General

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Environmental Restoration and Waste Management

Five-Year Plan
Fiscal Years 1992 - 1996

June 1990

United States Department of Energy

Washington, DC 20585

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The Secretary of Energy
Washington, DC 20585

June 1990

I am pleased to submit to Congress and the Nation the Department of Energy's Environmental Restoration and Waste Management Five-Year Plan for Fiscal Years (FY) 1992-1996. In March 1989, I promised to develop a plan for cleaning up DOE's nuclear-related waste sites and to bring its aging facilities into compliance with today's environmental laws and regulations. That plan was completed and made available for public comment in August 1989, after two earlier reviews by representatives of significantly affected States and Indian Nations, the National Governors' Association, the National Association of Attorneys General, the National Conference of State Legislatures, the Environmental Protection Agency (EPA), other executive agencies, and the National Academy of Sciences. A major commitment made by that plan was to initiate an aggressive technology development program to provide DOE with solutions to problems not now having solutions and to devise better solutions to the Department's other problems. A draft Research, Development, Demonstration, Testing, and Evaluation (RDDT&E) Plan was completed in November 1989. Both plans have been incorporated and made current in this FY 1992-1996 Plan, which also reports on progress achieved since last year.

I also can report that the departmental reorganization to integrate responsibility for facility cleanup and compliance has been completed. A new Office of Environmental Restoration and Waste Management has been established. This reorganization will raise the visibility of DOE's environmental problems and will increase accountability for finding and implementing solutions. I reaffirm my full intention, as stated in testimony before the Congress, to raise this Office to the status of Assistant Secretary.

Accountability has also been increased by revising the relationship between DOE and its management and operating contractors, and specific guidelines have been established that may determine a contractor's entire award fee based on the exercise of proper environmental stewardship.

I believe the Department has made an excellent start, but it is just a start. Both within and outside the agency, DOE must work to help achieve the national consensus and the technological and political breakthroughs required to accomplish the goal of cleanup and compliance by the year 2019.

The problem is large and complex. It requires technical competence, new innovative technologies, management discipline, and a national technical infrastructure that currently does not exist to assure that the financial resources are expended in the most effective manner.

The Department must work toward a spirit of a cooperative, success oriented program with the States and Congress. I recognize that without proper planning, the expenditures of large resources could result in waste and inefficiency.

As recently as October 1989, the Administrator of the EPA has stated that the Nation does not have enough qualified engineers to take on the Superfund cleanup simultaneously at all sites. The Department's Environmental Restoration and Waste Management program only compounds an already difficult problem. Even if more funds were applied to the total program, there is not sufficient capability within the Department, its contractors, or the Nation to use these funds effectively. As I indicated in the FY 1991-1995 Plan, the Department will not have a plan that coincides with outyear budget requirements until FY 1992. That situation still prevails.

Finally, I want to thank the Department's employees, both at Headquarters and in the field, for working so hard to implement my vision for the agency. I also want to thank all the reviewers of the Five-Year Plan and the draft RDDT&E Plan. These documents, and DOE's thinking as well, benefited greatly from their comments.

Sincerely,

James D. Watkins
Admiral, U.S. Navy (Retired)

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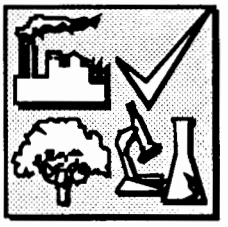
APPENDICES

1.0

Executive Summary



1.1 PURPOSE AND SCOPE OF THIS DOCUMENT

This document reaffirms the U.S. Department of Energy's (DOE's) commitment to a 30-year goal of compliance with laws, regulations, and agreements aimed at protecting human health and the environment; consolidates DOE's planning for Environmental Restoration, Waste Operations (including Corrective Activities), and Technology Development (including Transportation and Education); reports progress made toward achieving compliance goals; and explains changes in strategy due to new policies and external events.

This document reflects DOE's fulfillment of a major commitment of the Environmental Restoration and Waste Management Five-Year Plan (DOE/S-0070, August 1989): reorganization to create an Office of Environmental Restoration and Waste Management (EM) responsible for the consolidated environmental management of nuclear-related facilities and sites formerly under the Assistant Secretaries for Defense Programs and Nuclear Energy and the Director of the Office of Energy Research. The purposes of this Plan for FY 1992-1996 are (1) to measure progress in meeting DOE's compliance, cleanup, and waste management agenda; (2) to incorporate a revised and condensed version of the Draft Research, Development, Demonstration, Testing, and Evaluation (RDDT&E) Plan (November 1989) to describe DOE's process for developing the new technologies critically needed to solve its environmental problems; (3) to show DOE's current strategy and planned activities through FY 1996, including reasons for changes required to meet compliance and cleanup commitments; and (4) to increase the involvement of other agencies and the public in DOE's planning.

The Plan includes program activities and costs for Corrective Activities, Environmental Restoration (Remedial Actions and Decontamination and Decommissioning), Waste Operations, and Technology Development (including Transportation and Education). Included in Waste Operations are the costs associated with Purex and with landlord responsibilities at the Idaho National Engineering Laboratory in Idaho; the Hanford Reservation at Richland, Washington; and the Oak Ridge Gaseous Diffusion Plant in Tennessee. Also included are activities related to modernizing facilities under the cognizance of EM. The Plan includes EM's costs resulting from the independent internal oversight function of DOE's Safety and Health Program (Office of the Assistant Secretary for Environment, Safety, and Health). Although the Plan does not include programs of the Office of Civilian Radioactive Waste Management, it does include EM's annual contribution to the Nuclear Waste Fund for disposal of defense high-level waste and research toward characterizing the defense waste form for repository disposal.

There are six sections in this Plan. Section 1 is an executive-level summary of DOE's management, compliance, technical, and culture-related (including public involvement and review) accomplishments; setbacks; new and continuing commitments; and long-term strategy in light of last year's plans and current reality. Sections 2 through 4 and

Attachments A through C describe accomplishments, changes, and planned activities in the areas of Corrective Activities, Environmental Restoration, and Waste Operations, including program overviews, management approaches, and summary and detailed costs and milestones.

Section 5 and Attachment D, Technology Development (including education initiatives and university partnerships), display DOE's process for meeting identified technology needs related to Corrective Activities, Environmental Restoration, and Waste Operations. DOE's goal is to solve and prevent the recurrence of its essential environmental problem: actual or threatened migration to the biosphere of 40 years of radioactive and hazardous chemical pollutants dispersed through large volumes of soil and groundwater. These pollutants are often difficult to access for treatment and to reduce to regulatory standards. DOE must strive to transcend current methods and tools, replacing them with more effective and efficient means. When needed methods are not currently available, Technology Development must seek to provide them, either through adaptation from other fields or through development in concert with industry and academic institutions.

Section 6 and Attachment D, Transportation, have been added in response to many internal and external requests for a more comprehensive treatment of DOE's accomplishments and plans in this operational and research and development area than was provided in the Five-Year Plan for FY 1991-1995.

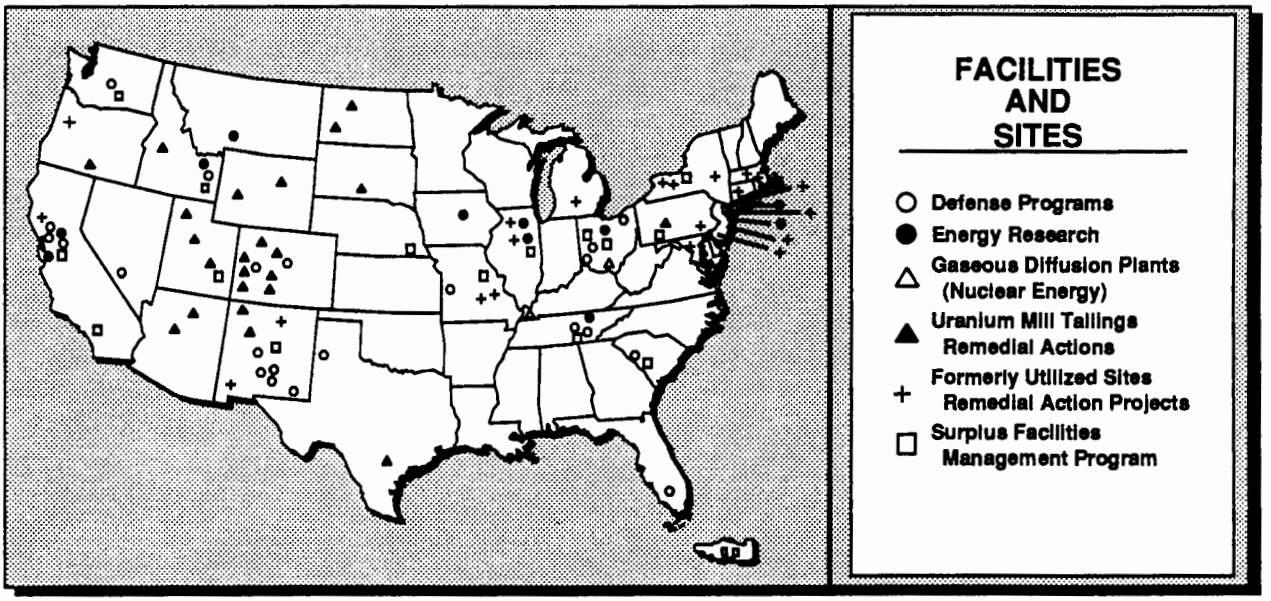


Figure 1.1. This Five-Year Environmental Restoration and Waste Management Plan, FY 1992-1996 addresses Environmental Restoration, Waste Operations, Corrective Activities, and Technology Development at nearly 100 sites located in 31 States and Territories.

1.2 GROWTH IN ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT COST ESTIMATES

The cost estimates requested by the field have increased significantly between the FY 1991-1995 and FY 1992-1996 Five-Year Plans for Environmental Restoration and Waste Management; these new cost estimates have not yet been fully validated. Such growth cannot now be managed responsibly and effectively, given the inadequacy of the DOE, contractor, industry, and regulator infrastructure.

The FY 1991-1995 Five-Year Plan represented the initial effort to identify, consolidate, and describe the full scope of work and corresponding funding requirements connected with the waste management and environmental restoration needs of DOE's nuclear complex. The FY 1992-1996 Five-Year Plan is the first update of the initial Plan. It has provided the first opportunity for DOE to reassess the program described in the initial Plan, assess the impacts of new regulatory requirements, and identify additional activities that are needed. Cost growth is to be expected as a normal consequence of this process; however, the cost estimates used in developing this FY 1992-1996 Plan exceed what is considered a manageable rate of growth. Cost estimates shown here for FY 1991 and 1992 are higher than were shown in the FY 1991-1995 Plan because (1) new activities have been added that were not within the original scope, (2) additional activities have been identified that fall within the original scope, and (3) estimates for program costs have increased. With respect to FY 1991 and FY 1992, the total estimated amounts set forth in this FY 1992-1996 Plan represent increases of $1.1 billion and $2.2 billion over the amounts set forth as a baseline for FY 1991 and FY 1992. The amounts estimated for FY 1993 and beyond exhibit similar increases over the baselines for those years. The FY 1991 baseline corresponds to the President's budget submission to Congress. Baselines for FY 1992 and beyond correspond to amounts in the FY 1991-1995 Plan. These amounts challenge and almost certainly exceed the resources that can be brought to bear by DOE, its principal contractors, the environmental restoration and waste management industries, and State and Federal regulators.

Figure 1.2a shows the major sources of the higher estimates for FY 1991 and FY 1992. The cost estimate connected with each component of increase is comprised of two categories: a validated amount and an unvalidated amount. This breakdown is intended to facilitate cooperation and will be used to initiate discussions with interested parties; they have not been formally adopted by the Department. Validated amounts represent the result of a preliminary DOE Headquarters review of the field office cost estimates. The remaining unvalidated estimates require further review and analysis. In addition, the validated estimates represent, in the aggregate, the maximum feasible program level that the Department likely would have the ability to administer effectively. At this time (June 1990) the Department can provide only preliminary estimates of validated and unvalidated amounts associated with each component of increase.

Over the next several months as part of the FY 1992 budget process, the Department expects to develop more precise estimates of these increases. These estimates will then become the Department's starting point for budget discussions within the Administration. Those discussions will result in decisions on budget totals for FY 1992, the final amounts that will appear in the Administration's request to Congress.

For the period through FY 1995, the structure of the overall estimate for the programs included in this Plan are shown in Figure 1.2b. The figure shows (1) the FY 1991-1995 baseline, (2) validated amounts associated with new activities not within the scope of the FY 1991-1995 Plan, and (3) validated increases for activities within the scope of the FY 1991-1995 Plan. The total of (1), (2), and (3) is the total validated cost estimate for the programs described herein. Also shown are the total cost estimates submitted by DOE Operations Offices. The difference between these estimates and the total validated costs constitutes the unvalidated portion of the estimate. Lacking sufficient data, DOE cannot project total validated amounts beyond FY 1992.

Sources of Increase and Uncertainty: The category "revised estimates for planned activities" covers activities that were included in the FY 1991-1995 Plan and have revised cost estimates. Examples are operational testing for environmental compliance at Waste Isolation Pilot Plant (WIPP), continuity of waste operations at several of the sites, Consolidated Incinerator Facility (CIF) operations support at Savannah River, assessment and remediation at facilities and sites under the responsibility of San Francisco, and acceleration of the Hanford Waste Vitrification Plant.

Growth in "Agreements/Regulatory Compliance" includes new and existing agreements and growth due to regulatory requirements. Examples of these include the Tri-Party Agreement at Hanford; the Colorado Regulations at Rocky Flats; Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Agreement at Fernald; Resource Conservation and Recovery Act (RCRA) waste storage and CERCLA requirements at the Oak Ridge Gaseous Diffusion Plant (ORGDP) and the Y-12 Plant (Y-12); RCRA Permit at Los Alamos National Laboratory; and site investigations at Oak Ridge and Paducah.

The category "DOE Orders/Secretarial Initiatives" involves growth associated with implementation of DOE Orders, actions in response to findings of DOE "Tiger Team" assessments, and Secretary of Energy Notices. Examples include implementing DOE Order 5820.2A (Radioactive Waste Management) at ORGDP and Y-12, conducting Assessment and Remediation at Mound, and implementing new requirements connected with the 5400 series (Environment, Safety and Health) of DOE Orders.

"New Activities" includes such projects as compliance with the Toxic Substances Control Act at ORGDP, building a waste analysis laboratory for DOE, building a new waste treatment facility at Pantex, and making major modifications to the Consolidated Incinerator Facility at Savannah River.

Perhaps the most significant (and troubling) factor in driving up cost estimates has been increased awareness of and exposure to civil and criminal liabilities for DOE and contractor employees. DOE's January 26, 1990, Federal Register Notice of Proposed Rule

Making to cease indemnifying contractors for violations of environmental laws and regulations has led to contractors' conservative interpretations or regulatory requirements. The potential for personal criminal liability has made both DOE and contractor employees conservative in estimating their needs. In some cases, task needs have been included regardless of immediacy or technical basis to minimize personal and corporate liability exposure. Even though current disparities between field-generated needs and Headquarters' view of these needs will narrow, the disparity will continue to be significant because of the liability issue. DOE intends to work with the States to mitigate this problem.

Owing to the relatively early phase of planning connected with the activities described in the Plan, estimates in the Activity Data Sheets submitted by DOE's Operations Offices indicate a considerable degree of uncertainty about their cost and scope. With respect to Corrective Activities, their 68 percent of the estimates are characterized at a low or medium level of confidence. For Environmental Restoration and Waste Operations, the percentages are 79 and 54 percent, respectively.

Transportation activities, on the other hand, encompass a well-developed, mature (although comparatively speaking, small) program. Consequently, confidence in cost estimates for Transportation is accordingly higher, with 92 percent characterized at a high level of confidence.

Technology Development activities are in the early planning phase, but uncertainties in the estimates of cost are not of the same concern as for other programs. Technology Development estimates are projected, not upon Operations Office requests, but upon the actual anticipated investment in the various technology areas. The requests from Operations Offices exceed, by design, the level of investment projected for the Technology Development program to enable selection of activities using the prioritization process described in Section 5.6.

Infrastructure Limitations: DOE's senior managers agree that the infrastructure needed to accomplish the work represented by the increases does not exist and will not exist for some time. DOE's new Office of Environmental Restoration and Waste Management is not fully staffed. Although staffing is proceeding as rapidly as practical, the organization will not be able to manage additional program increases for at least two years. Although DOE's Operations Offices have also embarked on similar expansions, they face a period of insufficient management and technical staff resources. Contractors are also growing and are beginning to experience shortages of qualified applicants. Judging from the amount of time now required for reviewing plans and permit applications, State and Federal regulators could not easily accommodate the increased work load embodied in the revised estimate.

DOE does not now know the precise resource limits of the cleanup industry, but it is aware of the concern that exists throughout government and the private sector. Preliminary estimates indicate that DOE and its contractors must increase staff to at least two and one-half times present levels. DOE is sponsoring research through the Oak Ridge Associated Universities and, separately, through The University of Tennessee, to evaluate the human and industrial

resources available to meet the anticipated demand for environmental cleanup.

DOE is informing the States, the Environmental Protection Agency (EPA), and Congress of the cost estimates identified by the Operations Offices and is working with these and other affected parties to plan and conduct cost-effective programs. DOE also wishes to benefit from the lessons learned by other Federal agencies, such as EPA and the Department of Defense, so the taxpayer pays only once for this experience. DOE intends to expend funds only when a clearly achievable work plan has been established. A key factor in judging the realism associated with any work plan is the degree of confidence placed in the associated estimated costs. DOE is exploring use of the Army Corps of Engineers to provide independent assessments of such costs. Furthermore, DOE will not exceed its ability to manage such efforts effectively. While this approach may at first appear to slow progress in environmental restoration, overly aggressive effort (without a properly trained working staff) is irresponsible and may actually result in reduced protection of public health and safety and the environment. Government and commercial experience confirms that unrestrained growth is unmanageable. DOE must be responsible for the effective expenditure of funds. To assure the States, Congress, EPA, and other stakeholders that DOE is committed to maximum effective progress in compliance and cleanup, DOE will meet with them regularly to review plans and progress, to solicit their suggestions, and to listen honestly to their comments. In short, DOE is "placing all of its cards face up on the table." DOE's expectation is that others will do the same.

FY 1991 Plan	FY 1991 ($ in Millions) Total	Validated	Unvalidated[A]	FY 1992 ($ in Millions) Total	Validated	Unvalidated[A]
Priorities 1 - 3	3,024	2,882	142[B]	3,403	3,403	0
Priority 4	298	0	298	319	0	319
Subtotal	3,322	2,882	440	3,722	3,403	319
New Scope to Five-Year Plan						
Transportation	15	15[C]	0	19	19	0
Landlord for ID, RL, ORGDP	115	63[C]	52	227	71	156
PUREX	34	34	0	123	123	0
Sanitary Landfill Activities	19	19[C]	0	25	25	0
Agreements-In-Principle	28	28[D]	0	28	28	0
Program Direction (HQ & Field)	54	32	22	86	40	46
Subtotal	265	191	74	508	306	202
Cost Increases for Existing Scope						
Revised Estimates for Planned Activities	159	84	75	481	220	261
Agreements/Regulatory Compliance	228	43	185	532	93	439
DOE Orders/Secretarial Initiatives	158	120	38	220	177	43
New Activities	91	11	80	198	10	188
Other	61	0	61	76	0	76
Subtotal	697	258	439	1,507	500	1,007
Field Cost Estimates for FY 1992 Plan	4,284	3,331	953	5,737	4,209	1,528
Technology Development[E]	156	156	0	230	230	0

A = Unvalidated is the difference between the total and the validated estimates of cost.

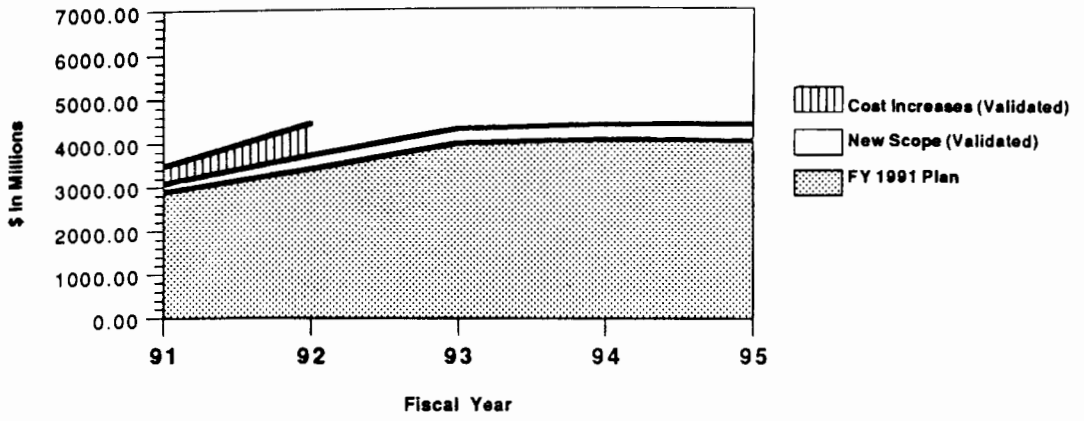
B = $142 million is for Program slippage.

C = The validated costs for transportation, landlord, and sanitary landfill activities have been transferred from other parts of the DOE budget.

D = $8.2 million of the program direction validated costs have been transferred from other parts of the DOE budget.

E = $50 million for Technology Development is included in the FY 1991 Plan.

Figure 1.2a. The program request by the field has increased significantly between the FY 1991-1995 and FY 1992-1996 Five-Year Plans. This increase most likely exceeds the resources which can be brought to bear.



Funding Total ($ In Millions)					
Fiscal Year	**91**	**92**	**93**	**94**	**95**
FY 1991 Plan	2,882	3,403	3,977	4,058	4,055
New Scope (Validated)	191	306	324	344	364
Cost Increases (Validated)	414	730			
Total Validated Estimates	3,487*	4,439*			
Field Cost Estimates (Includes Unvalidated Portion)	4,440*	5,967*	6,414*	6,800*	6,372*

***These estimates include funding and estimated costs for Technology Development.**

Figure 1.2b. Cost estimates growth between baseline and current field cost estimates.

1.2.1 FUNDING INTELLIGENTLY IN THE FACE OF MAJOR UNCERTAINTIES AND LIMITED RESOURCES AND INFRASTRUCTURE

Field cost estimates for Environmental Restoration and Waste Management for FY 1991 and beyond are large, have not yet been fully validated, and represent activities likely to outstrip the capability of the Department's infrastructure to manage effectively and in the public interest. DOE will work with the States, Indian Nations, and others to develop work plans that are clearly achievable, cost effective, and directly address the highest priority protection of worker and public health and safety and the environment.

The contrast between the magnitude of environmental compliance and cleanup problems and the resources that can be effectively brought to bear to resolve them is not unique to DOE. It is a national issue requiring a national solution. Although differing in a number of important respects, the Environmental Protection Agency's (EPA) Superfund program is a case in point. The remediation objectives of DOE's program are the same as those of Superfund. Indeed, 15 of DOE's installations, including the largest, are already included on the Superfund's National Priorities List.

On page 8 of the EPA Administrator's Management Review of the Superfund Program (90-Day Report, 1989), under the heading "The Challenge Ahead," appear words applicable to DOE: "Superfund's problems are tough and will not be soon or easily solved. Balancing competing statutory goals, getting the most from an apparently huge but actually limited resource pool, rewarding and retaining a top-notch Federal technical staff, and ensuring first-rate work in the public interest by teams of contractors with divided interests, while only parts of the challenge, nevertheless make up a formidable agenda."

In an attempt to respond to the many pressing problems facing the Department in the areas of environmental restoration and waste management, DOE must learn from the experience of others, avoid their mistakes, and seek to avoid making significant mistakes of its own by maintaining focus on overall program objectives and recognizing problems and negative trends early.

Expectations, Realism, and Responsibility: Commenting on the FY 1991-1995 Five-Year Plan, the National Academy of Sciences (NAS) Board on Radioactive Waste Management emphasized, among other things, that "Public trust can be won only by clear and credible progress toward environmental cleanup. Therefore, the Plan should be careful not to raise unreasonable expectations by promising more extensive cleanup, or a shorter timetable, than can realistically be achieved." (See Appendix C1 for the full text of NAS comments and DOE responses.)

In the EPA Administrator's report noted earlier, the significance of realism is also highlighted. "Both success and failure are relative, the final determination being a function of expectations as much as of performance. If Superfund is perceived so far to have been a high-cost disappointment, it is largely because program performance has not met high, and perhaps unrealistic expectations."

What is "unrealistic" is difficult to define so as to satisfy all interested parties and observers. Nevertheless, it is clear that DOE has raised expectations without satisfying them. It is also clear that the funding requests submitted by the field for the FY 1992-1996 Five-Year Plan represent more than the Department can spend effectively and responsibly. (In this regard, see Section 1.2 concerning validated and invalidated cost estimates.)

Progress has been slow on the development of a nationally acceptable, rigorous, risk-based system for prioritizing compliance and cleanup activities. (See Section 1.4.1.) But the lack of such a system does not relieve DOE of its responsibility to proceed as intelligently as possible. With or without a formal decision-aiding methodology, DOE must distinguish what is smart to do from what is not smart. DOE will work with the States, Indian Nations, and other interested parties to establish an agreed approach to pursuing what is smart. DOE recognizes that solving its problems and meeting its goal of compliance and cleanup by the year 2019 will require an enormous amount of realism, honesty, plain speaking, and cooperation among DOE, affected States, Indian Nations, the Administration, other Federal agencies, the Congress, and the public.

What Is Not Smart?

- Groundwater well drilling and other characterization efforts without a clear rationale for the number and location of samples necessary and sufficient for cleanup to start.

The current emphasis on installing groundwater characterization wells may actually increase risks to the public and/or the environment. Based on current plans, the Department would install nearly 1500 wells in FY 1991 under its Environmental Restoration program. Placing wells simply on the basis of rigor inferred from regulations detracts from efforts to design efficient characterization plans, leads to a data explosion yielding diminishingly useful returns, and most importantly provides potential new pathways for contaminants to migrate throughout the very groundwater the Department seeks to protect.

- Planning for a sampling and analysis program that exceeds the capacity of the system to support it.

There are significant uncertainties about the capacity of existing laboratories to analyze DOE mixed radioactive and hazardous samples. Until this uncertainty can be resolved, it is counterproductive for DOE to plan or commit to characterization schedules that cannot be met.

- Trying to manage, with too few qualified managers, more work than there are qualified workers to do.

The total of validated and invalidated estimates for cleanup and waste management for FY 1991 and beyond involves very large sums of money. Ignoring any questions of their accuracy and the availability of effective technology to achieve the needed degree of cleanup and waste management, there is nothing close to the required infrastructure available to manage and implement these solutions. Not only is DOE understaffed at Headquarters and throughout its Operations Offices, but the EPA regions, the States, and the remediation contractors are also understaffed--and are all competing for the same scarce human resources. DOE Headquarters will not be fully staffed for two to three years, and the national demand could easily take a decade to supply.

- Spending money on problems without sound cost verification.

The Nation's (not only DOE's) environmental compliance and cleanup efforts, and the management of these activities, are immature. There has not been sufficient time or experience nationwide to develop verified cost and scope estimates. DOE must be assured that it--and thereby the public it is mandated to serve--gets the most effective use of its limited fiscal resources.

- Allowing uncontrolled program growth to impact DOE's ability to conduct the program in an effective manner.

The environmental restoration programs for the Department of Defense (DOD), DOE, and EPA have grown significantly over the past several years. The combined growth rate of these programs from FY 1989 to FY 1991 is 45 percent. The human resources and industrial and analytical capacity do not exist to continue to support this type of growth.

What is Smart?

- Bias for action - avoiding excessive characterization; starting needed cleanup as soon as possible.

Activities must focus on eliminating or reducing known or recognized potential risks to worker and public health and the environment. Examples are actions to remove contamination source terms, contain or isolate known or suspected onsite contamination (pending development and application of effective remedial actions), and isolate, remove, or detoxify offsite contamination. While these concepts are certainly embodied in the commitments the Department has made to the public to date, it is not clear they have received the proper emphasis in the Department's regulatory agreements or field work plans.

During the review of an earlier draft of this Plan, EPA encouraged DOE to use the planning process to seek options for early action. A bias for action means do sufficient assessment to determine if there is a near-term risk to human health and safety or the environment; if so, then immediately undertake sufficient cleanup action to abate the near-term threat; if not, then place continuing assessment and subsequent cleanup on a longer schedule. Such immediate cleanup may not address all aspects of site contamination but would address that portion posing the near-term risk. After abating the immediate threat, further assessment and cleanup can be undertaken on a longer schedule.

The Environmental Restoration program is still in the phases of problem definition and remedy identification, and decision makers seem willing to make decisions on remediation only when uncertainty and risk are minimal. The tendency is to lose sight of the point at which continued characterization becomes excessive and counterproductive. This trend, though well intentioned, is disturbing and likely to be detrimental to the protection of worker and public health and safety and the environment.

The Department believes that remedial actions can generally be initiated at its sites with much less characterization than currently proposed and with little, if any, additional risk as to the ultimate success of the remedy.

Interim remedial actions, where appropriate, and application of the "Observational Approach" are smart ways to proceed. This technique, pioneered in the oil and gas exploration industries and large public works projects and in use since

early in this century, would allow cleanup work to start sooner than with a rigorous application of conventional methods. In addition, this technique is expected to yield lower overall costs by permitting flexible response to new characterization information during the implementation of a remedy. A reasonable range of contingencies in conditions affecting remedial action is recognized and accounted for in the remediation process under this technique. Under the more rigid conventional approach, remediation design typically is forced to account for nearly all possible contingencies. Such rigidity only builds delays and excessive cost into project plans.

- Beginning now to deal with the need for added analytical laboratory capacity.

Adequate characterization of DOE's sites and facilities depends directly on the Department's capability for carrying out a large number of sample analyses of the right kind and of the right quality and consistency. In contrast to other cleanup programs, such as EPA's Superfund Program, DOE's requirements are also unique in that a major fraction of the needed analyses may involve the detection and identification of radioactive substances. To provide a basis for increasing requisite laboratory capacity, DOE is assessing its needs relative to the expected increase in the number of samples needing analysis over the next five years. Furthermore, to ensure capability for constant processing with no shortfall in capacity, the Department is working with EPA, the Nuclear Regulatory Commission, and DOD to coordinate their needs with DOE's.

- Supporting the education of new scientists, engineers, managers, and workers and retraining those whose jobs are threatened by production shutdowns and cutbacks.

Not since Sputnik set off a massive national scientific and technical education effort in the late 1950s has there been such a large and pressing need to build an educated and reeducated human resource base. In effect, we need a second Space Program, this time, for the space where we live. As part of its Technology Development Program, DOE is implementing a comprehensive educational and outreach program in science and technology to increase the talent pool available for site cleanup and waste management needs (Section 5.7).

- Verifying cost estimates internally and externally.

The problems of estimating costs were highlighted in the recent Office of Technology Assessment Draft Report, Status of Site Assessments. "One of the difficulties in estimating remediation costs is that an historical data base, similar to that which exists for construction projects, is not available.... Cost accounting methods for these DOE EM [remediation] projects have not lent themselves to the creation of such a database. Several interested parties suggested that the creation of a unit cost accounting system for environmental activities would prove extremely useful for future cost estimation efforts. (Interestingly, the EPA also has no standardized unit cost accounting method for CERCLA or RCRA cleanups.)" The DOE EM Office of Quality Assurance and Quality Control is performing an independent internal evaluation of the cost and scope of several major Environmental Restoration projects. To take advantage of its relevant experience, DOE is using the Army Corps of Engineers and is exploring use of other third parties to independently verify the project costs for assessment and cleanup activities.

- Working with the Administration and the Congress to establish procedures to accommodate unexpected changes in funding requirements.

The experience with the FY 1992-1996 Five-Year Plan clearly demonstrates the dynamic nature of the DOE Environmental Restoration and Waste Management Program. It is likely that there will be a continuing series of unexpected changes as implementation of the program proceeds. It is extremely difficult in this type of environment to adhere to the traditional Federal budget process, which requires budget estimates to be prepared as much as 18 months in advance of expenditure and requires that Federal appropriations be controlled within extremely narrow budget line items. New budgetary mechanisms are needed to permit DOE greater flexibility to respond swiftly and effectively to unexpected changes without compromising the accountability and financial integrity of the Federal budget process. Section 1.9 discusses one possible option, the creation of a near-term response fund to allow DOE to respond quickly to sudden compliance and cleanup needs as they arise. DOE is assessing the feasibility of this as well as investigating proposals for other alternatives such as multi-year budgeting or a single appropriation account. DOE's aggressive steps toward policing its own operations and toward opening its doors to outside scrutiny make sound policy and underscore the need for new approaches.

- Investing in technology development, with an immediate and vigorous emphasis on waste minimization and waste avoidance.

Significant funding for technology development is a wise investment. (See Sections 1.16 and 5.) Many technology development projects are likely to fail or be only partially successful, which is typical of virtually all complex technical arenas. But to refrain from such investment in the short term is to incur a penalty over the long term. Waste minimization and waste avoidance technologies--whether by chemical substitution, process modification, or administrative controls--are the only hope for preventing passing on to future generations the legacy DOE has inherited from its past. DOE is making this investment, approximately eight to ten percent of EM's annual budget, to realize these benefits (Section 1.5.1).

- Keeping an open door, an open ear, and an open mind--and asking all stakeholders to do the same.

DOE's culture is changing and must continue to change, both within the Department and in its dealing with external interested parties and the public. Likewise, the culture of the interested parties is changing and must continue to change. Cautious optimism on everyone's part is the appropriate starting point. DOE is taking steps to expand external review of its activities, for example, through the State and Tribal Government Working Group, the Stakeholders Forum, public review of Five-Year and Site-Specific Plans and increased support of State oversight. (See Sections 1.14, 1.15, and 1.15.1.)

- Improving risk communications.

In the EPA Administrator's report noted earlier, it is stated that the public wants to be protected from risks associated with living near a contaminated site. DOE needs to improve its ability to explain the risks to the public in ways that can be easily understood. This will enable the public to participate in the decision-making process in a more meaningful way. DOE is implementing a program of public participation in EM's decision-making process. An essential element of this

program is the preparation of and public involvement in the Public Participation Plans to be part of the Site-Specific Plans, developed for each of DOE's major installations (Section 1.15.1).

1.3 GOALS AND COMMITMENTS

This section reaffirms "proposed actions" from Section 1.1.1 of the FY 1991-1995 Five Year Plan, dividing them into two categories: goals, which cannot be fulfilled all at once or by a small set of discrete actions, and commitments for FY 1990, some of which appeared last year but without completion dates.

Reaffirmed Goals:

- Clean up and restore the environment at DOE's nuclear sites by 2019.
- Comply with laws and regulations aimed at protecting public health and the environment.
- Contain known contamination at inactive sites and vigorously assess the uncertain nature and extent of contamination at other sites to enable realistic planning, scheduling, and budgeting for cleanup.
- Support the establishment of interagency agreements and fulfill the requirements of compliance agreements already in place.
- Continue to expand the public participation process. (See Section 1.15.1.)
- Change DOE culture to one of clear and open communication.
- Work diligently to achieve congressional support for the Plan's objectives.
- Recognize Tribal sovereignty and treaty rights related to Tribal and ceded lands.
- Continually examine environmental regulations to ensure that DOE's compliance actions effectively reduce risk to human health and the environment.

Reaffirmed and New Commitments for FY 1990:

- Develop an interim national prioritization system for cleanup activities based on initial State, Tribal, and other public involvement; apply the system in May-June 1990 to help formulate the FY 1992 budget request. (See Section 1.4.1.)
- Release, for independent scientific analysis, the health records of workers at DOE facilities and conduct public health risk assessments of plant sites for past, present, and future operations. (See Section 1.15.)
- Establish an Applied Research and Development Program. This commitment has been achieved by the creation of the Office of Technology Development within the Office of Environmental Restoration and Waste Management (EM). (See Section 5.)
- Implement programs to minimize current waste generation and future waste disposal requirements. In FY 1990, EM will coordinate the implementation of field site waste minimization plans required by DOE Orders 5820.2A and 5400.1.
- Take innovative steps to develop the human resources needed to implement compliance and cleanup activities. In FY 1990, DOE inaugurates its new education initiatives by funding two pilot partnerships (in South Carolina and New Mexico), preparing a procurement action to add other academic partnerships, and establishing vigorous educational outreach programs at all eight Operations Offices. (See Section 5.7.)
- Enter into Agreements-in-Principle with States that host DOE facilities to help

fund the cost of environmental monitoring of DOE's cleanup and compliance activities.

- Explore the concept of establishing a Near-Term Response Fund as well as other options to accommodate unplanned funding needs. (See Section 1.9.)
- Evaluate options for improving the process of contracting for remedial actions. (See Section 3.1.3.2.)
- Establish a liability Task Force to address liability issues associated with environmental restoration and waste operations activities. Issues include budget planning to ensure compliance with environmental regulations and interagency agreements and permits, contractor liability associated with Plan activities, and DOE employee liability associated with environmental restoration and waste management. The Task Force will function through the spring of 1990 and assist in developing written policy and guidance.
- Establish individual and facility awards for the achievement of excellence in environmental activities.

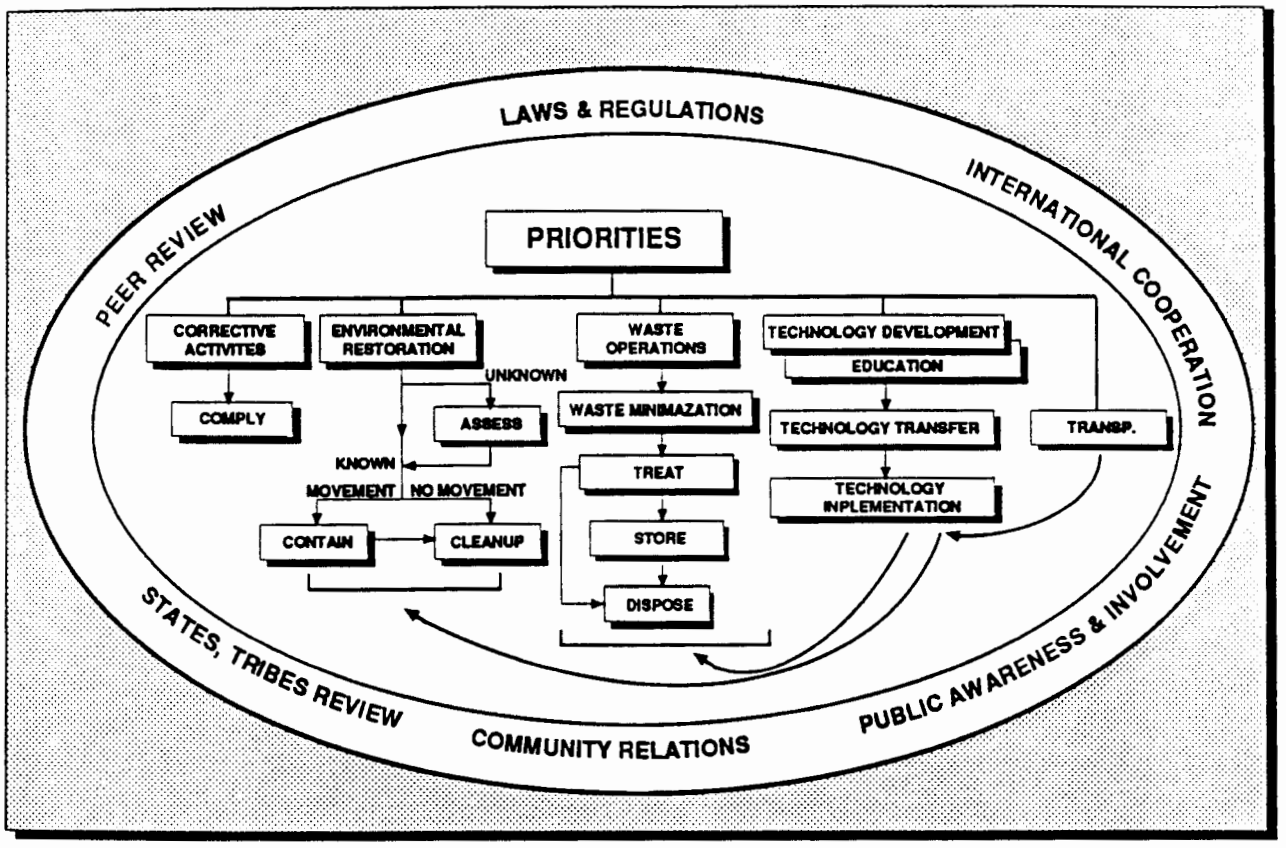


Figure 1.3. The Department of Energy's priorities for Corrective Activities, Environmental Restoration, Waste Operations, Technology Development (including Education), and Transportation are set within a context of laws and regulations, public awareness and involvement, and technical peer review.

1.4 PRIORITIZATION AND FUNDING OF PROGRAM ACTIVITIES

The Five-Year Plan reflects the Department's interim prioritization and estimates for funding the costs connected with existing environmental problems; ensuring compliance with applicable local, State, and Federal requirements and agreements; effectively executing the Department's waste management programs; and conducting the technology development associated with these activities.

Because of the magnitude of DOE waste operations, cleanup, and technology development programs, it is essential that a DOE-wide priority system be developed to guide activities and to support budget requests. The actions DOE has initiated for developing priority systems for environmental restoration activities are discussed in the following section. A separate prioritization system is also being developed for Waste Operations to prioritize ongoing activities and reflect regulatory compliance in the broadest sense. One approach being considered is to break the existing four priority levels into discrete sublevels; another is to develop a ranking based on direct health, safety, environmental, and regulatory risk. The system selected will be applied to next year's Five-Year Plan.

The Plan continues to group activities into four priority categories as developed for the first Plan. These priorities are applied to environmental restoration and waste operations. All corrective activities are defined as Priority 1 to achieve compliance on an expedited basis.

Priority 1: Priority 1 includes activities necessary to prevent near-term adverse impacts to workers, the public, or the environment. Examples include containment to prevent the spread of contamination, actions to prevent or minimize releases to the environment, and ongoing waste operations activities required to maintain safe conditions. Also included as Priority 1 are ongoing activities that, if terminated, could result in significant program and/or resource impacts. Impacts could include significantly increased risk to the environment or to workers or significantly increased costs.

Priority 2: Priority 2 items encompass those activities required to meet the terms of agreements (in place or in negotiation) between DOE and local, State, and Federal agencies. These agreements represent legal commitments to complete activities on the schedules agreed to by DOE. A major goal of this Plan is to document DOE's commitment to complying with these agreements.

Priority 3: Priority 3 includes activities required for compliance with external environmental regulations that were not captured by Priority 1 or 2. Other actions included in Priority 3 are compliance with DOE Orders that implement external regulations or that set specific DOE regulatory standards, actions that would reduce risks or costs, and actions that would prevent disruption of the DOE production mission.

Priority 4: Priority 4 includes activities that are not required by regulation but would be desirable. Examples of Priority 4 actions include complying with DOE Orders that are more stringent than external regulations, implementing improved

management practices, reducing personnel exposures below levels required by regulations or standards, and accelerating actions to satisfy an agreement or milestone ahead of schedule.

Estimated funding for technology development activities is set at approximately 10 percent of the total program budget for environmental restoration and waste operations. Prioritization of competitive technology development proposals is intended to select top-ranked activities that best improve environmental restoration and waste management operations. For FY 1990, technology development activities were selected for funding with the aid of recommendation from expert review groups.

In FY 1991, the Office of Technology Development will develop a prioritization and selection process that will include a more rigorous environmental restoration and waste management needs analysis. Because of the requirements for transportation to support all ongoing Departmental shipping, all transportation operations activities are Priority 1. Transportation technology development priorities will follow guidelines of the priority system to be established for the Technology Development Program.

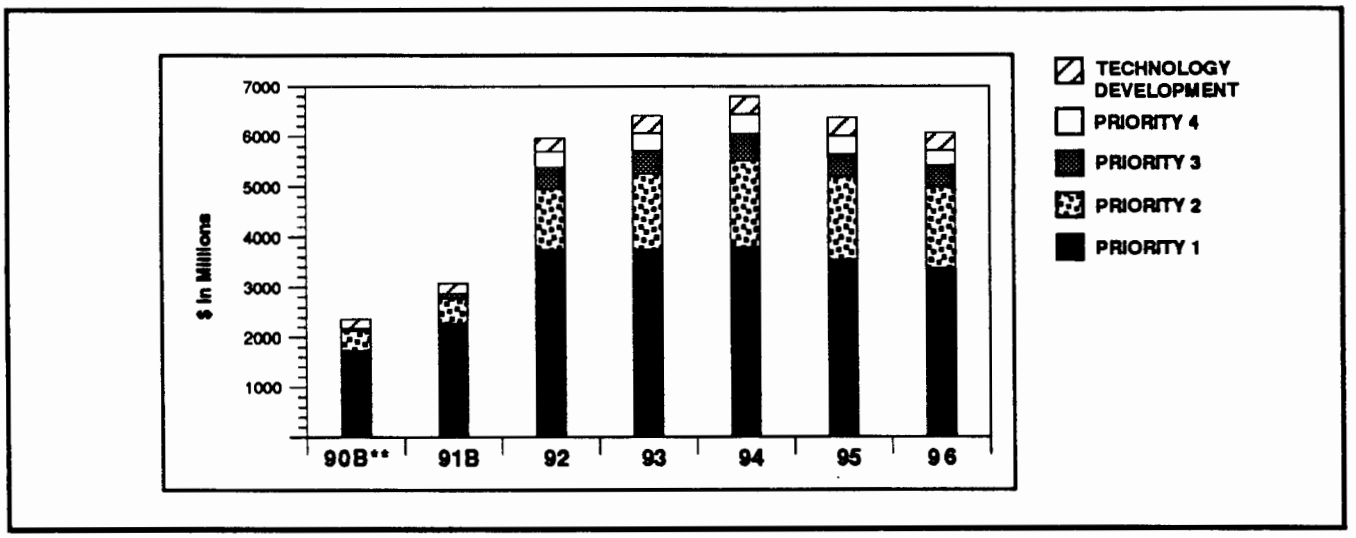
Estimates of FY 1990 and FY 1991 funding and, for FY 1992 and beyond, estimates of costs for activities described in this Five-Year Plan are shown in Figure 1.4a. Corresponding estimates for each of the categories of activities are shown separately in Figures 1.4b-1.4f. The estimates contain both validated and unvalidated amounts. (See Section 1.2 concerning validated and unvalidated cost estimates.)

TOTAL FUNDING AND ESTIMATES OF COSTS

NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by approximately $500 million. $1,528 million of the total field estimates set forth for FY 1992 is unvalidated. The estimates for FY 1993 and beyond include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)

Funding and Estimates of Costs By FIELD OFFICE - Fiscal Year ($ In Millions)*

OFFICE	1990B**	1991B	1992	1993	1994	1995	1996
Albuquerque	256.3	360.4	806.5	801.6	751.3	661.3	598.2
Chicago	27.9	62.2	72.9	61.2	73.3	67.5	62.8
Headquarters	75.9	143.2	379.3	529.1	525.9	397.7	398.5
Idaho	300.3	368.5	718.1	657.4	600.7	519.5	582.1
Nevada	11.1	23.6	66.7	87.5	127.4	121.5	124.4
Oak Ridge	416.5	567.0	1,214.1	1,407.8	1,637.1	1,634.0	1,492.8
Richland	429.9	627.3	1,302.3	1,384.5	1,514.2	1,460.0	1,325.2
Rocky Flats	135.9	89.2	166.9	192.9	195.6	189.1	191.9
San Francisco	48.3	50.6	137.8	161.3	127.3	89.9	67.6
Savannah Riv	474.7	585.3	822.1	777.2	888.3	871.9	863.7
Tech. Dev.	186.3	206.0	280.3	353.0	359.0	359.0	359.0
TOTAL	2,363.0	3,083.1***	5,966.9	6,413.5	6,800.2	6,371.6	6,066.0



Funding and Estimates of Costs By PRIORITY - Fiscal Year ($ In Millions)*

	1990B**	1991B	1992	1993	1994	1995	1996
Priority 1	1,742.0	2,284.1	3,757.6	3,743.6	3,799.8	3,542.1	3,386.8
Priority 2	385.9	498.1	1,181.7	1,517.6	1,717.7	1,640.0	1,592.8
Priority 3	42.1	90.0	443.9	451.7	533.5	457.3	435.4
Priority 4	6.6	4.9	303.4	347.6	390.2	373.2	292.0
Tech. Dev.	186.3	206.0	280.3	353.0	359.0	359.0	359.0
TOTAL	2,363.0	3,083.1***	5,966.9	6,413.5	6,800.2	6,371.6	6,066.0

* Numbers may not add up to totals due to rounding.
** Includes Congressional add on.
*** Includes transportation, uranium enrichment, landlord, and program slippage.

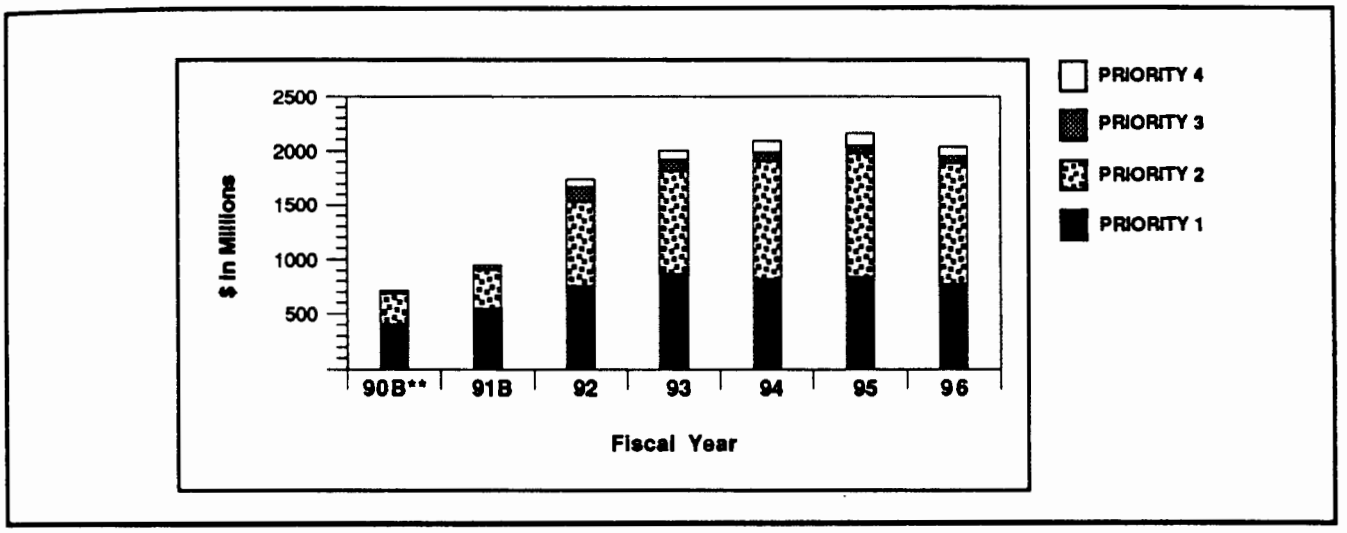
Figure 1.4a. **TOTAL FUNDING** and **ESTIMATED COSTS** of the Plan's activities represents a significant national commitment.

ENVIRONMENTAL RESTORATION and ESTIMATES OF COSTS

NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by approximately $500 million. $1,528 million of the total field estimates set forth for FY 1992 is unvalidated. The estimates for FY 1993 and beyond include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)

Funding and Estimates of Costs By FIELD OFFICE - Fiscal Year ($ In Millions)*

OFFICE	1990B**	1991B	1992	1993	1994	1995	1996
Albuquerque	109.8	161.9	360.6	421.3	356.4	294.9	213.7
Chicago	11.5	34.7	43.2	41.3	46.7	41.0	24.0
Headquarters	45.0	59.3	57.7	56.2	55.4	57.3	59.4
Idaho	81.0	75.6	127.5	106.8	89.6	82.7	88.6
Nevada	2.8	14.1	41.9	63.8	101.7	102.4	108.3
Oak Ridge	239.2	370.1	690.9	856.8	904.4	988.7	907.1
Richland	84.4	101.9	225.6	280.6	343.0	381.2	413.8
Rocky Flats	57.8	40.5	45.7	30.2	45.2	46.8	62.8
San Francisco	22.8	29.4	60.0	43.1	26.4	23.1	17.2
Savannah River	60.9	62.4	84.4	109.8	122.3	143.3	145.6
TOTAL	715.2	949.8	1,737.4	2,009.9	2,091.0	2,161.1	2,040.4



Funding and Estimates of Cost By PRIORITY - Fiscal Year ($ In Millions)*

	1990B**	1991B	1992	1993	1994	1995	1996
Priority 1	412.7	551.7	759.7	866.2	823.9	838.8	776.7
Priority 2	277.9	349.9	770.8	945.7	1,084.3	1,137.9	1,111.1
Priority 3	20.1	47.2	140.3	110.2	80.4	77.5	63.4
Priority 4	4.5	1.1	66.6	87.9	102.5	106.9	89.2
TOTAL	715.2	949.8	1,737.4	2,009.9	2,091.0	2,161.1	2,040.4

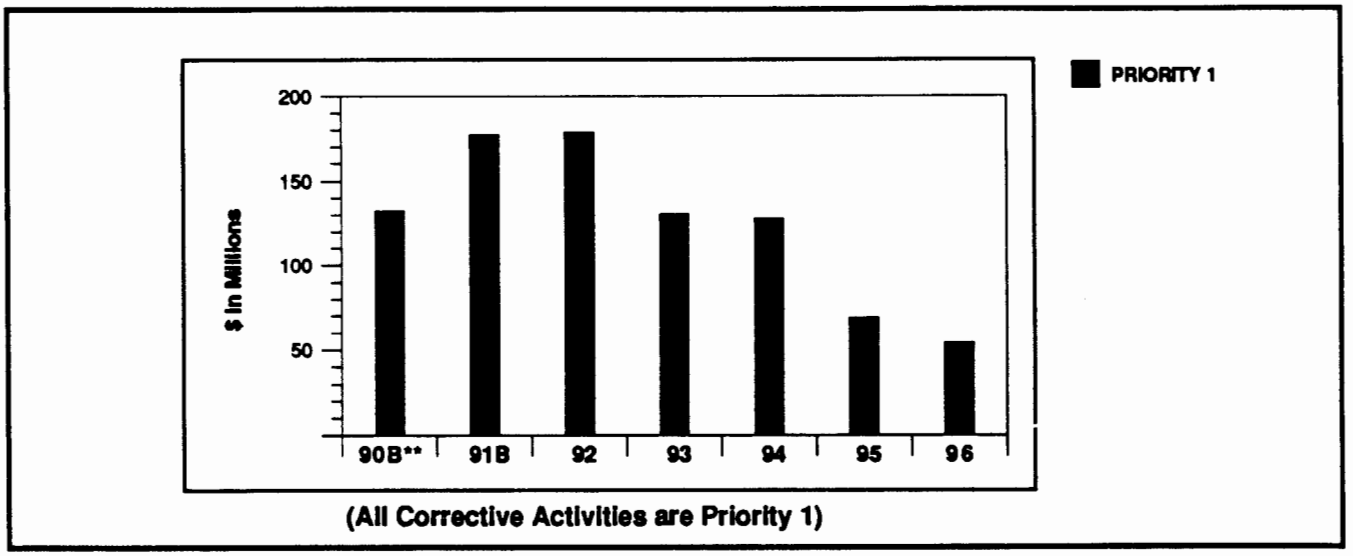
* Numbers may not add up to totals due to rounding.
** Includes Congresstional add on.

Figure 1.4b. Funding and estimated costs for **ENVIRONMENTAL RESTORATION** increase as assessments conclude and remediations begin.

NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by approximately $500 million. $1,528 million of the total field estimates set forth for FY 1992 is unvalidated. The estimates for FY 1993 and beyond include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)

Funding and Estimates of Cost By FIELD OFFICE - Fiscal Year ($ in Millions)*

OFFICE	1990B**	1991B	1992	1993	1994	1995	1996
Albuquerque	20.3	20.9	28.0	12.0	12.5	13.9	6.2
Chicago	5.3	10.2	10.2	1.9	0.6	0.6	0.6
Idaho	7.8	14.0	7.0	5.0	5.0	3.0	1.0
Nevada	1.7	0.8	1.7	0	0	0	0
Oak Ridge	30.9	55.7	61.4	63.2	73.9	31.4	32.9
Richland	18.3	22.0	24.8	13.0	11.2	11.2	11.2
Rocky Flats	1.8	1.4	2.9	6.2	2.4	0	0
San Francisco	6.6	5.4	24.0	29.3	22.2	8.7	2.4
Savannah River	39.4	46.6	17.6	0	0	0	0
TOTAL	132.3	177.1	178.5	130.5	127.8	68.8	54.1



(All Corrective Activities are Priority 1)

Funding and Estimates of Costs By PRIORITY - Fiscal Year ($ in Millions)*

	1990B**	1991B	1992	1993	1994	1995	1996
Priority 1	132.3	177.1	178.5	130.5	127.8	68.8	54.1
TOTAL	132.3	177.1	178.5	130.5	127.8	68.8	54.1

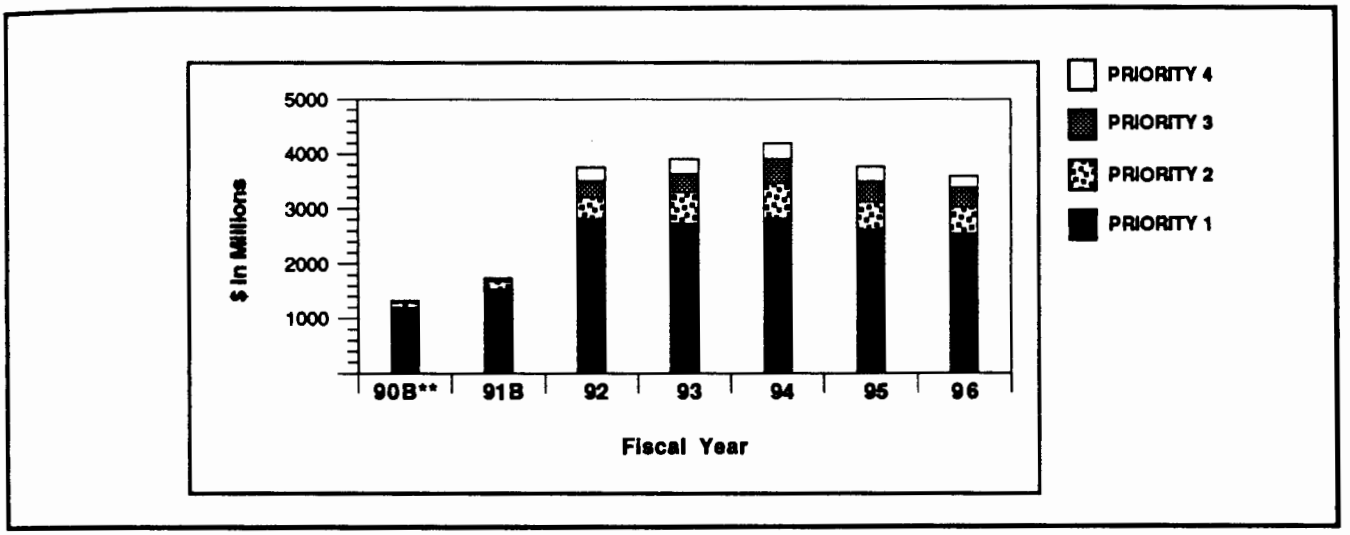
* Numbers may not add up to totals due to rounding.
** Includes Congresstional add on.

Figure 1.4c. The funding and estimated costs for CORRECTIVE ACTIVITIES are intended to resolve all identified out-of-compliance conditions at Department of Energy facilities.

NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by approximately $500 million. $1,528 million of the total field estimates set forth for FY 1992 is unvalidated. The estimates for FY 1993 and beyond include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)

Funding and Estimates of Costs By FIELD OFFICE - Fiscal Year ($ In Millions)*

OFFICE	1990B**	1991B	1992	1993	1994	1995	1996
Albuquerque	121.9	171.8	409.3	359.6	373.3	343.7	370.3
Chicago	10.9	17.2	19.3	17.6	25.6	25.5	37.6
Headquarters	29.3	81.9	319.6	470.9	468.4	338.3	336.9
Idaho	211.4	278.9	583.6	545.6	506.2	433.8	492.5
Nevada	6.5	8.6	22.8	23.4	25.4	18.8	15.8
Oak Ridge	142.8	137.7	456.8	482.4	653.4	608.6	547.5
Richland	324.7	499.7	1,047.7	1,085.6	1,155.5	1,063.1	895.7
Rocky Flats	76.3	47.3	118.3	156.5	148.0	142.4	129.0
San Francisco	18.9	15.7	53.8	88.9	78.8	58.1	48.0
Savannah River	374.4	476.2	720.2	667.4	766.0	728.7	718.1
TOTAL	1,317.2	1,735.0	3,751.3	3,898.0	4,200.5	3,760.9	3,591.3



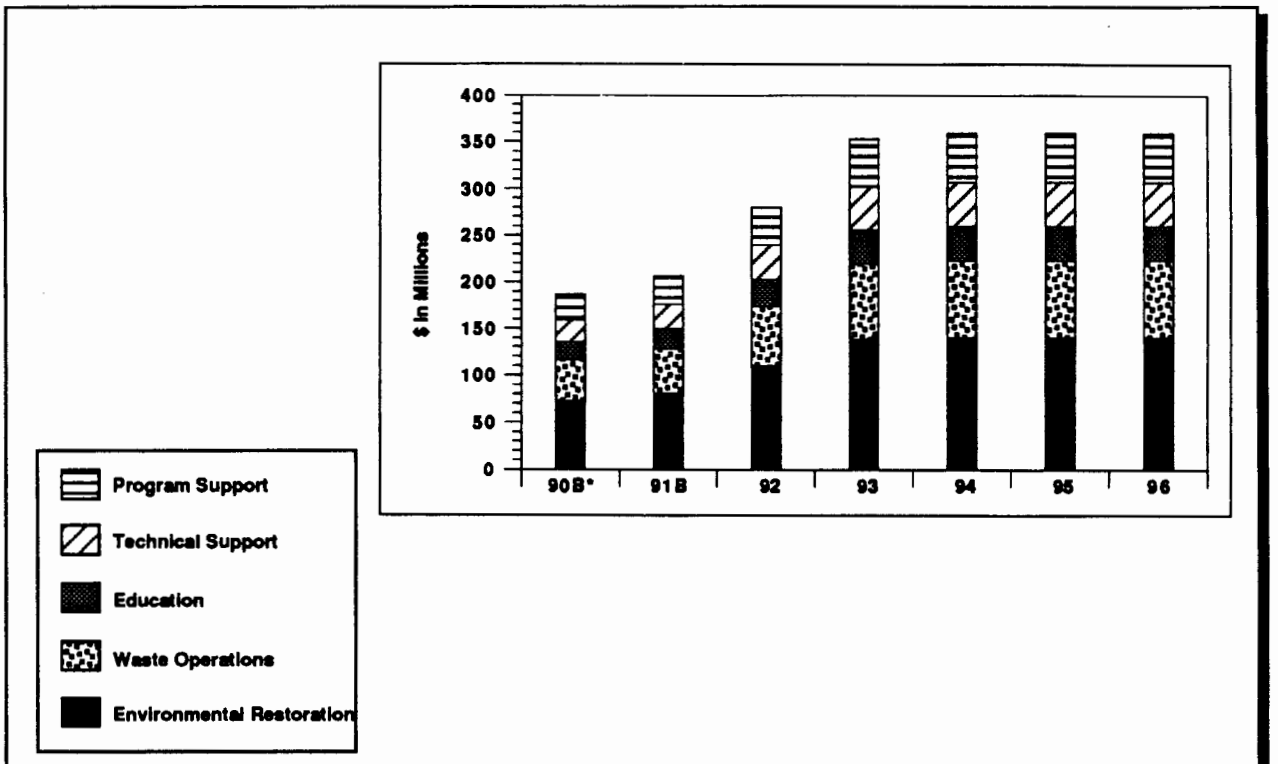
Funding and Estimates of Costs By PRIORITY - Fiscal Year ($ In Millions)*

	1990B**	1991B	1992	1993	1994	1995	1996
Priority 1	1,191.1	1,548.3	2,810.5	2,737.4	2,838.6	2,624.9	2,546.4
Priority 2	103.7	142.4	403.3	563.2	624.3	493.4	473.6
Priority 3	20.2	40.4	300.8	337.6	449.8	376.4	368.5
Priority 4	2.1	3.8	236.8	259.8	287.8	266.2	202.8
TOTAL	1,317.2	1,735.0	3,751.3	3,898.0	4,200.5	3,760.9	3,591.3

* Numbers may not add up to totals due to rounding.
** Includes Congressional add on.

Figure 1.4d. The funding and estimated costs for **WASTE OPERATIONS** is primarily for ongoing activities including treatment, storage, disposal and minimization of all types of wastes produced by Department of Energy (DOE). Funding also includes DOE's annual contribution to the Nuclear Waste Fund.

NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by approximately $500 million. $1,528 million of the total field estimates set forth for FY 1992 is unvalidated. The estimates for FY 1993 and beyond include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)



Funding and Estimates of Cost By Categories - Fiscal Year ($ In Millions)**

	1990B*	1991B	1992	1993	1994	1995	1996
Environmental Restoration	73.0	80.7	109.8	138.3	140.6	140.6	140.6
Waste Operations	42.7	47.2	64.2	80.9	82.2	82.2	82.2
Education	19.2	21.2	28.9	36.3	37.0	37.0	37.0
Technical Support	24.3	26.9	36.6	46.1	46.9	46.9	46.9
Program Support	27.1	30.0	40.8	51.4	52.3	52.3	52.3
TOTAL	186.3	206.0	280.3	353.0	359.0	359.0	359.0

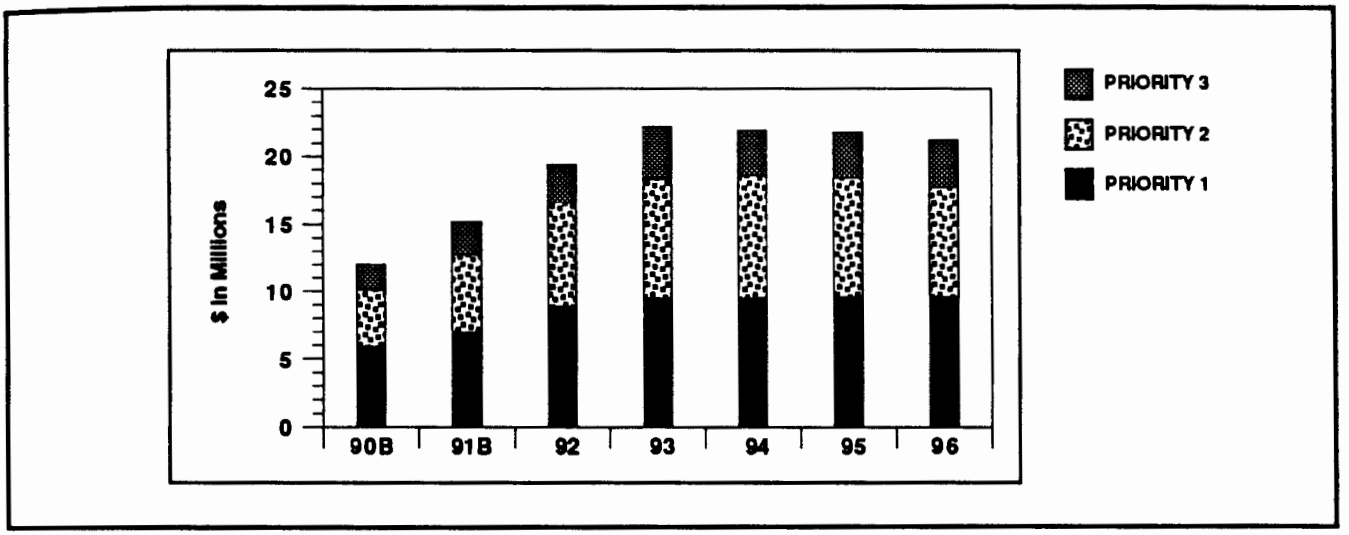
* Includes Congressional add on.
** Numbers may not add up to totals due to rounding.

Figure 1.4e. Funding and estimated costs for **TECHNOLOGY DEVELOPMENT** responds to needs for safer, faster, more effective, and less costly solutions to the Department of Energy's environmental restoration and waste management problems.

NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by approximately $500 million. $1,528 million of the total field estimates set forth for FY 1992 is unvalidated. The estimates for FY 1993 and beyond include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)

Funding and Estimates of Costs By FIELD OFFICE - Fiscal Year ($ in Millions)*

OFFICE	1990B	1991B	1992	1993	1994	1995	1996
Albuquerque	4.2	5.8	7.7	8.8	9.1	8.8	8.1
Chicago	0.2	0.2	0.2	0.4	0.4	0.5	0.6
Headquarters	1.5	2.0	2.0	2.1	2.1	2.2	2.3
Nevada	0	0	0.3	0.3	0.3	0.3	0.3
Oak Ridge	3.5	3.5	5.0	5.4	5.4	5.4	5.4
Richland	2.5	3.7	4.2	5.3	4.6	4.6	4.6
TOTAL	12.0	15.2	19.4	22.2	21.9	21.7	21.2



Funding and Estimates of Costs By PRIORITY - Fiscal Year ($ in Millions)*

	1990B	1991B	1992	1993	1994	1995	1996
Priority 1	5.9	7.0	8.9	9.5	9.5	9.6	9.6
Priority 2	4.2	5.8	7.7	8.8	9.1	8.8	8.1
Priority 3	1.9	2.4	2.8	3.9	3.3	3.4	3.5
TOTAL	12.0	15.2	19.4	22.2	21.9	21.7	21.2

* Numbers may not add up to totals due to rounding.

Figure 1.4f. The **TRANSPORTATION MANAGEMENT PROGRAM** includes many activities that support the safe and economical transport of Department of Energy materials and wastes.

1.4.1 PROGRESS IN DEVELOPING A CONSENSUS-BASED PRIORITIZATION METHODOLOGY

DOE, in consultation with interested parties, is developing a prioritization system for Environmental Restoration activities aimed at ensuring that program funding decisions reflect the primary goals of protecting public health and the environment and complying with regulatory requirements and agreements and that they are made in a technically defensible and even-handed manner.

DOE is in the process of developing a risk-based prioritization methodology to assist in the budget formulation and allocation process. This methodology will be a formal analytical decision-aiding tool addressing health and safety risks as well as social, technical, economic, and policy issues. The goals for this methodology are to support DOE budget formulation and allocation, measure the relative priority of program elements against a comprehensive set of program objectives, explicitly identify the tradeoffs between objectives, focus discussion about priorities, and provide a framework for evaluating the sensitivity of results to assumptions.

In keeping with DOE's commitment to involve interested parties in the Five-Year Plan process, this prioritization system is being developed in consultation with a wide range of outside parties, including State and Tribal governments, national environmental group representatives, the Environmental Protection Agency, and independent technical experts. DOE also plans to involve such parties during the implementation of the completed prioritization system. DOE appreciates the useful observations and advice that have been provided by these parties from the beginning of the development of the system, but recognizes that these parties do not necessarily approve, disapprove, or endorse the resulting system, for which DOE assumes full responsibility.

Responding to suggestions from outside reviewers that it would be wise to proceed slowly in developing the prioritization system, DOE has decided to follow two parallel paths--one directed toward meeting the near-term needs of the FY 1992 budget process and the other toward the long-term development of the complete prioritization system. Pending development of the final system over the course of the next year, a partial system based on the development effort thus far will be constructed and applied to the FY 1992 budget. This interim application will allow DOE to improve last year's four-tiered system and to test portions of the overall concept for the new system. Figure 1.4.1 provides an overview of this two-path approach.

Step 1: Identify Objectives for Budget Allocation. These objectives will provide the basis for establishing priorities among all DOE program elements.

Step 2: Conceptual Design Report (CDR). This report will describe a complete prioritization methodology as a focus for internal and external review.

Step 3a: Review CDR. The CDR will be reviewed by interested parties and technical advisory groups.

Step 3b: Develop and Apply an Interim Methodology. Consistent with the CDR,

this interim method will be used in developing the FY 1992 budget.

Step 3b.1: Develop Measures for Objectives. Interim scales developed to measure the performance of Environmental Restoration program elements against the objectives will probably be modified as additional data are developed for the final method.

Step 3b.2: Estimate Achievement of Objectives for Environmental Restoration Program Elements. These estimates will be based on available data and expert judgments.

Step 3b.3: Determine Relative Importance of Objectives. This step may be controversial, but value judgments are an essential part of any decision. DOE intends to make these value judgments explicit and subject to review.

Step 3b.4: Calculate Results and Conduct Sensitivity Analyses. DOE will calculate the relative value of Environmental Restoration program alternatives and conduct sensitivity analyses on key assumptions and judgments.

Step 3b.5: Provide Decision Makers with Results of Analyses.

Step 4: Evaluate CDR Reviews and Interim Application. Interested parties will have the opportunity to review the results of this interim application, consistent with requirements governing release of budget-formulation data.

Step 5: Revise the Conceptual Design and Complete Development of the Methodology. The revised method will be developed in time for a more complete application next year.

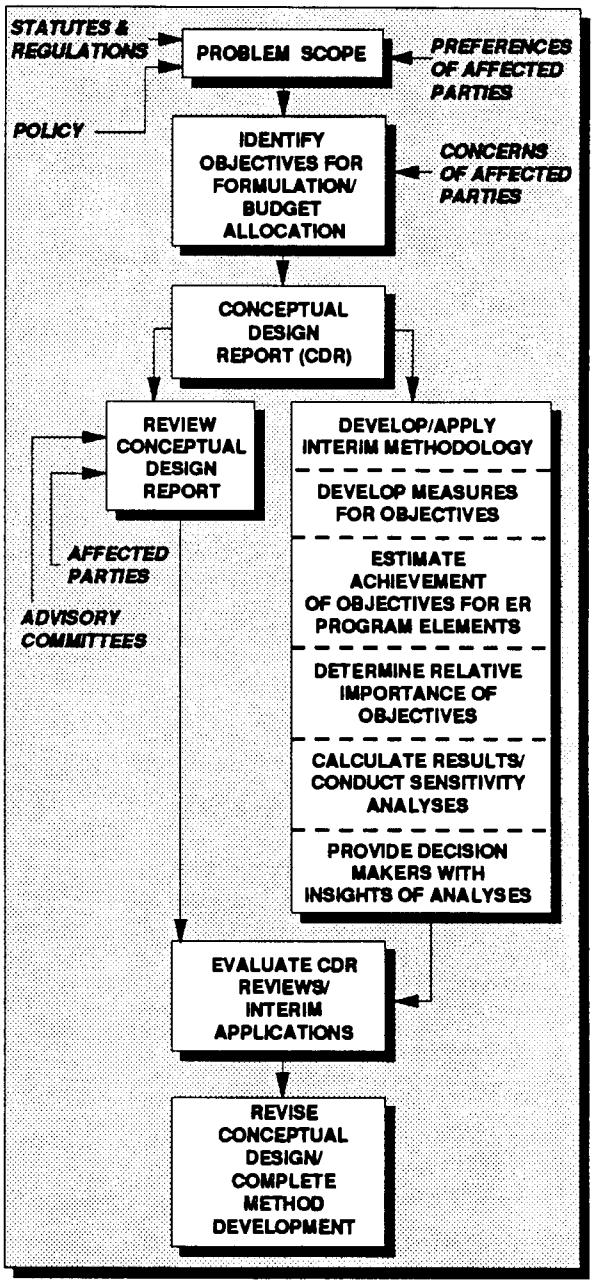


Figure 1.4.1. Steps to Environmental Restoration prioritization methodology development take two converging paths.

1.5 LONG-TERM PERSPECTIVE: DOE'S STRATEGY FOR ACHIEVING ITS 30-YEAR COMPLIANCE AND CLEANUP GOAL

DOE has set the ambitious goal of having all of its facilities cleaned up and in compliance with all applicable environmental laws and regulations by the year 2019. Achievement of this goal is contingent upon technological breakthroughs, education, cooperation of regulators, and a stable national policy.

DOE has set the ambitious goal of cleaning up all of its waste sites and bringing all of its facilities into full environmental compliance by 2019. That goal is ambitious both because of the magnitude of the effort required and because the means for attaining the goal do not now exist for all cases. DOE's strategy for reaching its goal is based on applied research and development, education, cooperation with regulators, and the promotion of a stable national policy.

DOE's environmental problems originate from activities dating as far back as the Manhattan Project of 1942-1945. Over the intervening years, practices that were considered safe and prudent have proven to be neither. Practices that have since been determined to cause environmental problems were carried out for decades. The result has been the creation of large sites requiring remediation, the full extent of which is still being evaluated.

The Office of Technology Development has instituted a program to assess the magnitude of its cleanup effort and to evaluate the potential technologies to be used. Results to date indicate that cleanup will be a long-term effort due to the cost of remediation, the number of specially trained people required, and the specialized equipment and facilities required. In addition, not all problems identified to date have satisfactory solutions available. At sites where there is no immediate solution, DOE's strategy for compliance must focus on near-term protection and risk reduction. Sites for which no satisfactory technology exists for cleanup must be stabilized and monitored pending development of a final solution.

Providing new technologies to meet intractable problems will require close cooperation among all of the stakeholders in DOE's cleanups, including the technologists, regulators, and contractors (Section 1.7). Not only must the technologists be attuned to the research, development, demonstration, testing, and evaluation needs of the Department, but the regulators must become an active part of solving problems. By joining in a cooperative effort to bring its facilities into compliance, DOE and the regulators will have similar goals, focus on reducing risks, seek permanent solutions to problems, and avoid creating new problems in the name of demonstrating action.

Meeting its 30-year goal for cleanup and compliance also depends on maintaining a stable national policy toward DOE and its environmental problems. To promote a stable national policy, DOE must communicate its needs to the public and allow the public to provide input to its planning. Public participation initiatives have already been set in motion (Section 1.15.1), and others are planned. Compliance with the National Environmental Policy Act (NEPA) will

allow DOE additional opportunities for public participation. A major programmatic environmental impact statement (PEIS) is in progress for the Environmental Restoration and Waste Management Five-Year Plan. The NEPA process incorporates public review and comment throughout, beginning with public scoping meetings and reviews of drafts. Public hearings are included before a final PEIS is issued.

The PEIS will provide major input to Departmental planning and will serve as an umbrella document for specific projects that implement the plans. NEPA review (i.e., Environmental Assessments or EISs) will be prepared for the implementing projects and will be tiered to the PEIS.

Completion of the PEIS process could affect Five-Year Plan activities. Such changes would be reflected, as they occur, in updates of the Five-Year Plan.

The Office of Environmental Restoration and Waste Management (EM) is preparing a study for modernization of the waste management complex. The study is the first step in preparing a strategic plan for the management of EM wastes over the next 25 years.

Meeting DOE's 30-year goal for compliance and cleanup is by no means assured. Section 1.5.1 explains DOE's sense of cautious optimism related to needed technological advancements.

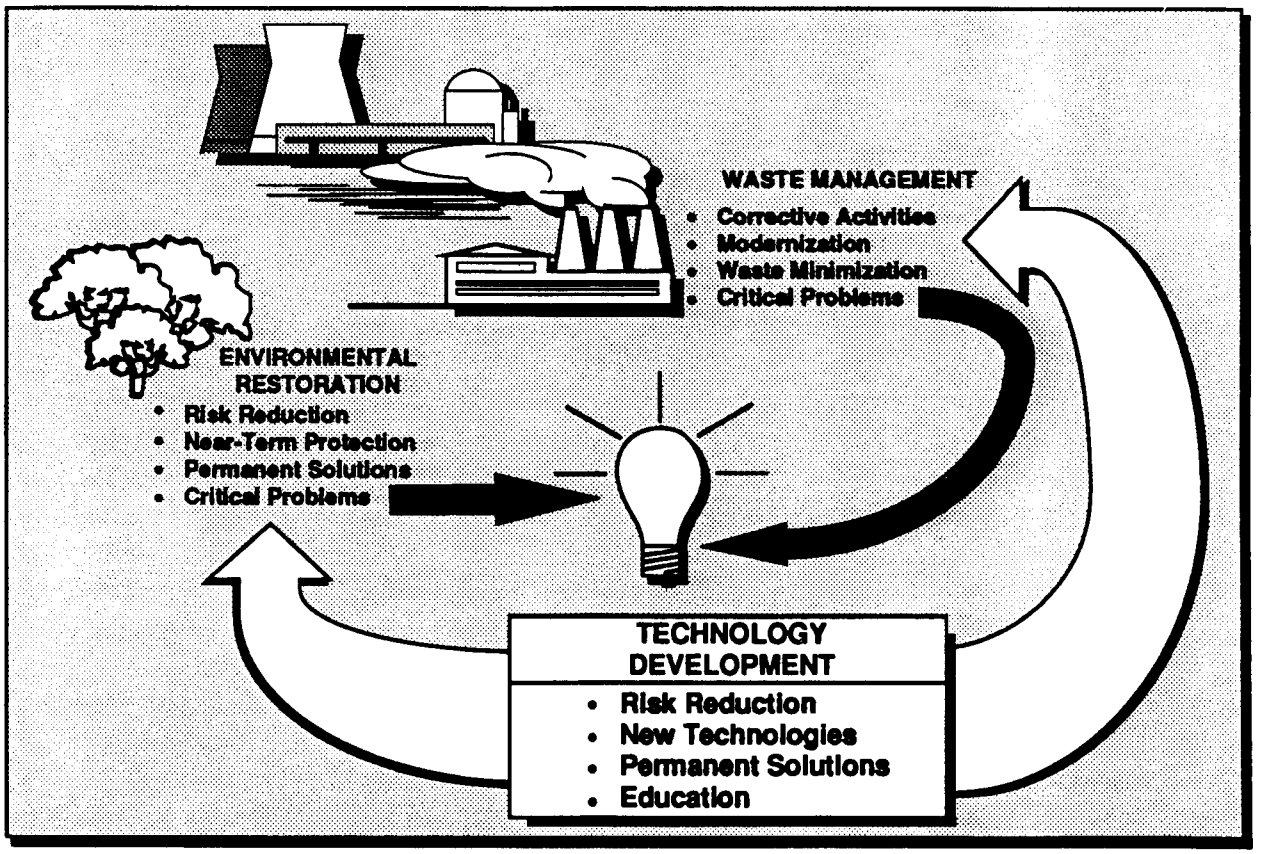


Figure 1.5. The Department of Energy's strategy for achieving its 30-year compliance and cleanup goal is strongly dependent on research and development to provide technological breakthroughs for solving critical problems.

1.5.1 ROLE OF TECHNOLOGY DEVELOPMENT IN COMPLIANCE AND CLEANUP

Collaboration among national laboratories, universities, and industry is a necessary but insufficient prerequisite for achieving technical advancements that address DOE's identified needs.

Meeting DOE's 30-year goal for compliance and cleanup is by no means assured. Although DOE stands at the forefront of a national desire to repair and maintain the environment, not all problems identified to date have satisfactory solutions. The Office of Technology Development (OTD) will strive to create refinements and advancements and will hope for the breakthroughs needed to solve DOE's environmental restoration and waste management problems. In addition, future waste generated by DOE sites must be in a form that is acceptable to repositories.

The DOE plan to restore and properly operate its sites should be the national testbed for environmental restoration and waste management technology development and implementation. A fully successful Technology Development Program constituting about 10 percent of the Office of Environmental Restoration and Waste Management's budget will result in DOE not only achieving its goal, but achieving it faster, more safely, and at lower cost. Even if only partially successful, technology development will provide significant benefits (Section 5.4). Technology transfer to industry, including the development of a cadre of DOE technical specialists, will support and expedite national efforts in restoration. The investment in technology development will be more than repaid by savings in operational costs. The absence of a Technology Development Program will result in a continuation of the old practices of "suck, muck, and truck." The result will be exorbitant costs, probable delays, and unnecessary exposure of workers and the public to chemical and radiological hazards.

DOE recognizes that OTD must expect to have a high rate of failure. Technological breakthroughs cannot be planned or depended upon. Progress will instead largely be made as the result of a series of incremental advancements. The projects that successfully pass through the test and evaluation stages will be sufficient for solving DOE's environmental problems. Research in science and technology moves in zigs and zags rather than in a linear fashion.

Areas of DOE's Needs: Waste minimization (Section 5.3.1) has the potential for reducing cost while providing a permanent and verifiable solution to some types of waste problems. Waste management consumes a significant part of a typical DOE production facility's operating budget. With less waste being generated, greater effort can be placed on confinement to prevent the need for future environmental restoration. A combination of material substitution, increased recycling, modification of production operations, and redesign of products has the potential for reducing the volume of waste resulting from existing weapon manufacturing by 60 to

80 percent from 1985 levels within 10 years of start. Studies of transuranic and low-level waste in the Draft Research, Development, Demonstration, Testing, and Evaluation Plan (November 1989) indicated that reductions of this magnitude would save $2.7 billion over 20 years. A review of a high-level waste minimization project at the Idaho Chemical Processing Plant indicated possible savings of up to $1.3 billion over 20 years. Achieving such reductions throughout the DOE system generally could save DOE $10 billion in reduced waste (Section 5.4.1) treatment, storage, and disposal costs over 20 years.

Site and waste characterization (Section 5.3.4.1) technologies can be made simpler and more efficient by the development of noninvasive remote sensors, real-time analytical tools, and improved systems for managing and interpreting data. In some cases, site contractors do not know what to do, where to do it, or when to stop. Geohydrologic systems are complex, and characterization is extremely expensive and slow. Improved risk assessment techniques must make it possible to start appropriate remediation with less complete characterization data.

Remediation technologies (Section 5.3.4.2) are available for many applications but have rarely been completely tested and evaluated for uses in specific DOE situations. Testing and evaluation of promising existing technologies for mixed wastes and contaminated sites will provide environmental restoration technologists with an arsenal of available methods with known costs and effectiveness. Without such testing, there is no verifiable basis for establishing regulatory compliance. In some cases, the containment of existing contamination is necessary to prevent the further spread of toxic material until the means are available to implement a permanent solution. Procedures for containment range from simple emplacement of plastic sheets for preventing contact with rainwater to new exotic techniques such as freezing for immobilizing material. The application of waste minimization methods to decontamination and decommissioning and improvements in waste treatment, storage, and disposal are also needed.

Education (Section 5.7) of technically trained personnel for the design, conduct, and management of environmental restoration and waste management activities is essential to the completion of DOE's 30-year plan for site cleanup. The shortage of trained personnel leads to bidding wars and increased costs among industry, consulting firms, and the government for qualified staff and managers. Programs are handicapped because the few technically trained managers are overcommitted. These problems are likely to increase in the future without an education program in waste management-related technology. DOE will find itself unable to compete in the marketplace for experienced managers and technologists and will be forced to rely on recent graduates and accept high turnover among more experienced personnel. The cleanup program will inevitably face higher costs because of inefficiencies and will probably miss milestones.

2.0

Corrective Activities

Activities necessary
to bring active and standby facilities
into compliance with
local, State, and Federal regulations.

2.1.1 SCOPE OF CORRECTIVE ACTIVITIES

DOE is out of compliance with a range of Federal, State, and local environmental requirements. Activities and projects required to bring DOE's active and standby facilities into compliance constitute Corrective Activities.

Corrective Activities are those activities needed to bring active and standby DOE facilities currently out of compliance with applicable local, State, and Federal requirements and internal DOE requirements into compliance in an expeditious manner. They span the range of media--air, water, and solids (i.e., waste)--as demonstrated in Figure 2.1.1. Also included as Corrective Activities are those projects and activities in which Operations Offices were able to identify specific cases in which DOE will be in noncompliance with near-term regulatory requirements.

Corrective Activities are intended to be discrete, focused efforts for achieving compliance. Maintaining compliance belongs to the appropriate Waste Operations or other programmatic activity (i.e., DOE intends to operate all of its facilities in compliance with the regulations). The major Federal regulatory drivers for Corrective Activities are the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Safe Drinking Water Act, and the Toxic Substances Control Act. Corrective Activities follow a life cycle consisting of identification, evaluation, funding, implementation, and closeout. Repetitive or routine activities or long-term programmatic efforts are considered outside the scope of Corrective Activities and belong to the appropriate operational organization. For example, routine monitoring in accordance with a compliance agreement is not a Corrective Activity, whereas establishing a monitoring system where none existed before can be a Corrective Activity if it is undertaken to eliminate an identified noncompliance situation.

Because DOE has recently expanded its site reviews and level of self assessment, the list of identified noncompliance conditions is growing as expected. Additionally, DOE is committed to supporting expanded monitoring and oversight by State and local regulatory authorities. As new noncompliances are identified by DOE or State and local authorities, the ability to respond to these challenges may not keep pace, primarily because of human resource and logistical constraints in defining and conducting all of the work simultaneously. Consequently, there is likely to be an initial increase in the backlog of Corrective Activities, which should be viewed as a positive indicator that the new proactive DOE culture is working and that problems are being brought to the forefront and disclosed publicly. As the number of newly identified deficiencies diminishes with time, the rate of work completion will overtake new items entering the plan, and the backlog will decline. This turning point is expected to occur in as soon as two to three years, given DOE's increasing level of effort to address these concerns.

Once properly classified, Corrective Activities remain as such until compliance is achieved. Some Corrective Activities

from the FY 1991-1995 Plan would not be classified as such by current criteria. However, because of budget cycle lead times and constraints, these activities will be "grandfathered" through 1990 and 1991. Beginning in FY 1992, those activities that are operational or programmatic in nature have been recategorized accordingly [e.g., preparation of air pollution emission notices at the Rocky Flats Plant (ADS-RF-108)].

As discussed in Section 2.1.3, Corrective Activities are not managed as a separate DOE program by the Office of Environmental Restoration and Waste Management (EM), but rather, they are managed by the DOE program offices having responsibility for the activity [e.g., Defense Programs (DP), EM, Nuclear Energy (NE), and Energy Research (ER)]. EM will have responsibility for many Corrective Activities, primarily because of the large number of waste operational facilities under its jurisdiction. The other Operational Programs (NE, ER, DP) will manage Corrective Activities directly related to their facility responsibilities. To keep all interested parties informed and to ensure that high priority is given to Corrective Activities, the Five-Year Plan will continue to reflect the planning, budgeting, progress, and status of all Corrective Activities regardless of which program manages them.

Because Corrective Activities must be completed in a timely and effective manner to protect public health and safety and the environment, these activities will generally be accomplished by the application of existing technologies rather than new technologies that would require lead time for development. In some cases that require new facilities, every reasonable opportunity will be taken to incorporate the most modern, demonstrated, best available technology into the facility processes, especially if the facility is expected to operate for many years.

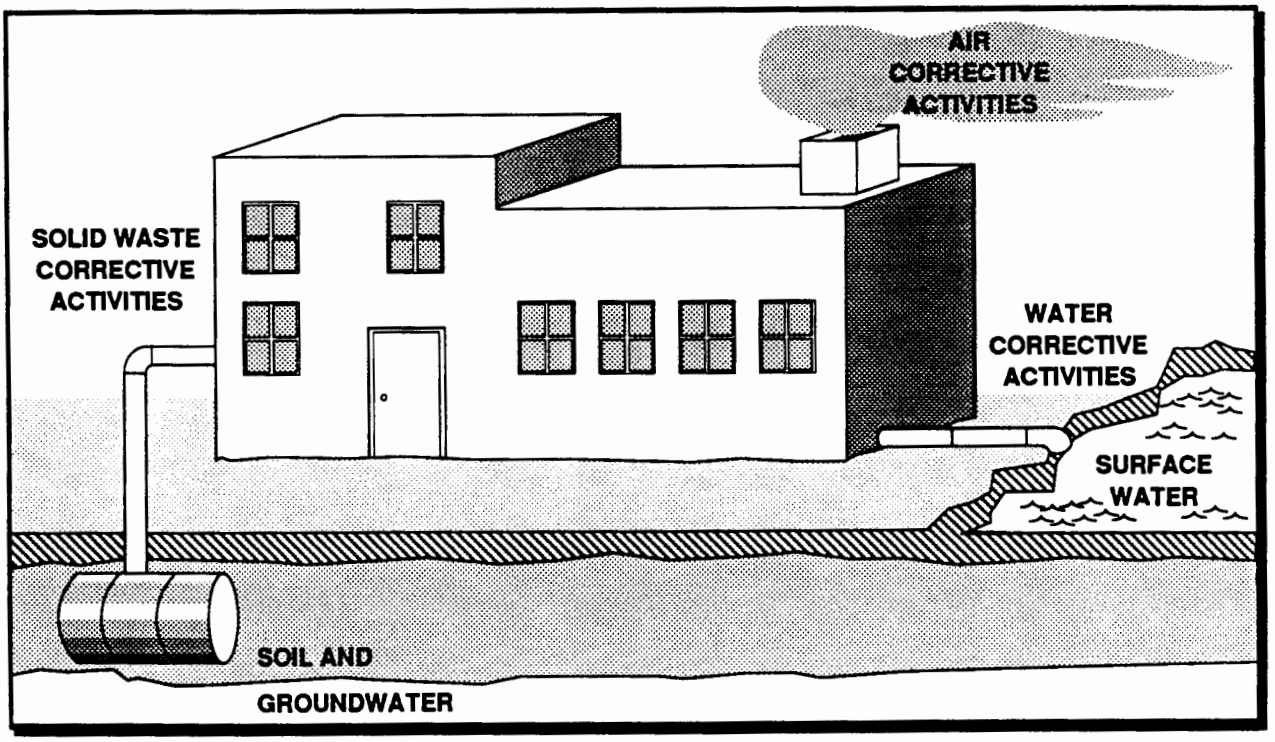


Figure 2.1.1. Corrective Activities cover the full range of environmental releases: (1) air, (2) surface water, and (3) solids and groundwater (solid waste).

2.1.2 GOAL OF CORRECTIVE ACTIVITIES

The primary goal for conducting Corrective Activities is to achieve compliance with applicable local, State, and Federal requirements and DOE Orders within an aggressive time frame. DOE has therefore placed the highest priority (Priority 1) on all of its Corrective Activities.

DOE is committed to correcting out-of-compliance conditions and maintaining compliance with applicable local, State, and Federal requirements (regulations, permits, consent orders, etc.), compliance orders, and DOE Orders.

Pursuant to State and Tribal Government Working Group comments received on the FY 1991-1995 Plan and in recognition of the essential nature of environmental regulatory compliance, the four-level priority scale applied to last year's Corrective Activities has been abandoned this year and replaced with a single priority, Priority 1. This change ensures that all out-of-compliance conditions are treated with the highest priority within the Five-Year Plan. Note that maintaining compliance is the primary objective of the technical program offices.

At the Stakeholder Forum, discussed in the Foreword and in Section 1.15, some of the attendees commented that DOE should reexamine the decision to place all Corrective Activities into Priority 1. They felt that this may have been an overreaction to the existence of a noncompliance situation, when there were not necessarily any adverse impacts associated with the condition being corrected.

Specific near-term program objectives can be found in the Corrective Activities site summaries in Attachment A. These can be used to measure DOE's progress in attaining the basic program goals of correcting noncompliance situations. Although planned for the schedules shown, some milestones may slip for various technical, regulatory, environmental, or fiscal reasons.

As an indication of DOE's commitment to achieving rapid compliance with requirements, the Plan estimates funding for Corrective Activities as follows:

- 1991 - $177 million
- 1992 - $178 million

The FY 1991 estimate represents a $42 million increase over the FY 1990 funding level. All such estimates are considered valid. (See Section 1.2.)

Support for Corrective Activities beyond FY 1992 is currently constrained by limited assessments and knowledge of the out-of-compliance conditions. The number and types of actions that must be accomplished in sequence (i.e., investigation, design, review by external agencies, public involvement, technology selection, etc.) further limits the accuracy of cost estimates beyond 1992. Section 2.2, Summary of Corrective Activities Accomplishments Since the FY 1991-1995 Plan, provides information regarding the status relative to last year's goals.

Although the goal of this Plan is to achieve compliance within an aggressive

time frame, several factors will strongly influence DOE's success. One of these is the number of Corrective Activities to be identified in the future. Figure 2.1.2 portrays the dominant influences affecting identification. Because of DOE's expanded self-assessments and a proactive culture focused on environmental restoration and compliance, it is expected that, during the next few years, newly identified noncompliance conditions will grow at a faster rate than the existing instances of noncompliance can be resolved. Thus, this will result in a near-term net increase in the number of open Corrective Activities. In the longer term, new regulatory requirements, particularly with retroactive provisions and, to a lesser extent, newly identified out-of-compliance conditions, will result in a reduced but continued level of Corrective Activities for the foreseeable future.

As DOE expands its efforts to aggressively pursue Corrective Activities, it recognizes a need to plan for managed growth in the level of effort to ensure that the work is performed right the first time and is coordinated with the affected Federal, State, and local authorities. Consistent with that objective, a functional organization within the Office of Environmental Restoration and Waste Management will coordinate DOE's Corrective Activities and ensure that steady progress toward environmentally sound operations is achieved. In coordination with the regulatory agencies, DOE will develop plans, select appropriate technologies, and implement schedules for completing the identified Corrective Activities. This process will provide appropriate opportunities for regulator involvement and review.

The Operations Office Site-Specific Plans contain schedules, milestones, and resource requirements for Corrective Activities.

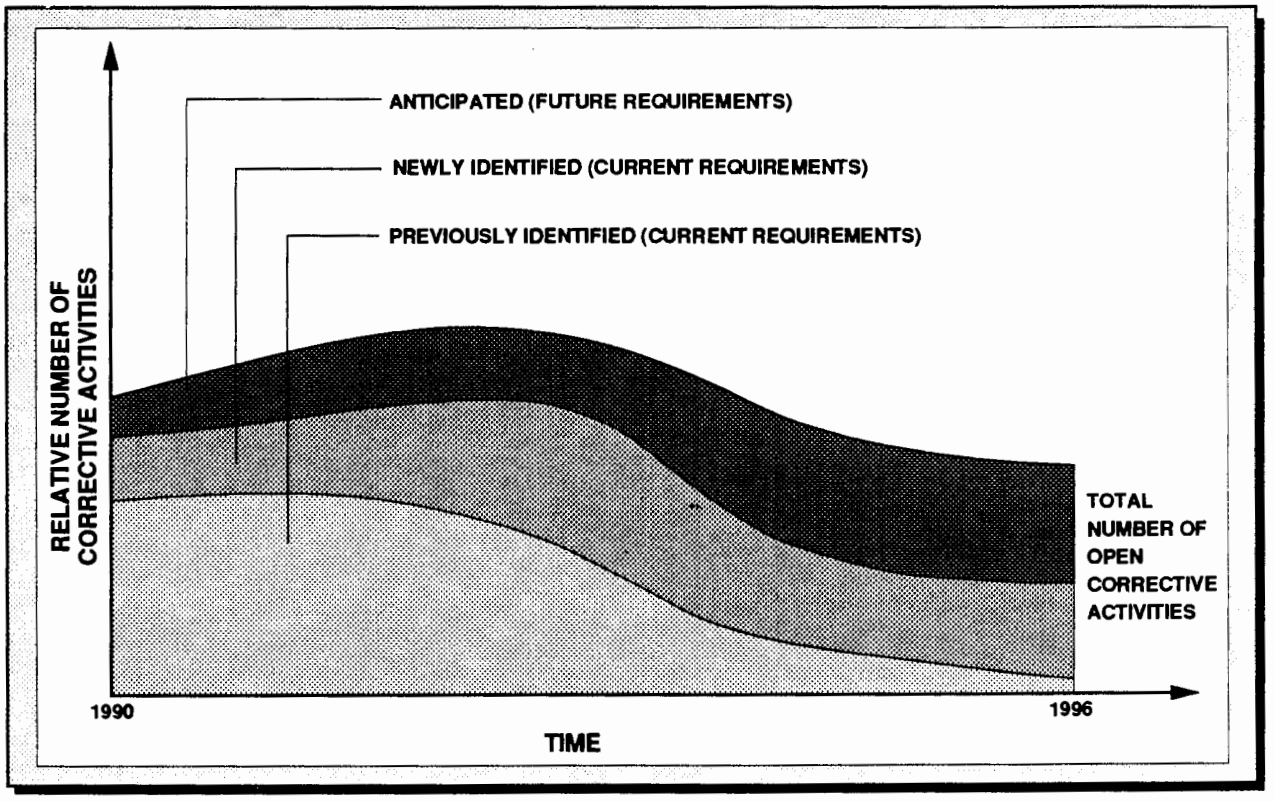


Figure 2.1.2. Changes in the components of the Corrective Activities backlog over time are shown.

2.1.3 DOE APPROACH TO MANAGING CORRECTIVE ACTIVITIES

DOE has adopted an interorganizational management process for Corrective Activities that ensures full line management accountability and provides for effective coordination across the various Program Secretarial Offices.

Corrective Activities are managed by the responsible DOE Program Secretarial Offices (Figure 2.1.3.a) to promote full accountability for operations associated with their respective facilities. The Office of Environmental Restoration and Waste Management, in addition to having the line management responsibility for its own facilities, is responsible for overseeing and coordinating all Departmental Corrective Activities, including the budget function. Day-to-day management, execution, and reporting are the responsibility of the appropriate DOE Operations Office for the facilities involved.

Corrective Activities are varied and designed to respond to requirements imposed by laws, regulations, negotiated agreements, DOE Orders, and other "contracts" by satisfying their requirements. The Corrective Activities may take such form as completed permits, facility design changes and modifications, and critical regulatory performance monitoring.

Consistent with Figure 2.1.3b, as existing regulations are applied and new ones are issued, compliance deficiencies are identified through various review processes, including Tiger Teams; environmental surveys; Headquarters, field office, and contractor audits; and audits conducted by the States and regulatory agencies.

Once a noncompliance is identified, action plans are developed for achieving compliance. These plans include actions related to permit development, technology assessment and direction, facility changes, proposed budgets, and schedules. Action plans are reviewed by the regulators, modified as appropriate by DOE, and approved as part of the yearly planning process. Short-term, low-cost actions are handled expeditiously through the base program operations and are not separately budgeted.

Responses to Corrective Activities are developed in consultation with regulatory agencies. In some cases these responses or action plans may be included in negotiated compliance agreements, such as a Federal Facility Compliance Agreement. Funding requirements for Corrective Activities are included in annual updates of this Plan and submitted as part of the annual DOE budget process. Upon receipt of funding, the Corrective Activities are implemented. If sufficient funding is not provided by Congress, DOE will submit a "supplemental" funding request to Congress, initiate discussion with regulators, and coordinate resources to evaluate possible alternative approaches.

In addition to public review processes required by environmental regulations, opportunities are provided for review by regulatory agencies, Indian Tribes, and interested citizens. Progress on completion of Corrective Activities will be documented in the annual Plan update.

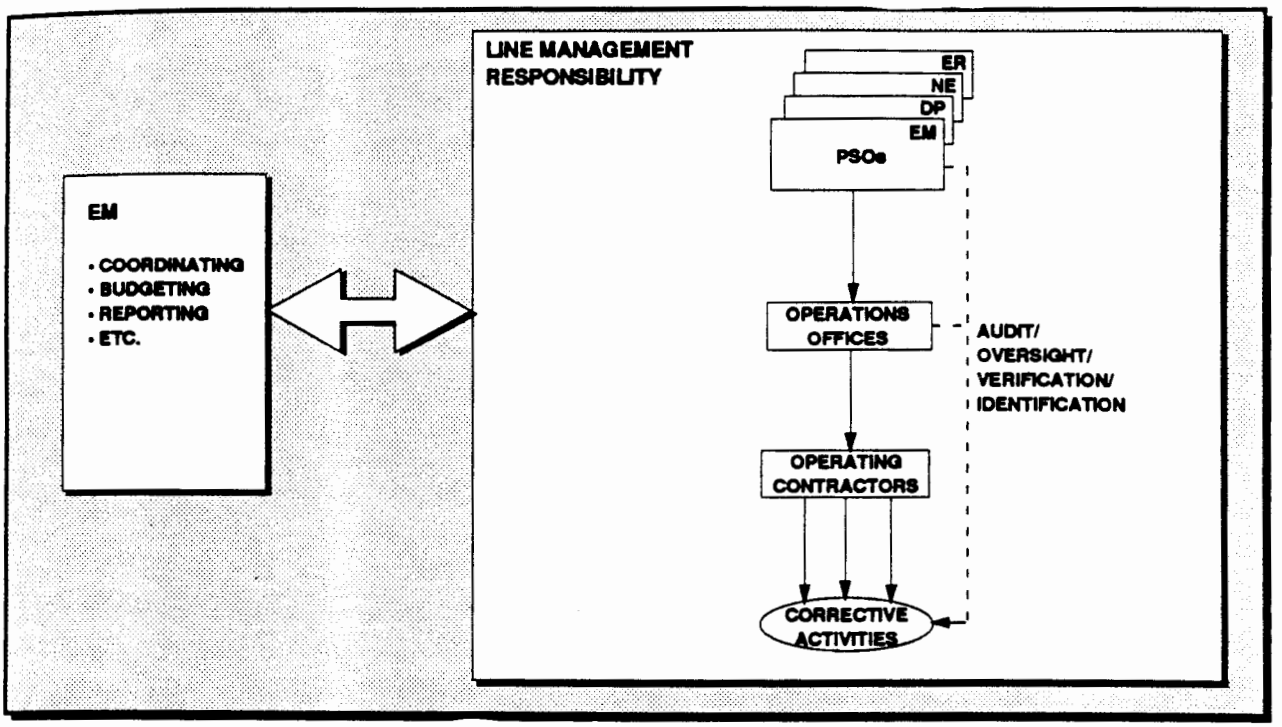


Figure 2.1.3a. The Department of Energy organizational structure for managing Corrective Activities promotes full line management accountability and provides for effective coordination across the various Program Secretarial Offices. (EM = Office of Environmental Restoration and Waste Management, DP = Defense Programs, NE = Nuclear Energy, ER = Energy Research, PSO = Program Secretarial Office)

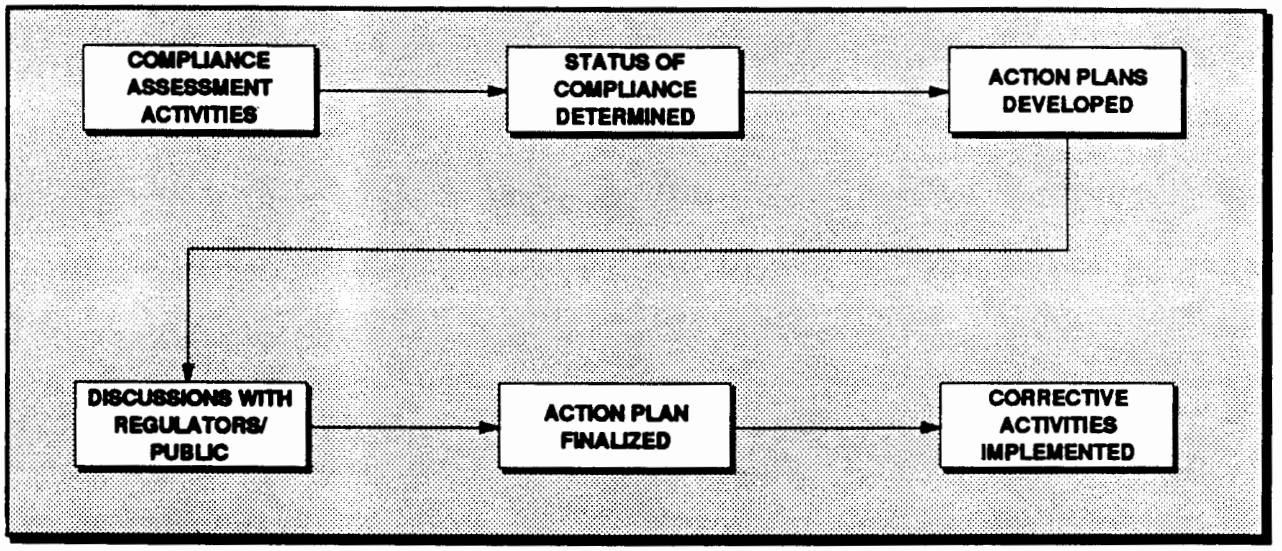


Figure 2.1.3b. The Department of Energy process for managing Corrective Activities involves analysis of regulations and compliance status, discussions with the regulatory agencies, and development of action plans and funding.

3.0

Environmental Restoration

The assessment and cleanup
of surplus facilities and inactive sites;
includes remedial actions and
decontamination and decommissioning.

3.1.1 ENVIRONMENTAL RESTORATION: BACKGROUND, SCOPE, REGULATORY REQUIREMENTS, CLEANUP STANDARDS, AND FUNDING

Past operations connected with DOE nuclear programs have resulted in contamination of a large number of sites and facilities with quantities of radioactive, hazardous, and mixed wastes. Environmental Restoration is concerned with assessment and cleanup of such sites and facilities to meet prescribed standards derived from Federal and State laws.

Background: Operations connected with DOE's nuclear complex involve the manufacture and processing of enriched uranium, the reprocessing of spent nuclear reactor fuel and other irradiated materials, production and testing of weapons, development of reactors, and various research activities. These operations, dating in some cases from the 1940s, generated and disposed of large quantities of radioactive and nonradioactive wastes. The history of operations shows the existence of spills of hazardous substances and waste management and disposal practices that, under today's regulatory structure and knowledge of the effects of chemicals in the environment, are unacceptable. The Department recognizes that many release sites must be cleaned up and that a large volume of wastes associated with these sites must be properly managed. DOE policy regarding these matters is in full compliance with the letter and spirit of applicable Federal, State, and local health, safety, and environmental statutes. To support this policy, DOE committed, in its FY 1991-1995 Environmental Restoration and Waste Management Five-Year Plan, to a goal of cleaning up its nuclear installations within 30 years. This FY 1992-1996 Five-Year Plan reaffirms this goal.

An essential element of this goal, Environmental Restoration, is concerned with all aspects of assessment and cleanup of facilities and sites that are no longer a part of active operations but are contaminated with various quantities of transuranic, low-level, hazardous, or mixed radioactive and hazardous waste materials. Such activities were first connected with the production of nuclear weapons and materials for national defense but have more recently included programs for the development of nuclear electric power sources and for carrying out basic nuclear research activities.

Scope: Environmental Restoration consists of two sets of activities: Remedial Actions and Decontamination and Decommissioning (D&D). The Remedial Actions tasks encompass (1) site discovery, preliminary assessment, and site inspection; (2) site characterization, analysis of cleanup alternatives, and selection of remedy; (3) cleanup and site closure; and (4) site compliance monitoring. Although Remedial Actions may deal with surface water contamination or with tanks, buildings, or structures, most Remedial Actions activities are concerned with contaminated soil and groundwater. The number of hazardous substance release sites is estimated to be approximately 3,700. In addition, more than 5,000 vicinity properties are connected with the Uranium Mill Tailings Remedial Action Project (UMTRAP).

D&D is concerned with the safe caretaking of surplus nuclear facilities and either their decontamination for reuse or

their complete dismantling and removal. The D&D tasks encompass (1) surveillance and maintenance, (2) assessment and characterization, (3) environmental review, (4) engineering, (5) D&D operations, and (6) closeout. Although D&D activities may deal with soil and groundwater contamination, most D&D activities are concerned with facilities such as reactors, hot cells, processing plants, storage tanks, and other structures from which there have been no known releases. Approximately 500 contaminated facilities are included under D&D.

Key Regulatory Requirements: For Remedial Actions, the principal regulatory requirements are those derived from the provisions of the Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the National Environmental Policy Act (NEPA); and the Uranium Mill Tailings Radiation Control Act (UMTRA) of 1978. Remedial Actions activities are further subject to important regulatory requirements imposed by various States. Other requirements are set forth in various DOE Orders, standards, and other guidance documents.

For D&D, activities are carried out in accordance with the provisions prescribed by NEPA and the Atomic Energy Act (AEA) and requirements set forth in various implementing DOE Orders, standards, and other guidance documents. For facilities from which there have been releases, or from which there is a potential for release, the provisions of CERCLA or RCRA also apply. State requirements are also applicable in certain instances.

Cleanup Standards: For the inactive facilities and sites connected with Environmental Restoration, technical cleanup standards are derived primarily from the provisions of CERCLA Section 121, "Cleanup Standards." Codified by the Environmental Protection Agency (EPA) in 40 CFR 300, Subpart F, such provisions establish general criteria for selecting remedial actions and require compliance with standards from other environmental statutes (such as the Toxic Substances Control Act, Safe Drinking Water Act, Clean Air Act, and Clean Water Act) to the extent the standards prescribed under such other statutes are applicable or relevant and appropriate. Risk assessment techniques may also be used in establishing standards as a means of ensuring safe cleanup levels. State standards may be substituted for Federal standards if a State imposes requirements that are more stringent than Federal standards. CERCLA Section 121(d) identifies the circumstances for use of State standards.

For facilities and sites cleaned up under RCRA, the standards applied are derived in a manner similar to that used under CERCLA; that is, standards from other environmental statutes are used and risk assessment techniques employed. RCRA requirements are codified by EPA, principally in 40 CFR 264, or, in the event a site may be closed under interim status, in 40 CFR 265. Under RCRA, States authorized to administer their own compliance programs may substitute State standards in lieu of Federal standards provided the State standards are at least as stringent as the Federal standards.

For sites being cleaned up under UMTRA, Project Cleanup Standards are codified by EPA in 40 CFR 192.

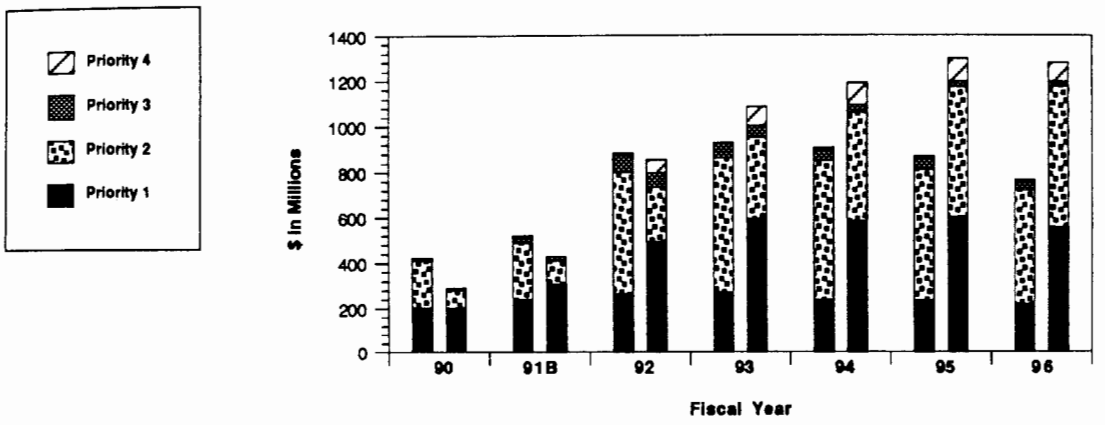
Funding Summary: Figure 3.1.1a sets forth estimated funding for assessment and cleanup according to priority category.

The amounts for FY 1990 are those currently appropriated by the Congress plus those pending authorization for reprogramming. Those for FY 1991 correspond to the President's budget currently before the Congress. Amounts for FY 1992-1996 include both validated and unvalidated amounts (see Section 1.2) and are projected requirements using the amounts in the FY 1990 budget appropriation and reprogramming requests and the FY 1991 budget request as a baseline. Figure 3.1.1b sets forth the allocation of such funding to Operations Offices, the Rocky Flats Office, and Headquarters.

The amounts set forth in Figures 3.1.1a and 3.1.1b are allocated according to the two major sets of activities in Environmental Restoration: Remedial Actions and D&D. Within Remedial Actions, funding is further allocated among three major subsets of activities: (1) the Formerly Utilized Sites Remedial Actions Program (FUSRAP), (2) UMTRAP, and (3) all other remedial actions at Departmental facilities and sites. Figures 3.1.1c, 3.1.1d, and 3.1.1e indicate the amounts of Remedial Actions funding allocated to FUSRAP, UMTRAP, and other remedial actions, respectively. Finally, Figure 3.1.1f indicates the amounts allocated to D&D.

For the period FY 1992-1996, the approximate total amount of funds associated with each priority level is, respectively, (1) $4.07 billion, (2) $5.05 billion, (3) $0.47 billion, and (4) $0.45 billion. The total for this period is $10.04 billion.

NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by approximately $500 million. $1,528 million of the total field estimates set forth for FY 1992 is unvalidated. The estimates for FY 1993 and beyond include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)



Totals							
Fiscal Year	90	91B	92	93	94	95	96
Assessment	424.6	521.1	883.0	927.0	904.8	866.6	763.8
Cleanup	290.6	428.7	854.4	1,082.9	1,186.2	1,294.5	1,276.6
$ in Millions	715.2	949.8	1,737.4	2,009.9	2,091.0	2,161.1	2,040.4

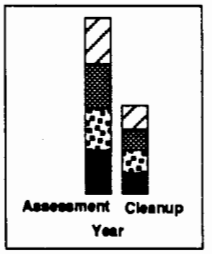
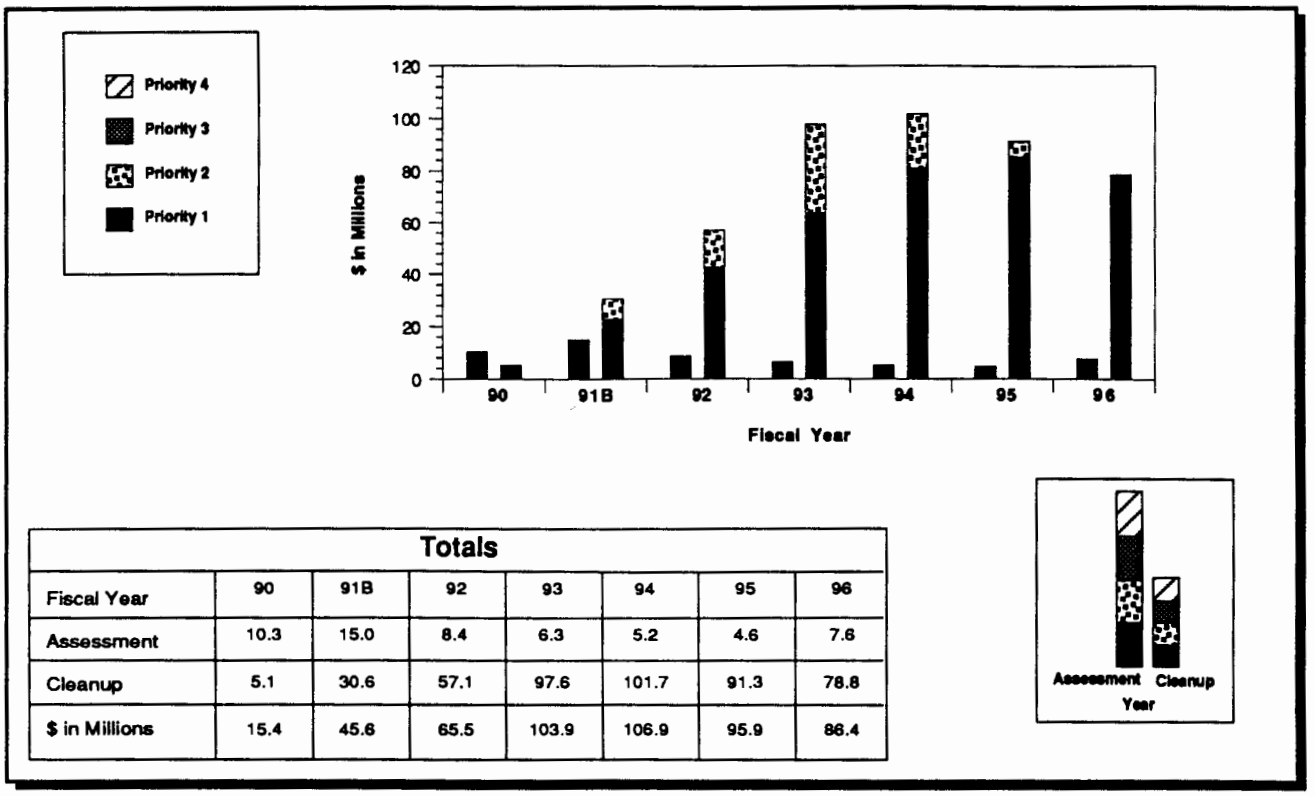


Figure 3.1.1a. Environmental Restoration funding and estimated costs are allocated assessment and cleanup needs according to four categories of priority.

	Fiscal Year ($ in Millions)						
OFFICE	1990	1991B	1992	1993	1994	1995	1996
Albuquerque	109.8	161.9	360.6	421.3	356.4	294.9	213.7
Chicago	11.5	34.7	43.2	41.3	46.7	41.0	24.0
Idaho	81.0	75.6	127.5	106.8	89.6	82.7	88.6
Nevada	2.8	14.1	41.9	63.8	101.7	102.4	108.3
Oak Ridge	239.2	370.1	690.9	856.8	904.4	988.7	907.1
Richland	84.4	101.9	225.6	280.6	343.0	381.2	413.8
Rocky Flats	57.8	40.5	45.7	30.2	45.2	46.8	62.8
San Francisco	22.8	29.4	60.0	43.1	26.4	23.1	17.2
Savannah River	60.9	62.4	84.4	109.8	122.3	143.3	145.6
Headquarters	45.0	59.3	57.7	56.2	55.4	57.3	59.4
TOTAL	715.2	949.8	1,737.4	2,009.9	2,091.0	2,161.1	2,040.4

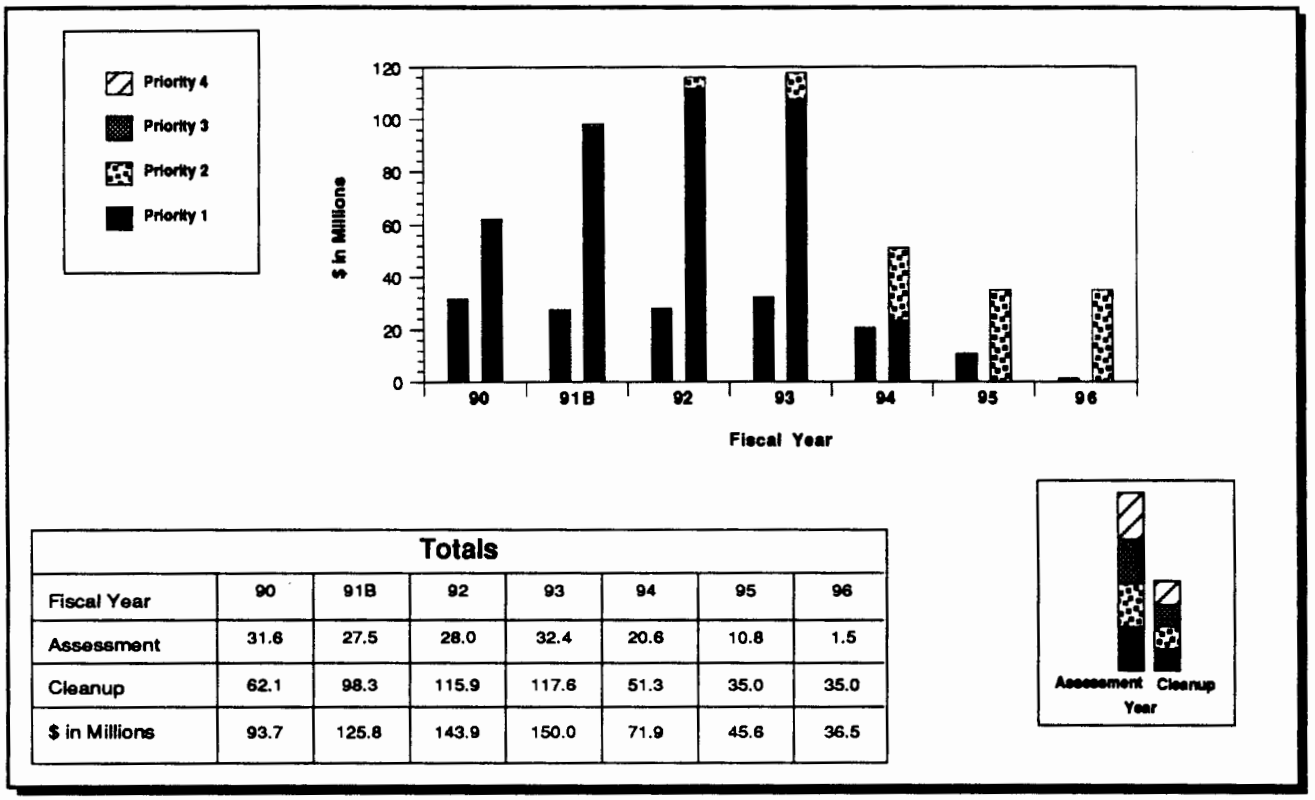
Figure 3.1.1b. Environmental Restoration funding and estimated costs are allocated among eight Operations Offices, the Rocky Flats Office, and Department of Energy Headquarters.

NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by approximately $500 million. $1,528 million of the total field estimates set forth for FY 1992 is unvalidated. The estimates for FY 1993 and beyond include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)



Totals							
Fiscal Year	90	91B	92	93	94	95	96
Assessment	10.3	15.0	8.4	6.3	5.2	4.6	7.6
Cleanup	5.1	30.6	57.1	97.6	101.7	91.3	78.8
$ in Millions	15.4	45.6	65.5	103.9	106.9	95.9	86.4

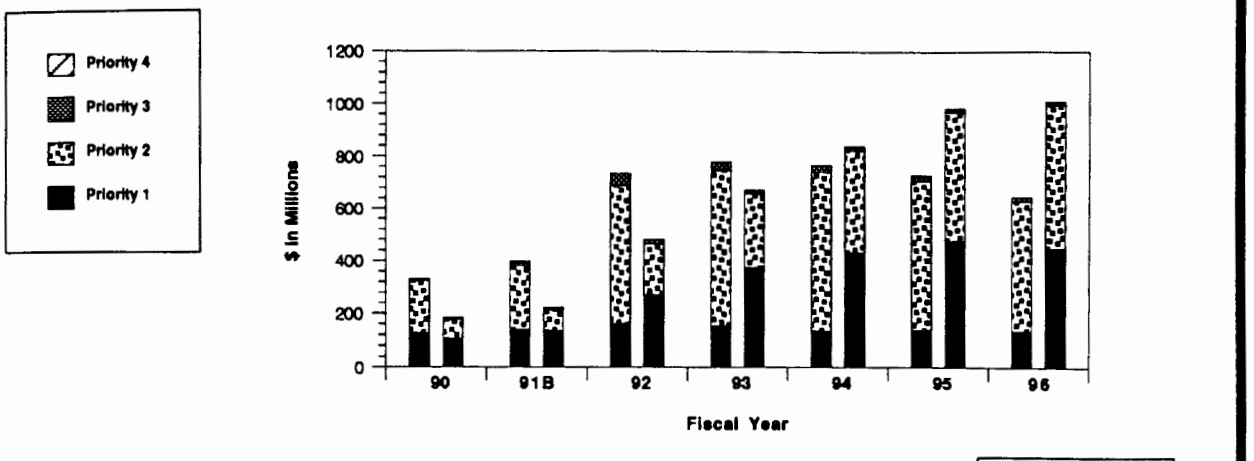
Figure 3.1.1c. Environmental Restoration funding and estimated costs are allocated to assessment and cleanup needs according to four categories of priority for the Formerly Utilized Sites Remedial Action Program.



Totals							
Fiscal Year	90	91B	92	93	94	95	96
Assessment	31.6	27.5	28.0	32.4	20.6	10.8	1.5
Cleanup	62.1	98.3	115.9	117.6	51.3	35.0	35.0
$ in Millions	93.7	125.8	143.9	150.0	71.9	45.6	36.5

Figure 3.1.1d. Environmental Restoration funding and estimated costs are allocated to assessment and cleanup needs according to four categories of priority for the Uranium Mill Tailings Remedial Action Project.

NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by approximately $500 million. $1,528 million of the total field estimates set forth for FY 1992 is unvalidated. The estimates for FY 1993 and beyond include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)



Totals

Fiscal Year	90	91B	92	93	94	95	96
Assessment	330.3	395.8	731.7	777.4	767.4	730.4	648.0
Cleanup	183.2	222.5	478.8	669.7	837.0	984.9	1,008.2
$ in Millions	513.5	618.3	1,210.5	1,447.1	1,604.4	1,715.3	1,656.2

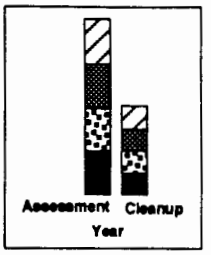
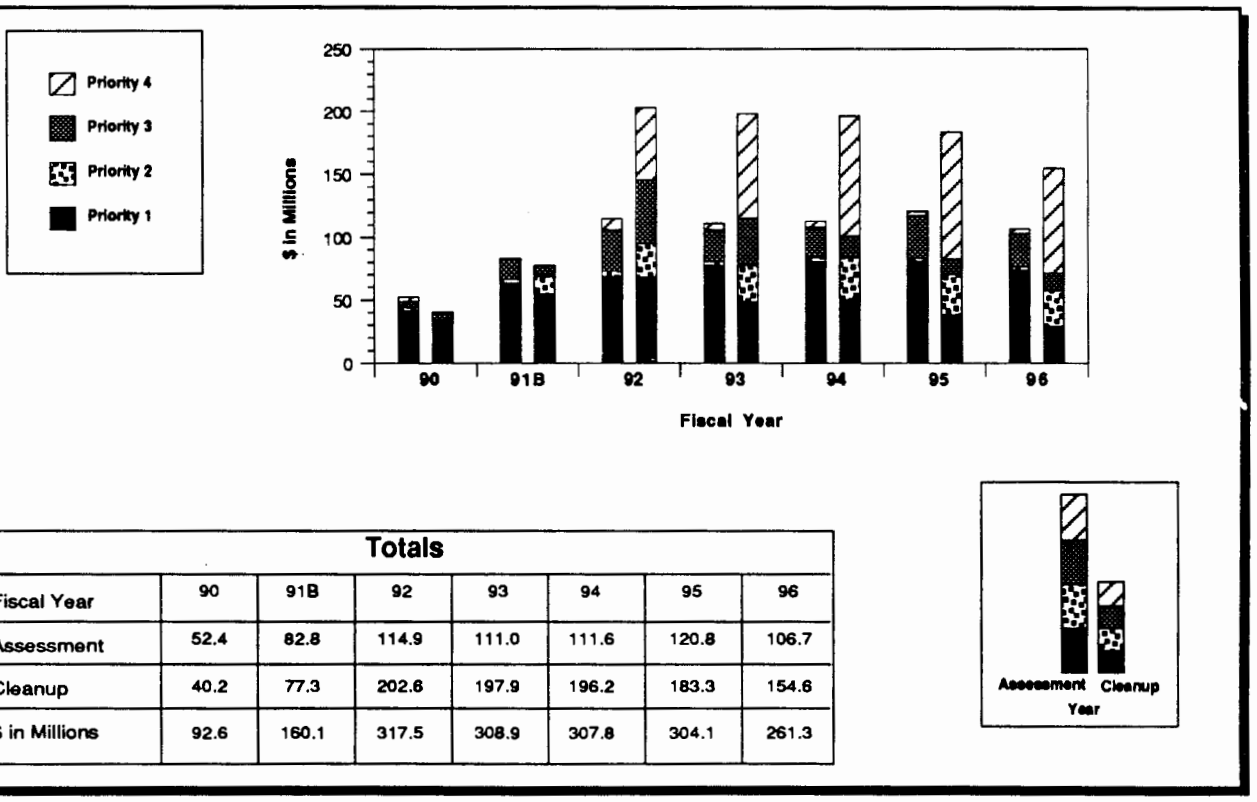


Figure 3.1.1e. Environmental Restoration funding and estimated costs are allocated to assessment and cleanup needs according to four categories of priority for remedial actions at Departmental facilities and sites.



Totals

Fiscal Year	90	91B	92	93	94	95	96
Assessment	52.4	82.8	114.9	111.0	111.6	120.8	106.7
Cleanup	40.2	77.3	202.6	197.9	196.2	183.3	154.6
$ in Millions	92.6	160.1	317.5	308.9	307.8	304.1	261.3

Figure 3.1.1f. Environmental Restoration funding and estimated costs are allocated to assessment and cleanup needs according to four categories of priority for Decontamination and Decommissioning activities.

3.1.2 ENVIRONMENTAL RESTORATION GOAL, STRATEGY, NEAR-TERM APPROACH, INCLUDING THE ROLE OF TECHNOLOGY DEVELOPMENT

The goal for all Environmental Restoration activities is to ensure that risks to the environment and to human health and safety posed by inactive and surplus facilities and sites are either eliminated or reduced to prescribed, safe levels. A near-term bias for action and a program of technology development directed toward Environmental Restoration needs are essential elements of the strategy for obtaining this goal and reaching DOE's overall goal of cleanup by the year 2019.

Environmental Restoration Goal: The fundamental goal for Environmental Restoration is to ensure that risks to the environment and to human health and safety posed by inactive and surplus facilities and sites contaminated by radioactive, hazardous, or mixed wastes are either eliminated or reduced to prescribed, safe levels. It is a cornerstone of DOE's overall goal to clean up its nuclear complex by the year 2019. Although encompassing all requirements prescribed by applicable Federal, State, and local environmental statutes and regulatory requirements, this goal is not limited to regulatory compliance; that is, protection of human health and safety is of paramount concern to DOE. This goal is supported by a continuing program of essential technology development intended to provide improved techniques for more effectively and economically dealing with contamination problems.

DOE generally intends that facilities and sites be returned to a condition suitable for unrestricted use; however, in certain instances, in-place remedies, such as stabilization followed by appropriate monitoring, may be a preferred alternative. Under certain circumstances, in-place remedies may offer advantages by (1) avoiding transportation risks and the potential for public exposure, (2) reducing risks associated with the handling of radioactive and hazardous materials, and (3) avoiding the need to develop new disposal facilities and sites. However, selection of in-place remedies will require regulatory approval and depend on (1) specific site conditions; (2) the type, nature, extent, and amount of contaminants present; (3) the availability of suitable stabilization technologies; (4) regulatory factors; or (5) other agreed to considerations as may result from the remediation or public interaction processes.

Strategy: The overall strategy for achieving the cleanup goal is defined by separate sets of objectives established in connection with remedial actions and decontamination and decommissioning. With respect to remedial actions, the objectives are to (1) identify inactive, contaminated nuclear facilities and sites; (2) assess these facilities and sites to determine the nature and extent of contamination; (3) confine and contain existing contamination to the extent necessary for minimizing its further spread; (4) provide for negotiated agreements with regulatory authorities defining the requirements and achievable schedule for the cleanup of these facilities and sites; (5) ensure that cleanup is carried out in strict accordance with these agreements; and (6) undertake long-term monitoring to ensure continuing compliance.

The objectives associated with decontamination and decommissioning are to (1) maintain facilities awaiting either decontamination or decommissioning in a manner that limits worker, public, and environmental exposure to potential hazards; (2) assess such facilities to determine the nature and extent of contamination; (3) decontaminate facilities designated for reuse in compliance with approved health and safety standards; and (4) decommission all other facilities in accordance with the requirements set forth in an approved environmental compliance plan.

Near-Term Approach: Although it is believed the strategy prescribed for Environmental Restoration provides a sound approach to carrying out the program set forth in this Plan, uncertainties unassociated with the implementation of this strategy have the potential for a significant adverse impact on carrying out Environmental Restoration activities. These uncertainties revolve around the broad issues connected with (1) the degree of assessment required before start of cleanup, (2) the potential for further environmental degradation that can result from assessment activities, (3) the lack of industrial laboratory capacity to support the sample analyses required as a result of the assessment process, and (4) the lack of industrial capacity to clean up the widely varying range of contaminants and conditions posed by DOE's sites and facilities.

Given such uncertainties, it is clear that Environmental Restoration activities cannot be conducted at the levels requested by the various Operations Offices and reflected in this Plan. Even if unlimited funds were available, DOE has neither sufficient expert staff, nor the Nation enough analytical and industrial capacity and qualified engineering, scientific, and other technical personnel, to take on a full-scale effort at all sites simultaneously. For the moment, the program can pursue either complete cleanup at some sites or incremental cleanup at many sites but cannot accommodate both simultaneously. Consequently, Environmental Restoration must be based on overall capability to support effectively the goal and objectives of the program. The near-term approach to be adopted for Environmental Restoration is built around the concept of a "bias for action"; that is, do sufficient assessment to determine if there is a near-term risk to human health and safety or the environment; if a risk exists, then immediately undertake sufficient cleanup action to abate the near-term threat; if no risk exists, then place continuing assessment and subsequent cleanup on a longer schedule. Such immediate cleanup may not address all aspects of site contamination but would address that portion posing the near-term risk. After abating the immediate threat, further assessment and cleanup can be undertaken on a longer schedule.

This approach, the basic elements of which were set forth by the Environmental Protection Agency in connection with Superfund[1], makes it possible to attack the highest risks first, removing the sources of immediate threat in a logical and systematic manner, and then to turn to remaining long-term contamination according to a priority basis. This approach (1) allows the capacity of the system to grow while dealing with near-term risks, (2) provides

[1]Reilly, William K., "A Management Review of the Superfund Program." U.S. EPA, Washington, D.C.

time for development of new, cost-effective technologies for dealing better with remaining cleanup needs, and (3) ensures that scarce resources, both human and financial, are targeted at real, present problems while avoiding their expenditure on less immediate needs.

Technology Development: Integral to the strategy for Environmental Restoration, the role for technology development is to provide an improved technical and economic basis for the assessment and cleanup of contaminated facilities and sites. Efforts will address development of new technologies as well as adaptation of technologies not previously considered for application to this field. The scope of technology development for Environmental Restoration will include development of improved methods for (1) site identification, (2) facility and site characterization, (3) risk management and technology assessment, (4) interim confinement, (5) cleanup techniques, (6) waste minimization, and (7) compliance monitoring. A successful technology development program is expected to result in greater capability for (1) bringing facilities and sites into regulatory compliance, (2) minimizing the need for continuing cleanup activities at facilities and sites by providing permanent remedies, (3) minimizing the quantity of radioactive and hazardous material generated from cleanup operations, and (4) releasing restored sites to unrestricted use. In addition, such a successful technology development program would enhance the Environmental Restoration program by providing techniques to accomplish site assessment and cleanup more rapidly and in a more economical manner than anticipated to be possible with current technologies.

3.1.3.1 DOE APPROACH TO MANAGING ENVIRONMENTAL RESTORATION

The process for managing Environmental Restoration is characterized by control of activities against approved technical, schedule, and cost baselines derived from the five-year planning process.

The Environmental Restoration and Waste Management Five-Year Plan is the approved planning basis for all activities connected with the management, cleanup, and disposal of the radioactive, hazardous, and mixed wastes resulting from DOE's past and present nuclear operations. Based on the requirements set forth in the Plan, more detailed Environmental Restoration and Waste Management Site-Specific Plans are being prepared in connection with each of DOE's installations and field programs. All departmental planning concerning activities for dealing with such wastes is derived from, and is required to be consistent with, these two categories of plans.

With respect to Environmental Restoration, a major purpose of such planning is to establish for each project or activity in the program baselines for use as approved standards against which accomplishments, progress, and expenditures are measured and the program controlled. These baselines each consist of three constituent element baselines: (1) a technical element of the baseline that specifies the nature, extent, content, technology, and sequence of authorized activities; (2) a schedule element of the baseline that sets forth the timing of such activities; and (3) a cost element of the baseline that sets forth the approved funding schedule for the amounts estimated as needed to pay for such activities. The overall program baseline consists of a hierarchy of baselines, of which each successively lower tier corresponds to a more detailed plan for approved work. Although described in separate terms, technical, schedule, and cost baselines are not discrete, but fully interrelated and integrated components of a larger composite.

Management of Environmental Restoration activities is exercised through control of baselines at the various tiers of the planning hierarchy. With respect to DOE Headquarters' control of program activities, the process is characterized by (1) preparation and approval of the Five-Year and Site-Specific Plans, (2) formal baseline identification and approval, (3) specification of allowed variances from the approved baseline, (4) regular reporting and assessment of status against the approved baseline, and (5) corrective management action (which may include baseline revision through a formal change control process) in the event a variance exceeds the specified threshold. This concept is summarized in Figure 3.1.3.1. The process is supported by formal approval of baseline revisions and documentation control.

The requirements against which Environmental Restoration baselines are developed are, in general, prescribed by (1) environmental, safety, and health needs; (2) Federal, State, and local statutes and regulatory requirements; (3) provisions of the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental

Response, Compensation, and Liability Act (CERCLA) agreements, permits, and orders; (4) DOE and Administration policy; and (5) approved budgets and budgetary constraints. All baselines must be consistent with the approved planning basis set forth in the approved Five-Year and Site-Specific Plans.

Environmental Restoration baselines become more detailed and precise as program activities progress. They are typically established separately for activities associated with assessment and with cleanup. With respect to any given site or facility, the baseline for assessment activities initially is a preliminary estimate of proposed work that is based on data derived from available records and reports, site visits, sampling activities, and analysis (i.e., as a result of the preliminary assessment and inspection phases of the environmental restoration process). This baseline is adjusted on the basis of regulatory approval of the remedial investigation or RCRA Facility Investigation work plan. A baseline for cleanup activities will be established at the conclusion of the characterization and evaluation of cleanup alternatives phases. A final baseline will be established following the Record of Decision (CERCLA) or Corrective Action Decision (RCRA) at the conclusion of remedial design just before the cleanup action phase. This baseline incorporates the detailed costs, schedules, engineering plans, designs, site specifications, and all site-specific factors upon which actual cleanup work will be based.

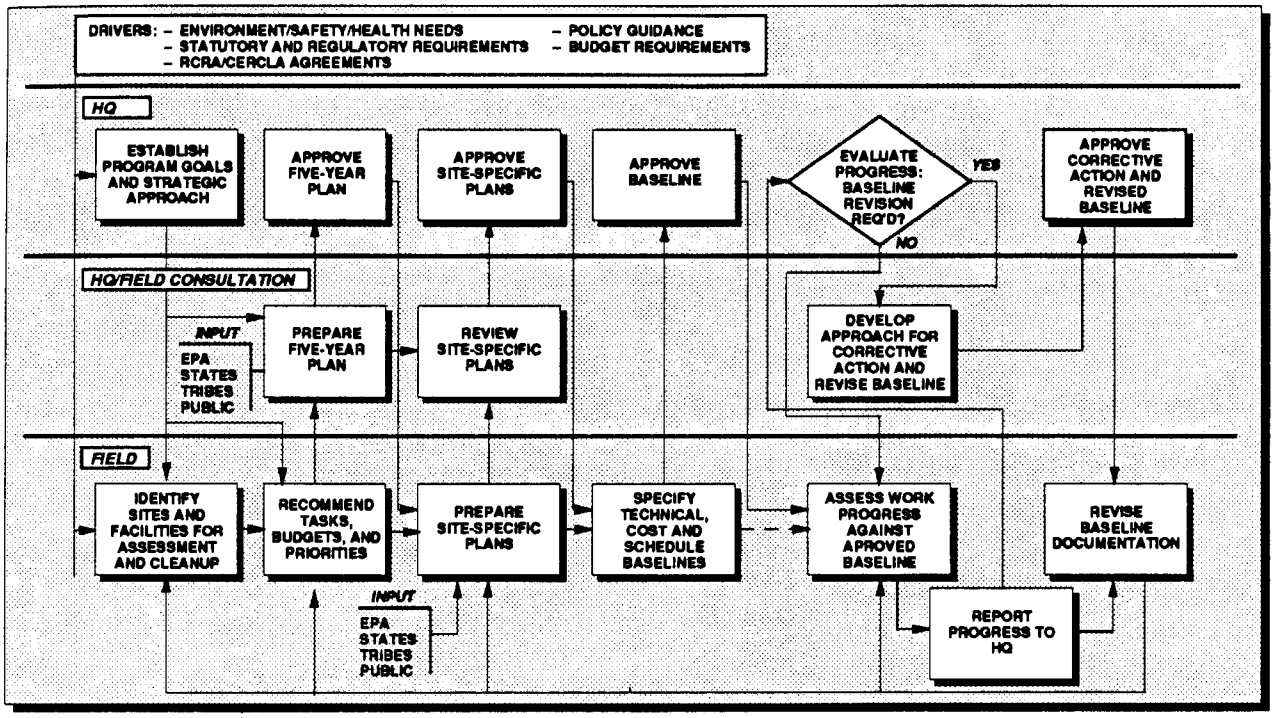


Figure 3.1.3.1. Five-Year and Site-Specific Plans are integral components of the baseline management concept used for Environmental Restoration. (HQ = Headquarters, EPA = Environmental Protection Agency)

3.1.3.2 IMPLEMENTING ENVIRONMENTAL RESTORATION ACTIVITIES

DOE seeks to improve efficiency and performance in planning and carrying out Environmental Restoration activities by (1) promoting a more streamlined process for establishing regulatory requirements and authorities through use of three-party agreements and (2) using remediation contractors competitively selected on the basis of prescribed qualification standards.

Agreements for Cleanup: The principal requirements for Environmental Restoration cleanup activities are derived either from (1) the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); (2) the Resource Conservation and Recovery Act (RCRA) Sections 3004(u), 3004(v), and 3008(h); or (3) State and local laws. Furthermore, it is DOE's policy that activities carried out in accordance with these requirements must also comply with the National Environmental Policy Act (NEPA). To minimize delay and duplication of effort, the procedural, documentational, and public participation requirements of CERCLA or RCRA are supplemented to the extent necessary to ensure compliance with NEPA requirements.

With respect to any specific DOE installation, cleanup requirements will generally be set forth in agreements negotiated with the Environmental Protection Agency (EPA) or involved State. Such agreements may take various forms such as a consent order, a consent decree, an operating permit, or a tri-party Interagency Agreement (a.k.a., Federal Facility Agreement). Most Federal installations have inactive facilities or sites that may be subject to the jurisdiction of more than one regulatory authority. This measurably increases the complexity of the regulatory process and the uncertainty associated with the criteria by which the various regulatory requirements are imposed under the various agreements that may be in force. Such complexity and uncertainty make it difficult to define the most effective actions to meet fully all regulatory requirements.

To streamline the regulatory process while at the same time fully accommodate the requirements of the various applicable statutes and regulatory jurisdictions, DOE seeks, to the extent possible, to negotiate a single, comprehensive, three-party agreement with EPA and the involved State with respect to a specific installation. Such agreements are intended to establish technical requirements and schedules for cleanup and to delineate the roles and responsibilities of each party to the agreement. (For National Priorities List sites, such an agreement is termed a tri-party Interagency Agreement, previously called a Federal Facility Agreement, and DOE has, in consultation with EPA, developed model provisions for use as a baseline to negotiations.) The scope of such agreements sets forth the requirements and schedule for cleanup and satisfies the statutory requirements in Section 120 of CERCLA for an interagency agreement. It may also include assessment activities. Of particular importance is that each tri-party Interagency Agreement will also identify the regulatory authority, Federal or State, empowered to administer specific provisions contained therein. The Hanford "Tri-Party Agreement" with

DOE, EPA, and the State of Washington as signatories is an example of a tri-party Interagency Agreement. DOE intends to continue pursuing three-party agreements as the most efficient basis for reconciling multiple regulatory requirements and for prescribing assessment and cleanup activities for all Environmental Restoration facilities and sites.

Remediation Contractors: With respect to Environmental Restoration activities, DOE intends to develop a more efficient contracting methodology. One approach under consideration would involve the use of industrial concerns, competitively selected by individual Operations Offices on the basis of their qualifications to carry out various aspects of Environmental Restoration activities for which the Operations Office is responsible. Competing firms would be required to demonstrate certain prescribed standards of qualification to be eligible for selection as a Remediation Contractor. Firms may qualify and be selected for more than one work area.

To ensure that Operations Offices develop consistent standards for qualification and selection, such standards would be developed in close consultation with DOE Headquarters. The purpose of this approach would be to (1) provide for uniform approved contractor qualification and selection standards, (2) ensure that only the most capable concerns are awarded work, and (3) promote high cost benefit and performance through contractor competition. Incentive to perform well is promoted through (1) the award in each work area of multiple contracts having an aggregate value in excess of needed work and (2) provisions for award determinations built into a contractor's fee structure. Poor performance results in replacement by another firm or in award of lower fees. The scope of work remediation contractors would be eligible to perform could encompass (1) project management, (2) planning and design of assessment and cleanup actions, (3) assessment and cleanup work, and (4) other technical and management assistance connected with Environmental Restoration. However, it is likely no one firm would be awarded work in all areas. Contractors would also oversee subcontractors performing all or portions of such work.

An incumbent Management and Operating (M&O) contractor or an M&O subcontractor could support onsite work being carried out by a remediation contractor by collecting and providing data and information, providing laboratory services, and preparing secondary documentation connected with site assessment and cleanup to the extent such services are authorized, managed, and approved by the responsible DOE Operations or Installation Site Office after consultation with DOE Headquarters. The potential role of M&O contractors in this regard is under review as part of consideration of the remediation contractor concept.

3.4.1 ALBUQUERQUE OPERATIONS OFFICE OVERVIEW

DOE Albuquerque Operations Office (AL) is fully committed to the assessment and cleanup of problems resulting from its inactive waste management units and facilities. AL demonstrated this commitment in 1984 with the establishment of a program to address inactive release sites.

AL established the Comprehensive Environmental Assessment and Response Program in 1984 to identify, assess, and correct actual/potential releases at AL installations. By 1988, the Comprehensive Environmental Assessment and Response Program was incorporated into the Environmental Restoration Program. Currently, Environmental Restoration activities at AL consist of the Environmental Restoration Remedial Action Program, the Decontamination and Decommissioning (D&D) Program, and the Uranium Mill Tailings Remedial Action Project (UMTRA).

The primary objective of the AL Environmental Restoration Remedial Action Program is to identify and restore inactive release sites at its installations. The AL Environmental Restoration Program is being implemented at the Kansas City Plant, Los Alamos National Laboratory, Mound Plant, Pantex Plant, Pinellas Plant, Sandia-Albuquerque, Sandia-Livermore, South Valley, and Inhalation Toxicology Research Institute (Energy Research Facility). The two primary acts governing assessment and cleanup of inactive release sites are the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The fundamental responsibility of the DOE D&D Program is to protect the public and the environment from potentially harmful radioactive contamination at surplus DOE facilities. To that end, AL conducts surveillance, maintenance, and decontamination or decommissioning of those facilities within the AL complex. The D&D of inactive facilities complies with the intent of Executive Order 12088, "Federal Compliance with Pollution Control Standards"; DOE Order 5480.1B, "Environmental Safety and Health Program for Department of Energy Operations"; DOE Order 5820.2A, "Radioactive Waste Management"; and CERCLA.

The Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604, authorizes DOE to undertake remedial actions at 24 designated inactive uranium processing sites and approximately 5,000 vicinity properties. The purpose of this remedial action is to stabilize and control uranium mill tailings and other residual radioactive materials in a safe and environmentally sound manner to minimize radiation hazards to the public.

Past operations in support of Defense Programs production missions at AL facilities left a legacy of radioactive and hazardous waste problems that must be rectified. Most of the problems being addressed in the Environmental Restoration category are the result of past waste management practices that, although considered acceptable at the time, no longer meet today's more stringent standards for protection of human health and the environment.

During the six years of AL's program, more than 1,000 potential release sites across the AL complex have been identified as needing further assessment and/or cleanup. In addition, approximately 22 surplus facilities are included in the D&D Program for surveillance and maintenance or final decommissioning.

The types and extent of contamination vary from one place to another. Attachment B describes in more detail the problems, status of Environmental Restoration activities, and risks for each installation in the AL complex. In general, the types of wastes found include radionuclides, solvents, gasoline, organics, metals, high-explosive residues, and uranium tailings. These wastes are primarily present in soils, groundwater, surface waters, buildings, structures, and equipment. In many cases, hazardous and radioactive contaminants are found together as "mixed" wastes.

Active surveillance and maintenance programs help ensure that many contaminated sites and facilities do not become significant, immediate health risks to employees or to the public. On the other hand, a number of sites containing unstabilized mill tailings constitute a recognized source of environmental harm and risk to human health and safety as a result of radon gas emissions. Groundwater at certain sites has been contaminated by radiological and nonradiological hazardous constituents that have been carried into the soil by percolating rainwater. This contamination constitutes a potential source of exposure to possible toxic and cancer-causing agents.

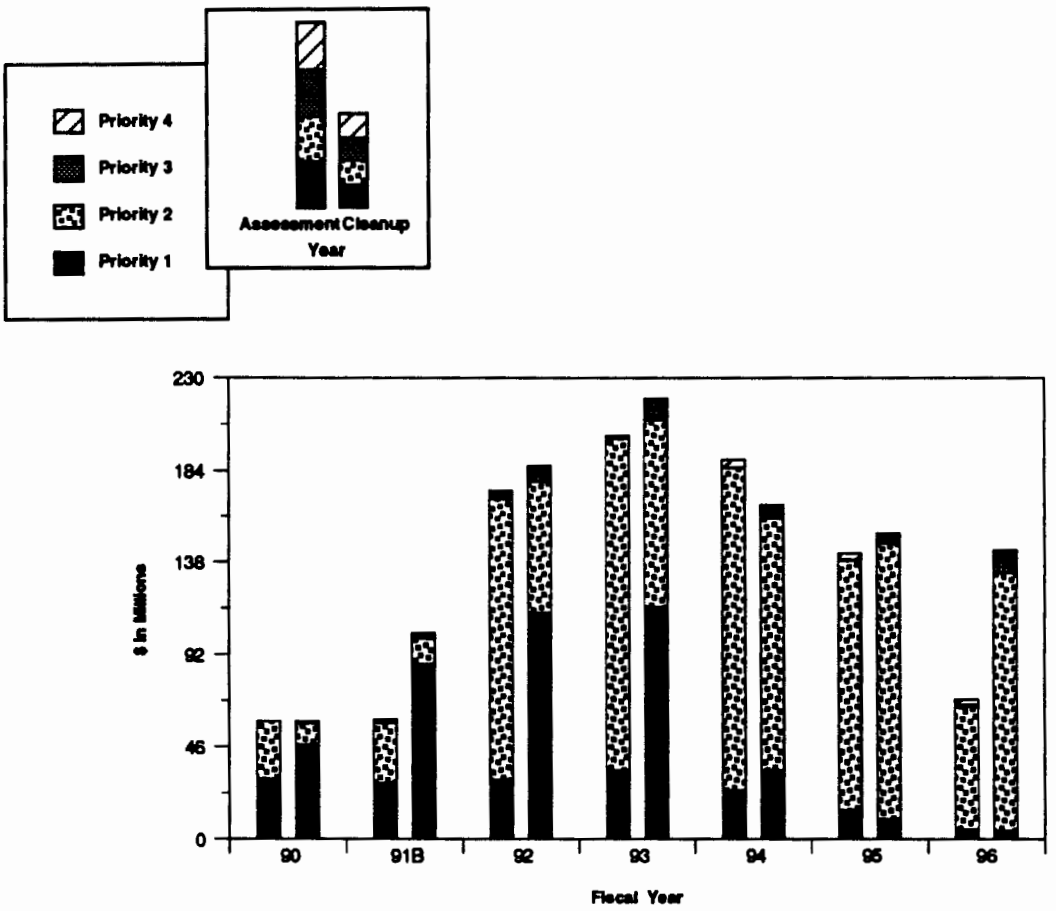
Between FY 1991 and FY 1996, the AL Environmental Restoration Remedial Action Program will complete the CERCLA remedial investigation/feasibility study and/or the RCRA Facility Investigation/Corrective Measures Study activities for the higher-priority sites. All of the installations will have signed RCRA or CERCLA multiparty agreements for remediation or will be regulated under the corrective action provisions of the RCRA Part B Permit. All installations will have implemented cleanup, including RCRA closures and/or CERCLA Remedial Actions at sites that require more immediate attention.

Key UMTRA activities planned for FY 1991-1996 include completion of nine sites by the end of FY 1991, three more by the end of FY 1992, four more by the end of FY 1993, and the remaining eight sites by the end of FY 1994. Certification and licensing of the last eight sites will extend into FY 1995.

Figure 3.4.1 provides anticipated funding needs, broken out by fiscal year, priority, and activity phase.

Further information on the Albuquerque installations is provided in Attachment B.

NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by approximately $500 million. $1,528 million of the total field estimates set forth for FY 1992 is unvalidated. The estimates for FY 1993 and beyond include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)



Funding Estimates of Costs By Priority Level (Thousands of Dollars)

	Priority 1		Priority 2		Priority 3		Priority 4		Total	
Year	A*	C**	A*	C**	A*	C**	A*	C**	A*	C**
FY90	30,255	47,256	20,587	9,805	368	1,482	67	0	51,277	58,543
FY91B	28,121	87,440	29,362	12,082	751	3,065	1,076	0	59,310	102,587
FY92	29,935	112,969	139,768	65,347	4,037	7,999	503	0	174,243	186,315
FY93	34,612	116,203	165,220	92,981	867	10,682	705	0	201,404	219,866
FY94	24,322	34,490	160,980	125,714	417	6,849	3,669	0	189,388	167,053
FY95	14,558	10,335	124,364	136,976	767	5,216	2,645	0	142,334	152,527
FY96	5,093	4,511	60,824	127,965	1,237	11,530	2,530	0	69,684	144,006
FY92-96 TOTAL	108,520	278,508	651,156	548,983	7,325	42,276	10,052	0	777,053	869,767

A* Assessment C** Cleanup

Grand Total 1,646,820

Figure 3.4.1. Funding needs for the Albuquerque Operations Office are projected by phase, fiscal year, and priority.

4.1.1 OVERVIEW OF DOE WASTE OPERATIONS AND ACCOUNTABILITY

Waste operations embrace ongoing activities throughout DOE's operating complex. DOE's primary purpose is to manage and to account for and dispose of radioactive, hazardous, mixed, and sanitary wastes in a safe and environmentally sound manner.

The Office of Environmental Restoration and Waste Management (EM) has been designated as the focal point for the management and accountability of DOE's overall waste operations. Most waste operations activities have been consolidated under this office, where the philosophy, policy, leadership, and approach to responsible waste management are set for DOE. EM's Office of Waste Operations Division operates the majority of DOE's waste facilities and manages activities as shown in Figure 4.1.1. However, as the figure shows, other DOE organizations generate and handle waste. Each base program is responsible for compliance with waste management orders and regulatory standards and for development of budgets to support their activities. Eventually the waste generated, after being characterized, packaged, and labelled by the producers, is transferred to EM for final treatment, storage, and disposal. All DOE waste producers are required to follow EM established policies and practices in their daily operations. EM must do likewise for internal operations and is responsible for conducting oversight reviews of base program waste management activities.

Accountability means that the Plan provides a vehicle for keeping track of DOE's efforts to safely treat, store, and dispose of the wastes generated and managed throughout the complex. The Plan reports progress on these efforts and on the work needed to achieve environmental regulatory compliance.

Some base program activities are conducted in facilities shared with EM. These are included in the Plan and reported along with all EM progress. By reporting annual status in the Plan, the Department can demonstrate stewardship of public funds and progress toward improved waste management activities.

One of the major DOE waste operations objectives is to effectively manage its processes and facilities in a safe and environmentally responsible manner, encompassing the program missions highlighted in Figure 4.1.1. These missions are essentially the same as described last year and include treatment, storage, disposal, and minimization activities for all types of wastes produced by the DOE complex. Radioactive (high-level, low-level, transuranic, greater-than-class-C, remote handled transuranic, noncertifiable), mixed, hazardous, and sanitary wastes are typical. Reduction of inventories and waste repackaging continue as part of the efforts. It is the responsibility of waste management to ensure that all of these wastes and activities are defined and managed in accordance with applicable regulations promulgated by the Environmental Protection Agency (EPA), the States, DOE, local governments, and municipalities.

Corrective Activities (described in Section 2 of this plan) continue to be the major effort needed to bring DOE facilities into immediate compliance with

environmental regulations and laws. Once compliance is attained, continued activities needed to maintain this condition are the responsibility of the operating program, whether it be EM or any of the other base programs.

Currently, waste management practices are enhanced through active reviews and audits designed to establish a clear understanding of the program direction, status of operations, and compliance efforts relative to regulations and other requirements. DOE line organizations, operating contractors, internal audit and Tiger Teams, and outside independent reviewers provide the oversight and "checks and balances" needed to ensure that credible actions are taken and a new culture is truly established.

As described in the FY 1991-1995 Plan, some radioactive wastes remain outside the jurisdiction of EM. The Office of Civilian Radioactive Waste Management continues to be responsible for the disposal of high-level radioactive waste in the Federal repository. However, as before, DOE's contribution to the Nuclear Waste Fund remains part of the plan.

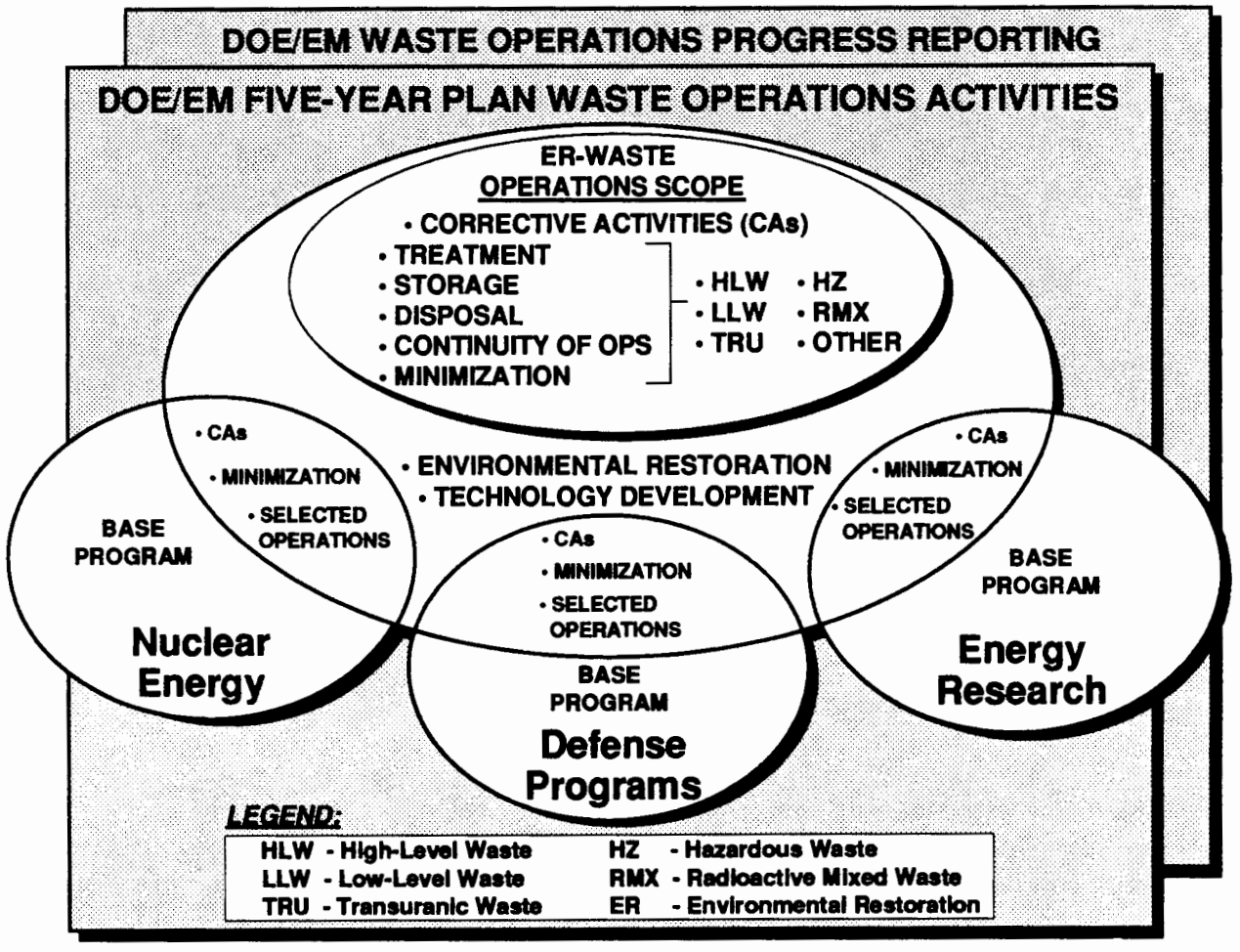


Figure 4.1.1. The Five-Year Plan describes and reports progress for the Office of Environmental Restoration and Waste Management (EM) waste operations and portions of other Department of Energy (DOE) organizations included in the Plan.

4.1.2 DOE APPROACH TO MANAGING WASTE OPERATIONS ACTIVITIES

DOE's approach to managing the Office of Environmental Restoration and Waste Management's (EM's) waste operations activities involves independent management of four major functional elements combined under the Associate Director for Waste Operations.

To manage the EM Waste Operations mission introduced in Section 4.1.1, EM established an Office of Waste Operations (WO) to report directly to the EM Office Director. WO is composed of four divisions focused on (1) Site Operations, (2) Waste Management Projects, (3) Program Support, and (4) Technical Support. Figure 4.1.2 shows the makeup of the Office. Areas of responsibility for each division are described.

1. The Site Operations Division is supported by three functional elements responsible for regional management: (a) an Eastern Operations Branch overseeing Chicago, Oak Ridge, and Savannah River; (b) a Central Operations Branch covering Albuquerque, Rocky Flats, and Idaho; and (c) a Western Operations Branch overseeing Nevada, Richland, and San Francisco.
   - The Division is responsible for aggressively focusing EM resources on safe, environmentally responsible daily operations and maintenance of all WO facilities.
   - The Division must achieve and maintain compliance with applicable Federal, State, Tribal, local, municipal, and DOE regulations governing environmental and waste management activities.
   - The Division is responsible for managing all EM Corrective Activities and providing oversight of all non-EM Corrective Activities managed by Defense Programs, Nuclear Energy, or Energy Research (Section 2.0).
2. The Waste Management Projects Division oversees the majority of the construction projects associated with waste operations.
   - The Division ensures that projects progress efficiently through the design and construction stages and then, through an organized transfer process, ensures "turn over" to the site Operations Division for routine usage.
   - Currently, a number of projects are in progress or nearing completion such as the Defense Waste Processing Facility, the Hanford Waste Vitrification Plant, and the Idaho National Engineering Laboratory Waste Experimental Reduction Facility. Exceptions do occur, for example, the Savannah River Cooling Tower Project is being managed by Defense Programs because it is classified as a Corrective Activity and is a part of the normal production base program.
3. The Technical Support Division
   - The Technical Support Branch may provide routine assistance to both Site Operations and Waste Management Projects where technical "specialties" are needed. This may include activities such as seismic analysis, safety analysis, and technical reviews.
   - This branch also develops operations standards for transport, storage, and disposal of specific waste types and provides an integrating function to ensure that wastes are managed consistently across the operations complex.

- The Waste Minimization Branch leads the minimization effort for Site Operations and participates in the development of Waste Minimization programs and policy in conjunction with the Office of Technology Development (see Section 5.3.1) and the Office of Environment, Safety and Health.

4. The Program Support Division provides resource management guidance from both a budget and regulatory viewpoint. While the Five-Year Plan does represent the Department's "Plan" for Environmental Restoration and Waste Management, upon completion it must be integrated with the total DOE budget, and eventually the President's budget.
   - The Division's Resource Management Branch provides this integration and acts as the WO liaison Branch with EM-10, the Office of Planning and Resource Management.
   - The Regulatory Compliance Branch provides support in the form of assessments and impact analyses of environmental and/or waste management compliance regulations and legislation on the WO budget and resources.
   - The Regulatory Compliance Branch also reviews and audits field activities for environmental compliance, safety, and quality assurance.

Functionally, the WO charter includes active technical and engineering management of daily on-line maintenance and operations; discussions with State representatives and regulators; preparation of permit applications; compliance with statutes, regulations, and DOE Orders; and acceptance of overall responsibility for worker and public safety and environmental stewardship.

Waste Operations staff, by virtue of their knowledge of the program mission, the results of operational audits, and program reviews, plan and classify the work to be done, both near term and long range, in the four priority classes discussed in Section 1.4. Working with the Office of Management and Budget and the Congress, WO develops budget plans needed to support the identified activities and takes action to notify the Congress of additional resource needs when increased scope or unforeseen conditions dictate.

The Associate Director and Deputy provide direction and management to the Operations Division and ensure that effective integration is occurring with other Department organizations and EM offices.

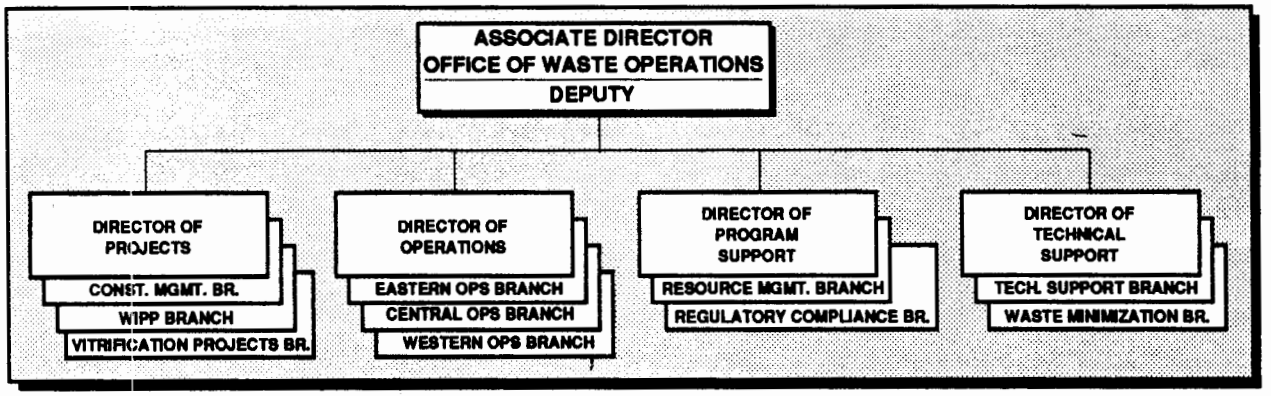


Figure 4.1.2. The Office of Environmental Restoration and Waste Management's Office of Waste Operations is designed to provide four functional areas of management.

4.3 OVERVIEW OF TRANSURANIC WASTE PROGRAM ACTIVITIES

Significant events in the past year have caused delays in implementing DOE's disposal strategy for transuranic (TRU) waste management. DOE is also reassessing requirements for mixed TRU waste storage.

TRU waste is waste that contains more than 100 nanocuries per gram of alpha-emitting transuranium radionuclides (e.g., plutonium) with half-lives greater than 20 years. Presently, DOE has about 59,680 cubic meters of TRU waste in storage and is adding about 2,500 cubic meters each year.

For nearly 20 years DOE's principal strategy for managing TRU wastes has been based on the development of a geologic repository, and for over 10 years the focus of this effort has been the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. Faced with mounting issues affecting the withdrawal of land around the WIPP site and concerns over environmental, safety, and regulatory documentation, the Secretary of Energy decided to reevaluate requirements for the opening of WIPP. The Secretary's reevaluation of the WIPP schedule led to the Draft Decision Plan (Section 4.3.1), which identifies the prerequisites for initiating the WIPP test phase.

Responding to delays in the WIPP site opening, the Governor of Idaho announced that he would no longer allow TRU wastes from other DOE sites to continue to be received for storage at the Idaho National Engineering Laboratory (INEL). (See Section 4.3.2.) With over 35,000 cubic meters of TRU waste in storage, INEL operates DOE's largest TRU waste management program and has served as the storage location for DOE's largest TRU waste generator, the Rocky Flats Plant (Figure 4.3).

With the Governor's ban on shipment of TRU wastes, closure of INEL for interim storage and a significant delay in opening WIPP, TRU waste operations at all sites have been impacted. Finding alternative storage locations for Rocky Flats TRU wastes, as well as activities to support the WIPP Draft Decision Plan, has been the focus of DOE task forces and the subject of several meetings between DOE and State governments.

Another impact to DOE's TRU waste management system has been the dual regulatory requirements that are applicable to mixed TRU wastes, which are TRU wastes also containing hazardous waste constituents as defined by the Environmental Protection Agency's (EPA's) Resource Conservation and Recovery Act (RCRA) regulations. This difference in approach is apparent in the contradictions between EPA's proposed regulations for TRU and high-level wastes (40 CFR 191) and RCRA. A key element of the RCRA regulations is the Land Disposal Restrictions, which prohibit the disposal of certain untreated hazardous materials either in or on the land unless it can be demonstrated to a reasonable degree of certainty that there will be no migration of hazardous constituents for as long as the waste remains hazardous. In contrast, the approach used in 40 CFR 191 assumes that over 10,000 years some fraction of the wastes will migrate but restricts the amount that can be released. EPA has not yet provided guidance to resolve differences in regulations and waste

management approaches. To comply with existing regulatory requirements, DOE has prepared a RCRA "No Migration Variance Petition" for WIPP. Although DOE believes EPA will grant this variance, the uncertainty is reflected in increased costs for TRU waste management.

Several DOE sites have proposed new incinerators to treat the RCRA components of TRU mixed waste. Estimated construction costs for these new facilities will exceed $300 million, with total operating and construction costs likely to exceed $1 billion. While DOE has not yet approved construction of all of these new facilities, the facilities have been identified in this Plan, and some of the funds have been requested in FY 1992 and outyears.

All DOE TRU waste storage site facilities were designed for long-term storage, but most were developed before RCRA was enacted. While these facilities meet the intent of the RCRA regulations for controlled storage, many do not provide the aisle-spacing requirements for the passage of equipment and inspections. While not all of DOE's TRU wastes are mixed, the cost for retrieving, analyzing, and segregating the wastes and for constructing new storage facilities will likely exceed $200 million.

Another aspect of the TRU waste management system is finding an appropriate disposal method for the small volume of classified wastes (less than one percent of the total). While classified information is controlled on a "need to know" basis, DOE also recognizes that it must provide assurances that classified waste management operations are being conducted in accordance with applicable Federal and State environmental laws and regulations. To address this issue, DOE has requested that several States obtain DOE security clearances for some of their regulatory personnel, thereby ensuring compliance with both environmental regulations and national security requirements.

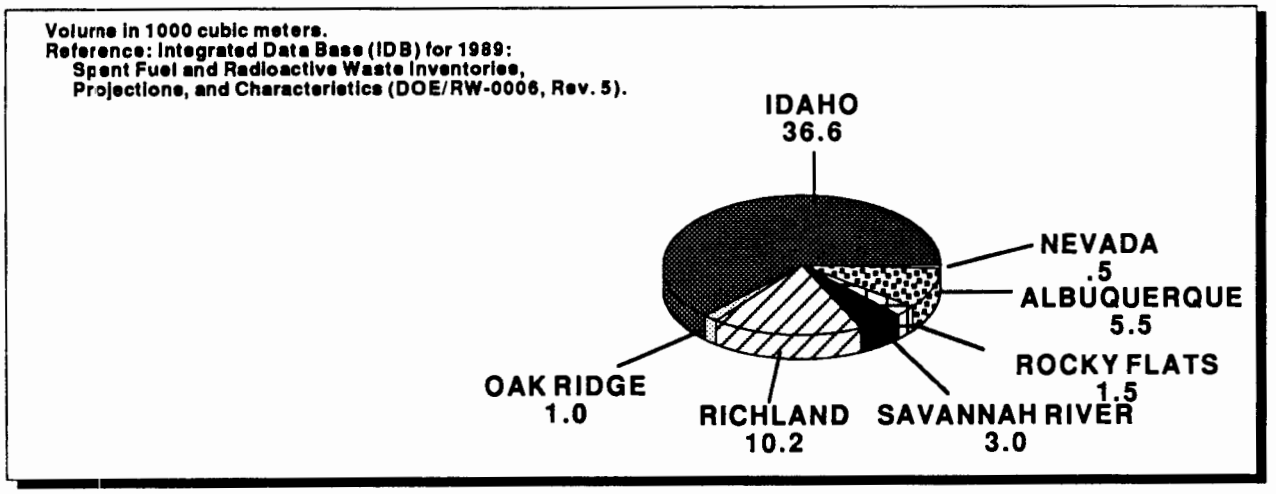


Figure 4.3. The majority of the Department's retrievably located transuranic wastes are located at the Idaho National Engineering Laboratory. Neither the Chicago nor the San Francisco Operations Offices currently has long-term storage capability.

4.3.1 DRAFT DECISION PLAN FOR THE WASTE ISOLATION PILOT PLANT

DOE has developed a Draft Decision Plan for the Waste Isolation Pilot Plant (WIPP) that identifies the prerequisites for beginning the Test Phase.

In October 1989, the Secretary of Energy issued a Draft Decision Plan for WIPP that identified those activities that need to be completed before WIPP can begin receiving waste for the Test Phase. In addition, the Plan identifies the process for conducting these activities and a best estimate of the schedules for completing them. Given the number and nature of the external reviews and the participants contributing to WIPP, coupled with the uncertainties involved in the timing and outcome of several of the activities, the Secretary recognized the uncertainty in the schedule. Therefore, the Decision Plan was issued as a draft and will remain in draft form until the uncertainties have been reduced.

The Decision Plan is updated monthly and distributed to the appropriate congressional committees, governors, other Federal agencies, interested groups, and individuals. With each issuance, recipients are offered the opportunity to provide comments or suggestions that are reviewed and incorporated appropriately into the next revision.

Organizationally, the Plan is divided into three activity group schedules: technical/internal, technical/external, and institutional. Each group includes a number of activities and schedules that have a major role in the opening of WIPP for Test Phase waste receipt. One of the most valuable facets of the Plan is its ability to display the interfaces between the activities, identify the current critical path(s), and document progress to date.

Areas currently considered as high risks to the successful opening of WIPP include issuance of the No-Migration Variance by the Environmental Protection Agency (EPA), Land Withdrawal, Final Safety Analysis Report approval, and institutional issues such as State of New Mexico Regulatory Authority for Resource Conservation and Recovery Act waste. All of these areas have the potential of delaying WIPP and, consequently, are receiving focused management attention and resources.

One of the current major milestones is the mid-June 1990 Secretary's decision point, when the Secretary is expected to announce the date for the facility's readiness to accept waste for the Test Phase. This date would be when the appropriate prerequisites will be completed and the Secretary can make a decision on the facility's readiness. It is also worth noting that the waste receipt date referenced in the Plan is for the Test Phase. A decision as to whether disposal operations can commence at WIPP will not be made until the Department can successfully demonstrate compliance with the EPA TRU waste disposal standards and confirm compliance with other applicable requirements as 40 CFR 191 and 40 CFR 268. Currently, the Test Phase is expected to last about five years.

Some of the major accomplishments at WIPP in the last year include issuance of the Supplemental Environmental Impact Statement, receipt of the Nuclear Regulatory Commission Certificate of Compliance for the waste shipment package (TRUPACT II),

issuance of the Final Plan for the Test Phase Performance Assessment, completion of the required submittals to EPA in support of the No-Migration Variance process, and the completion of a number of internal and external safety-related reviews.

In summary, the Draft Decision Plan represents a management tool that allows DOE to prioritize and focus its attention and resources on those areas and activities needed to qualify and facilitate the opening of WIPP.

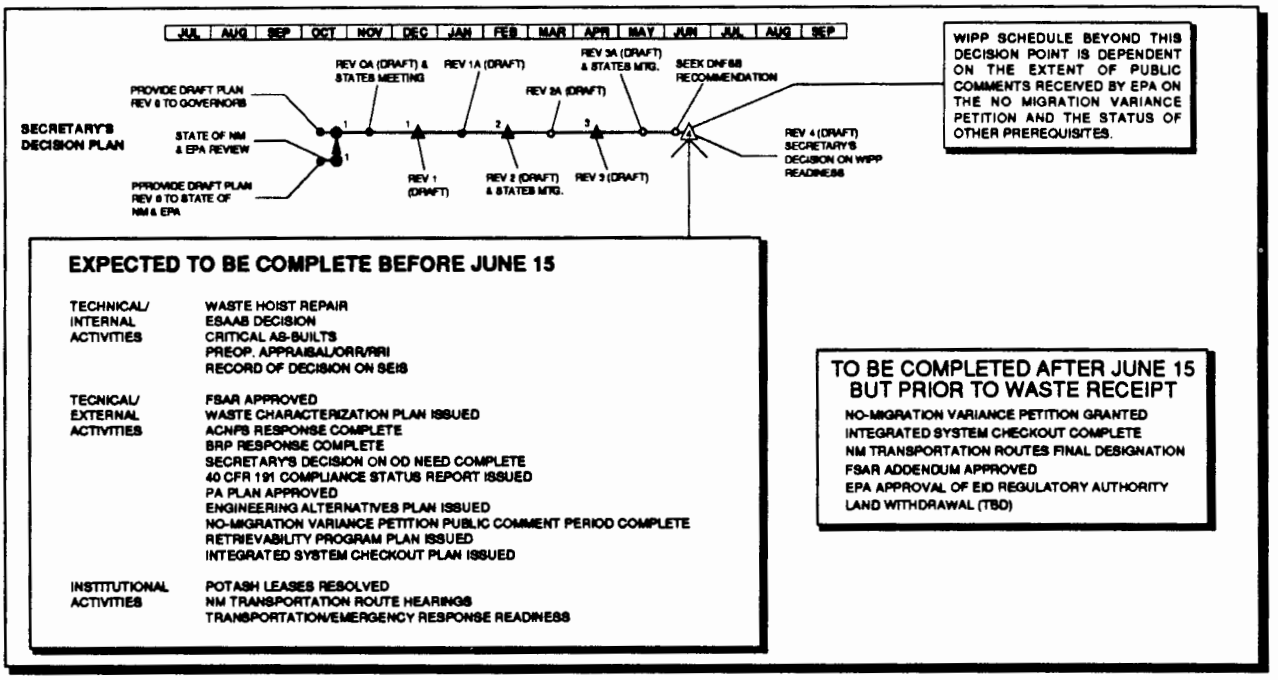


Figure 4.3.1. The Department of Energy has issued a Draft Decision Plan that defines what must be accomplished before waste may be shipped to the Waste Isolation Pilot Plant (WIPP). (TBD = to be determined, EPA = Environmental Protection Agency, FSAR = Final Safety Analysis Report, NMEID = New Mexico Environmental Improvement Division, PA = Preliminary Assessment, SEIS = Supplemental Environmental Impact Statement)

4.3.2 ROCKY FLATS PLANT MIXED TRANSURANIC WASTE ALTERNATIVE STORAGE

A new storage location for mixed transuranic (TRU) wastes generated at the Rocky Flats Plant (RFP) will be used if necessary until the Waste Isolation Pilot Plant (WIPP) is available for disposal.

RFP is part of the nuclear weapons research, development, and production complex that manufactures components for nuclear weapons. Plutonium is used in the process of component fabrication. A by-product of this process is the generation of TRU waste. Some of the TRU waste may also contain Resource Conservation and Recovery Act (RCRA) hazardous wastes, in which case it is called mixed TRU waste. WIPP is being built to allow disposal of TRU wastes, but it is not yet ready to receive waste. Consequently, TRU waste must continue to be stored.

Storage capacity at RFP for mixed TRU waste is limited to 1,601 cubic yards by DOE's permit with the State of Colorado, a limit RFP could reach during 1990. To maximize the use of authorized storage at RFP, several actions are under way. Aggressive efforts to minimize the amount of waste produced are making progress. Better waste characterization is minimizing the amount of waste characterized as mixed TRU, allowing segregation into TRU and low-level fractions that have less restrictive storage/disposal requirements. Finally, a supercompactor is being readied for operation later in 1990. The supercompactor will reduce the waste to about one-half its uncompacted volume. Figure 4.3.2 illustrates the "reserve" capacity achievable through use of the supercompactor. RFP TRU has historically been shipped to DOE's Idaho National Engineering Laboratory (INEL) for interim storage. The State of Idaho closed its borders to waste generated outside of the State. Consequently, until the WIPP is ready to receive TRU wastes, alternative storage locations must be found to keep RFP from exceeding its storage limit.

DOE established the Alternative Storage Task Force to provide a systematic review of the DOE mixed TRU waste management system and to recommend interim storage sites for RFP mixed TRU wastes. Three alternative storage approaches are being pursued:

- store RFP TRU waste at other DOE sites in addition to RFP and INEL,
- establish a commercially owned and operated storage site, or
- store RFP TRU waste at a Department of Defense (DOD) controlled site.

Storing RFP waste at other DOE sites is being pursued as a near-term option, with commercial storage or storage at DOD sites being longer-term options.

DOE briefed the governors of the seven States that host the eight DOE sites that currently handle or have plans to handle TRU waste (Washington, Idaho, Colorado, South Carolina, Tennessee, New Mexico, Nevada) in November 1989 and February 1990. As a near-term option, DOE may propose that each State to take a share of the waste for several years until longer-term storgae could be put in place.

In addition to interim storage at the existing DOE facilities, an option for a commercial

storage option is being pursued as a procurement activity. A Commerce Business Daily announcement indicating DOE's intent to issue a request for proposals for a commercial storage site appeared on February 23, 1990. A contract award may occur in September 1990, leading to an operational storage facility in 1993 or 1994.

DOE also requested that DOD assess potential sites for temporary storage of waste from RFP. A joint DOE/DOD task force was formed to screen potential sites and to develop proposed strategies.

DOE is developing the necessary National Environmental Policy Act documentation and safety assessments for the near-term option of storing the waste at various DOE sites. This will be completed before any decisions are made on where to store the RFP waste.

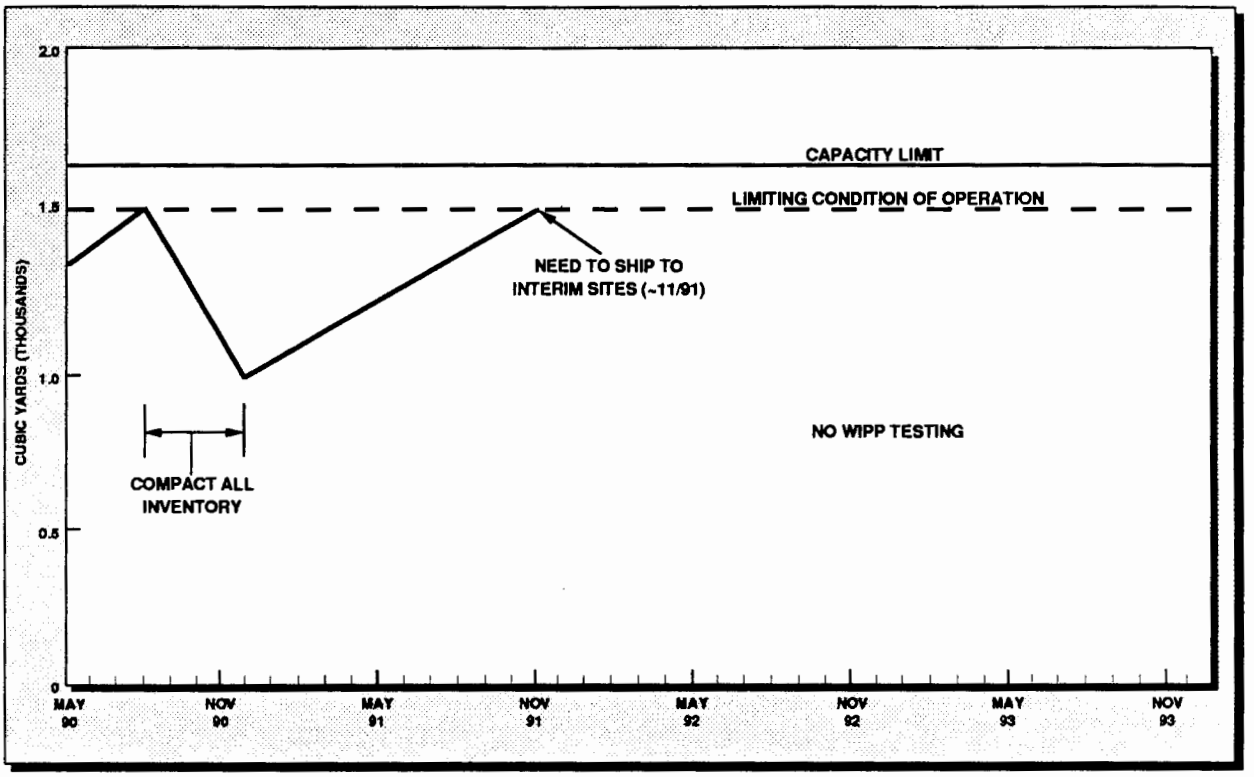


Figure 4.3.2. Rocky Flats Plant waste inventory estimates assume a volume of 70 cubic yards per month until the supercompactor is operational. (WIPP = Waste Isolation Pilot Plant)

4.5 OVERVIEW OF HAZARDOUS WASTE PROGRAM ACTIVITIES

DOE hazardous waste program activities will result in the minimization, treatment, and disposal of hazardous waste.

Hazardous waste management addresses materials identified as hazardous or requiring regulatory control as stipulated by the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act, and the Clean Water Act. For example, materials such as trichloroethane, polychlorinated biphenyls (PCBs), mercury, and cadmium are classified as hazardous waste. These regulations are interpreted by the States or EPA regions and are applied to local DOE operations. As time goes on, the regulatory agencies steadily increase the number of waste types banned from land disposal without previous treatment. Similarly, disposal facilities must meet increasingly stringent waste acceptance criteria. The DOE hazardous waste program is designed to comply with these regulatory requirements, reduce risk to human health and the environment, and minimize waste generation.

The Office of Environmental Restoration and Waste Management (EM) has a five-point strategy for handling hazardous waste:

1. Avoid hazardous waste generation. The best approach is to minimize and/or eliminate hazardous waste generation. EM currently has programs in place with the objectives of minimizing and eliminating the use of chlorinated solvents in its facilities, for example, nonplutonium operations eliminating the use of carbon tetrachloride at Rocky Flats; recycling mercury waste at Savannah River; and recycling antifreeze at Richland.
2. Treat hazardous waste. DOE's near-term objective is to treat hazardous waste as it is generated, and, thus, avoid additional storage capacity. Two examples are the hazardous waste incinerator at Oak Ridge and the planned incineration facility at Savannah River. Wet oxidation technology is being investigated by Technology Development for specific hazardous waste treatment.
3. Dispose of hazardous waste. DOE disposes of hazardous waste in permitted DOE facilities after minimization and treatment.
4. Use applicable commercial technology. DOE uses the best available technology for hazardous waste treatment, including commercial technology, and intends upgrade as new methods are developed.
5. Control liability. DOE will control liability by using RCRA-permitted DOE treatment, storage, or disposal facilities instead of commercial hazardous waste disposal sites. The number of sites is limited, and only Government waste is accepted.

Figure 4.5 illustrates this strategy. As treatment and minimization efforts increase, the volume of waste disposed of should steadily diminish. Storage, however, will continue to rise to a peak, then diminish steadily as advanced programs get in place for minimization and treatment. Figure 4.5 is only illustrative; actual timing will differ.

When DOE uses licensed commercial facilities for the disposal of its hazardous

wastes, priority in selecting a vendor is given to recycling first, treatment second, and final containment and storage last.

The Land Disposal Restriction (LDR) regulations (40 CFR 268) under RCRA require treatment of the hazardous constituent of wastes to specific concentration levels before disposal. Some progress has been made in developing and implementing methods to reduce or eliminate the hazardous component of the waste. For example, Argonne National Laboratory-East (ANL-E) is building a plant to remove chlorides from the waste stream. Lawrence Berkeley Laboratory installed an acid neutralization system for Building 70/70A. Los Alamos is designing a waste treatment facility to recycle lead and waste oil and neutralize plating waste.

In many cases, neither DOE nor industry can meet current and proposed LDR regulations. As a result, available storage will have to increase until technology demonstrates effective methods for reducing the toxicity of the hazardous waste to below established limits. However, LDR regulations prohibit storage of banned waste except to accumulate sufficient quantities to facilitate proper recovery, treatment, or disposal. The Office of Technology Development is funding research for waste minimization and for associated waste treatment to meet these challenges.

Several States having RCRA authority are proposing and establishing more stringent regulations for wastewater discharge. As a result, several DOE sites must upgrade their stormwater discharge areas and industrial waste treatment facilities to meet the new requirements for renewing their National Pollutant Discharge Elimination System permits. The Kansas City Plant will design and construct several stormwater retention areas that will allow stormwater collection, testing, and treatment to remove contaminants before discharge. Mound Laboratory is upgrading all site drainage and will install a stormwater treatment system. The Pantex Plant will upgrade and/or construct new wastewater treatment plants for runoff and site drainage.

In the last year, DOE made progress on a wide range of hazardous waste issues. Several sites report upgrades and new construction of hazardous storage facilities to meet RCRA requirements, including:

- continued upgrading and removal of underground storage tanks (USTs) to meet the requirements of 40 CFR 280, (e.g., Idaho has replaced or closed USTs, ANL-E plans to replace nine USTs and to remove and permanently close six others), and
- continued removal of PCB transformers (e.g., ANL-E has replaced all but 18 PCB transformers, which will be removed this year, Richland plans to replace 17 PCB transformers this year).

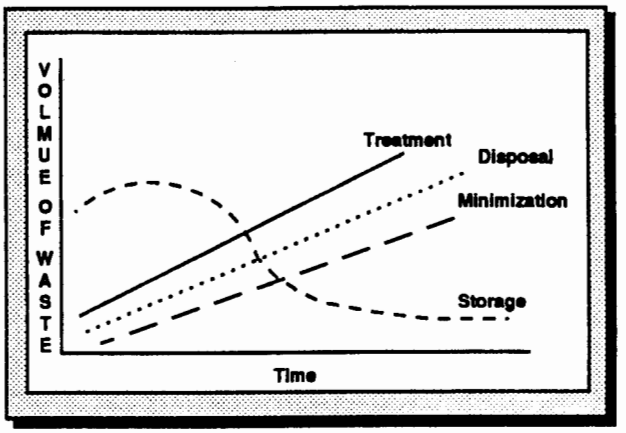


Figure 4.5. The Department of Energy's strategy for hazardous waste management includes avoiding waste generation and increasing waste treatment to reduce storage and disposal of hazardous waste.

4.6 OVERVIEW OF RADIOACTIVE MIXED WASTE PROGRAM ACTIVITIES

Radioactive mixed waste (RMW) program activities will minimize the generation of mixed waste and meet the regulations for treatment, storage, and disposal (T/S/D) for wastes that are generated.

RMW is radioactive waste that is also hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). The presence of both RCRA hazardous waste and radioactive waste means that radioactive mixed waste is subject to the requirements of RCRA as implemented through State and Environmental Protection Agency (EPA) regulations, as well as regulations governing radioactive wastes. As part of the continuing development of RCRA regulations, EPA is promulgating land disposal restrictions (LDRs) (40 CFR 268) on many waste constituents, which must be treated to specific concentration levels or by specified technologies before disposal. In addition, regulations restrict the time that untreated RMW may be stored. Implementing these LDRs for RMW poses difficult problems because of the lack of treatment facilities to handle the radioactive component. EPA has issued a national capacity variance that delays the applicability of the LDR restrictions on certain mixed wastes until May 8, 1992. RMW containing solvent/dioxin and California-list wastes are currently subject to RCRA and LDR requirements.

RMWs are generated at many DOE sites and include all the high-level and a significant portion of the transuranic (TRU) waste as well as most low-level wastes. The RMW program focuses on low-level, non-TRU radioactive mixed wastes and has as its objectives minimizing the generation of RMW and, for the RMW that is generated, the use of T/S/D facilities that comply with State and EPA regulations and DOE Orders.

Most DOE-generated RMW is stored pending treatment. Most RMW storage complies with current regulatory requirements, and all sites have submitted, or are in the process of submitting, RCRA Part B Permit applications.

Figure 4.6 shows current RMW inventories and generation rates. These wastes are composed of materials that are both low-level radioactively contaminated and chemically hazardous. Typically, RMW includes a broad spectrum of contaminated materials, such as air purifiers, cleaning solutions, engine oils, soils, and water treatment chemicals.

Facilities to treat some of the RMW are currently available or planned at some DOE sites. The Hanford Grout Processing Facility has been constructed to treat and dispose of low-level liquid RMW presently stored in underground tanks. This facility will mix the liquid waste with cement-forming materials to form a grout that will be pumped to engineered concrete disposal vaults and allowed to solidify. Processing of RMW is scheduled to begin in FY 1991.

The Waste Experimental Reduction Facility (WERF) incinerator in Idaho is currently operable under an interim status authorization. Its usefulness will be expanded by the addition of off-gas treatment capabilities for incineration of RMW-containing halogens. The upgrades

are scheduled for completion in FY 1990, with a trial burn in FY 1991.

The RMW incinerator at Oak Ridge experienced failure of an induction fan during a RCRA trial burn in FY 1989, which has delayed operations. The fan has been replaced, with operation scheduled to begin in FY 1990, pending receipt of the final RCRA permit. The incinerator will process mixed wastes from Paducah, Portsmouth, Fernald, the Oak Ridge Gaseous Diffusion Plant, the Y-12 Plant, and the Oak Ridge National Laboratory.

Los Alamos National Laboratory (LANL) has an incinerator facility--and has another proposed--slated to burn RMW. The facility is not currently in operation, pending completion of technical upgrades and resolution of issues involving regulatory control of radioactive emissions.

The Nevada Test Site (NTS) RMW disposal facility is operating under interim status and is authorized to dispose of RMW generated by the NTS, Rocky Flats Plant, and Sandia National Laboratories-Albuquerque. The facility is also authorized to dispose of classified RMW generated by any DOE site. NTS plans to construct a facility for disposal of RMW other than the low-level, liquid RMW. LANL is also proposing to construct an RMW disposal facility.

FY 1989 Accomplishments:

- A million-gallon test campaign of the Hanford grout facility was conducted.
- A Federal Facility Compliance Agreement was negotiated with EPA and the State of Colorado to address storage of RMW at Rocky Flats Plant.
- Best Demonstrated Available Technology information was submitted to EPA for treatment of four types of RMW:
  - vitrification of high-level waste;
  - solidification of zirconium fines;
  - stabilization/grouting of low-level RMW, specifically the Hanford grout and the Savannah River saltstone; and
  - stabilization of incinerator ash.
- A Toxic Substances Control Act (TSCA) Permit was issued to the Oak Ridge RMW incinerator.
- "DOE Land Disposal Restrictions Strategy Report for Radioactive Mixed Waste" was generated addressing options and recommending a course of action for LDR compliance.

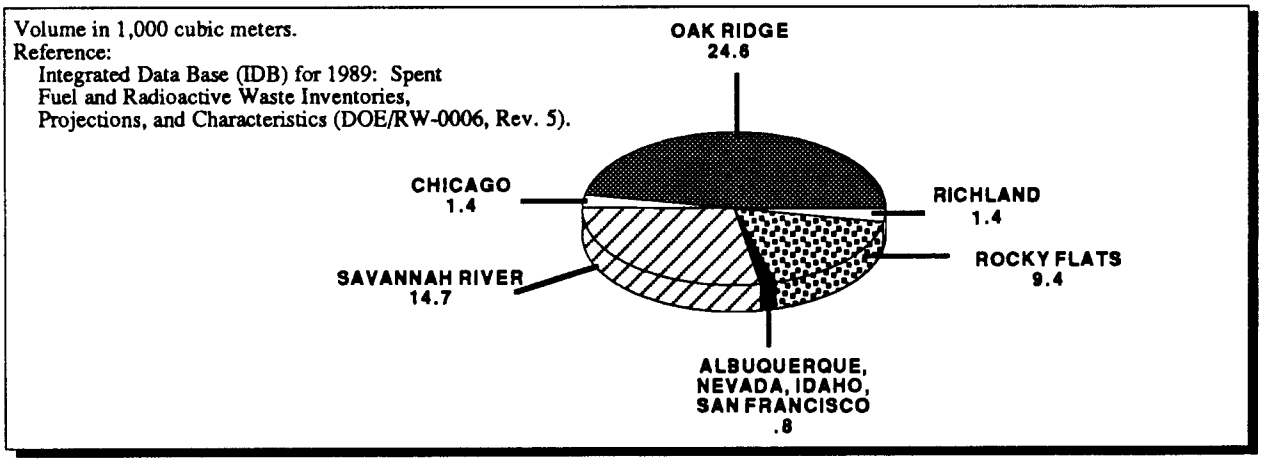
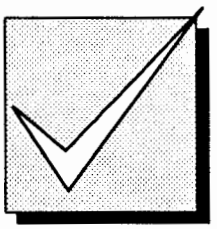


Figure 4.6. Cumulative volume of low-level radioactive mixed waste was 59,140 cubic meters through 1988 at the DOE sites. The annual volume generation rate for 1988 was 12,356 cubic meters.

Attachment A

Corrective Activities Summaries by Site



NOTE: Validated estimates have been identified that exceed the amount set forth for the FY 1991 President's budget by $30 million. The estimates set forth for FY 1992 are all validated estimates. The estimates for FY 1993 and beyond include validated amounts and may include unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)

CORRECTIVE ACTIVITIES FUNDING SUMMARY BY SITE
(Thousands of Dollars)

Operations Office/Installation	FY90	FY91B	FY92	FY93	FY94	FY95	FY96
Albuquerque Operations Office							
Kansas City Plant	4,174	6,049	4,140	316	316	316	316
Los Alamos National Laboratory	7,224	11,478	20,664	9,482	12,168	13,633	5,836
Mound Plant	2,700	1,723	0	0	0	0	0
Pantex Plant	3,053	1,300	315	0	0	0	0
Pinellas Plant	256	0	0	0	0	0	0
Sandia National Laboratory - Albuquerque	2,118	100	3,411	2,154	0	0	0
Sandia National Laboratory - Livermore	217	280	440	0	0	0	0
Albuquerque Other 1/	591	0	0	0	0	0	0
Albuquerque Total	20,333	20,930	28,970	11,952	12,484	13,949	6,152
Chicago Operations Office							
Chicago Combined Laboratories	5,328	10,172	10,200	1,870	603	603	603
Chicago Total	5,328	10,172	10,200	1,870	603	603	603
Idaho Operations Office							
Idaho National Engineering Laboratory	7,800	13,978	7,000	5,000	5,000	3,000	1,000
Idaho Total	7,800	13,978	7,000	5,000	5,000	3,000	1,000
Nevada Operations							
Nevada Test Site	1,737	836	1,660	0	0	0	0
Nevada Total	1,737	836	1,660	0	0	0	0
Oak Ridge Operations Office							
FMPC and Ports	17,129	35,429	23,912	25,839	11,775	8,918	3,220
Oak Ridge Reservation (ORNL ORGDP Y-12)	12,875	17,533	24,737	15,610	30,700	12,400	23,400
Paducah Gaseous Diffusion Plant	889	2,750	12,709	21,700	31,410	10,000	6,200
Oak Ridge Other 1/	33	0	48	48	48	48	48
Oak Ridge Total	30,926	55,712	61,406	63,197	73,933	31,366	32,868
Richland Operations Office							
Richland Site	18,319	22,026	24,777	13,008	11,158	11,158	11,158
Richland Total	18,319	22,026	24,777	13,008	11,158	11,158	11,158
Rocky Flats Office							
Rocky Flats Plant	1,807	1,381	2,921	6,223	2,415	0	0
Rocky Flats Total	1,807	1,381	2,921	6,223	2,415	0	0
San Francisco Operations Office							
SF Laboratories and Installations	6,641	5,441	23,960	29,250	22,200	8,710	2,360
San Francisco Total	6,641	5,441	23,960	29,250	22,200	8,710	2,360
Savannah River Operations Office							
Savannah River Site	39,400	46,600	17,600	0	0	0	0
Savannah River Total	39,400	46,600	17,600	0	0	0	0
TOTAL CORRECTIVE ACTIVITIES	132,291	177,076	178,494	130,500	127,793	68,786	54,141

1/ No installation Summary Table Included in Attachment A.

ALBUQUERQUE OPERATIONS OFFICE CORRECTIVE ACTIVITIES SUMMARY

Nine facilities, located in five different states, are managed by AL. Major compliance issues occur at KCP, Pantex, SNL, and LANL. Thirty-nine projects have been submitted for funding, with the majority of projects consisting of the improvement or upgrade of pollution control and monitoring capabilities. Other projects address improvements to TSCA and RCRA storage facilities. The outyears show decreases in Corrective Activities funding as the problem areas are brought into compliance.

CORRECTIVE ACTIVITIES NEEDED	STATUS
• Upgrade waste handling and waste management facilities • Upgrade treatment facilities to ensure effluent discharges within NPDES permit limits • Store hazardous and toxic wastes in areas below the level of the 100-year flood elevation • Achieve compliance levels of toxic compounds discharged to POTW • Clean up contamination of soil and groundwater from leaking USTs and remove, replace, or upgrade USTs • Reduce emission of gaseous pollutants from air exhausts • Clean and reline storm sewers to eliminate release of PCBs to nearby streams • Construct flood walls around all TSCA and RCRA storage areas • Construct consolidated sanitary and hazardous waste treatment facilities • Design and construct wastewater treatment facilities • Upgrade exhausts with volatile organic compound control equipment • Construct hazardous material storage facilities with spill containment	• Phase 1 of Relining the 002 Main Trunk was completed in 1989 (KCP). • Radioactive Storage Upgrades was completed in 1989 (KCP). • Start of Flood Protection Improvements is expected in 1991 (KCP). • Sewer line design construction was completed for TA III; construction is in progress (SNL). • Design and construction of the RCRA Waste Staging Facility is under way in 1990 (Pantex). • Procurement and installation of waste treatment equipment for the high-explosive fabrication facilities and USTs is in progress (Pantex). • Design specifications have been established for a Tritium Monitoring System (SNL). • Construction was completed during 1989 on the segregation of sanitary and radioactive wastewater at TA 53 (LANL).
ENVIRONMENTAL RISKS	**SPECIAL CONSIDERATIONS**
In the event of a 100-year flood occurring before the completion of the proposed Corrective Activity, hazardous and toxic wastes could be dispersed over a wide area by the flood waters. (Kansas City)	NPDES permit reapplication must be submitted in September 1990. Early discussions with NMEID and EPA suggest that the permit will be reissued with more stringent water-quality-based effluent requirements. (LANL)

REGULATORY DRIVERS

- FFCAs with EPA and/or States
- CAA/State Air Quality Control Acts
- RCRA/State Hazardous Waste Acts
- CWA/State Water Pollution Control Acts
- TSCA
- State Regulatory Administrative Codes (FL/OH/TX)
- State and EPA UST Regulations
- State Air Toxics Information and Assessment Act (California)

REGULATORY AUTHORITIES

- EPA Regions IV, V, VI, VII, and IX
- BAAQMD
- NMEID
- City of Albuquerque
- MDNR
- Kansas City POTW
- Ohio EPA
- Texas Water Commission
- Florida Department of Environmental Regulation
- Pinellas County Air Quality Division
- Pinellas County POTW
- Texas Department of Health

MAJOR MILESTONES

- Upgrade Liquid Waste Storage Facility, Pinellas (FY 1990)
- Complete UST removal and associated remediation, Pinellas (FY 1990)
- Procure and install RCRA storage units, Pantex (FY 1990)
- Construct RCRA Waste Staging Facility, Pantex (FY 1990)
- Begin construction of spill containment and installation of storage tank, Mound (4Q FY 1990)
- Design and construct effluent discharge holding systems for high explosives and laboratory facilities, Pantex (FY 1991)
- Complete Waste Management Facilities Modifications, Kansas City (1Q FY 1991)
- Complete Surface Coating Operations Emissions Control, Kansas City (1Q FY 1991)
- Complete Flood Protection Improvements, Kansas City (FY 1993)

FUNDING

(Thousands of Dollars)

	EM
FY90	20,333
FY91B	20,930
FY92	28,970
FY93	11,952
FY94	12,484
FY95	13,949
FY96	6,152
FY92-96 TOT	73,507

ALBUQUERQUE OPERATIONS OFFICE CORRECTIVE ACTIVITIES SUMMARY - LOS ALAMOS NATIONAL LABORATORY

At present, 12 Corrective Activities are planned at Los Alamos National Laboratory to redress problems with water pollution, hazardous waste management, and air quality.

CORRECTIVE ACTIVITIES NEEDED	STATUS
• Design and construct air quality controls at TA-53 to control radioactive air emissions • Replace PCB transformers and capacitors to alleviate PCB leaks and spills • Replace USTs to reduce risk of leaks and spills of oils, chemicals, and radioactive liquids • Design and construct a hazardous waste treatment facility to properly handle and dispose of waste • Design and construct wastewater treatment facilities to eliminate NPDES Permit violations, reduce potential contamination, and protect surface waters • Design and construct a Sanitary Wastewater System Consolidation Project to achieve state-of-the-art sanitary wastewater treatment on an areawide basis • Design and repair septic tanks Laboratorywide to ensure full regulatory compliance • Design and construct spill prevention and control measures at numerous sites throughout LANL to prevent contamination of watercourses and the environment • Design and construct stormwater runoff controls at HE firing sites • Implement water supply protection program	• All 12 Corrective Activities are at least in the planning and design phase, while several Activities are in early construction. Specifically, the design for the new Sanitary Wastewater System Consolidation Project is 50 percent complete; a contract is being written to retrofill 20 PCB transformers, while construction on PCB transformer replacement projects is beginning; construction is under way regarding two spill prevention control facilities; and engineering study and design are in progress for all other Corrective Activities. • During 1989, construction was completed on the segregation of sanitary and radioactive wastewater at TA 53.
ENVIRONMENTAL RISKS	**SPECIAL CONSIDERATIONS**
Potential risks are present for PCB transformers regarding leaks or spills that may adversely affect the environment if the corrective activities do not proceed as scheduled. Likewise, other corrective activities targeted to improve compliance with air and water regulations could present environmental risks if funding and schedules are delayed.	The Laboratory's NPDES Permit reapplication must be submitted by September 1990, with a new permit expected by March 1991. Early discussions with EPA and NMEID suggest that the permit will be reissued with more stringent water-quality-based effluent requirements.

REGULATORY DRIVERS	REGULATORY AUTHORITIES
· NPDES · FFCA · PCB regulations at 40 CFR 761 · Radioactive air regulations at 40 CFR 61 · CWA · New Mexico Liquid Waste Regulations · New Mexico UST Regulations · RCRA · HSWA · New Mexico Hazardous Waste Regulations	· NMEID · EPA Region VI

MAJOR MILESTONES	FUNDING
· Complete construction of and fully operate a Sanitary Wastewater System Consolidation Plant (4Q FY 1992) · Complete construction of all needed septic tank facilities and ensure compliance with liquid waste regulations (4Q FY 1992) · Replace or retrofill all PCB transformers and capacitors so no PCBs are in the inservice inventory (FY 1993) · Complete construction of and fully operate a Hazardous Waste Treatment Facility (FY 1993) · Complete construction of all spill control and countermeasure facilities Laboratorywide (FY 1995) · Complete construction of and fully operate a Centralized High Explosive Wastewater Treatment Facility (FY 1996) · Complete construction of all NPDES Wastewater Treatment Facilities to ensure NPDES compliance (FY 1996) · Replace approximately 100 USTs (FY 1996)	(Thousands of Dollars) EM FY90 7,224 FY91B 11,478 FY92 20,664 FY93 9,482 FY94 12,168 FY95 13,633 FY96 5,836 FY92-96 TOT 61,783

ALBUQUERQUE OPERATIONS OFFICE
CORRECTIVE ACTIVITIES SUMMARY - SANDIA NATIONAL LABORATORIES-ALBUQUERQUE AND INHALATION TOXICOLOGY RESEARCH INSTITUTE SUMMARY

SNLA has five Corrective Activities: three previously identified items and two new Corrective Activities pertaining to air pollution control and monitoring and potential cross connections of stormwater and sewer lines. ITRI has two previously identified Corrective Activities pertaining to construction of a sewer line and replacing underground fuel oil storage tanks and lines.

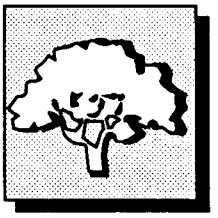
CORRECTIVE ACTIVITIES NEEDED	STATUS
· Characterize groundwater flow regimes at SNL · Construct and monitor sewer line at SNL · Install pollution control and monitoring equipment at SNL · Correct sewer cross connections at SNL · Construct 1.7 miles of sewer line to discharge sanitary wastes into Albuquerque Sewage Treatment Plant at ITRI · Replace, remove, or relocate entire fuel oil system at ITRI	· Initiated data compilation to locate new hydrogeologic wells at SNL · Completed sewer line design for TA III; construction in progress at SNL · Air/water pollution activities to begin in FY 1992 at SNL · Completed leak test on all underground storage tanks in March 1989 at ITRI · Removed two empty fuel tanks in October 1989 at ITRI
ENVIRONMENTAL RISKS	**SPECIAL CONSIDERATIONS**
· Completion of the sewer line removes the potential for nondomestic wastes in septic systems to be leached continually into the soils. · Discharge of untreated sanitary sewers into storm sewers results in potential contamination of New Mexico's waterways	· DOE/NMEID Agreement in Principle will identify special air/water pollution conditions that require correction. · The use and construction costs of the sewer line will be shared by ITRI, SNLA, CTA, and Kirtland Air Force Base.

REGULATORY DRIVERS	REGULATORY AUTHORITIES
· RCRA · CWA · CAA · NPDES · City of Albuquerque Sewer Ordinance	· EPA Region VI · NMEID · City of Albuquerque Pretreatment Section · Bernatillo County Air Quality Control Board

MAJOR MILESTONES	FUNDING
· Complete construction of TA III sewer line (4Q FY 1990) · Design air pollution control equipment (4Q FY 1992) · Design and construct TA V sewer line (FY 1993) · Correct sanitary and storm sewer cross connections (FY 1993) · Install/monitor performance of air pollution control equipment (FY 1993) · Complete sewer line connection, ITRI (FY 1991) · Complete fuel tank project, ITRI (FY 1991)	(Thousands of Dollars) EM FY90 2,118 FY91B 100 FY92 3,411 FY93 2,154 FY94 0 FY95 0 FY96 0 FY 92-96 TOT 5,565

Attachment B

Environmental Restoration Summaries by Site



NOTE: Validated estimates for Environmental Restoration (ER), Waste Management (WM), and Corrective Activities (CA) have been identified that exceed the amount set forth for the FY 1991 President's budget by $605 million. $1,528 million of the total ER, WM, and CA estimates set forth for FY 1992 is unvalidated. The estimates set forth for FY 1993-1996 include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)

ENVIRONMENTAL RESTORATION FUNDING SUMMARY BY SITE (cont'd)
(Thousands of Dollars)

Operations Office/Installation	FY90	FY91B	FY92	FY93	FY94	FY95	FY96
Richland Operations Office							
Hanford Site 100	17,087	10,790	60,641	85,931	101,658	96,587	92,285
Hanford Site 200	19,554	31,533	43,382	64,096	104,119	126,553	163,811
Hanford Site 300	4,376	5,001	24,765	31,866	35,093	29,988	26,083
Hanford Site 1100	4,944	5,494	9,370	12,320	12,830	37,800	37,800
Richland Other 1/	38,399	49,038	87,439	86,396	89,254	90,235	93,801
Richland Total	84,360	101,856	225,597	280,609	342,954	381,163	413,780
Rocky Flats Office							
Rocky Flats Plant	57,814	40,500	45,692	30,171	45,204	46,764	62,817
Rocky Flats Total	57,814	40,500	45,692	30,171	45,204	46,764	62,817
San Francisco Operations Office							
Lawrence Livermore National Laboratory	17,313	19,462	36,850	28,100	18,350	16,900	16,600
ETEC, LBL, LEHR, and SLAC	5,454	9,986	23,199	15,046	8,041	6,193	571
San Francisco Total	22,767	29,448	60,049	43,146	26,391	23,093	17,171
Savannah River Operations Office							
Savannah River Site	60,862	62,427	84,357	109,824	122,263	143,252	145,589
Savannah River Total	60,862	62,427	84,357	109,824	122,263	143,252	145,589
Headquarters Office 1/	45,036	59,298	57,698	56,206	55,410	57,260	59,360
TOTAL ENVIRONMENTAL RESTORATION	715,213	949,839	1,737,393	2,009,887	2,090,970	2,161,134	2,040,384

1/ No Installation Summary Table included in Attachment B.

ENVIRONMENTAL RESTORATION FUNDING SUMMARY BY SITE
(Thousands of Dollars)

Operations Office/Installation	FY90	FY91B	FY92	FY93	FY94	FY95	FY96
Albuquerque Operations Office							
Inhalation Toxicology Research Institute	182	65	6,280	6,234	6,080	2,586	432
Kansas City Plant	2,685	4,564	20,655	26,064	13,222	16,772	5,901
Los Alamos National Laboratory	16,143	15,408	120,610	160,220	161,900	131,970	86,180
Mound Plant	16,438	23,057	47,934	44,882	59,931	64,249	51,787
Pantex Plant	2,950	9,428	10,856	11,376	12,266	12,486	12,566
Pinellas Plant	1,607	2,692	3,039	3,272	6,388	6,519	7,442
Sandia National Laboratory - Albuquerque	4,074	4,352	12,994	14,683	15,280	9,071	7,639
Sandia National Laboratory - Livermore	1,019	1,256	9,883	5,527	5,304	1,041	1,041
South Valley Site	1,300	3,000	2,064	872	872	872	872
Uranium Mill Tailings Remedial Action Project	61,504	96,245	121,623	143,310	70,368	44,465	35,000
Albuquerque Other 1/	1,918	1,830	4,620	4,830	4,830	4,830	4,830
Albuquerque Total	109,820	161,897	360,558	421,270	356,441	294,861	213,690
Chicago Operations Office							
Argonne National Laboratory - East	5,963	15,091	17,452	22,493	16,957	13,571	11,001
Argonne National Laboratory - West	0	210	2,237	295	268	268	268
Brookhaven National Laboratory	3,909	7,455	4,705	3,113	10,855	10,510	61
Chicago Combined Laboratories	1,579	11,905	18,695	15,388	18,598	16,597	12,656
Fermi National Acceleration Laboratory	0	0	64	0	0	0	0
Princeton Plasma Physics Laboratory	0	0	20	21	15	15	15
Chicago Total	11,451	34,661	43,173	41,310	46,693	40,961	24,001
Idaho Operations Office							
Grand Junction Project Office	36,120	36,792	46,191	23,055	15,470	11,020	6,120
Idaho National Engineering Laboratory	44,912	38,759	81,324	83,700	74,080	71,630	82,490
Idaho Total	81,032	75,551	127,515	106,755	89,550	82,650	88,610
Nevada Operations							
Nevada Test Site	2,714	13,900	39,110	60,863	98,358	98,534	100,250
Nevada Offsite Test Locations	135	207	2,775	2,915	3,300	3,900	8,050
Nevada Total	2,849	14,107	41,885	63,778	101,658	102,434	108,300
Oak Ridge Operations Office							
Feed Materials Production Center	42,245	82,482	154,945	274,206	337,266	387,709	343,702
Formerly Utilized Sites Remedial Action Program	12,323	34,565	47,626	66,642	82,654	86,554	82,117
Oak Ridge Gaseous Diffusion Plant	55,218	94,773	153,424	137,617	137,576	156,088	135,883
Oak Ridge National Laboratory	37,054	62,816	145,660	178,236	133,120	153,862	170,367
Paducah Gaseous Diffusion Plant	21,467	20,485	30,808	34,953	27,595	19,595	11,097
Portsmouth Gaseous Diffusion Plant	19,998	11,178	27,880	23,768	46,988	44,488	28,188
Weldon Spring Remedial Action Project	9,530	25,985	51,543	52,845	48,561	51,499	49,298
Y-12 Plant	28,268	31,140	51,601	59,703	60,392	59,227	60,597
Oak Ridge Other 1/	13,119	6,670	27,382	28,848	30,254	29,674	25,817
Oak Ridge Total	239,222	370,094	690,869	856,818	904,406	988,696	907,066

1/ No Installation Summary Table included in Attachment B.

ALBUQUERQUE OPERATIONS OFFICE
INSTALLATION SUMMARY - INHALATION TOXICOLOGY RESEARCH INSTITUTE

ITRI occupies approximately 200,000 square feet of laboratory space on the south edge of Kirtland AFB in Albuquerque. The laboratory houses up to 15,000 research animals and generates sanitary, hazardous, radioactive, and mixed wastes. ITRI conducts studies on the health effects of inhaling fission products, fuel cycle actinides, insulating materials, coal combustion effluents, and diesel exhaust emissions.

EXTENT/TYPES OF CONTAMINATION	STATUS
Four areas were identified as requiring investigation: · sanitary lagoons - could contain RCRA wastes · groundwater under sanitary lagoons - contains elevated levels of nitrates · hot ponds - could contain RCRA wastes, and · USTs - could be releasing diesel oil	· USTs were tested; one tank failed tightness test and was permanently removed from service. · Two empty USTs have been removed. · Diesel oil contamination of soil to a depth of 75 ft has been found. · Hot pond cleanup has been completed, and all radioactive sediment has been removed. Contaminated concrete remains.
HEALTH RISKS	**SPECIAL CONSIDERATIONS**
No immediate health risks have been identified based on information available to date.	If ITRI is unable to connect to the Albuquerque sewage treatment plant or unable to remediate the nitrate plume, NMEID could withdraw the discharge permit, which would effectively shut down the facility.

REGULATORY DRIVERS

- NMEID discharge permit for sanitary lagoons
- State and Federal UST regulations
- RCRA
- Applicable State regulations
- DOE Orders

REGULATORY AUTHORITIES

- NMEID
- EPA Region VI

MAJOR MILESTONES

- Complete hot pond structure removal task (FY 1991)
- Complete assessments for sanitary lagoons, nitrates in groundwater, diesel oil release, and hot ponds remediation tasks (FY 1992)
- Complete cleanup of sanitary lagoons, hot ponds remediation tasks (FY 1994)
- Complete cleanup of nitrates in groundwater, diesel oil release tasks (FY 1995)

CONTINUATION

FUNDING

Funding By Priority Level
(Thousands of Dollars)

Year	Priority 1		Priority 2		Priority 3		Priority 4		Total	
	A*	C**	A	C	A	C	A	C	A	C
FY90	0	0	0	0	0	182	0	0	0	182
FY91B	0	0	0	0	0	65	0	0	0	65
FY92	0	0	1,928	2,498	1,132	722	0	0	3,060	3,220
FY93	0	0	0	3,275	0	2,959	0	0	0	6,234
FY94	0	0	0	3,053	0	3,027	0	0	0	6,080
FY95	0	0	0	2,442	0	144	0	0	0	2,586
FY96	0	0	0	144	0	288	0	0	0	432
FY 92-96 TOT	0	0	1,928	11,412	1,132	7,140	0	0	3,060	18,552
								Grand Total		21,612

A*Assessment C**Cleanup

ALBUQUERQUE OPERATIONS OFFICE
INSTALLATION SUMMARY - LOS ALAMOS NATIONAL LABORATORY

LANL occupies about 24,400 acres in Los Alamos County, approximately 90 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe. The Laboratory is situated on the Pajarito Plateau, which is made up of fingerlike mesas ranging in elevation from 6,200 to 7,800 ft. Major programs at LANL include applied research in nuclear and conventional weapons development, nuclear fission and fusion, nuclear safeguards and security, and waste management. Approximately 600 potential release sites are currently scheduled for investigation under HSWA. Seven surplus facilities are identified for D&D in the Five-Year Plan.

EXTENT/TYPES OF CONTAMINATION

The approximately 600 potential release sites scheduled for investigation are a result of historic operational practices (e.g., disposal in trenches, pits, shafts, and routine untreated releases to canyons) or accidents (e.g., leaks and spills). Waste streams include:

- processing operations--radionuclides, solvents, organics, and metals;
- R&D activities--laboratory reagents, chemicals, solvents, metals, and radionuclides;
- high-explosives operations--barium, metals, and high explosives; and
- D&D activities--large quantities of building debris contaminated with radionuclides and high-explosive residuals.

STATUS

Remedial Actions

- Approximately 600 potential release sites were identified from the 1988 Solid Waste Management Unit Report.
- RCRA Closure Plans have been submitted for seven closure tasks.
- Scoping and reconnaissance studies were conducted for 33 of 55 release sites.

D&D

- D&D is in progress on three reactors and one hot cell facility.

HEALTH RISKS

No immediate health risks have been identified based on information available to date; however, the risk associated with the waste sites at LANL cannot be quantified until a major portion of the characterization work is completed.

SPECIAL CONSIDERATIONS

RCRA waste resulting from ER Program activities may initially be shipped offsite until a RCRA-permitted mixed waste disposal facility at LANL is available for use.

REGULATORY DRIVERS

- RCRA 3004(u) Permit (March 1990)
- Applicable State regulations
- CERCLA
- DOE Orders

REGULATORY AUTHORITIES

- NMEID
- EPA Region VI

MAJOR MILESTONES

- Complete 3 RCRA closures (FY 1990)
- Start RFI/CMS assessments for 3 tasks in FY 1991 and 1 task in FY 1992
- Start 3 D&D tasks in FY 1990, 2 in FY 1991, 1 in FY 1992, and 1 in FY 1993
- Complete RFI/CMS assessments for 9 tasks in FY 1995 and 12 tasks in FY 1996
- Complete 4 D&D tasks in FY 1990, 1 in FY 1991, 2 in FY 1993, and 1 in FY 1994
- Start CMI remediations for 9 tasks in FY 1995

CONTINUATION

FUNDING

Funding By Priority Level
(Thousands of Dollars)

Year	Priority 1		Priority 2		Priority 3		Priority 4		Total	
	A*	C**	A	C	A	C	A	C	A	C
FY90	0	983	10,895	4,265	0	0	0	0	10,895	5,248
FY91B	110	0	6,680	8,618	0	0	0	0	6,790	8,618
FY92	90	0	97,580	21,440	0	1,500	0	0	97,670	22,940
FY93	90	0	140,650	15,980	0	3,500	0	0	140,740	19,480
FY94	90	0	145,550	16,260	0	0	0	0	145,640	16,260
FY95	0	0	115,300	15,370	0	1,300	0	0	115,300	16,670
FY96	0	0	55,000	24,500	0	6,680	0	0	55,000	31,180
FY 92-96 TOT	270	0	554,080	93,550	0	12,980	0	0	554,350	106,530
									Grand Total	660,880

A*Assessment C**Cleanup

ALBUQUERQUE OPERATIONS OFFICE
INSTALLATION SUMMARY - SANDIA NATIONAL LABORATORIES-ALBUQUERQUE

SNLA occupies several parcels of land covering 2,820 acres within Kirtland AFB in Albuquerque. SNLA is an R&D laboratory primarily dedicated to the design and testing of nonnuclear components of nuclear weapons. Sandia also has responsibility for two offsite areas: the TTR and Kauai Test Range. TTR covers 640 square miles in the high desert region of west central Nevada, approximately 140 air miles northwest of Las Vegas. TTR was used as a bombing range throughout World War II. The Kauai Test Range is located on the island of Kauai within the Navy-owned Pacific Missile Range Facility. The facility is used for launching missiles over the Pacific Ocean to remote target areas.

EXTENT/TYPES OF CONTAMINATION

SNLA
The Installation Assessment identified 20 tasks containing 139 potential release sites. These potential release sites include shallow land burial sites, test areas, drainfields, and historic spill sites. Contaminants include a wide variety of hazardous and radioactive wastes, explosive residues, solvents, photochemicals, and petroleum products. Few of the sites have been characterized to date; however, the potential (unverified) for TCE groundwater contamination has been identified.

Tonopah Test Range
The Preliminary Assessment identified 3 tasks containing 15 potential release sites. These potential release sites include shallow land burial sites, test areas, drainfields, and historic spill sites. Contaminants include a limited group of hazardous and radioactive wastes, explosive and rocket propellant residues, solvents, photochemicals, and petroleum products. Few of the sites have been characterized to date; however, it is estimated that the extent of contamination is limited to surface and subsurface soils.

(Continued)

STATUS

Assessment
At SNLA the Environmental Restoration program has begun RCRA Facility Investigations of 6 tasks that contain 30 potential release sites. Groundwater detection monitoring networks have been installed at the shallow land burial sites. A closure plan was submitted to the NMEID for approval of a cap at the Chemical Waste Landfill and has not yet been reviewed. Closure cannot begin until approval is secured, and this project may be delayed until FY 1991. The assessment phase of the program was developed as a two-stage process. The first stage will confirm or reject the status of a potential release site. The second stage will sufficiently characterize a release to support a CMS.

Remediation
At SNLA the installation of a multicomponent RCRA cap is planned for the Chemical Waste Landfill after design approval is obtained from NMEID.

HEALTH RISKS

No immediate health risks have been identified based on information available to date; however, the risk associated with the release sites at SNLA cannot be quantified until a major portion of the characterization work performed during the RCRA Facility Investigations has been completed.

SPECIAL CONSIDERATIONS

The release sites at SNLA and TTR are located in alluvial materials at large distances from the groundwater. In these arid climates, driving forces to cause movement of contaminants to a receptor are weak; however, the technology to demonstrate low migration potential and minimal risk if the contamination is left in place is also weak. Technical risk evaluations and cost/benefit evaluations will be necessary to propose corrective measures that meet the regulatory requirements.

REGULATORY DRIVERS

SNLA
- RCRA 3004(u) Corrective Action for releases from SWMUs
- Postclosure permit for closed landfills
- RCRA Closure for regulated landfills
- RCRA Part B Operating Permit with HSWA provisions of SWMUs (expected in Fall 1990)
- DOE Orders

TTR and Kauai
- CERCLA, Non-NPL
- Applicable State regulations
- DOE Orders

REGULATORY AUTHORITIES

- NMEID
- EPA Region VI
- EPA Region IX

MAJOR MILESTONES

SNLA
- Complete two-stage assessment process in 4 years for each task
- Complete Chemical Waste Landfill cap (FY 1990)
- Complete requirements of the NMEID Compliance Agreement for the Chemical Waste Landfill (FY 1991)
- Complete 1 assessment in FY 1991, 1 assessment in FY 1992, 3 assessments in FY 1993, 4 assessments in FY 1994, 7 assessments in FY 1995, 1 assessment in FY 1996, and 4 assessments in outyears. Remediation milestones dependent on assessment results

CONTINUATION

Extent/Types of Contamination (Continued)

Kauai Test Facility

The Preliminary Assessment identified one task containing three potential release sites. These potential release sites include rocket propellant residues, a drainfield, and historic spills. Contaminants are limited to hazardous constituents and petroleum products.

FUNDING

Funding By Priority Level
(Thousands of Dollars)

Year	Priority 1		Priority 2		Priority 3		Priority 4		Total	
	A*	C**	A	C	A	C	A	C	A	C
FY90	0	0	2,272	1,735	0	0	67	0	2,339	1,735
FY91B	27	0	3,704	0	45	0	576	0	4,352	0
FY92	32	0	9,761	1,943	755	0	503	0	11,051	1,943
FY93	32	0	9,306	4,435	205	0	705	0	10,248	4,435
FY94	32	0	7,495	3,879	205	0	3,669	0	11,401	3,879
FY95	32	0	4,047	2,142	205	0	2,645	0	6,929	2,142
FY96	32	0	3,132	1,740	205	0	2,530	0	5,899	1,740
FY 92-96 TOT	160	0	33,741	14,139	1,575	0	10,052	0	45,528	14,139
								Grand Total		59,667

A*Assessment C**Cleanup

ALBUQUERQUE OPERATIONS OFFICE
INSTALLATION SUMMARY - SOUTH VALLEY SITE

From 1951 to 1967, the AEC operated a metal-working plant associated with weapons production in the South Valley of Albuquerque, approximately 2 miles west of Kirtland AFB. The Air Force bought the plant in 1967 and produced jet engines from then until 1984 when GE bought the plant. The site includes two separate units--the GE Plant and the nearby San Jose 6 Municipal well. Discovery of solvent contamination of the municipal well in 1980 led to the designation of the South Valley Superfund site in 1983. As a former owner (as AEC), DOE is liable for its share of the cleanup.

EXTENT/TYPES OF CONTAMINATION	STATUS
• VOCs are present in groundwater and soil. • The vertical and lateral extent of VOC contamination in the groundwater is not fully known. • It is not known if there is metal contamination. • Cleanup standards for VOCs are yet to be negotiated.	• The RI/FS was completed in 1988, and EPA issued RODs for cleanup. • DOE, the Air Force, and GE attempted to negotiate an agreement to fund the EPA-selected remedies. Due to failure to reach agreement after 6 months, EPA issued CERCLA 106 Unilateral Orders against GE to implement the remedies. • GE is currently implementing RAs. • GE submitted a Remedial Action Plan to EPA in late 1989. • GE is negotiating an RD/RA schedule with EPA Region VI. • GE, the Air Force, DOE, and DOJ are negotiating a settlement agreement to reimburse GE. • The Air Force and DOE are negotiating an IAG to transfer DOE's share of the cleanup money to the Air Force. The Air Force will reimburse GE for the Federal government.
HEALTH RISKS	**SPECIAL CONSIDERATIONS**
Contamination of the underlying aquifer with solvents is a potential health risk.	• The contaminated site is private (GE) property. • As a PRP and previous facility owner, DOE is required by statute and regulation to cover its fair share of response action costs at the South Valley Superfund site. Negotiations with DOJ, the Air Force, and GE defining how this should be done are nearing completion.

REGULATORY DRIVERS	REGULATORY AUTHORITIES
· CERCLA 106 Unilateral Cleanup Orders issued against GE in July 1989 · EPA special notice letters that identified DOE, the Air Force, and GE as PRPs liable for cleanup activities at GE and the San Jose 6 OUs · Applicable State regulations · DOE Orders	· NMEID · EPA Region VI

MAJOR MILESTONES	CONTINUATION
· Start RD/RA (FY 1990) · Complete RD/RA (FY 2003 for GE plant - 2019 for San Jose) (RD/RA schedule is under negotiation. Further detail is not available at this time.)	

FUNDING

Funding By Priority Level
(Thousands of Dollars)

Year	Priority 1		Priority 2		Priority 3		Priority 4		Total	
	A*	C**	A	C	A	C	A	C	A	C
FY90	0	0	0	0	0	1,300	0	0	0	1,300
FY91B	0	0	0	0	0	3,000	0	0	0	3,000
FY92	0	0	0	0	0	2,064	0	0	0	2,064
FY93	0	0	0	0	0	872	0	0	0	872
FY94	0	0	0	0	0	872	0	0	0	872
FY95	0	0	0	0	0	872	0	0	0	872
FY96	0	0	0	0	0	872	0	0	0	872
FY 92-96 TOT	0	0	0	0	0	5,552	0	0	0	5,552

A*Assessment C**Cleanup

Grand Total 5,552

ALBUQUERQUE OPERATIONS OFFICE
INSTALLATION SUMMARY - URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

In 1978, the Congress passed the Uranium Mill Tailings Radiation Control Act (Public Law 95-604), which directed DOE to provide for stabilization and control of the uranium mill tailings from inactive sites in a safe and environmentally sound manner. The sandlike tailings, located at 24 sites and associated vicinity properties, are the result of uranium production from the early 1950s until the early 1970s. Compliance with proposed EPA UMTRA standards will require restoration of groundwater at some tailings sites. Activities described include only the UMTRA sites managed by AL. Additional UMTRA activities are being conducted by other Operations Offices.

EXTENT/TYPES OF CONTAMINATION

- Twenty-four sites in 10 States (4 of which are on Indian reservations) consisting of one or more piles of tailings and abandoned mill buildings
- Approximately 5000 vicinity properties, tailings used for construction and landscaping before recognition of the potential hazards, and open lands contaminated by windblown tailings from sites
- 30 million cubic yards of tailings
- Emanation of radon gas from decay of radium-226, (radon-222, polonium-218, and 214)
- Gamma radiation decay products (lead-214, bismuth-214)
- RCRA-listed hazardous constituents in groundwater plus molybedum, radium, uranium, selenium, and nitrates
- Asbestos and other hazardous and mixed organic wastes at abandoned millsites

STATUS

- Remediation was completed at 4 of 24 sites before FY 1990. Two of these were completed in 1989. The commitment of three sites was missed by one site, which was completed in FY 1990.
- Through FY 1989, remediation has been completed at more than 3,500 of 5,000 vicinity properties, over 4,000 of which are the responsibility of ID. Remediation was completed at 769 vicinity properties in 1989, which is greater than the commitment of 720 properties.
- One additional site was completed during the first quarter of FY 1990, with two more projected to be completed by the end of the year. To date (FY 1990), 255 of the scheduled 721 vicinity properties have been remediated.
- Engineering and NEPA documentation are under way on all remaining sites.

HEALTH RISKS

- Unstabilized piles will continue to emanate radon gas and allow dispersal of windblown contamination.
- Unremediated vicinity properties will expose occupants of residential and commercial structures to unacceptable levels of radon gas.
- Unstabilized tailings piles will continue to contaminate groundwater through infiltration of water.

SPECIAL CONSIDERATIONS

Shared State/DOE Funding

Site acquisition, engineering, and remedial action costs are shared: DOE 90 percent and States 10 percent. DOE pays all costs for the four sites on Indian land. In addition, DOE pays all other project costs such as project management and control, NEPA documentation, conceptual design, and S&M.

Groundwater Restoration

Compliance with UMTRA standards promulgated by EPA in 1983 did not require groundwater restoration. Following a court remand in 1985, EPA proposed revised groundwater standards in 1987. Compliance with these revised standards, not yet finalized, will require groundwater characterization at all 24 UMTRA sites and groundwater restoration at some of those sites. Restoration will be performed under a new, separate DOE project.

REGULATORY DRIVERS

- PL 95-604 Uranium Mill Tailings Radiation Control Act
- 40 CFR 192
- PL 100-616
- Applicable State regulations
- PL 95-415
- RCRA
- DOE Orders

REGULATORY AUTHORITIES

- Affected States Department of Health
- NRC
- EPA
- DOI

MAJOR MILESTONES

- Complete NEPA documentation at four additional sites, with the four remaining sites rescheduled for completion during FY 1991 (FY 1990)
- Complete site engineering at two additional sites, with the five remaining sites rescheduled for completion in FY 1991 (FY 1990)
- Complete remediation at 721 additional vicinity properties and 4 additional sites (including 1 delayed from FY 1989), with 8 sites due to be under construction by the end of FY 1990 (of the 9 sites previously planned, 2 construction starts have been delayed until FY 1991 and 1 site scheduled to be completed in FY 1989 was completed in FY 1990) (FY 1990)
- Complete remediation at 510 additional vicinity properties and 1 additional site (which had initially been scheduled to be completed in FY 1990), resume remediation at 4 sites, and have 8 sites under construction (end of FY 1991)
- Complete all remaining UMTRA surface NEPA documentation and site engineering (FY 1991)

(Continued)

CONTINUATION

Major Milestones (Continued)

- Complete UMTRA surface remediation at 3 additional sites and 81 additional vicinity properties and have 10 sites under construction (end of FY 1992)
- Complete UMTRA surface remediation at 4 additional sites and at all remaining vicinity properties for a total of 5,048 and have 8 sites under construction (end of FY 1993)
- Complete UMTRA surface remediation at remaining 8 sites (FY 1994)
- Complete surface postremediation assessment at all remaining UMTRA sites (FY 1995)
- Complete UMTRA groundwater technology development at 1 site (FY 1995)
- Complete UMTRA groundwater technology development at 3 additional sites (FY 1996)
- Complete preremediation UMTRA groundwater assessment at 2 sites (FY 1996)

FUNDING

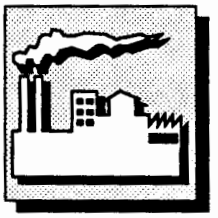
Funding By Priority Level
(Thousands of Dollars)

Year	Priority 1		Priority 2		Priority 3		Priority 4		Total	
	A*	C**	A	C	A	C	A	C	A	C
FY90	27,544	33,960	0	0	0	0	0	0	27,544	33,960
FY91B	24,310	70,935	0	1,000	0	0	0	0	24,310	71,935
FY92	24,038	93,585	0	4,000	0	0	0	0	24,038	97,585
FY93	29,065	104,245	0	10,000	0	0	0	0	29,065	114,245
FY94	19,093	23,275	0	28,000	0	0	0	0	19,093	51,275
FY95	9,465	0	0	35,000	0	0	0	0	9,465	35,000
FY96	0	0	0	35,000	0	0	0	0	0	35,000
FY 92-96 TOTAL	81,661	221,105	0	112,000	0	0	0	0	81,661	333,105
									Grand Total	414,766

A*Assessment C**Cleanup

Attachment C

Waste Operations Summaries by Site



NOTE: Validated estimates for ER, WM, and CA have been identified that exceed the amount set forth for the FY 1991 President's budget by $605 million. $1,528 million of the total ER, WM, and CA estimates set forth for FY 1992 is unvalidated. The estimates set forth for FY 1993-1996 include both validated and unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)

WASTE OPERATIONS FUNDING SUMMARY BY SITE
(Thousands of Dollars)

Operations Office/Installation	FY90	FY91B	FY92	FY93	FY94	FY95	FY96
Albuquerque Operations Office							
Kansas City Plant	4,067	5,160	14,305	12,055	15,328	8,828	31,028
Los Alamos National Laboratory	11,061	27,521	59,962	48,999	49,827	64,913	64,734
Mound Plant	4,205	5,085	12,419	26,769	19,985	7,331	7,358
Pantex Plant	1,983	3,004	26,338	9,333	13,638	9,949	16,492
Pinellas Plant	1,705	1,255	3,609	1,654	1,654	1,654	1,654
Sandia Nat. Lab.-AL & ITRI	4,582	5,105	29,468	31,332	46,875	26,488	27,771
Sandia National Laboratory-Livermore	2,266	795	1,775	1,354	1,436	1,446	1,446
Waste Isolation Pilot Plant	92,055	123,808	212,987	184,111	180,591	179,307	175,832
Albuquerque Other 1/	0	63	48,425	43,975	43,925	43,825	44,025
Albuquerque Total	121,924	171,796	409,288	359,582	373,259	343,741	370,340
Chicago Operations Office							
Chicago Combined Laboratories	10,916	17,178	19,291	17,627	25,635	25,471	37,568
Chicago Total	10,916	17,178	19,291	17,627	25,635	25,471	37,568
DOE Headquarters							
Office of Waste Operations	29,329	81,872	319,600	470,850	468,370	338,280	336,887
Headquarters Total	29,329	81,872	319,600	470,850	468,370	338,280	336,887
Idaho Operations Office							
Idaho National Engineering Laboratory	124,083	188,925	459,564	430,632	401,198	342,822	401,517
West Valley Demonstration Project	87,360	90,000	124,000	115,000	105,000	91,000	91,000
Idaho Total	211,443	278,925	583,564	545,632	506,198	433,822	492,517
Nevada Operations							
Nevada Test Site	6,488	8,609	22,824	23,409	25,434	18,774	15,754
Nevada Total	6,488	8,609	22,824	23,409	25,434	18,774	15,754
Oak Ridge Operations Office							
Feed Materials Production Center	29,717	33,020	44,043	46,123	127,332	110,085	99,402
Oak Ridge Gaseous Diffusion Plant	21,201	18,072	179,440	129,658	151,304	139,673	114,854
Oak Ridge National Laboratory	32,135	36,923	69,055	99,222	117,908	155,842	73,697
Paducah Gaseous Diffusion Plant	2,851	2,339	14,647	30,890	36,540	29,940	20,440
Portsmouth Gaseous Diffusion Plant	4,700	5,625	17,310	50,875	39,409	15,150	11,150
Y-12 Plant	44,784	40,621	127,548	120,824	175,987	152,828	222,760
Oak Ridge Other 1/	7,417	1,063	4,750	4,853	4,956	5,059	5,162
Oak Ridge Total	142,805	137,663	456,793	482,445	653,436	608,577	547,465
Richland Operations Office							
Hanford Reservation	324,709	499,667	1,047,740	1,085,559	1,155,479	1,063,099	895,655
Richland Total	324,709	499,667	1,047,740	1,085,559	1,155,479	1,063,099	895,655
Rocky Flats Office							
Rocky Flats Plant	76,267	47,292	118,293	156,524	147,964	142,365	129,042
Rocky Flats Total	76,267	47,292	118,293	156,524	147,964	142,365	129,042
San Francisco Operations Office							
SF Laboratories and Installations	18,925	15,716	53,774	88,929	78,753	58,130	48,024
San Francisco Total	18,925	15,716	53,774	88,929	78,753	58,130	48,024
Savannah River Operations Office							
Savannah River Site	374,396	476,235	720,172	667,404	766,002	728,684	718,070
Savannah River Total	374,396	476,235	720,172	667,404	766,002	728,684	718,070
TOTAL WASTE OPERATIONS	1,317,202	1,734,953	3,751,339	3,897,961	4,200,530	3,760,943	3,591,322

ALBUQUERQUE OPERATIONS OFFICE
SITE SUMMARY

AL has the responsibility for WIPP, an R&D facility for demonstration of safe disposal of TRU waste resulting from defense activities. AL also is responsible for management of facilities located in eight states that constitute the nuclear weapons production complex. Pantex Plant in Texas, Pinellas Plant in Florida, Mound Plant in Ohio, Los Alamos National Laboratory in New Mexico, Sandia National Laboratories-Albuquerque in New Mexico, Inhalation Toxicology Research Institute in New Mexico, Sandia National Laboratories-Livermore in California, and Kansas City Plant in Missouri.

ACTIVITIES	STATUS
• TRU waste is generated, treated as appropriate, and either stored onsite or shipped to central storage facilities. Planning for eventual shipment of TRU wastes to WIPP continues. • LLW is generated, treated as appropriate, and either disposed of onsite or shipped to central disposal facilities. • HW is generated and shipped to offsite facilities for treatment and disposal (some wastes, such as LANL's, are handled onsite). • Mixed waste (TRU and LLW) is stored onsite pending the identification of appropriate waste management options. • Waste minimization programs are being implemented and are scheduled to be fully implemented and formally documented by the end of FY 1990. • Technologies directed toward potential application to TRU waste management are being developed; many are in the demonstration, testing, and evaluation phase. • Waste management facilities and equipment are being designed and constructed or enhanced, such as the Mixed Waste Facility at SNLA.	• Continuity of operations for handling radioactive, hazardous, and mixed waste is ongoing. • Waste Management at AL has been working with NV during FY 1989-1990 to characterize the AL contractors mixed waste for disposal at NTS. • Opening of WIPP is pending the complete satisfactory addressing of all regulatory issues. • The annual AL and AL contractor permitting status workshop is scheduled for 2Q FY 1990. • Waste Management at AL has begun planning a waste minimization workshop for the third quarter of FY 1990; successes, problems, measurement systems, and regulatory requirements will be emphasized.

REGULATORY DRIVERS

- CERCLA
- RCRA
- SARA
- CAA
- CWA
- SDWA
- FFCA
- NEPA
- 40 CFR Part 191
- TSCA
- HWSA
- NESHAP
- Various State's agreements and regulations

REGULATORY AUTHORITIES

- EPA Region IV, V, VI, VII, VIII, IX
- DOE
- NRC
- Various State Regulatory Agencies

MAJOR MILESTONES

- Complete hazardous waste facility upgrade, SNLL (3Q FY 1990)
- Obtain SEIS Record of Decision, WIPP (3Q FY 1990)
- Complete design and construction of a TRU waste treatment facility, LANL (4Q FY 1990)
- Set up explosive (reactive) hazardous waste storage area, SNLA (4Q FY 1990)
- Complete construction of wastewater recycling system for the Development High Explosive Machining Facilities, Pantex (1Q FY 1991)
- Obtain No Migration Variance Petition, WIPP (4Q FY 1991)
- Acquire prototype model of equipment and delivery for spray booths, KCP (FY 1991)
- Construct additional storage for LLW and TRU radioactive waste, Mound (FY 1991)
- Complete construction of the pH Neutralization Facility Upgrades, Pinellas (1Q FY 1992)
- Complete Waste Treatment and Storage construction, ITRI (3Q FY 1992)
- Complete distillation unit, Mound (FY 1992)

FUNDING

(Thousands of Dollars)

	EM
FY90	121,924
FY91B	171,796
FY92	409,288
FY93	359,582
FY94	373,259
FY95	343,741
FY96	370,340
FY92-96 TOT	1,856,210

REFERENCES

Environmental Restoration and Waste Management Site-Specific Plans for each facility

SPECIAL CONSIDERATIONS

ALBUQUERQUE OPERATIONS OFFICE
LOS ALAMOS NATIONAL LABORATORY SUMMARY

LANL is located in Los Alamos, New Mexico. Its primary mission is nuclear weapons R&D. Programs include weapons development, nuclear fission and fusion research, nuclear safeguards and security, and verification and control technologies. Basic research in the areas of physics is integral to LANL activities. Research on peaceful uses of nuclear energy has included space applications, power radiobiology, and medicine.

ACTIVITIES	STATUS
• Treatment of radioactive and mixed wastes is accomplished onsite, while most HW is shipped to offsite commercial contractors for treatment. • TRU waste is generated and stored in a retrievable manner pending shipment to WIPP. • LLW is generated, treated as appropriate, and disposed of in an onsite disposal facility. • Mixed LLW is stored onsite pending identification of an appropriate management option for these waste packages. • Waste minimization, brokering, and chemical substitution programs exist through generator interfacing.	• Design has begun for a LLW/mixed waste incinerator. • Design has been initiated for a TRU Waste Treatment Facility and for a Corrugated Metal Pipe Facility for handling TRU waste that was stored in a concrete matrix in metal pipes. • Procedures and facilities have been developed to ensure proper management, treatment, and disposal of solid radioactive and chemical waste. • Discussions have been initiated with NTS to explore the possibility of shipping certain mixed waste to that facility for disposal. The option of establishing an onsite RCRA-approved landfill is also being explored for the 1992 time frame. • Construction has begun on a project to expand the current LLW Disposal Facility. • Preliminary design has begun for a new Radioactive Liquid Waste Treatment Plant. • Design has begun on a Hazardous Waste Treatment Facility.

REGULATORY DRIVERS

- CWA
- RCRA
- CAA
- NEPA
- TSCA
- FFCA
- SDWA
- New Mexico Water Quality Control Commission Regulations
- New Mexico UST Regulations of 1988

REGULATORY AUTHORITIES

- EPA Region VI
- NMEID

MAJOR MILESTONES

- Complete construction of a new liquid waste transfer line between TA-55 and TA-50 (4Q FY 1990)
- Complete design and construction of a TRU waste treatment facility (4Q FY 1990)
- End construction of the LLW disposal facility expansion (4Q FY 1990); begin operations at the expanded LLW facility (1991)
- Complete Title I design of the new radioactive liquid waste treatment plant (FY 1994)

FUNDING

(Thousands of Dollars)

	EM
FY90	11,061
FY91B	27,521
FY92	59,962
FY93	48,999
FY94	49,827
FY95	64,913
FY96	64,734
FY92-96 TOT	288,435

REFERENCES

- Part B RCRA Permit
- Waste Minimization Plan
- Implementation Plan for DOE Order 5820.2A
- TSCA Permits
- NPDES Permit
- Environmental Restoration and Waste Management Site-Specific Plan, Albuquerque Operations Office, December 1989

SPECIAL CONSIDERATIONS

- LANL's wastewater treatment facilities are approximately 40 years old and are experiencing difficulty meeting discharge limitations. Replacement parts for these aged units are seldom available.
- Maintaining compliance while managing complex and ever-changing waste streams is difficult.

ALBUQUERQUE OPERATIONS OFFICE
SANDIA NATIONAL LABORATORIES-ALBUQUERQUE
AND INHALATION TOXICOLOGY RESEARCH INSTITUTE
SUMMARY

AL installations located in Albuquerque, New Mexico, are SNLA, whose primary mission is nuclear weapons development and engineering, and ITRI, whose mission is investigating the nature and magnitude of human health effects from the inhalation of airborne materials.

ACTIVITIES	STATUS
· Construct Rad/Mixed Waste Storage Facility (SNLA) · Begin waste minimization through Chemical Exchange Program (SNLA) · Form MinNet (SNLA) · Replace PCB electrical transformers (ITRI) · Upgrade Waste Storage and Treatment Building (ITRI) · Remove Asbestos (ITRI)	· The RCRA Part A Permit application for mixed waste has been prepared and will be submitted in FY 1990 (SNLA). · The Chemical Exchange Program was initiated in August 1989. A total of $21,000 in cost savings was realized, and 1,200 kg of wastes was avoided in 6 months (SNLA). · Line organizations now participate in MinNet to determine ways to minimize hazardous waste (SNLA). · Pathological wastes that do not contain radioactive or hazardous waste are thermally destroyed onsite (ITRI). · Generator's Application for disposal of low-level radioactive waste at the Nevada Test Site has been submitted in accordance with NVO-325 (ITRI). · A formal waste minimization program will be established in FY 1990 (SNLA). · No hazardous or radioactive wastes are disposed of onsite (ITRI). · A quantity of actinide-containing LSC vial wastes (137 drums) are presently stored onsite for commercial treatment and disposal (ITRI).

REGULATORY DRIVERS

- TSCA
- RCRA
- HSWA
- New Mexico Hazardous Waste Management Regulations
- DOE Orders

REGULATORY AUTHORITIES

- EPA Region VI
- NMEID
- DOE
- DOT
- NRC
- City of Albuquerque

MAJOR MILESTONES

- Set up explosive (reactive) hazardous waste storage area, SNLA (4Q FY 1990)
- Implement Chemical Exchange with external agencies, SNLA (4Q FY 1990)
- Implement Wastewater Data Automation, SNLA (4Q FY 1990)
- Dispose of 137 drums of actinide-LSC vial wastes (FY 1990)
- Complete removal of PCB transformers, ITRI (1Q FY 1991)
- Complete asbestos removal, ITRI (4Q FY 1991)
- Complete Waste Treatment and Storage Construction, ITRI (3Q FY 1992)
- Construct Rad/MW Assay and SNM Storage Facilities, SNLA (4Q FY 1992)
- Complete Construction of HW Support Building, SNLA (4Q FY 1992)
- Construct Sewer Line for Tech Area V, SNLA (FY 1993)
- Install HW Warehouse monitoring equipment, SNLA (FY 1994)
- Remove, replace, or retrofit 30 USTs, SNLA (FY 1995)
- Document MW Facility upgrades, SNLA (FY 1996)

FUNDING

(Thousands of Dollars)

	EM
FY90	4,582
FY91B	5,105
FY92	29,468
FY93	31,332
FY94	46,875
FY95	26,488
FY96	27,771
FY92-96 TOT	161,934

REFERENCES

- 1990 Waste Management Plan for Sandia National Laboratories-Albuquerque
- Waste Minimization and Pollution Prevention Awareness Plan for Sandia National Laboratories-Albuquerque
- Environmental Protection Implementation Plan, Sandia National Laboratories-Albuquerque
- Environmental Restoration and Waste Management Site-Specific Plan (December 1989)
- ITRI Hazardous Waste Implementation Plan (November 1983)
- ITRI Radioactive Waste Management Implementation Plan (April 1989)
- ITRI Site Waste Management Plan (December 1989)

SPECIAL CONSIDERATIONS

- New land disposal restrictions concerning laboratory packs place severe constraints on the types of laboratory packs and alternatives to disposal.
- No disposal options exist for mixed wastes.
- Limited market for certain recycled wastes exists.
- No characterization or packaging capabilities exist for old, noncertifiable wastes, and high-activity wastes.

ALBUQUERQUE OPERATIONS OFFICE
WASTE ISOLATION PILOT PLANT SUMMARY

WIPP, 26 miles east of Carlsbad, New Mexico, is an R&D facility intended to demonstrate the safe disposal of radioactive TRU wastes resulting from the Nation's defense activities and programs. It is the only facility in the United States specifically designed and constructed for the disposal of TRU wastes. WIPP is essential to the national defense programs and is a solution to the growing problem of how to safely and efficiently dispose of radioactive waste in an environmentally sound manner. WIPP is designed to receive, handle, and provide permanent isolation for defense-generated TRU waste. This waste is generated at other DOE facilities and is planned to be transported by truck to WIPP.

ACTIVITIES	STATUS
· Continue to perform R&D activities to gather data necessary to support the performance assessment and to prove and confirm the viability of WIPP · Complete the FSAR and obtain approval before WIPP becomes operational · Complete SEIS and issue a ROD before WIPP becomes operational · Design, test, and procure the TRUPACT II fleet that will be used for shipping waste to WIPP · Comply with all applicable environmental regulations	· The FSAR has been drafted and is in the approval process. · The SEIS has been completed (January 1990). A ROD is in the review process. · The TRUPACT II has received a Certificate of Compliance from the NRC (August 1989). · A No-Migration Variance petition has been prepared by DOE and reviewed by EPA. Approval will clear the way for MW to be received at WIPP. · Funding was obtained for road construction from the State of New Mexico (FY 1989). · Major construction was completed (April 1989). · Land withdrawal legislation was prepared (September 1989).

REGULATORY DRIVERS

- RCRA
- NEPA
- Federal Land Policy and Management Act
- 40 CFR Part 191
- CAA
- Stipulated Agreement with the State of New Mexico

REGULATORY AUTHORITIES

- NMEID
- EPA Region VI

MAJOR MILESTONES

- Obtain FSAR approval (2Q FY 1990)
- Obtain SEIS ROD (3Q FY 1990)
- Issue Plan for WIPP Test Phase (3Q FY 1990)
- Complete TRUPACT fleet (3Q FY 1991)
- Obtain ESAAB decision (3Q FY 1990)
- Obtain No-Migration Variance Petition (4Q FY 1990)

FUNDING

(Thousands of Dollars)

	EM
FY90	92,055
FY91B	123,808
FY92	212,987
FY93	184,111
FY94	180,591
FY95	179,307
FY96	175,832
FY92-96 TOT	932,828

REFERENCES

- DOE/EIS-0026: FEIS, WIPP (October 1980)
- DOE/EIS SEIS, WIPP, 1989 (in process)
- Draft Decision Plan for WIPP (Rev 3, April 20, 1990)
- Environmental Restoration and Waste Management Site-Specific Plan, Albuquerque Operations Office, December 1989

SPECIAL CONSIDERATIONS

Attachment D

Technology Development Summaries

NOTE: The estimates set forth for FY 1990-1992 are validated amounts. The estimates for FY 1993 and beyond include validated amounts and may include unvalidated amounts. (See Section 1.2 regarding validated and unvalidated cost estimates.)

TECHNOLOGY DEVELOPMENT FUNDING SUMMARY BY CATEGORY
(Thousands of Dollars)

Category	FY90	FY91B	FY92	FY93	FY94	FY95	FY96
Technology Development							
Education and Technology Transfer	19,177	21,207	28,856	36,341	36,958	36,958	37,958
Environmental Restoration	72,966	80,694	109,798	138,274	140,625	140,625	140,625
Technology Support	24,320	26,895	36,596	46,088	46,871	46,871	46,871
Program Support	27,146	30,021	40,849	51,444	52,318	52,318	52,318
Waste Management	42,665	47,183	64,202	80,853	82,228	82,228	82,228
Development Total	186,275	206,000	280,301	353,000	359,000	359,000	359,000
Transportation Management							
Albuquerque	4,210	5,789	7,660	8,780	9,120	8,750	8,050
Oak Ridge	3,516	3,490	5,017	5,372	5,372	5,377	5,377
Richland	2,512	3,705	4,220	5,335	4,585	4,585	4,585
*Transportation Total	10,238	12,984	16,897	19,487	19,077	18,712	18,012
TECHNOLOGY DEVELOPMENT TOTAL	195,238	218,984	295,897	368,487	372,077	372,712	372,012

*Transportation Total for Albuquerque, Oak Ridge and Richland only.

ALBUQUERQUE OPERATIONS OFFICE-ALBUQUERQUE ACTIVITIES SUMMARY FOR TRANSPORTATION DEVELOPMENT

AL directly manages a transportation technology development program for the development of nuclear and hazardous materials packaging and transportation systems. This R&D program consists of seven activity areas for developing technology to solve current and future transportation and packaging problems for DOE and for providing technical support on institutional and regulatory issues.

ACTIVITIES	STATUS
• Develop improved engineering analysis methods to better predict the behavior of packaging under accident conditions • Perform transportation package testing for certification and develop and maintain testing and laboratory facilities to accommodate future designs • Develop advanced technology for new systems, components, and materials for use by packaging designers • Develop and maintain state-of-the-art analysis skills and capabilities to support transportation package development and certification • Provide technical data to aid in the resolution of regulatory transportation issues and support U.S. and international standards development and technology transfer • Provide safety and systems assessment, including radiological risk, logistic, and economic considerations as they affect and are affected by operational and institutional forces • Develop hazardous and mixed waste materials packaging technology	• This is a continuing activity, with milestones in each year, for an ongoing program that will provide technology development support for the development of transportation packagings for DOE. • As stated in DOE Order 1540.3, it is DOE policy to ensure that the development of radioactive material packagings shall be accomplished in a manner commensurate with (1) operational and program requirements, (2) compliance with all applicable safety regulations, and (3) efficient and effective planning, acquisition, and use. • Technology exchange meetings with French (CEA) and Japanese (PNL) representatives have been completed. Future meetings are planned that include other countries. • The program for investigating the problem of hydrogen gas generation in CH TRU waste transported in the TRUPACT II has been completed. • Various impact limiter designs and materials have been evaluated in structural and thermal tests. More testing is planned in the future for other designs and materials.
REGULATORY AUTHORITIES & DRIVERS	**SPECIAL CONSIDERATIONS**
• Title 10 CFR 71, Title 10 CFR 871, NUREG-0360, Title 49 CFR 171-178, Title 40 CFR 260-265 • DOE Orders: 1540.1, 1540.2, 1540.3, 5610.1, 5480.2, 5480.3 • IAEA Safety Series No. 6 and related series publication • EPA	• This transportation technology program operates under the auspices of DOE Order 1540.3 and is described by EM ADSs 100 and 1001 through 1007. • U.S. transportation regulations are influenced by and are consistent with International Atomic Energy Agency Model Regulations.

MAJOR MILESTONES

- Establish scope of generic EA (3Q FY 1990)
- Submit Ductile Fracture Capability Report (4Q FY 1990)
- Complete Instrumentation Trailer (4Q FY 1990)
- Drop test Mosaik Cask (4Q FY 1990)
- Complete Elastomeric Seal Test Data Compilation (3Q FY 1991)
- Prepare Hazardous and Mixed-Waste Needs and Feasibility Report (4Q FY 1991)
- Make Comprehensive Routing Model available on TRANSNET (2Q FY 1992)
- Plan and support PATRAM Meeting (1992, 1995, and continuing at 3-year intervals)
- Submit Elastic-Plastic Design Report (3Q FY 1992)
- Complete Impact Limiter Studies (4Q FY 1992)
- Complete RADTRAN 5.0 Development (FY 1993)
- Submit Rail Transport Data Report (FY 1993)
- Provide Domestic Support for N14 and Working Groups (Continuing)

REFERENCES

- FY 1990 Transportation Base Technology Program Plan (October 1989)
- Transportation Management Division Management Summary
- DOE Order 1540.3
- RADTRAN 4.0 User Guide, SAND89-2370, TTC-0943

FUNDING BY PROGRAM

(Thousands of Dollars)

	DP	EM	TOTAL
FY90	4,210	0	4,210
FY91	5,789	0	5,789
FY92	0	7,660	7,660
FY93	0	8,780	8,780
FY94	0	9,120	9,120
FY95	0	8,750	8,750
FY96	0	8,050	8,050
FY92-96 TOT	0	42,060	42,060

FUNDING