The License Application will be supported by technical documents that establish the foundation for the safety case for pre-closure and post-closure performance. These documents include:

- Total System Performance Assessment supported by process model and analysis model reports that provide the bases for post-closure compliance.
- Integrated Safety Analysis that provides the basis for pre-closure compliance.
- System Description Documents and Engineering Analyses that establish the design basis.
- Site Description Document that describes the characteristics of the Yucca Mountain site.

FY 2001 Performance Metrics

The Yucca Mountain Site Characterization Office is focused on the preparation of the necessary documentation for a Secretarial decision whether to recommend the Yucca Mountain site for development as a repository. By the end of FY 2001, the Secretary's performance measures for that year are expected to be met. The Yucca Mountain Site Characterization Office is anticipated to have completed the field and laboratory investigations necessary to complete our first Strategic Objective—the Completion of the Characterization of Yucca Mountain. Site characterization is over when the Secretary decides to recommend the site to the President.

By the end of FY 2001, the Yucca Mountain Site Characterization Office expects to meet the following goals:

- Complete the scientific and technical documents that will provide the technical basis for a potential Site Recommendation.
- Conduct statutory hearings in the vicinity of Yucca Mountain to inform the residents that the site is under consideration and to receive comments regarding a possible Site Recommendation.

- Complete the estimate of the repository costs for the *Total System Life Cycle Cost* and *Fee Adequacy* reports.
- Update all process models and conduct a total system performance assessment for use in the Site Recommendation.

FY 2002 Performance Metrics

Performance measures proposed for FY 2002 are:

- Issue a Final Environmental Impact Statement as required by the Nuclear Waste Policy Act
- Finalize a *Site Recommendation Report* for the Secretary of Energy to submit to the President and then to the Congress.
- Complete a safety analysis to support the repository License Application regarding Department-owned spent nuclear fuel and high-level radioactive waste; naval spent nuclear fuel; and plutonium waste forms
- Update the repository cost estimate for the *Total System Life Cycle Cost* and *Fee Adequacy* reports.

Work Planned Subsequent to FY 2002

- Continue design work to support development of a License Application for authorization to construct a repository.
- Complete the safety analysis to support the repository.
- Complete the development of a License Application for authorization to construct a repository for submittal to the Nuclear Regulatory Commission (2003).
- Conduct technical activities in support of the Nuclear Regulatory Commission's review of the License Application (2003 – 2006).
- Continue design work to develop final construction drawings and specifications (FY 2003 – 2007).
- Continue to conduct performance confirmation testing, monitoring, and evaluation activities, as required by the Nuclear Regulatory Commission's licensing regulations, begun during site characterization (Activity continues until repository closure).
- Procure long-lead equipment (FY 2004-2006).
- Start pre-construction activities to prepare the site for delivery of excavation equipment including tunnel boring machines (FY 2004 - FY 2006).

- Commence repository construction upon receipt of a Nuclear Regulatory Commission construction authorization (2006).
- Conduct additional National Environmental Policy Act analysis, if required.

Funding Schedule

(Dollars in Thousands)

	FY 2000	FY 2001	FY 2002	\$ Change	% Change
Suitability/Licensing and Performance Assessment . . .	57,936	85,442	84,945	-497	-0.6%
Core Science	67,070	65,821	75,643	9,822	14.9%
Design and Engineering	62,720	73,943	104,390	30,447	41.2%
National Environmental Policy Act	1,320	2,192	1,600	-592	-27.0%
Operations/Construction	30,000	31,656	35,050	3,394	10.7%
Project Management	35,177	34,090	34,150	60	0.2%
External Oversight and Payments Equal to Taxes	16,372	19,841	19,687	-154	-0.8%
Total, Yucca Mountain Site	270,595	312,985	355,465	42,480	13.6%

Detailed Program Justification

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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Suitability/Licensing and Performance Assessment	57,936	85,442	84,945
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This budget element evaluates whether the Yucca Mountain site appears to be suitable, and that in early FY 2002 the Secretary will decide to recommend the site to the President, the President will recommend approval of the site to Congress, and the site designation will take effect. In FY 2002, the Office of Civilian Radioactive Waste Management plans to continue those activities essential to support the development of a License Application for repository construction for submittal to the Nuclear Regulatory Commission in 2003.

To obtain a Nuclear Regulatory Commission construction authorization, the Department of Energy must provide reasonable assurance that a repository loaded with different types of spent fuel and high-level nuclear waste can perform safely while it is being operated and long after it is closed. The Department will perform a total system performance assessment that analyzes how a repository containing this inventory, with each waste type encapsulated in specially designed waste packages, may perform in the geologic environment of Yucca Mountain following repository closure. This safety analysis will evaluate a nominal case considering those processes and events deemed likely at the Yucca Mountain site. It will also consider the probabilities and potential consequences of disruptive events such as earthquakes and volcanic eruptions, and the possible effects of human intrusion into the repository after permanent closure.

■ Site Recommendation	1,697	33,727	3,935
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The work in FY 2002 encompassed by this budget subelement entails technical support to the submittal of the *Site Recommendation Report* to the Secretary. In FY 2001, the Office of Civilian Radioactive Waste Management completed and released the technical documents that present the essential data, analyses, and safety arguments that support consideration of a possible site recommendation. Later in FY 2001, the Office of Civilian Radioactive Waste Management completed the documentation required under the Nuclear Waste Policy Act to support a site recommendation decision by the Secretary.

■ License Application	15,314	14,763	46,700
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Presuming the President and Congress support and approve the development of a repository at the Yucca Mountain site, the Department will continue the work essential to support development of a License Application for submittal to the Nuclear Regulatory Commission in 2003. The license application will provide the basis for Nuclear Regulatory Commission authorization to construct a repository at the Yucca Mountain site. To obtain a construction authorization, the Department must demonstrate that a repository can be constructed, operated, monitored, and eventually closed

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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without unreasonable risk to the health and safety of workers and the public. To accomplish this, the Department's License Application must provide an adequate basis for the Nuclear Regulatory Commission to find with reasonable assurance that the Nuclear Regulatory Commission's performance objectives and other licensing criteria are met.

The License Application will include a description of site characteristics, waste package designs, repository surface and subsurface designs, operations and maintenance plans for surface and subsurface facilities, results of an integrated safety analysis for the pre-closure period, results of the total system performance assessment for the post-closure period, and a discussion of how the proposed waste package and repository will comply with applicable regulatory requirements. It also will include a discussion of the safeguards, certification, and physical security plan and descriptions of the quality assurance program and required performance confirmation program. The License Application is expected to comprise on the order of 10,000 pages.

- **Develop Programmatic Chapters** **0 0 6,500**
Develop and compile Programmatic Chapters of the License Application covering radiation protection, conduct of operations, performance confirmation, and land ownership and control.
- **Comment Resolution - Site Resolution** **0 0 8,470**
Develop and compile the Site Description Chapter and the Design Chapters of the License Application.
- **General Information Chapters** **0 0 7,500**
Develop and compile the Performance Chapters and the General Information chapters of the License Application.
- **Comment Resolution - Performance** **0 0 6,000**
Verify and validate the information used in each chapter and assure configuration control associated with the information in each chapter of the License Application.
- **Regulatory Interactions** **1,200 2,200 3,000**
Provide interactions with the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission (staff and Advisory Committee on Nuclear Waste), and other oversight agencies. Prelicensing interactions with the Nuclear Regulatory Commission have two main objectives: reaching a common understanding of the issues that are significant to overall repository performance, and reaching agreement on the adequacy of methods and approaches to resolve these issues. The purpose of the ongoing interactions is to reach a mutual understanding of the repository concept as it develops. Oversight group interactions, such as those with the Nuclear Waste Technical Review Board, enable a shared understanding of the repository program and receipt of advice and recommendations from external experts and the public. It is anticipated that there will be 25 to 35 interactions per year.

(dollars in thousands)

	FY 2000	FY 2001	FY 2002
• Regulatory Reviews	2,258	2,000	2,200
Provide regulatory reviews and provide regulatory consultation.			
• LSN	1,456	2,885	3,000
Review project records and technical documents for inclusion into the licensing support network. Maintain the licensing support network certification and operation. Periodically certify that all relevant documentary material are available on the licensing support network.			
• Verify Data	7,400	6,678	7,030
Verify all data used in the site recommendation and planned to be used in the license application to ensure it is traceable and referenceable and that records processes are adequately maintained to accurately capture images and text.			
• Radiation Protection, Emergency Plan	3,000	1,000	3,000
Prepare the radiation protection program, emergency plan, and land use plans to support the regulatory documents.			
■ Technical Information Management	23,785	22,249	24,520
Manage and ensure the integrity and traceability of the technical data and program records that have been compiled to support site characterization and associated design and analysis activities for Yucca Mountain.			
• Load Internet	3,000	5,306	4,010
Develop, update, and maintain key technical products, procedures, and program deliverables regarding the site recommendation and license application.			
• Comments and Commitments	500	1,009	1,000
Develop, populate, and maintain the data bases which track comments and commitments to regulators and oversight groups in support of the site recommendation and license application.			
• Computer Applications	2,000	4,768	6,975
Develop and maintain information systems, computer applications, databases, operating systems, utilities, networks, and software development to ensure integrity of data and systems.			
• Capture Documents for Internet	8,000	3,893	6,290
Place key technical products on the Internet to provide public access to program information.			
• Maintain Technical Data Bases	10,285	7,273	6,245

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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Populate, and maintain the technical data bases which contain field data, results of laboratory tests, engineering analyses, location information, radioactive waste inventories, waste forms characteristics, and data sets generated and used by the Department as input to design, performance assessment, and development of the license application.

■ **Performance Assessment** **17,140** **14,703** **9,790**

Performance assessment is a mathematical modeling method of forecasting how systems (natural or engineered) or parts of systems contain and isolate radioactive waste over time. A total system performance assessment is an analysis in which all of the systems and components of Yucca Mountain are linked into a single analysis. The technical documentation for the site recommendation, released in FY 2001, is supported by a total system performance assessment conducted in FY 2000 and additional analyses for the total system performance assessment conducted in FY 2001. Another iteration of the total system performance assessment will be initiated in FY 2002 to support the potential license application. All iterations will reflect increased understanding of how emplaced nuclear waste would interact with the natural and engineered barriers.

Updated data from scientific tests and designs, along with review comments from various sources, will be incorporated into the total system performance assessment for license application. Where appropriate, the abstracted models that support the total system performance assessment will be updated (Biosphere, Disruptive Events, Engineered Barrier System Degradation, Waste Form Degradation, Integrated Site, Near-Field Environment, Waste Package Degradation, Saturated-Zone Flow and Transport, and Unsaturated-Zone Flow and Transport.)

- **TSPA** **2,640** **3,773** **1,520**
 Conduct the post-closure safety analyses to support the license application using the total system performance assessment method.
- **Control of Software and Data** **2,900** **2,500** **1,650**
 Perform process control of software and data.
- **Abstract/Test Modeling for SR** **0** **1000** **0**
 Develop, abstract, and test the modeling to support license application.
- **Disruptive Events Model** **700** **530** **400**
 Develop, abstract, and test the disruptive events models.
- **Saturated-Zone & Biosphere Model** **1,200** **1,200** **680**
 Develop, abstract, and test the saturated-zone and biosphere models.

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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- **Waste Form and Engineered Barrier** **1,000** **900** **570**
Develop, abstract, and test the waste form and engineered barrier system transport models.
- **Waste Package** **400** **400** **230**
Develop, abstract, and test the waste package degradation models.
- **Unsaturated-Zone Flow** **1,900** **1,900** **1,090**
Develop, abstract, and test the unsaturated-zone flow and transport models.
- **TSPA Approach** **2,400** **500** **1,370**
Develop a total system performance assessment approach and model development.
- **Design and Regulatory Analysis** **4,000** **2,000** **2,280**
Conduct design analysis, regulatory analysis and Environmental Impact Statement analysis.

Core Science **67,070** **65,821** **75,643**

This budget subelement encompasses surface and subsurface field tests and monitoring, laboratory tests, literature reviews, analyses and modeling of resulting data. Selected long term tests, both above ground and underground, will continue after Site Characterization to validate assumptions in the License Application that are the basis for conclusions about repository system performance. These tests will continue as part of the Performance Confirmation Program required by the Nuclear Regulatory Commission.

Some studies will be conducted under a cooperative agreement with the University and Community College System of Nevada.

■ **Data Analysis and Modeling** **28,738** **28,891** **33,860**

This work area involves the analysis and modeling of data collected from scientific testing to help confirm understanding of the natural features and processes of the site.

Incorporate newly acquired test data and analysis into models of the site’s natural features and processes to refine the models on which the performance assessment is based. The natural system process models to be updated/refined include: Integrated Site, Near-Field Environment, Unsaturated-Zone Flow and Transport, Saturated-Zone Flow and Transport, Disruptive Events, and Biosphere. The flow and transport models are supported by several lower-level ground water flow and transport models which will also be updated/refined.

- **Saturated Zone for TSPA** **5,000** **1,592** **5,500**

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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- Incorporate latest test data and analysis into modeling of the saturated-zone for total system performance assessment for the license application including data collected from the alluvial tracer complex, started in FY 2001.
- **Saturated Zone PMR** **0 3,000 0**
- Incorporate latest test data and analysis into modeling of the saturated-zone for process models and license application technical updates.
- **Unsaturated Zone PMR** **0 3,261 500**
- Incorporate the latest test data and analysis into modeling of the unsaturated-zone for process models and license application technical updates.
- **Unsaturated Zone for TSPA** **8,038 3,150 4,700**
- Incorporate the latest test data and analysis into the modeling of the unsaturated-zone for the total system performance assessment that supports the license application.
- **Near Field PMR** **3,200 2,300 3,950**
- Incorporate data from the thermal tests, including those from the Cross Drift started in FY 2001, into data analysis and modeling for the coupled process model and technical update for license application.
- **Integrated Site Model and Disruptive Events** **0 1,124 1,090**
- Incorporate latest test data and analysis into the integrated site model and disruptive events models for license application.
- **Biosphere PMR** **0 1,618 2,200**
- Incorporate latest test data and analysis into modeling for biosphere for license application.
- **Nevada University System** **8,600 8,500 7,000**
- Support Nevada University System scientific studies which provide independent studies and analysis of Yucca Mountain. Work includes over 30 studies covering radionuclide and colloids transport in the saturated-zone, rock physical studies, and investigations of ground surface strains. (The remaining Nevada University System work is included in Waste Forms and Waste Package Testing in the Design and Engineering budget area.).
- **Natural Analogs and Site Description** **700 946 2,220**
- Conduct data interpretations and modeling for natural analogs and the site description for license application.
- **Technical Support** **3,200 3,400 6,700**

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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Provide technical support activities for site recommendation and license application document preparation.

■ **Testing to Support Site Recommendation** **19,700** **1,273** **0**

Testing and analyses supporting the site recommendation will be completed in FY 2001.

■ **Testing to Support License Application** **4,249** **12,278** **17,600**

Numerous tests will support development of the documentation needed to prepare the license application. The tests include the on going long-term seepage and fracture-matrix interaction tests and the drift-scale thermal test in the Exploratory Studies Facility; the hydrologic tests begun in FY 2000 and FY 2001 in the Cross Drift for enhanced characterization of the repository block, specifically the lower lithophysal unit, which will host the bulk of the repository; the thermal tests in the Cross Drift that were originally planned to begin in FY 2001; conclusion of the Atomic Energy Commission of Canada tests on radionuclides transport in the unsaturated-zone; monitoring the Nye County Early Warning Drilling Program wells will be completed in early FY 2002; and continuation of the Alluvial Tracer Complex tests in the saturated zone started in late FY 2000.

• **Water Release Seepage Exp** **0** **0** **600**

Conduct water-release seepage experiments in the repository horizon. This includes collection and analysis of pneumatic testing, water recovery data, and determination of drift seepage threshold in the unit.

• **Moisture Monitoring and Seepage** **0** **0** **3,000**

Conduct moisture monitoring and seepage observations in Crest Alcove beneath suspected zone of high infiltration.

• **Pneumatic** **0** **0** **3,000**

Conduct pneumatic, hydrochemical, and hydraulic testing of the Solitario Canyon Fault to obtain hydro geologic parameters.

• **Site Investigations Base Support** **500** **3,111** **2,200**

Site Investigations base support and test coordination/support for site activities.

• **Ambient ESF Testing** **3,749** **2,820** **3,000**

Continue the drift scale thermal testing (hydrology and hydrology chemistry tests) in the Exploratory Studies Facility. The four-year cooling phase begins in FY 2002.

• **Ambient Cross Drift Testing** **0** **1,700** **2,900**

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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- Conduct ambient tests (fracture matrix interaction and seepage) and begin thermal testing (hydrologic, chemical, and mechanical) in the Cross Drift.
- **Support Nye County** **0 4,000 100**
Support Nye County Drilling–Early Warning System Drilling Project.
 - **AEC and BOR** **0 647 200**
Consult with the Atomic Energy Commission of Canada and fund interagency support from US Bureau of Reclamation Services.
 - **Alluvial Tracer Complex** **0 0 2,600**
Support testing of the saturated-zone at the Alluvial Tracer Complex.

Testing to support the license application continues to reduce the uncertainty in the technical databases, the total system performance assessment, and design features. The testing activities are focused on addressing the issues raised by the Nuclear Waste Technical Review Board and those required to close the remaining key technical issues with the Nuclear Regulatory Commission. Some long-term tests continue and are necessary for performance confirmation. They are discussed in the next section.

■ **Testing for the License Application and Performance**

Confirmation **2,000 10,220 10,860**

The database built during site characterization and throughout repository licensing, construction, and operation will be used to validate assumptions in the license application that are the basis for Nuclear Regulatory Commission findings about repository system performance. Some testing started during site characterization will continue until repository closure as part of the performance confirmation program. Tasks include the following:

- **Long-Term ESF Testing** **0 2,500 2,560**
Perform long-term seepage tests in the Exploratory Studies Facility and the Cross Drift that were started during site characterization. The performance confirmation tests overlap between site characterization and follow-on phases of the Program.
- **Site Investigations Base Support** **150 1,500 1,500**
Provide site investigations base support and test coordination/support for site activities.
- **Ambient ESF Testing** **1,500 1,820 2,000**
Continue drift scale thermal testing (hydrology and hydrology chemistry migration tests) in the Exploratory Studies Facility.

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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- **Ambient Cross Drift Testing** **300** **2,200** **2,150**
Perform ambient, fracture matrix interaction and seepage, tests and begin thermal testing (hydrology and hydrology chemistry tests) in the Cross Drift.
- **Support Nye County** **50** **200** **250**
Complete the Nye County Early Warning Drilling Project.
- **AEC and BOR** **0** **500** **900**
Consult with the Atomic Energy Commission of Canada and fund the interagency support from US Bureau of Reclamation Services.
- **Alluvial Tracer Complex** **0** **1,500** **500**
Support testing of the saturated-zone at the Alluvial Tracer Complex.
- **Inyo County** **0** **0** **1,000**
Support hydrologic investigations needed to better define the relationship of the saturated-zone site-scale flow model with the groundwater flow system.

■ **Environmental Safety and Health Monitoring and Compliance** **12,383** **13,159** **13,323**

Environmental monitoring and compliance began with site characterization and will continue throughout licensing, construction, operations, closure, and decommissioning of the repository.

- **Maintain Permits** **6,200** **6,268** **6,383**
Maintain compliance with environmental permits and environmental regulatory requirements.
- **Technical Support** **2,400** **2,472** **2,800**
Provide meteorological/radiological integration and Regulatory support.
- **Safety and Health Compliance** **2,283** **3,669** **4,140**
Maintain safety and health compliance.
- **NEPA Support** **1,500** **750** **0**
Provide National Environmental Policy Act technical support.

Design and Engineering **62,720** **73,943** **104,390**

The repository would house spent nuclear fuel from commercial nuclear power plants, Department of Energy-managed spent nuclear fuel and high-level radioactive waste, Naval spent nuclear fuel, and

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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immobilized plutonium. These waste forms have diverse characteristics with respect to radioactive materials, size, weight, configuration, heat output and levels of radioactivity. Department of Energy-spent nuclear fuel presents particular complexity because there are over 250 kinds. The Department of Energy must demonstrate in the license application that a repository for spent nuclear fuel and high-level radioactive waste can perform safely during waste emplacement and for many thousands of years in the future. The Department of Energy will perform an integrated safety analysis of the performance of the repository and its operating systems prior to closure. The post-closure safety analysis is budgeted in Suitability/Licensing and Performance Assessment.

The design and engineering products needed to support the license application include the development of the pre-closure integrated safety analysis; design studies to support the development of the post-closure safety analyses; design bases (which includes the design requirements and evidence to satisfy these requirements); and a description of the waste package, waste forms, and surface and underground facilities and systems.

Four major design areas, waste package, repository subsurface, repository surface, and Nevada transportation, will need to be completed before procurement and construction can begin. Due to the amount of design work to be done for construction, it has to be started before the License Application is submitted to the Nuclear Regulatory Commission. Nevada transportation design will start in FY 2003.

The Office of Civilian Radioactive Waste Management will utilize cost-benefit trade studies in a continuous effort to determine how to optimize future funding requirements for the planned construction work prior to waste emplacement. Present evaluations include investigating implementation of phased construction and/or modular design of the repository, which initially shows potential for significant reductions in annual funding for the construction work.

■ **Waste Package Design** **8,670** **9,000** **13,400**

The diverse inventory of waste forms to be disposed of in the geologic repository will require the development of several different types of waste packages. The waste packages must be robust so they can be handled safely and they must be corrosion and heat resistant. The waste package must also provide safety with regard to criticality (a self-sustaining chain reaction) during both the pre- and post-closure periods. During the post-closure period the waste package must contain radionuclides for many thousands of years.

• **WP Design** **2,600** **3,700** **7,200**

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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Develop waste package design and analysis to determine the materials and dimensions of waste packages for multiple waste forms. Analyze design against requirements to assure compliance with Nuclear Regulatory Commission regulations. Develop waste stream characteristics.

- **Closure Welds** **1,000** **2,200** **3,300**

Develop fabrication, welding, and testing methods and identify standards, technologies, and procedures needed to fabricate waste packages and perform and inspect the closure weld. Develop plan for constructing and testing prototypes.

- **Design Options** **4,070** **2,100** **900**

Perform waste package designs, options, and analysis for site recommendation and license application.

- **Criticality Analysis** **0** **0** **2,000**

Conduct disposal criticality analysis, which will develop methodologies for evaluating the potential for criticalities and attendant consequences for plausible waste form configurations. Validation of codes used in the methodology.

- **Neutronics Methology** **1,000** **1,000** **0**

Provide neutronics methodology development.

- **Waste Forms and Waste Package Materials** **15,081** **24,485** **28,820**

Testing of waste forms and candidate materials for waste package fabrication, under anticipated repository conditions, provides the basis for developing performance models that predict the natural degradation of the waste, changes to the cladding over time, and the containment of the waste within the waste packages. These tests in turn support selection of materials for fabrication of waste packages that would isolate radionuclides for thousands of years.

- **Long-Term Waste Form Testing** **5,000** **5,440** **6,290**

Perform long term waste form testing and modeling including testing of waste forms under various chemical and moisture conditions, oxidation tests using thermogravimetric analysis, flow through dissolution tests, tests on cladding and hardware, and tests on borosilicate glass.

- **Waste Package Materials Testing** **3,036** **10,785** **11,150**

Conduct waste package materials testing for the site recommendation and license application including long-term corrosion, microbial induced corrosion, passivity and localized corrosion, passive film and oxide growth, thermal aging and phase stability, stress corrosion cracking and hydrogen-induced cracking, and experimental determination of surface environment.

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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- **Waste Package and Waste Package Testing** 7,045 8,260 8,380

Conduct waste package degradation and waste form degradation testing, analysis and process modeling, and integration of near-field environment thermal, mechanical, and hydrologic processes.

- **Nevada University System** 0 0 3,000

Support Nevada University System independent studies and analysis of Yucca Mountain. Work includes over 10 engineering and waste package materials studies including stress corrosion cracking/electrochemical testing and model support and thermal transport evaluations related to waste package design.

- **Subsurface Facilities Design** 14,691 14,691 22,320

Subsurface engineering provides the design, description, integration, and decommissioning of the underground features of the repository. Design requirements to be met include those for waste emplacement, containment and isolation, compliance with thermal loading requirements, stability of excavations, a safe working environment, and waste package retrieval.

- **Facilities and Utilities** 1,470 1,470 3,340

Design and analysis of the subsurface facilities and safety systems – including radiological safety, radiation shielding, electrical distribution, fire protection, instrumentation and controls, remote systems, and performance confirmation design.

- **Waste Emplacement & Retrieval** 2,200 2,200 3,890

Design and analysis of the waste emplacement and retrieval system – including waste package transport (transporter, locomotives, and rail car), emplacement (gantry and gantry transporter), and waste package retrieval.

- **Engineered Barrier System Design** 5,140 5,140 6,240

Design and analysis of the engineered barrier system– including drip shield support, emplacement drift inverts, sealing and closure systems, and repository layout and design confirmation.

- **Engineered Barrier System Testing** 2,940 2,940 3,650

Testing and analysis of the engineered barrier system– including testing and analysis of design features and concepts and design basis for modeling and analysis.

- **Ground Support Design** 1,470 1,470 2,600

Design and analysis of the ground control system– including emplacement and non-emplacement drift ground support and shaft and ramp design.

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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- **Ventilation System Design** **1,471** **1,471** **2,600**
Design and analysis of the ventilation systems—including the separate waste emplacement and underground development area ventilation systems.

- **Surface Facilities Design** **6,093** **7,589** **23,350**

FY 2002 encompasses two major design activities, license application design and developing the preliminary design of the surface facilities. License application design includes design of the buildings, operations, and systems located in the radiological controlled area for inclusion in the license application. Preliminary design takes the more general design from the license application and develops it to the point that materials and quantities can be taken from the drawings and specifications, and reasonably accurate cost estimates and schedules of the construction and operations can be established. Surface preliminary design focuses on engineering that supports key surface operations: those buildings, systems, and operations within the radiologically controlled area; site utilities; those buildings, operations, and systems outside the radiological controlled area; off-site utilities; and rail road interfaces.

- **Site Recommendation Design** **6,093** **3,347** **0**
Develop the design for site recommendation.
- **Waste Handling Building GA** **0** **2,392** **5,150**
Develop the waste handling building general arrangement drawings, flow diagrams and equipment arrangements, and system descriptions for license application design in sufficient detail to support the pre-closure safety analysis.
- **Waste Handling Building Preliminary Design** **0** **1,850** **5,050**
Develop preliminary design for the waste handling building—includes receipt of waste (transportation casks), fuel blending for manageable heat content, waste package welding, and related operations.
- **Radiological Controlled Area Preliminary Design** **0** **0** **5,000**
Develop preliminary design for the radiological controlled area—buildings, operations, and systems necessary for waste handling system, waste treatment, carrier preparation, and transporter maintenance.
- **Outside Radio. Cont. Area Preliminary Design** **0** **0** **3,800**
Develop preliminary design for the outside the radiological controlled area—buildings, operations and systems that make up the balance of plant including: administration, fire control, emergency response, medical, radiological monitoring, communications, security, transportation, and safeguards and security.

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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- **Site Utilities Preliminary Design** **0 0 3,400**
Develop preliminary design for the site utilities—electrical, environmental monitoring, fuel oil and gasoline storage, sanitation, storm control and drainage, and water supply.
- **Off-Site Power and Communication Prelim Design** **0 0 600**
Develop preliminary design for the off-site power and communications—develop designs, analysis, and specifications and develop request-for-proposals for procurement.
- **Nevada Trans Preliminary Design** **0 0 350**
Develop preliminary design for Nevada Transportation—develop requirements and provide technical support for conceptual design of the Nevada transportation system.

■ **Systems Engineering** **18,185 18,178 16,500**

The systems engineering process is important to coordinate and integrate design functions to ensure that designs meet regulatory and safety requirements for protecting workers, the public, and the environment; to demonstrate that designs as built will operate cost-effectively and efficiently, and to ensure that changes to designs and specifications are documented and controlled in accordance with quality assurance requirements.

- **Design Integration** **8,200 8,200 7,000**
Conduct design and engineering integration—update and maintain the interface control documents that define the physical interfaces among structures, systems and components of the waste management system and provide integration among the design elements.
- **Alternatives/Options Evaluations** **1,000 1,000 1,000**
Provide alternatives/options evaluation—conduct an integrated review of design options.
- **Interface Configuration Management** **1,200 1,200 1,400**
Provide an interface configuration management and site recommendation and license application design verification. Conduct a comprehensive review of several hundred design analyses to verify that the designs meet the regulatory and design requirements.
- **Procurement Construction-Test Development** **2,000 2,000 2,150**
Develop procurement construction—test development and definition of evaluation and test plans.
- **TSLCC** **1,297 100 1,200**
Update the total system life cycle cost estimate.
- **Pre-Closure Safety Analysis** **0 2,300 2,000**

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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Complete integrated pre-closure safety analyses of the repository design and operations.

- **MGR Requirements** **4,488** **2,400** **1,000**

Develop the site recommendation and license application requirements, which include the Design Basis Events and System Design Description Documents.

- **Performance Confirmation Test Plans** **0** **978** **750**

Update the Performance Confirmation and Test and Evaluation Plans.

- **National Environmental Policy Act** **1,320** **2,192** **1,600**

The Final Environmental Impact Statement will be issued with the Secretary’s site recommendation to the President. However, work continues to complete the administrative record and to develop the Mitigation Action Plan. The Project intends to develop and make available National Environmental Policy Act documentation. This documentation will present new or changed information for consideration in the decision making process. The Department’s Final Environmental Impact Statement must accompany the License Application that will be submitted to the Nuclear Regulatory Commission in 2003.

In FY 2002, tasks pursuant to the issuance of the Final Environmental Impact Statement will include the following:

- **Administrative Record & Mitigation Action Plan** **1,320** **2,192** **1,600**

Complete the administrative record that supports the Environmental Impact Statement and develop the Mitigation Action Plan required by the National Environmental Policy Act, to mitigate adverse effects of repository construction and operation.

Operations/Construction **30,000** **31,656** **35,050**

This budget subelement encompasses the work required to provide the support systems, infrastructure, and utilities needed to safely operate the surface and underground facilities that support field testing at Yucca Mountain and maintain access to the site and underground research facilities.

- **Maintain ESF Support Systems** **11,225** **13,520** **14,760**

Maintain and operate the support systems that provide a safe work environment for scientists conducting tests in the underground facilities. The systems include ventilation, power distribution, water supply, compressed air supply, lighting, ground support, underground transportation, handling of materials and supplies, management of trash and refuse, sanitation, underground access control, data acquisition, fire protection, and communications.

- **Construction for Testing** **5,539** **4,070** **4,000**

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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Provide excavation, construction, and setup support for testing.

- **Site Utilities and Services** **10,058** **10,666** **12,590**

Provide communication services, electricity and water, collecting sewage and refuse, and janitorial services at the Yucca Mountain site. Control materials and property on the site and warehouse supplies. Operate motor pool, provide bus transportation for workers and fuel for vehicles. Provide staging for underground activities and utility feeds to underground operations. Calibrate scientific equipment. Coordinate the operations for public tours of the site.

- **Site Safety and Health** **3,178** **3,400** **3,700**

Provide safety and health—install engineering controls to protect workers, visitors to the site, and hazards resulting from site activities. The Project will continue its rigorous safety and health efforts.

Project Management Support **35,177** **34,090** **34,150**

This budget subelement encompasses the management support that enables technical and scientific programs to plan for and fund the collection of data; to analyze, process, and manage it; and to compile and synthesize it into major products and decision documents.

■ **Management Support Activities** **29,377** **29,490** **31,150**

- **Project Control** **22,627** **22,137** **23,795**

Provide project control, cost estimating and planning; information technology systems and support; records management/document control—non-quality records; information management operations—network and computer operations; administrative support—mail, logistics, and facility/equipment management.

- **Institutional Support** **3,850** **4,253** **4,255**

Provide institutional support—outreach and public relations, administration of public tours and information centers.

- **QA and Safety Training** **2,900** **3,100** **3,100**

Provide quality assurance training, safety training, underground training, and policy and procedure training.

Lease Scoring **5,800** **4,600** **3,000**

Maintain current office space leases in Las Vegas, Nevada. In FY 2002, the Office of Civilian Radioactive Waste Management will be negotiating new lease contracts. All new contracts for leased

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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space are being negotiated to reduce the lease termination liability.

External Oversight and Payments-Equal-To-Taxes 16,372 19,841 19,687

This budget subelement includes funding for Program oversight and payment-equal-to-taxes.

External oversight is required by the Nuclear Waste Policy Act [Section 116(c)(1)]; financial assistance is being requested for eligible units of government for external oversight.

Payments-equal-to-taxes are required under the Nuclear Waste Policy Act [Section 116(c)(3)]. Payments-equal-to-taxes are made to the State of Nevada and Nye and Clark Counties.

- External Oversight **7,072 8,500 8,387**
- Payments-Equal-To-Taxes **9,300 11,341 11,300**

Total, Yucca Mountain 270,595 312,985 355,465

Explanation of Funding Changes from FY 2001 to FY 2002

FY 2002 vs.
FY 2001
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Suitability/Licensing and Performance Assessment -497

The budget change for Suitability/Licensing and Performance Assessment is due to the completion of the site recommendation and the contractor transition. These decreases are offset by starting the preparation of the license application, including substantial work on the performance assessment for the license application in FY 2002. The budget for Technical Information Management increases slightly with the development of the licensing support network that is to be available to the Nuclear Regulatory Commission within 30 days of the site recommendation. The performance assessment budget decreases as the design alternative calculations and total system performance assessment necessary for the license application is completed. The total system performance assessment and the iterations for license application must fulfill specific Department of Energy and Nuclear Regulatory Commission regulatory requirements, some of which have only recently been proposed or promulgated. Data and computer model quality assurance requirements must also be completed for these iterations.

Core Science +9,822

The increase in Core Science is due to the rescheduling of the FY 2001 work scope to provide a more defensible basis for the site recommendation and license application. This work generally falls into four categories: 1) additional testing and analyses to further characterize and quantify the uncertainties in the assessments of the long term performance of the repository; 2) work to evaluate modifications to the operations and/or design of the potential repository to reduce the maximum temperatures reached after closure of the repository; 3) additional studies of waste package materials to improve understanding of corrosion processes; and 4) more work on the development of multiple lines of evidence for a safety case. Items 1 and 4 above are the major cost drivers for the increase in Core Science.

Design and Engineering +30,447

The largest increase in the Yucca Mountain Project budget is in design. The upward trend from FY 2001 to FY 2002 reflects the increased design activity needed to complete the license application and the shift from conceptual design to preliminary design. In preparation for the license application, efforts will be focused on providing more detailed design. The design in prior years has been focused on those areas that have little or no regulatory precedent, such as the waste package and underground operations, leaving much of the surface facilities with less design detail. For the license application,

FY 2002 vs. FY 2001 (\$000)

the design, which includes 35 complex surface systems, the waste package, and the underground facilities, must include a preclosure safety analysis (defensible regulatory safety analysis of system operations, accident analysis, and mitigating features), and a modular design approach. The design will focus on systems and structures both inside and outside the radiological controlled area of the repository, and the waste package.

National Environmental Policy Act -592

The budget for National Environmental Policy Act decreases due to the completion of the administrative record that supports the Final Environmental Impact Statement, which must accompany the License Application submitted to the Nuclear Regulatory Commission.

Operations/Construction +3,394

The increase in FY 2002 is due to the construction of the cross drift heater alcove and the drilling and test set-up for the cross drift heater test.

Project Management Support +60

The Project Management Support budget remains constant.

External Oversight and Payments Equal to Taxes (PETT) -154

Decrease in FY 2002 is due to no allowance attributable to prior year PETT payments as in FY 2001.

Total Funding Change, Yucca Mountain Site Characterization Project +42,480

Waste Acceptance Storage and Transportation

Mission Supporting Goals and Objectives

The Waste Acceptance, Storage and Transportation (WAST) function is primarily responsible for developing plans and a process for the legal and physical transfer of spent nuclear fuel to the Federal Government; managing the acceptance of the Department's spent nuclear fuel (SNF), high-level waste (HLW) and Navy spent fuel; implementing a competitive process for the acquisition of waste acceptance and transportation services; and interacting with stakeholders to address institutional issues.

The FY 2002 funding will provide for the major activities that will precede removal and transportation of SNF from reactor sites to a Federal facility. These activities include: the collection and maintenance of SNF discharge information; development of procedures for verification of SNF parameters; maintenance and implementation of the Standard Contract; interactions with the Nuclear Regulatory Commission, contract holders, and others concerning nuclear materials safeguards; interactions with stakeholders; issuance of Nuclear Waste Policy Act Section 180(c) Notice of Policy and Procedures; and development of the acquisition process for waste acceptance and transportation equipment and services, including the issuance of a request for proposals.

Transportation

The core element of the transportation activity involves the development of a private sector based competitive procurement process for the acquisition of a safe and cost-effective transportation capability to accomplish the Department's commercial SNF waste acceptance and transportation requirements. A phased procurement process will be utilized to facilitate competition and limit contract risk to the Department. The planned contract phases will incorporate the development of the detailed plans for waste acceptance and transport; the fabrication of the transportation casks and related equipment; and the actual transportation services. The Department plans to complete development of a draft request for proposals for waste acceptance and transportation services in FY 2002. The Department will issue for public comment a Notice of Policy and Procedures for implementation of the Nuclear Waste Policy Act Section 180(c) requirements related to provision of technical assistance and grants to States for training of public safety officials of appropriate units of local governments and Native American tribes through whose jurisdictions spent nuclear fuel and high level radioactive waste will be transported. In order to help address issues related to the transportation of radioactive waste, this activity also involves interactions with organizations representing State, Tribal, local, professional, technical, and industry interests.

Waste Acceptance

The following activities will be required for the Waste Acceptance activity: the development of plans for achieving the legal and physical transfer of SNF and HLW to the Federal Government from the owners and generators of such SNF and HLW; the execution of agreements with the Office of Environmental Management for the acceptance of Department-owned SNF and HLW and with the Office of Naval Reactors' Navy Nuclear Propulsion Program for acceptance of naval SNF; the development of planning

assumptions and recommendations for the Department's waste acceptance policy; and supporting the transportation, storage and disposal of SNF and HLW, once accepted. Activities required to facilitate waste acceptance include: 1) development of a process for the orderly transfer of SNF and HLW into the Federal system consistent with the needs of both the Federal Government and the owners and generators; 2) development of a plan to carry out the Program's waste acceptance responsibilities; 3) continuation of a collaborative dialogue with the Nation's nuclear utility companies as well as other SNF and HLW owners and interested stakeholders; 4) verification of the fees collected for commercial spent nuclear fuel; 5) maintenance and implementation of the provisions in the Standard Disposal Contract; and 6) provision of contingency planning support, studies and analyses directed toward the private sector-based acceptance and transportation initiative.

Project Management

Project Management activities support each of the product areas for the Waste Acceptance, Storage and Transportation Project. Specifically, the Project Management 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 2000	FY 2001	FY 2002	\$ Change	% Change
Transportation	0	520	3,100	2,580	496.2%
Waste Acceptance	1,268	1,614	2,328	714	44.2%
Project Management	527	527	440	-87	-16.5%
Total, Waste Acceptance, Storage and Transportation	1,795	2,661	5,868	3,207	120.5%

Detailed Program Justification

(dollars in thousands)

	FY 2000	FY 2001	FY 2002
Waste Acceptance, Storage and Transportation	1,795	2,661	5,868
■ Transportation	0	520	3,100
•	0	420	2,700

Prepare and revise acquisition documents and technical specifications, and issue for public comment, the revised draft Request for Proposal (FY 2002) for waste acceptance and

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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transportation services including transport cask systems and auxiliaries; interact with stakeholders on institutional issues; and develop the procurement process for competitive private sector waste acceptance and transportation services.

- 0 100 400

Review and revise Section 180(c) Notice of Proposed Policy and Procedures (for issuance in FY 2002) for implementing the Nuclear Waste Policy Act Section 180(c) and support preparation and evaluation of grant applications.

■ **Waste Acceptance** 1,268 1,614 2,328

- 175 175 108

In FY 2001 and FY 2002, manage interface/liaison with other affected elements of the Civilian Radioactive Waste Management System.

- 504 639 620

Support the waste acceptance process and Regional Servicing Contractor services acquisition processes through modifications and/or deviations to the Standard Disposal Contract, as required. Maintain spent nuclear fuel storage data and assumptions; update industry storage forecasts to support Civilian Radioactive Waste Management System planning; and support development of waste acceptance criteria.

- 239 450 450

Implement the Standard Disposal Contract and other agreements; validate and disseminate utility supplied spent nuclear fuel discharge/storage data; and, update 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. Issue the Spent Nuclear Fuel Verification Plan in FY 2001.

- 350 350 250

Implement the responsibilities established in the Memorandum of Agreement for acceptance of DOE spent nuclear fuel, high level waste and Navy spent fuel. This includes issuance of high level waste data needs; development of acceptance capacities for DOE and Navy materials requiring acceptance, transportation, disposal and establishment of fee payment schedules.

- 0 0 900

Department of Justice support for litigation involving civilian radioactive waste management system.

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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■ Project Management	527	527	440
•	160	160	160
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.			
•	267	267	180
Develop the Waste Acceptance, Storage and Transportation Annual Plan, and support the project validation review process; update the Long-Range Plan, as required.			
•	100	100	100
Maintain Waste Acceptance, Storage and Transportation life cycle cost estimate, support Total System Life Cycle Cost, and update Waste Acceptance, Storage and Transportation Project Life Cycle Cost Report; conduct/coordinate system studies and analyses including the Waste Acceptance, Storage and Transportation Operations Plan; and perform/support verification and design control.			

Explanation of Funding Changes from FY 2001 to FY2002

FY 2002 vs. FY 2001 (\$000)

Transportation +2,580

The increase reflects the funds requested for the preparation of acquisition documents and technical specifications. A draft Request for Proposal for acquisition of waste acceptance and transportation services will be issued. In addition, Nuclear Waste Policy Act, Section 180(c), Notice of Revised Proposed Policy and Procedures, will be developed and issued for public comments.

Waste Acceptance +714

The increase reflects the provision of funding to the U.S. Department of Justice for litigation support related to civilian radioactive waste management system.

Project Management -87

The decrease reflects elimination of the need to update the Long-Range Plan in FY2002.

Total Funding Change, Waste Acceptance, Storage and Transportation	+3,207
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Program Integration

Mission Supporting Goals and Objectives

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

Quality Assurance

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

Activities associated with the QA function are performed by personnel not associated with the performer organization (NRC independence requirements), and are directly related to the acceptability of the technical products and services provided by the performer organization. The Quality Assurance element achieves this independence by requiring the Program's Management and Operations contractor (M&O) to establish a Quality Assurance organization, independent of the line functions, to support achievement of quality in M&O products, services and activities. Further independence (as required by NRC regulation) is achieved by utilizing a DOE Quality Assurance support contractor responsible for establishment/maintenance of DOE Quality Assurance Requirements and Policy to be implemented by the M&O and other participants and by performance of independent oversight (audits, surveillance, and reviews) of M&O and other participant products, services, and activities. Quality Assurance is not an administrative function, but rather a necessary step (per NRC regulation) to assure technical acceptability and confidence in fulfilling our mission to protect the public, workers, and the environment.

Program Management

System Integration

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

to enhance communication among parties responsible for individual system components.

Systems Integration also provides support and strategic planning assistance to the Director and project offices. This unit annually determines the adequacy of the fee charged to generators of commercial Spent Nuclear Fuel (SNF), in accordance with the Nuclear Waste Policy Act of 1982. Periodically, the Department's recommendation requires the conduct of Total System Life-Cycle Cost (TSLCC) analyses to support the decision of whether program revenues are sufficient to cover the cost of the program. Additionally, this unit conducts systems studies, tradeoff studies, sensitivity studies, and contingency analyses to ensure that the system-wide impacts of proposed changes are considered and alternative or contingency system configurations and concepts are evaluated. In addition, Systems Integration manages all program-level baseline change control board activities and monitors YMSCO project-level baseline control board's activities.

Regulatory Integration

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

Strategic Planning

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

International Waste Management

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

This element maintains up-to-date information on other countries' nuclear energy and nuclear waste management programs. In addition, collaborative work on repository issues with the Russian Federation is supported.

Program Management

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

Human Resources and Administration

Audits, Reports, Education and Information

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

Information Management

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

Funding Schedule

(dollars in thousands)

	FY 2000	FY 2001	FY 2002	Change	% Change
Quality Assurance	0	0	6,384	6,384	100.0%
Program Management					
Systems Integration	2,266	2,833	3,833	1,000	35.3%
Regulatory Integration	593	913	913	0	0.0%
Strategic Planning	712	1,020	1,002	-18	-1.8%
International Waste Management	627	933	933	0	0.0%
Program Management	563	534	523	-11	-2.1%
Total, Program Management	4,761	6,233	7,204	971	15.6%
Human Resources and Administration					
Human Resources Development	20	20	20	0	0.0%
Audits, Reports, Education and Information	1,190	1,246	1,231	-15	-1.2%
Information Management	2,650	4,572	4,405	-167	-3.7%
Total, Human Resources Administration	3,860	5,838	5,656	-182	-3.1%
Total, Program Integration	8,621	12,071	19,244	7,173	59.4%

Detailed Program Justification

(dollars in thousands)

	FY 2000	FY 2001	FY 2002
Program Integration	8,621	12,071	19,244
<ul style="list-style-type: none"> Quality Assurance 0 0 6,384 <ul style="list-style-type: none"> ● Provide in-process (i.e., during product development) quality assurance support to ensure Nuclear Regulatory Commission quality assurance requirements are appropriately incorporated into technical products. ● Support quality assurance interface within the program and external to the Program with other DOE high level waste producing entities. 			

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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- Support the maintenance of the Office of Civilian Radioactive Waste Management (OCRWM) Qualified Suppliers List (and database) to ensure appropriate qualification of OCRWM vendors.

Program Management **4,761** **6,233** **7,204**

■ **Systems Integration** **2,266** **2,833** **3,833**

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

Systems Analysis

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

Configuration/Baseline Management

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

■ **Regulatory Integration** **593** **913** **913**

- Coordinate and participate in interactions with external agencies, such as: the Nuclear Regulatory Commission and the Environmental Protection Agency. These interactions include addressing management and technical issues related to the civilian radioactive waste

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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management system.

- Coordinate and integrate Program environmental, safety, and health activities to ensure compliance with Departmental directives and policies, EPA standards, NRC licensing requirements, and Occupational Safety and Health Act (OSHA) standards. Major activities include coordination of environmental impact statements from other Departmental Offices involving disposal of spent nuclear fuel, high-level waste and other Department-owned radioactive materials.
- Support project regulatory assessments and integration of storage, transportation, and disposal considerations for waste forms managed by other Departmental offices, such as Environmental Management, Fissile Materials Disposition, and Nuclear Energy (Naval Reactors), to ensure consistency with applicable regulatory 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 project activities associated with development and submission of the license application, including coordination of relevant interactions with the Nuclear Regulatory Commission, Advisory Committee on Nuclear Waste and Congress.
- Interface with Nuclear Regulatory Commission’s Advisory Committee on Nuclear Waste.
- Provide coordination with Nuclear Regulatory Commission on issues related to the NRC’s adoption of DOE’s environmental impact statement for a repository at Yucca Mountain.

■ **Strategic Planning** **712** **1,020** **1,002**

- Respond to program inquiries and links requirements with external program oversight parties and liaison activities with the Department. Support semiannual Program planning workshops. 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.

■ **International Waste Management** **627** **933** **933**

- Assist in preparing for cooperative bilateral meetings and Nuclear Energy Agency Radioactive Waste Management Committee Meetings. Provide input to the International Nuclear Waste Management Fact Book and update the document *Status of International High-Level Radioactive Waste Management Program*.
- Develop and maintain electronic database on international programs.

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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- Assist in the management and oversight of collaborative work with the Russian Academy of Sciences and the Ministry of Russian Federation for Atomic Energy.

Program Management **563** **534** **523**

- Improve program and project management systems. Maintain program management policy document, and support implementation of new Departmental project management policy and requirements.

Human Resources and Administration **3,860** **5,838** **5,656**

■ **Human Resources Development** **20** **20** **20**

- Purchase needed supplies, non-computer equipment, publications, and services.

■ **Audits, Reports, Education and Information** **1,190** **1,246** **1,231**

- Develop reports and other documents required by Congress or the Department, such as the Program's Annual Report to Congress, audited financial statements, annual Federal Managers Financial Integrity Act (FMFIA) reports, responses to General Accounting Office (GAO) and DOE IG audit recommendations, and Freedom of Information Act (FOIA) requests. Manage the Nuclear Waste Fund investment portfolio by providing monthly investment instructions to the CFO for implementation. Comply with executive orders and support the Department's education initiatives by conducting a Historically Black Colleges and Universities (HBCU) Undergraduate Scholarship Program and the Radioactive Waste Management Graduate Fellowship Program. Provide Program information to customers/stakeholders/public through the OCRWM Home Page and publication of *The OCRWM Enterprise*, a semiannual newsletter.

■ **Information Management** **2,650** **4,572** **4,405**

- Maintain existing information systems and networks. Validate Information Management (IM) Strategic Plan; revise/update IM Multi-Year Implementation Plan; develop integrated IM Annual Planning Guidance; conduct IM short-range planning and integrated IM budget planning.
- Complete implementation phase 2 of the Integrated Information and Infrastructure Project. This effort completes the re-engineering of the Records Management, Document Management, and Web Publishing processes and initiates the improved processes and associated technology

(dollars in thousands)

FY 2000	FY 2001	FY 2002
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solutions.

- Upgrade telecommunications and basic computing infrastructures.
- Continue the development and implementation of the Program's information architecture to ensure compatibility with the Department's information architecture.

Explanation of Funding Changes from FY 2001 to FY 2002

FY 2002 vs.
FY 2001
(\$000)

Quality Assurance +6,384

In FY 2000 and 2001, the Quality Assurance function was completely supported by support service contractors and was therefore budgeted in the Program Direction account. In FY 2002, the Program will utilize the M&O contractor who will provide quality assurance support to ensure Nuclear Regulatory Commission quality assurance requirements are appropriately incorporated into technical products. In addition, the M&O will support quality assurance interface and maintain the Qualified Suppliers List and database.

Program Management +971

The increase is linked to supporting new and emerging high-level radioactive waste disposal technologies within System Integration.

Human Resources and Administration -182

- The decrease is due to contractor transition funds that are not required in FY 2002.

Total Funding Change, Program Integration	+7,173
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Program Direction

Mission Supporting Goals and Objectives

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

Salaries and Benefits

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

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

Environmental Impact Statement Technical Support – The Final Environmental Impact Statement was issued in FY 2001 and accompanied the Secretary's recommendation to the President. However, work continues to complete the administrative record and to develop the Mitigation Action Plan. The Project intends to develop and make available NEPA documentation. This documentation will present new or changed information for consideration in the decision making process.

Quality Assurance Technical Support – Provide support in: the establishment and maintenance of NRC required OCRWM QA Program and Policy. Includes developing and maintaining the OCRWM Quality Assurance Requirements and Description, developing QA procedures, and maintaining required QA databases.

Support the performance of independent QA audits surveillance, and review of M&O and other participant products, services, and activities.

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

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

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

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

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

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

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

Funding Schedule

(dollars in thousands)

	FY 2000	FY 2001	FY 2002	\$ Change	% Change
Nevada Operations Office					
Salaries and Benefits	491	510	530	20	4.0%
Total, Nevada Operations Office	491	510	530	20	4.0%
FTEs	6	6	6	0	0.0%
Other DOE Matrix Support					
Salaries and Benefits	1,136	1,179	1,226	47	4.0%
Travel	7	7	7	0	0.0%
Total, Other DOE Matrix Support	1,143	1,186	1,233	47	4.0%
FTEs	15	15	15	0	0.0%
Headquarters-OCRWM					
Headquarters					
Salaries and Benefits	6,034	6,242	6,626	246	3.9%
Travel	244	244	260	16	6.6%
Working Capital Fund	1,468	1,394	1,444	50	3.6%
Other Related Expenses	150	156	156	0	0.0%
Support Services	7,206	7,742	12,505	4,763	61.5%
Total, Headquarters	15,069	15,840	20,991	5,013	31.4%
FTEs	58	58	58	0	0.0%
Nevada					
Salaries and Benefits	12,265	13,509	14,374	865	6.4%
Travel	465	465	500	35	7.5%
Other Related Expenses	2,434	2,656	4,201	1,545	58.2%
Support Services	27,600	28,558	22,572	-5,986	-21.0%
Total, YMSCO	42,764	45,126	41,647	-3,479	-7.8%
FTEs	117	121	121	0	0.0%
Total Program Direction					
Salaries and Benefits	19,926	21,440	22,757	1,317	6.1%
Travel	716	716	767	51	7.1%
Other Related Expenses	2,584	2,812	4,357	1,545	54.9%
Working Capital Fund	1,468	1,394	1,444	50	3.6%
Support Services	34,806	36,300	35,077	-1,223	-3.4%
Total, Program Direction	59,500	62,662	64,402	-1,602	-2.6%
FTEs	196	200	200	0	0.0%

Detailed Program Justification

(dollars in thousands)

	FY 2000	FY 2001	FY 2002
Program Direction	59,500	62,662	64,402
Salaries and Benefits	19,926	21,440	22,757
<p>Funds salaries, awards, lump sum leave payments, benefits and buyout compensation for full-time permanent and other than full-time permanent employees. The FY 2002 funding level provides for 200 FTEs which is level with FY 2001.</p>			
Travel	716	716	767
<p>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.</p>			
Other Related Expenses	2,584	2,812	4,357
<p>Includes funding for building maintenance, Yucca Mountain rents, communications, utilities, computer/video support, training, printing and graphics, photocopying, postage, supplies and common administrative services.</p>			
Working Capital Fund	1,468	1,394	1,444
<p>Includes funding for headquarters building maintenance, rents, communications, utilities, computer/video support, printing and graphics, photocopying, postage, supplies and common administrative services.</p>			
Support Services	34,806	36,300	35,077
<p>Includes all costs which are defined as advisory and assistance services acquired by contract from non-governmental services to support or improve the OCRWM organization. This element provides support for the following activities: developing the Environmental Impact Statement Mitigation Action Plan, developing and making available NEPA documentation, complying with NRC requirements, developing and maintaining the Quality Assurance Requirements and Description, developing Quality Assurance procedures, and conducting audits, surveillance, and reviews of M&O and other participant activities. Support services also provide an independent technical review capability of the work accomplished by the DOE National Laboratories and the management and operations contractor. In addition, funds are provided for the operation and management of the communications network and computer facilities.</p>			

Explanation of Funding Changes from FY 2001 to FY 2002

FY 2002 vs.
FY 2001
(\$000)

Salaries and Benefits **+1,317**

The increase in salaries and benefits is due to general pay increases, promotions, lump sum payments, awards and within-in grade increases.

Travel **+51**

The 7.1% increase is due to inflation plus additional requirements for travel to support the development of the License Application.

Other Related Expenses **+1,545**

The increase is due to lease-related costs associated with the contractor transition.

Working Capital Fund **+50**

The increase is due to the projected funding profile provided by the Working Capital Fund Board.

Support Services **-1,223**

The decrease in support services is due to the finalization of the Environmental Impact Statement in FY 2002.

Total Funding Change, Program Direction **+1,740**

Support Services

(dollars in thousands)

	FY 2000	FY 2001	FY 2002	\$ Change	% Change
Headquarters Support Services					
Technical Support Services					
Management & Technical Services.....	1,865	2,062	2,106	44	2.1%
Technical Analysis.....	270	290	270	-20	-6.9%
Subtotal, Technical Support Services.....	2,135	2,352	2,376	24	1.0%
Management Support Services					
Automated Data Processing (ADP).....	3,026	3,345	3,912	567	17.0%
Human Resources Support Services.....	335	335	335	0	0.0%
Subtotal, Management Support Services.....	3,361	3,680	4,247	567	15.4%
Total, Headquarters Support Services.....	5,496	6,032	6,623	591	9.8%
Quality Assurance Support Services					
Quality Assurance.....	9,931	7,629	5,500	-2,129	-27.9%
Quality Assurance Mgmt Assessment.....	382	382	382	0	0.0%
Total, Quality Assurance Support Services.....	10,313	8,011	5,882	-2,129	-26.6%
YMSCO Support Services					
Technical Support Services					
Management & Technical Services.....	9,748	11,911	13,794	1,883	15.8%
Environmental Impact Statement (EIS).....	5,583	5,840	3,100	-2,740	-46.9%
Subtotal, Technical Support Services.....	15,331	17,751	16,894	-857	-4.8%
Management Support Services					
Automated Data Processing (ADP).....	2,698	3,345	4,215	870	26.0%
Administrative Support.....	968	1,161	1,463	302	26.0%
Subtotal, Management Support Services.....	3,666	4,506	5,678	1,172	26.0%
Total, YMSCO Support Services.....	18,997	22,257	22,572	315	1.4%
Total, Support Services.....	34,806	36,300	35,077	(1,223)	-3.4%