

Chapter 1

Introduction



The Department of Energy’s (DOE’s) Environmental Management (EM) program has made significant progress over the past nine years in meeting the enormous challenge of cleaning up the nuclear weapons complex. Initially the program focused on characterizing waste, assessing the magnitude of contamination, stabilizing material, addressing urgent risks, and achieving compliance. Over time, EM has increased the pace at which it manages waste and cleans up sites. In 1995, EM crossed the threshold and began spending more resources on cleanup than on assessment. Now, EM can focus on completing its mission by establishing an acceleration and closure strategy. Supported by new management tools and improved estimates of the scope, schedule, and cost, EM is challenging sites to define better and more efficient ways to conduct work to achieve EM’s 2006 vision (see text box).

This document, *Accelerating Cleanup: Paths to Closure* (herein-after referred to as *Paths to Closure*), embodies stakeholder, regulator, and Tribal Nation views and comments on *Paths to Closure*. *Paths to Closure* provides:

- An integrated path forward for the management of the EM complex, based on a site-by-site, project-by-project, life-cycle foundation;
- A basis to evaluate EM’s annual budgets in a long-term context;
- A response to Congressional requests for a documented management strategy for the EM program; and
- A response to concerns of stakeholders, regulators, and Tribal Nations.

Vision

By 2006, the Environmental Management program intends to complete cleanup at most of its 53 remaining sites. At the 10 remaining sites, including our five largest sites, treatment will continue for the remaining “legacy” waste streams. This vision will drive budget decisions, the sequencing of projects, and the actions needed to meet program objectives. This vision will be implemented in collaboration with stakeholders, regulators, and Tribal Nations.

Paths to Closure is not an action plan or a decision-making document. Furthermore, it does not show completion of EM work scope at most major EM sites by 2006. *Paths to Closure* retains a focus on 2006, which serves as a point in time around which objectives and goals are established.

Paths to Closure describes the status of EM’s cleanup program and a direction forward to complete achievement of the 2006 vision. Achieving the 2006 vision results in significant benefits related to accomplishing EM program objectives. As DOE sites accelerate cleanup activities, risks to public health, the environment, and worker safety and health are all reduced. Finding more efficient ways to conduct work can result in making compliance with applicable environmental requirements easier to achieve. Finally, as cleanup activities at sites are completed, the EM program can focus attention and resources on the small number of sites with more complex cleanup challenges.

1.1 Overview of *Paths to Closure*

Paths to Closure is the Environmental Management program’s² blueprint for completing the cleanup of contaminated soil, groundwater, and facilities; treating, storing, and disposing of waste; and effectively managing nuclear

<i>Paths to Closure</i> Is...	<i>Paths to Closure</i> Is Not...	Consequences
...a blueprint for EM’s cleanup program.	...a decision document.	EM will make specific decisions—the need for which <i>Paths to Closure</i> identifies—following the legislative requirements of NEPA, CERCLA, RCRA, and other applicable statutes.
	...a budget document.	EM will use <i>Paths to Closure</i> to formulate annual budget strategies in the context of life-cycle cleanup costs and schedules.
...a management tool for the EM program with site-developed detailed scope, schedule, and cost data by project.	...a life-cycle cost study.	EM will use <i>Paths to Closure</i> to manage its cleanup program, including evaluating progress against performance metrics and project baselines. <i>Paths to Closure</i> will also satisfy 1994 National Defense Authorization Act reporting requirements.
...an annual account of an ongoing process.	...a one-time report.	EM plans to publish an annual <i>Paths to Closure</i> update that reflects changes made during the course of each year.

²Throughout this document, the phrase “Environmental Management program” or “EM program” refers to operations at both the Headquarters and site level. Section 1.3 explains the relationships of Headquarters and site levels in the EM program.

materials and spent nuclear fuel. The blueprint contains detailed site-developed scope, schedules, and costs for completing the work. Further, the blueprint identifies future decisions that must be made and defines the degree of technical and scope uncertainties.

Paths to Closure should be viewed as a management tool that reflects individual sites' best judgment as to what can be accomplished, assuming a constant funding level over time. This tool allows the EM program to formulate annual budget priorities and goals in the context of effects on life-cycle cleanup costs and schedules. The EM program recognizes that, in any given year, there will be differences between actual budget requests and the funding amount assumed in *Paths to Closure*. Such differences are inevitable because of the dynamic nature of the budget formulation process. Nevertheless, *Paths to Closure's* role to inform annual budget deliberations is valuable because the normal range of annual budget variation is small compared with the overall life-cycle costs of the cleanup program. *Paths to Closure* will be updated annually, and these updates will allow the EM program to use the information set forth in *Paths to Closure* to assist in reviewing budget options and developing the budget. An additional benefit of the annual update is that, because it portrays the life-cycle scope, schedule, and cost for the EM program, it can meet the reporting requirements under the 1994 National Defense Authorization Act.³

In *Paths to Closure*, EM decided to utilize a single funding guideline and to include only those enhanced performances that sites could document in baselines. For the development of *Paths to Closure*, sites received a total funding guideline of \$5.75 billion per year, which is consistent with recent appropriations. In some cases, sites exceeded this funding guideline in order to meet compliance commitments. Site funding requirements vary from year to year, as displayed in Exhibit 4-2 later in this document.

A variety of factors significantly affect the estimated scope, schedule, and cost of the EM program. Factors such as acceptance of additional facilities into the EM program, application of new technologies, or revisions of regulations, can change over time, altering the assumptions under which the EM program is conducted. To develop a foundation for estimating the scope, schedule, and cost of the program, *Paths to Closure* is based on several key planning assumptions (see text box on following page). With respect to the assumption for the Waste Isolation Pilot Plant (WIPP), the U.S. Environmental Protection Agency (EPA) has determined that WIPP can safely contain transuranic waste and that it will comply with the Agency's radioactive waste disposal standards. On May 13, 1998, the Secretary of Energy made the decision that WIPP is ready to begin disposal operations after the 30-day Congressionally mandated notification period. However, transportation of transuranic waste will be limited to non-mixed waste until the State of New Mexico has issued a Resource Conservation and Recovery Act (RCRA) Part B Permit.

³As contained in Section 3153 of Public Law 103-160, codified at 42 U.S. Code 7274k.

Area	Assumption
Funding	Level funding at \$5.75 billion per year (unless additional resources are required for compliance) from FY 1999 through program completion.
Facilities	A stable scope of facilities will be addressed in EM baselines.
Waste Management	After FY 2000, newly-generated waste will be the responsibility of the DOE programs that generate it.
Waste Disposal	The Waste Isolation Pilot Plant will open in FY 1998 to receive transuranic waste.
Site End State	End states will be determined by regulators with the involvement of local stakeholders.

Paths to Closure represents a snapshot of a single point in time in EM's cleanup program. However, the dynamic nature of the program will allow subsequent versions of *Paths to Closure* to reflect revised programmatic assumptions based upon new compliance agreements; the results of analyses prepared under the National Environmental Policy Act (NEPA); Records of Decision signed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and Statements of Basis, Closure and Post-Closure Plans, and Permits agreed to under the Resource Conservation and Recovery Act (RCRA). In addition, planned annual updates of this report will reflect cleanup progress, advances in technologies, projected sav-

ings due to demonstrated enhanced performance, the effects of annual budget allocations, and changes in site end states.

Defining end states is a key aspect of defining the scope of the cleanup program. Once the end state of a site is known, the work necessary to achieve that end state can be divided into steps, and the steps can be organized in an appropriate sequence. Currently, *Paths to Closure* is based on the best available end state assumptions (i.e., planned end points) made by each site with respect to EM activities. However, decisions about end states and cleanup approaches to achieve those end states will be made in accordance with the requirements of CERCLA, RCRA, and other applicable statutes (with appropriate environmental review) and may differ from the assumptions described in this document. It should also be noted that the



completion of cleanup activities at many sites (see text box) does not mean there will no longer be an EM presence at the site. Many sites will require additional surveillance and monitoring funded by EM, and some will have an ongoing, non-EM mission, such as research and development not related to environmental matters.

Current site assumptions about planned end state do not rule out future decisions to clean up a site to a different end state from that envisioned under those assumptions. In fact, site versions of *Paths to Closure* explicitly state that the planning end point assumed for purposes of establishing baselines may not represent the ultimate end state of any

given site. Improvements in end states may be possible at some time in the future with the development of new technologies, more economical cleanup approaches, the availability of additional resources, and/or changes in the interests of stakeholders, regulators, and Tribal Nations.

The EM program is developing an integrated management system to align more closely three aspects of its efforts: life-cycle planning, the annual budget formulation process, and the measurement of results. To facilitate that objective, the EM program organized all cleanup activities into discrete projects. For the first time, an integrated life-cycle database has been developed to maintain information about those projects. The process of establishing specific projects and baselines with scope, schedule, and costs has resulted in significant reductions in EM life-cycle cost estimates since the initiation of the cleanup strategy in 1996.

1.2 Background on the EM Program and Mission

During the past nine years, the EM program has grown from infancy to its present status as a major focus of DOE. This section provides a brief description of the EM program, its history, and the current context of its efforts to pursue the *Paths to Closure* vision.

1.2.1 What is the Environmental Management Program?

During the Cold War period of nuclear weapons production, awareness of the effects of environmental pollution grew significantly. Congress enacted a series of stringent environmental protection laws that empower both federal and state regulatory agencies to oversee federal activities affecting the environment. In 1989, DOE established the EM program to address the contamination and waste created by nuclear weapons production, research, and testing activities during the Manhattan Project and the Cold War era in a manner consistent with applicable environmental laws. Those activities included mining and milling of uranium, uranium enrichment, fuel and target fabrication, reactor operations, chemical separations, weapons component fabrication, weapons operations, and research, development, and testing.

The primary mission of the EM program is to reduce threats to health and safety posed by contamination and waste (referred to as “legacy” activities or problems) at DOE sites including those associated with the nuclear weapons complex. EM’s mission is realized through the following program areas: waste management; stabilization of nuclear material and spent fuel; deactivation and decommissioning of facilities; remedial actions to soil and water; infrastructure and support; and national programs focused on such activities as science and technology development, transportation, emergency management, and pollution prevention.

The EM program manages its cleanup work through 11 Operations/Field Offices across the United States. Offices are located in the following areas: Albuquerque, New Mexico; Carlsbad, New Mexico⁴; Chicago, Illinois; Idaho Falls, Idaho; Las Vegas, Nevada; Oakland, California; Oak Ridge, Tennessee; Miamisburg, Ohio; Richland, Washington; Jefferson County, Colorado; and Aiken, South Carolina. Each Operations/Field Office is responsible for cleanup activities at one or several sites. The EM program historically has identified 134 “geographic sites” (distinct geographic locations that generated waste or were contaminated by DOE or predecessor agency activities) as part of its scope. These sites are located in 31 states and one territory and encompass an area of over two million acres—equal to the size of Rhode Island and Delaware combined. At the beginning of 1998, cleanup responsibility for 21 sites managed by EM under the Formerly Utilized Sites’ Remedial Action Program (FUSRAP) was transferred to the U.S. Army Corps of Engineers. *Paths to Closure* addresses the remaining 113 sites, including required long-term surveillance and monitoring of the 60 sites completed before FY 1998 and environmental management activities for 53 additional sites. Appendix C contains a complete list of sites and completion dates.

⁴Technically, Carlsbad is an Area Office; however it is included in discussions of Operations/Field Offices throughout this report.

1.2.2 Historical Management: From the Cold War to Environmental Cleanup

The threat to national security initiated during World War II led to the development of a substantial, high-security engineering and production operation. Over the past five decades, DOE and its predecessor agencies developed the largest government-owned industry in the United States. This entity was responsible for the research, development, testing, and production of nuclear weapons and a variety of nuclear-related research projects. To protect national security interests, information on these activities was generally limited to a small group of managers, researchers, and workers and was generally kept from public knowledge.

During the Cold War era, the relatively unconstrained availability of resources fostered “level-of-effort” management approaches such as contracting for the full-time commitment of an agreed-upon number of personnel rather than for the accomplishment of specific tasks in specified time frames. Moving the focus of DOE’s effort from production to cleanup required that the management and organizational culture move away from the “level-of-effort” approach towards a more open, project-oriented cleanup program in which stakeholders would have effective involvement. After a 50-year operating history, the effort required to make these changes was significant. The abrupt end of the Cold War in the late 1980’s also brought an end to the availability of relatively unbounded resources.

Now, the EM program must focus on completing cleanup through the adoption of management strategies based on project needs. The EM program must increase its public accountability, committing itself to public involvement throughout the cleanup process. Further, the EM program must complete its cleanup activities with stabilized funding and staffing levels, while demonstrating measurable progress. All the while, EM must maintain its focus on safety and health and regulatory compliance.

Understanding the Legacy

Through publications such as *Closing the Circle on the Splitting of the Atom*, the *Baseline Environmental Management Report*, *Taking Stock*, *Linking Legacies*, and now *Paths to Closure*, the EM program has worked to inform the public about the past, present, and future of the nuclear weapons complex and resulting cleanup activities. (See Appendix F, List of References)

1.3 Relationship of *Paths to Closure* to the EM Decision-making Process

Public comments on the February 1998 draft *Paths to Closure* requested clarification on the decision-making process for the work described in *Paths to Closure*. Decisions in the EM program are driven by various statutory mandates, most notably CERCLA and RCRA. Most decisions are made at the site level (with appropriate Headquarters oversight). Other decisions are made at the Headquarters level because of their complex-wide implications. In many cases, ultimate decision-making authority, in the sense of final approval authority, resides with EPA or state regulators.

Public participation is an important element of the EM program's decision-making process. NEPA requires federal agencies to consider the environmental impacts of their proposed actions. NEPA also requires that the public be informed of, and have an opportunity to comment on, major federal actions significantly affecting the environment. Consistent with its obligations under NEPA, the EM program performs an appropriate level of environmental review in connection with its projects, with opportunities for public involvement. For projects managed under CERCLA, EM relies on the CERCLA process to incorporate NEPA values.

Paths to Closure outlines EM's current estimate of the scope, schedule, and costs for each site to complete the cleanup program. The estimate includes projects for which key site cleanup decisions have been made pursuant to CERCLA, RCRA, or other statutes, and projects where such decisions have yet to be made. Where decisions have not yet been made, sites make **assumptions** (e.g., site planning end states) about how those cleanup actions might be carried out so that sites can define work and develop schedule and cost estimates. In those cases where decisions have not yet been made, the Environmental Management program will follow the decision-making processes called for by the relevant statutory authority that governs the activity in question (e.g., CERCLA or RCRA) with appropriate environmental review.

Paths to Closure also includes cost estimates for federal salaries, investments in science and technology development, and miscellaneous support functions. EM sites and EM Headquarters make decisions through the budgetary process on the scope and pace of work for these activities. Stakeholders and Tribal Nations will have significant opportunities to be involved in all decision-making processes.

1.3.1 EM Decision-making Processes

EM projects typically consist of six phases:

- (1) **Planning**, where initial project planning occurs;
- (2) **Study**, where projects are characterized and alternative solutions are evaluated;

- (3) **Recommendation**, where a preferred solution is identified;
- (4) **Decision**, where a formal decision is made;
- (5) **Implementation**, where the work to execute the decision is conducted; and
- (6) **Monitoring**, where actions taken during project implementation are maintained.

The names of these project phases may differ by statute. For example, in CERCLA, the study phase is called a Remedial Investigation, while under RCRA it is called a RCRA Facility Investigation. Conceptually, however, the study phases of projects conducted under each of the different statutes are analogous to one another. Similarly, other phases of projects conducted under different statutes are analogous to each other, even if the terminology is different.

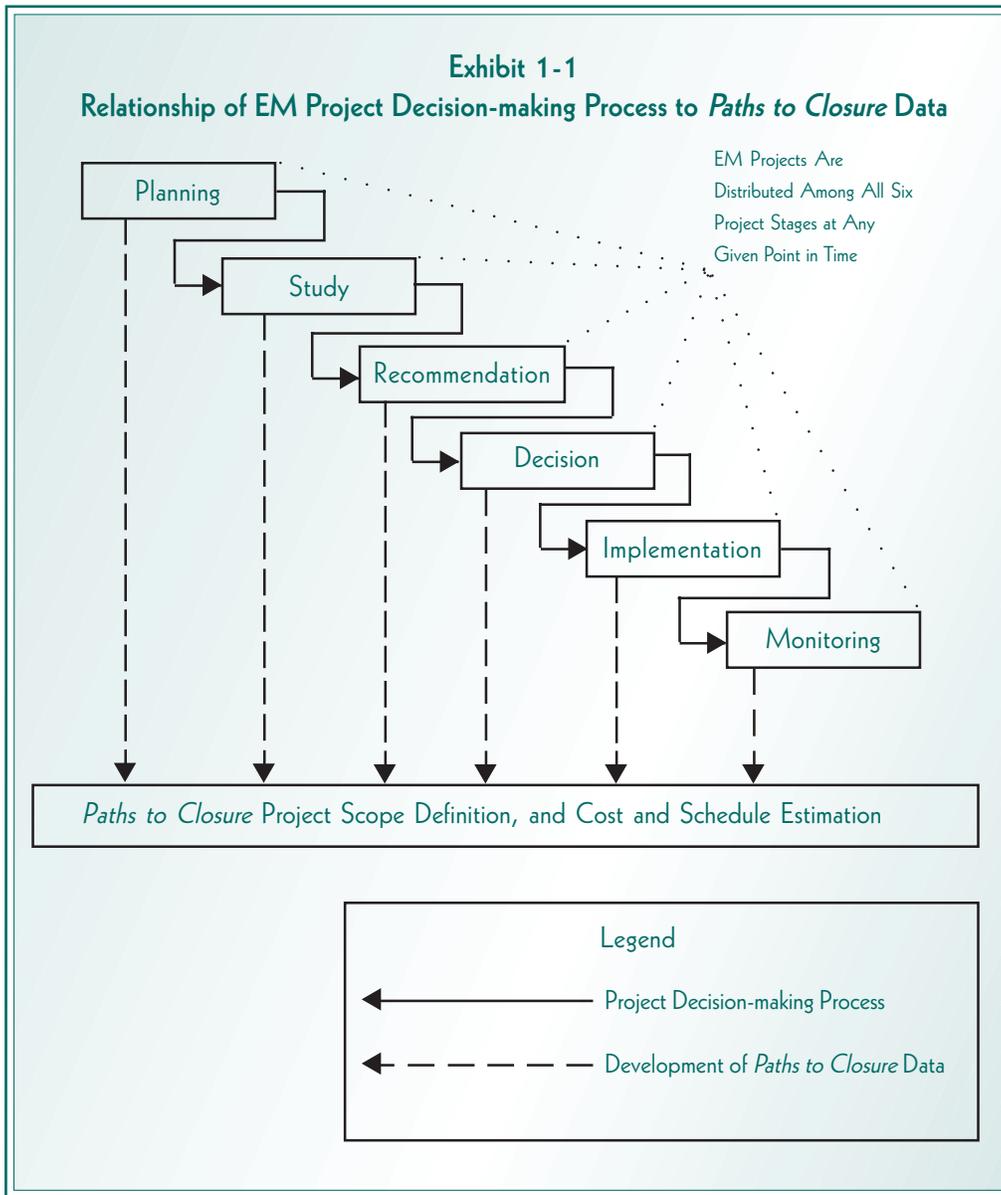
EPA or state environmental regulators are the final decision-makers for cleanup work conducted under CERCLA and RCRA because of their regulatory approval roles. At the site level, the Environmental Management program negotiates with state and federal regulators regarding the scope and schedule for conducting the studies, confers with the regulators on the recommended course of actions, and negotiates with the regulators on the scope and schedule for implementing and monitoring the actions once decisions have been finalized. The EM program's role is to comply with schedules negotiated with state and federal regulators for conducting studies, proposing recommended courses of action, and implementing the actions once the regulators have made decisions.

For work performed as a result of decisions informed by the NEPA process, EM makes decisions in accordance with the Council on Environmental Quality's regulations implementing NEPA and the Department's own NEPA-implementation regulations.

1.3.2 Paths to Closure Relationships

Exhibit 1-1 illustrates a conceptual decision-making process applicable to CERCLA, RCRA, NEPA, or any other statutory framework, and the relationship of *Paths to Closure* to that process. As the exhibit illustrates, projects advance through the decision process over time. As a project (or project activity) moves through the stages, additional information is collected. Therefore, the uncertainty about project scope, costs, and schedule of the implementation phase diminishes as indicated by the length of the dotted arrows in Exhibit 1-1.

Because each yearly version of *Paths to Closure* is a vantage from a single point in time, EM makes a series of evolving planning assumptions about future activities based on information generated and decisions made during the previous year. As mentioned above, assumptions about specific projects do not bias decisions that will be made about those projects, nor do they eliminate or restrict alternative approaches or opportunities for public involvement in the decision-making process.



Paths to Closure also identifies opportunities to accelerate the pace of projects or parts of projects made under CERCLA, RCRA, and NEPA, such as the completion of specific cleanup projects more rapidly than may be required under compliance agreements or the pace at which EM performs environmental impact statements. We will ensure that acceleration of the pace of cleanup activities does not reduce cleanup scope and does not compromise the health and safety of workers or the achievement of appropriate cleanup standards.

In addition, *Paths to Closure* plays an important role in EM's site and Headquarters budget processes. Sites use their *Paths to Closure* reports as a guide to developing site budget priorities. EM Headquarters uses *Paths to Closure* to formulate annual budget strategies in the context of life-cycle cleanup costs and

schedules. *Paths to Closure* is also a useful tool for making annual adjustments to the execution of the cleanup program based on budget funding decisions. Chapter 4 describes the relationship of *Paths to Closure* to the budget process in greater detail.

1.4 Safety and Health and Regulatory Compliance

Since its inception, the EM program has placed a high priority on achieving its mission in a manner that ensures a safe and healthy workplace, reduces risk, and attains compliance with all applicable regulatory requirements. *Paths to Closure* embraces those objectives in accelerating cleanup efforts. However, comments of stakeholders, regulators, and Tribal Nations on the *Discussion Draft* expressed concern that initial development of *Paths to Closure* had focused on defining the scope, schedule, and cost of the cleanup at the perceived expense of these cleanup objectives.

1.4.1 Safety and Health

A fundamental objective of the EM program is to ensure the protection of workers and the public throughout the conduct of its cleanup mission. The EM program's cleanup workers, including federal employees, contractors, and subcontractors, are the most vulnerable to hazardous exposure and risk. Such workers are frequently engaged in activities that involve radioactive and toxic wastes, and under conditions that are conducive to industrial accidents. The EM program has a responsibility to protect the safety of its workers; failure to meet that responsibility is unacceptable.

That philosophy is reflected in EM's safety and health policy: "Do Work Safely or Don't Do It." The need to accelerate cleanup and reduce costs does not alter that commitment to safety. In implementing the project-oriented approach presented in *Paths to Closure*, protection of worker health and safety is built into each specific project across the complex. The Environmental Management program is implementing the principles of Integrated Safety Management in all projects so that safety and health become an integral part of project management. That approach is consistent with the best in industry, and it reduces accidents and improves work planning. Those benefits may in turn give rise to performance enhancements through reductions in workers compensation premiums, reduced lost productive time, and enhancements in work planning and execution.

EM's safety and health activities, therefore, become an integral component of EM's planning, budgeting, and accountability management system. In addition, reducing risk to workers, the public, and the environment is an integral element of EM's approach to setting priorities, sequencing project work, and measuring performance. Efforts to accelerate activities can in turn accelerate risk reduction. Initiatives set forth in *Paths to Closure* place priority on projects that eliminate urgent risks.

1.4.2 Regulatory Compliance

The EM program will comply with all activities required under applicable federal, state, and local environmental statutes and regulations; activities required under the terms of permits, administrative orders, or judicial decrees; enforceable milestones or schedules established in agreements negotiated between EM and its regulators; and commitments to the Defense Nuclear Facilities Safety Board (DNFSB). All site versions of *Paths to Closure* reflect and explicitly state this position. To support this position, Operations/Field Offices are required to identify regulatory drivers for projects as well as all significant enforceable agreement milestones. Additionally, all Operations/Field Office budget requests must include an integrated project priority list which is tied to regulatory compliance drivers. EM's commitment to compliance is discussed further in Chapter 4.

1.5 Easing the Transition of Workers

Workforce restructuring plans are currently in place or under development for the sites that will address adjustments in the workforce that may occur from time to time as cleanup activities are completed at a site. Potential strategies for offering benefits to workers affected by workforce adjustments are under review. These strategies are focusing on approaches that are linked to requirements identified by a comprehensive personnel resource management plan. They may include incentive programs for both voluntary and involuntary separation and outplacement assistant services, such as job search workshops, access to job listings, resume preparation, career and educational counseling, and educational assistance to help workers make the transition to new job opportunities. Certain involuntarily separated workers will be eligible for preference in hiring and for severance pay, in accordance with Section 3161 of the National Defense Authorization Act for FY 1993. Some approaches may include providing benefits prior to employee separation.

As projects come to a close and sites approach closure, DOE also intends to provide, in accordance with Section 3161 of the National Defense Authorization Act for FY 1993, assistance to communities that are affected by the reconfiguring, downsizing, and closing of its defense nuclear facilities. DOE realizes that attaining *Paths to Closure* goals may affect the economies of nearby communities where a significant number of displaced workers live. DOE will cooperate with the Community Reuse Organization and execute economic development initiatives to help minimize those effects. The Office of Worker and Community Transition, which is responsible for the overall management of DOE's community transition program, will authorize specific actions, within approved funding levels, selected through application of the evaluation criteria set forth in the guidance.

*The remainder of this report is organized into five chapters and a series of appendices. **Chapter 2** summarizes the scope, schedule, and costs for the Environmental Management cleanup program. **Chapter 3** provides more detailed scope, schedule, and cost information for three Operations/Field Offices: Rocky Flats, Richland, and Savannah River. (**Appendix E** provides analogous information for the remaining eight Operations/Field Offices.) **Chapter 4** discusses EM efforts to meet programmatic challenges, largely focusing on mechanisms to accelerate cleanup and reduce costs. **Chapter 5** describes the new integrated system EM intends to use to manage the cleanup program. **Chapter 6** summarizes stakeholder, regulator, and Tribal Nation comments and EM program responses to comments on the February 1998 draft Paths to Closure.*