OFFICE OF ENVIRONMENTAL MANAGEMENT

UNITED STATES DEPARTMENT OF ENERGY

CLOSURE PLANNING GUIDANCE

June 1, 2004

Preface

Three years ago, the Department of Energy's Environmental Management Program was in disarray. On top of a prior year $14-billion increase in total cost, little in the way of risk reduction was actually happening. In response, Secretary of Energy Spencer Abraham directed a ***Top-to-Bottom Review*** of the cleanup program. In February 2002, the Review was completed and presented to the Secretary. The Secretary accepted the report and said:

> "…after being presented with the old plan for cleaning up the Department's Cold War nuclear sites that had a timetable of some 70 years and a cost of $300-billion…a timeline of 70 years means decades of treading water on environmental hazards that need to be eliminated, not just managed. It is not fair to tell people who live near these sites that if everything works right, maybe their grandchildren will live in communities that are risk free…"

The Secretary strongly agreed with the teams' assessment and directed a reform of the program that included:

- Reduce as expeditiously as possible the most serious risks,
- Pursue this task with the sense of urgency,
- Streamline cleanup so that funding currently spent on routine maintenance can be used for expedited cleanup,
- Restructure internal processes that focus efforts,
- Continue to work with interested parties - stakeholders, communities, regulators and state and local elected officials to build consensus for change.

Since that time, the Office of Environmental Management has been focused on delivering accelerated cleanup that is safe for the worker, protective of the environment, and responsible to the taxpayers. A listing of key accomplishments of the program is presented in Appendix 1 to this document. Additionally, since the publication of the FY 2001 Financial Report of the United States Government, the Environmental Management Program has successfully eliminated over $50-billion worth of liabilities as documented in the FY 2002 and FY 2003 financial reports.

The purpose of this document, the ***Office of Environmental Management Closure Planning Guidance***, is to turn initiatives from the Top to Bottom Review into formal processes that can predictably deliver results and safely complete cleanup of the EM program by 2035. The program will be fully protective of the environment, at a total project cost of no more than $142-billion (FY 2003 constant dollars). Additionally, this document clearly establishes cleanup

objectives, goals, and performance expectations for each organizational element within Environmental Management. It also documents and integrates all corporate reforms undertaken since the publication of the Top to Bottom Review. All objectives, goals, and performance expectations are defined and measurable so that EM may hold itself accountable and may be held accountable for completing cleanup.

The main document shall serve as a guide for a 5-year period and will provide consistency as well as linkage among the report of the Top-to-Bottom Review team, the Integrated Planning, Accountability, and Budgeting System – Information System (IPABS-IS), and EM's Reports to Congress, as well as the Department of Energy's strategic plan. This document contains all necessary strategy and performance elements needed to carry out the cleanup program within the funding targets provided to each site; only external forces could change the cleanup and closure strategy. Accordingly, this document is subject to configuration control under the EM Configuration Control Board, and sites will be required to report their progress annually in terms of variance from this plan.

Appendix 1 is to be updated in December of each year so EM's performance can be assessed against the corporate plan in time for the President's budget submittal to Congress in February of the following year. The first edition of Appendix 1 will be released in December 2004.

The ***Office of Environmental Management Closure Planning Guidance*** is EM's integrated response to the President's Management Agenda challenge to improve the management and performance of the federal government. In particular this document addresses three problems identified by the President[1]:

- Agency performance measures tend to be ill defined and not properly integrated into agency budget submissions,
- The structure of the federal budget makes it impossible to identify the full cost associated with individual programs, and
- The American people should be able to see how government programs are performing and compare performance and cost.

The President also said, "…good beginnings are not the measure of success. What matters in the end is completion. Performance. Results. Not just making promises, but making good on promises."[2]

EM's accountability and responsibility for planning, developing, and implementing elements of EM's cleanup plan are assigned to individuals by name and position within the EM organization. Performance elements in this plan will become part of the Senior Executive Service (SES) Annual Performance Plans whereby EM managers will be held accountable for performance.

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[1] Executive Office of the President, Office of Management and Budget, *The President's Management Agenda*, Washington, D.C., October 2001, p.28
[2] ibid, p.1

Table of Contents

I. Executive Summary I-1
A. Purpose I-1
B. Background I-2

II. EM Closure Planning Guidance: Overview II-1

III. EM's Cleanup Strategy III-1
A. Vision III-1
B. Program Goals and Objectives III-4
C. Performance Targets III-5

IV. Establishing a Visible, Responsible, and Accountable Cleanup Program IV-1
A. Visibility IV-1
B. Responsibility IV-2
C. Accountability IV-2

V. EM Internal Initiatives V-1
A. Performance-Oriented Organization V-2
Change How EM Thinks About Work Planning and Execution ***(Goal A.1)*** V-5
Identify Motivated, Capable Federal Employees for Future Leadership Positions within the EM Organization ***(Goal A.2)*** V-5
Select, Qualify, and Assign Federal Project Directors to EM Cleanup Projects ***(Goal A.3)*** V-5
Develop and Implement a Workforce Strategy ***(Goal A.4)*** V-6
B. Safety Emphasis V-6
Continually Improve Safety Performance ***(Goal B.1)*** V-7
Expand the Integrated Safety Management Approach to Higher-Level Work Planning ***(Goal B.2)*** V-7
Clarify Government Responsibilities for Oversight of Contractor Work ***(Goal B.3)*** .. V-7
Exploit Past Lessons Learned in Which Safety Issues Are Involved ***(Goal B.4)*** V-8
Comply with DOE Orders and Requirements during the Cleanup Process ***(Goal B.5)*** V-8
C. Risk Reduction V-9
Identify Risk-Based Cleanup End States to Support Site Closure ***(Goal C.1)*** V-11
Complete Cleanup at Closure Sites ***(Goal C.2)*** V-11
Accelerate Risk Reduction ***(Goal C.3)*** V-12
Consolidate Special Nuclear Materials out of EM Sites by 2004 ***(Goal C.4)*** V-13
Get Wastes to Disposal Facilities Quickly ***(Goal C.5)*** V-13

Reduce the Cost and Time to Complete the EM Cleanup Program ***(Goal C.6)*** V-15
D. EM Becoming a Better Customer V-16
Improve EM's Contract Management ***(Goal D.1)*** V-19
Develop and Implement a Long-term, Integrated Acquisition Strategy ***(Goal D.2)*** .. V-19
Get Cleanup Scope, Schedule, and Cost under Control ***(Goal D.3)*** V-21
Transition EM Corporate Projects into the New EM Organization ***(Goal D.4)*** V-22
Seek Regulatory Clarification on the Definition of High-Level Waste ***(Goal D.5)*** ... V-23
Enhance the National Environmental Policy Act Process within EM ***(Goal D.6)*** V-24
Refocus the Science and Technology Program ***(Goal D.7)*** V-24

VI. Key Uncertainties and External Factors VI-1
A. Program Uncertainties VI-1
Budget Support VI-1
Cleanup Standards VI-1
Technology VI-1
Uncertain Work Scope VI-1
B. External Factors VI-2
Regulatory Requirements VI-2
Legislative Requirements VI-2
Disposal Sites VI-2

VII. Program Evaluation VII-1

VIII. Five-Year Budget and Performance Integration VIII-1

Annex A. Summary of EM Cleanup Sites and Closure Dates A-1

Annex B. Life-Cycle Work Scope by Geographic Location B-1

Annex C. Glossary of Acronyms and Abbreviations C-1

I. Executive Summary

A. Purpose

This document defines the Department of Energy's (DOE) program for cleanup of legacy waste in terms of safety expectations, performance metrics, management responsibility, and corporate business practices. This guidance and its performance expectations will remain in effect for 5 years, until 2009. Any changes will be based on the major uncertainties and external factors discussed in Section IV. Should changes occur, they will be explained and documented in the Office of Environmental Management's (EM) annual report, as described in Appendix 1.

More specifically, this document identifies the high-level work scope, schedule, and cost estimate for EM's plan to clean up legacy waste resulting from the cold war by fiscal year (FY) 2035. These planning elements function as the cleanup objectives, goals, and performance targets for each EM organization involved in the cleanup effort. Within this guidance, the Assistant Secretary for Environmental Management assigns responsibility to individuals for planning, developing, and implementing elements of the cleanup plan using the management principles presented in DOE Manual 413.3-1, *Project Management for the Acquisition of Capital Assets.* Additionally, major EM internal business initiatives in response to recommendations resulting from EM's Top-to-Bottom Review are described.

Key elements of EM's closure planning guidance include the following:

- **Safety Emphasis**—EM is totally responsible for safe conduct of operations at all its facilities, in all its cleanup activities, and in all supporting work initiatives. Although EM's path forward includes initiatives related to acquisition strategy, contract management, risk reduction, project management, performance targets, and performance oversight, the focus on safety is paramount. EM's emphasis on safety, including its initiative to continuously improve safety performance, is described in Section V.B.

- **Performance Metrics**—The cleanup work scope is described using 16 objectively determined performance metrics that provide a quantitative measure of progress on the cleanup program. These metrics, often referred to as corporate performance measures, are defined and quantified for individual cleanup sites in Section III.C.

- **Cleanup Completion Dates**—Major schedule commitments for the life-cycle of the cleanup program include the dates by which EM plans to complete cleanup activities at each of its field locations. These cleanup completion dates are identified in Section III.B.

- **Annualized Cost Estimates**—The EM plan completes cleanup of legacy waste for a total life-cycle cost estimate of $142 billion (constant FY 2003 dollars). Annualized

cost estimates for the required cleanup performance are identified at the individual site level. Appendix 1, Section II.B, describes performance expectations for individual sites.

- **Project Management Expectations**—Although specific cleanup challenges, regulatory constraints, and decision-making processes vary from site to site, EM is steadfast in its expectations for identifying, planning, and accomplishing cleanup activities in accordance with the principles of DOE Manual 413.3-1. These principles of project management will be applied to all EM cleanup activities as described in Section II. EM Headquarters will provide oversight to ensure that the principles of DOE Manual 413.3-1 produce genuine value added to the cleanup effort, rather than unnecessary, bureaucratic compliance. This oversight is described in Section V.

- **EM's Corporate Business Practices**—Responses to recommendations from the Top-to-Bottom Review are identified in Sections IV and V.

- **Accelerated Risk Reduction**—A technically based effort to accelerate risk reduction within the EM cleanup program is under way, as described in Section III.A. The purpose of this effort is to review, analyze, and technically challenge major programmatic constraints within the existing EM cleanup program while improving safety performance and protecting workers, the public, and the environment. Major issues being explored for the potential to accelerate risk reduction include, but are not limited to, a nationwide acquisition strategy and breakthrough technology advances.

- **Annual Report**—Not only does this document present the quantitative elements of EM's life-cycle cleanup program, but its format is designed to support an annual assessment of the program's progress. Appendix 1 will be updated and published annually to report EM's progress against its life-cycle cleanup plan for each cleanup site, including the resources consumed and specific progress made. EM's progress toward implementing its internal initiatives will also be described.

- **Individual Responsibility**—Throughout this document, individual responsibility for cleanup activities, internal initiatives, and attainment of objectives for accelerated cleanup is assigned. As employees change their assignments as a result of career development, continuity of responsibility for these initiatives will be retained and documented in EM's annual report (i.e., Appendix 1).

B. Background

In August 2001, the Assistant Secretary for Environmental Management (EM-1) created the Top-to-Bottom Review team to conduct a programmatic review of EM's current program and its management systems. The report resulting from that review, containing recommendations for quickly and markedly improving performance, was published on February 4, 2002. After reviewing the report's recommendations, the Secretary of Energy directed EM-1 to act on those recommendations. Major reforms and progress have occurred since that time. The status of

implementation of the recommendations was discussed in an October 2003 Report to Congress[3] and is updated in this document.

DOE issued a strategic plan in September 2003. Among the strategic goals in that plan is "to protect the environment by providing a responsible resolution to the environmental legacy of the cold war and by providing for the permanent disposal of the nation's high-level waste." DOE's strategic plan also sets forth a general goal for EM: "Accelerate cleanup of nuclear weapons manufacturing and testing sites, completing cleanup of 108 contaminated sites by 2025." Eight strategies for achieving this goal, based directly on recommendations from the Top-to-Bottom report, will be implemented. Thus a direct link exists between implementation of the Top-to-Bottom Review recommendations and DOE's strategic plan.

The present document responds to DOE's strategic plan by charting a course of action for EM's cleanup program for the next 25 years. A number of key intermediate objectives are identified, as well as several external factors that could affect the ability to achieve these objectives and the program's ultimate goals.

The cleanup goals in DOE's strategic plan are explicit with regard to the desired outcomes of EM's cleanup and closure program, but the plan does not provide guidance or direction for implementing a program to meet those goals. The present document meets that need by providing program guidance for the next 5-year period. This guidance will be used for program planning and congressional budget requests, and will be linked to the budget process to ensure a match among program direction, resources, priorities, and schedules. The program guidance provided herein formalizes a process that was developed as a result of the Top-to-Bottom report, with positive results having been demonstrated in FY 2002 and 2003, and now well into FY 2004.

In addition to this 5-year program guidance, Appendix 1 presents the current status of the program's implementation and reviews external events affecting progress. As noted above, this is intended to be a multiyear document, with Appendix 1 being published annually to report EM's progress on its cleanup mission.

When the EM program was established in 1989, its goal was to safely clean up and dispose of the radioactive and hazardous waste produced during the cold war. The Top-to-Bottom report identified 12 issues that were preventing the EM program from achieving this goal in a timely and cost-effective way. Those issues will also be addressed in the annual edition of Appendix 1.

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[3] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003.

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II. EM Closure Planning Guidance: Overview

This document is more than a strategic plan. It is the overall guidance template for EM's cleanup planning and budget decisions.

Cleanup planning objectives are the completion dates for legacy waste cleanup at each geographic location where EM is conducting cleanup activities. Individual site organizations are responsible for developing detailed plans to achieve their completion objective as scheduled. When conducting cleanup planning, the project management principles identified in DOE Manual 413.3-1, *Project Management for the Acquisition of Capital Assets*, will be applied.

Although specific cleanup challenges, regulatory constraints, and decision-making processes vary from site to site, EM's expectations for defining and managing cleanup activities are consistent, as described in DOE Manual 413.3-1:

- Identifying individual responsibility and accountability by formally designating integrated project teams led by qualified federal project directors.
- Clearly identifying cleanup requirements in technical terms.
- Developing and executing a baseline cleanup plan for EM's life-cycle effort that supports an earned-value method of measurement. This includes, but is not limited to:
  - Identifying the cleanup work scope needed to achieve the technically defined cleanup requirements.
  - Integrating all work scope activities into a schedule that includes contractor and government actions. Baseline schedules will use the critical path method of scheduling.
  - Providing an auditable basis of estimate for the cleanup activities.
- Identifying and proactively managing scope, schedule, and cost uncertainties within the EM cleanup effort. Uncertainty often occurs within EM cleanup projects because a record of decision (i.e., a regulatory document) identifying the final cleanup levels is not approved until well into the cleanup project. When this situation exists, effective and realistic uncertainty management must occur to minimize the risk to project scope, schedule, and cost. The principles of risk management as described in Chapter 14 of DOE Manual 413.3-1 will be applied as appropriate.
- Providing effective government oversight of contractor performance, including objectively and independently determining how the contractor's cleanup performance compares with the baseline cleanup plan. This includes a well-defined plan to identify and provide federal resources and competencies as necessary to provide effective oversight.

EM Headquarters will provide oversight of individual site cleanup efforts to ensure that the principles of DOE Manual 413.3-1 provide value added to the cleanup effort, rather than wasteful, bureaucratic compliance. This oversight involves formal and informal interaction with contractors and is described in Section V.

EM's cleanup objectives and performance targets as presented in this document are under the formal change control procedures described in EM's Standing Operating Policies and Procedures (SOPP) RM 1.1, *Resource Management: Configuration Management Change Control Process for the Environmental Management (EM) Program*. EM's Change Control Board approves all changes to EM's cleanup objectives and performance targets. Any such changes will be documented in the annual update of Appendix 1 to the present document. Appendix 1 is intended to provide an objective measure of progress against EM's overall national cleanup plan. Its annual update will be published every December to coincide with the submission of EM's congressional budget request.

III. EM's Cleanup Strategy

EM's strategic goal, as stated in DOE's strategic plan, is "to protect the environment by providing responsible resolution to the environmental legacy of the Cold War and by providing for the permanent disposal of the Nation's high level radioactive waste."

In February 2002, EM's Top-to-Bottom Review team reported that EM's past cleanup performance had been characterized by uncontrolled cost and schedule growth and a misplaced emphasis on managing risk, rather than reducing risk to workers, the public, and the environment.[4] In response, EM committed to a more visible, responsible, and accountable cleanup program by publishing its cleanup completion dates and institutionalizing its response to the recommendations of the Top-to-Bottom Review team. Figure 1 identifies the links between those recommendations and the initiatives set forth in the present document.

EM's approach to cleanup is intended to provide predictability and visibility to its cleanup goals, schedule objectives, and resource estimates. The EM cleanup effort has been under way since 1989; consequently, its successes, failures, and experiences to date have all contributed to EM's present vision, which values uncompromised safety standards, clearly defined goals, and objectively measured performance.

A. Vision

EM's vision is to conduct all cleanup activities in a professional, responsible, and businesslike manner, including the use of breakthrough management thinking.[5] Management's approach, tools, and standards are presented in DOE Manual 413.3-1. The breakthrough management thinking that EM is pursuing is focused on conducting business activities in ways that minimize waste and resources while increasing customer (i.e., taxpayer) satisfaction.

Individual site cleanup projects will be described with clearly defined technical requirements, credible schedules, and detailed cost estimates. In the development of these work planning tools, the principles of DOE Manual 413.3-1 will be applied. When, because of uncertainty in work scope, schedule, or cost estimates, any of the defined management approaches cannot be applied as expected, a risk-mitigated path forward will be identified, using, as appropriate, the risk management principles set forth in DOE Manual 413.3-1.

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[4] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. ES-2.

[5] M. Harry and R. Schroeder, *Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations*, New York: Doubleday, 2000.

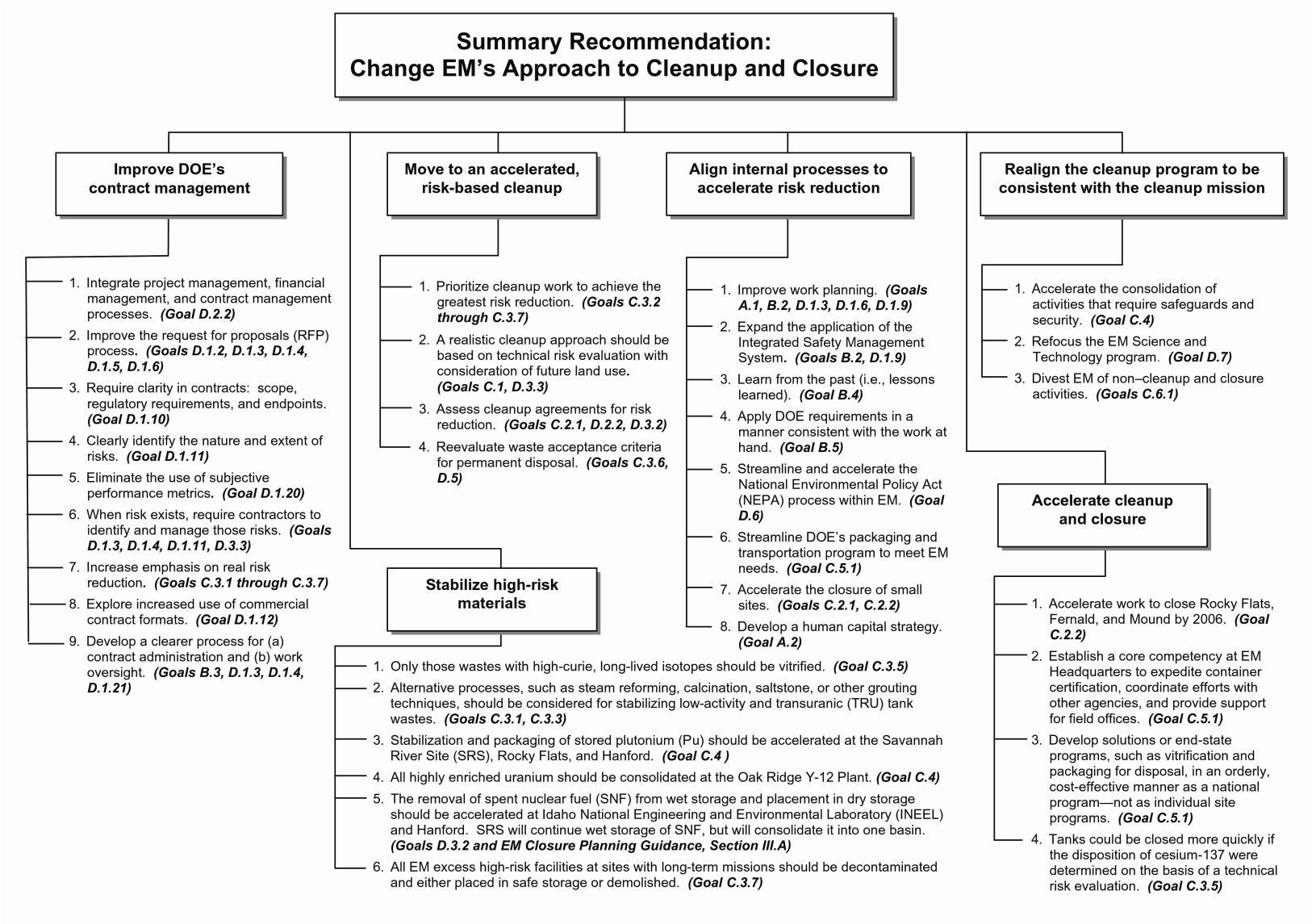

Figure 1. EM Top-to-Bottom Review Recommendations and Closure Planning Guidance Goals

EM's internal initiatives responding to the recommendations of the Top-to-Bottom Review team (see Section V) will also be managed using the work planning principles of DOE Manual 413.3-1 and breakthrough management thinking.

Because private contractors accomplish EM's cleanup activities, EM's vision includes the use of clearly defined cleanup standards and performance objectives within a performance-based contract. Contractor performance will be determined by objectively measuring performance achievements against EM's technically defined performance targets; contractor fees will be determined accordingly. In essence, EM will structure its cleanup contracts so contractors will receive exceptional fees for exceptional cleanup performance.

EM's present cleanup plan is targeted to complete cleanup of legacy waste by 2035, at a total estimated life-cycle cost of $142 billion (constant FY 2003 dollars). EM's vision for its cleanup program includes a strong, technically based effort to search continually for ways to accelerate the completion of the program to FY 2025 at a total life-cycle cost of $122 billion (constant FY 2003 dollars). This acceleration effort will involve examining, modifying, and pursuing opportunities to:

- Achieve continuous improvement in safety performance throughout the entire cleanup program.
- Apply programmatic and major work practice lessons learned during the course of the EM cleanup program. These include, but are not limited to, the vitrification lessons learned from the Defense Waste Processing Facility (DWPF) at the Savannah River Site (SRS) and closure planning lessons learned from the Rocky Flats Closure Project.[6]
- Apply technology to reduce the resources required for high-cost elements of the legacy waste cleanup program (e.g., dispositioning of tank wastes).
- Apply acquisition strategy principles initiated at Rocky Flats and further developed at the Miamisburg Environmental Management Project.
- Apply acquisition strategy on a national level to achieve significant efficiency and productivity.
- Apply the DOE policy on the use of risk-based end states (DOE Policy 455.1).
- Request and receive clarification of key regulatory principles, such as the high-level waste (HLW) definition relative to the Waste Incidental to Reprocessing (WIR) concept.
- Eliminate avoidable cost and schedule requirements due to inefficient integration of national waste repository resources. For example, spent nuclear fuel (SNF) is being

[6] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. III-15.

maintained in expensive wet storage basins that can leak into the environment. If the repository's opening is delayed, this expensive storage may be unnecessarily continued. Early dry storage may be a better, lower-risk, and more cost-effective solution.

- Maximize the resources spent on direct cleanup activities as identified in the Critical Decision 4 Report of November 4, 2003, by the EM Corporate Project "Focusing Resources on Cleanup."

B. Program Goals and Objectives

The general goal of EM's cleanup program, as set forth in DOE's strategic plan, is to "accelerate cleanup of the nuclear weapons manufacturing and testing sites, completing cleanup of 108 contaminated sites by 2025."

A complete listing of all geographic sites where EM is involved in environmental restoration, including the 108 to be completed by 2025, is provided in Annex A. This list includes "completion date" objectives that identify when EM cleanup is to be completed.

Table 1 lists the cleanup completion dates for the remaining sites where EM cleanup has not yet been completed. As of June 1, 2004, EM has completed legacy waste cleanup at 75 sites.

Table 1. Sites with Outstanding EM Cleanup Activities (as of June 1, 2004)

No.	State	Location	Planned Completion Year
1	NM	Inhalation Toxicology Laboratory	1997
2	MS	Salmon Site	2003
3	AK	Amchitka Island	2005
4	CA	Laboratory for Energy-Related Health Research	2005
5	OH	Ashtabula Environmental Management Project	2006
6	OH	Columbus Environmental Management Project—West Jefferson	2006
7	OH	Fernald Environmental Management Project	2006
8	MO	Kansas City Plant	2006
9	CA	Lawrence Berkeley National Laboratory	2006
10	CA	Lawrence Livermore National Laboratory—Main Site	2006
11	OH	Miamisburg Environmental Management Project	2006
12	CO	Rocky Flats Environmental Technology Site	2006
13	NM	Sandia National Laboratories	2006
14	CA	Stanford Linear Accelerator Center	2006
15	CA	Energy Technology Engineering Center	2007
16	NY	Brookhaven National Laboratory	2008
17	CA	Lawrence Livermore National Laboratory—Site 300	2008
18	TX	Pantex Plant	2008
19	IL	Argonne National Laboratory—East	2009

No.	State	Location	Planned Completion Year
20	NV	Central Nevada Test Area	2010
21	NV	Project Shoal Area	2010
22	CO	Rio Blanco Site	2010
23	UT	Moab, Utah (Atlas Site)	2011
24	CO	Rulison Site	2012
25	NY	West Valley Demonstration Project	2012
26	NM	Gasbuggy Site	2014
27	CA	General Electric Vallecitos Nuclear Center	2014
28	NM	Gnome—Coach Site	2014
29	NY	Separations Process Research Unit	2014
30	NM	Los Alamos National Laboratory	2015
31	TN	Oak Ridge Reservation	2015
32	OH	Portsmouth Gaseous Diffusion Plant	2025
33	SC	Savannah River Site	2025
34	NV	Nevada Test Site	2027
35	NV	Tonopah Test Range Area	2027
36	KY	Paducah Gaseous Diffusion Plant	2030
37	WA	Hanford Site	2035
38	ID	Idaho National Laboratory	2035
39	NM	Waste Isolation Pilot Plant	2035

C. Performance Targets

EM's performance targets are clearly defined, objectively measured performance metrics that provide a measure of progress in the cleanup program. Sixteen metrics are used to quantify the amount of cleanup completed at individual sites, as well as throughout the entire complex. Definitions of these metrics are provided in Table 2.

Table 2. Definitions of EM Cleanup Performance Metrics

No.	Performance Metric	Description
1	Plutonium (Pu) packaged for long-term disposition	Number of certified DOE storage/treatment/disposal (STD) 3013 containers (or equivalent) of plutonium metal or oxide packaged and ready for long-term storage.
2	Enriched uranium (eU) packaged for disposition	Number of certified containers packaged and ready for long-term storage.
3	Pu/uranium (U) residues packaged for disposition	Kilograms of residue material packaged and ready for disposition/disposal.
4	Depleted uranium and uranium (DU&U) packaged for disposition	Number of metric tons of depleted and natural uranium packaged in a form suitable for disposition.
5	Liquid waste eliminated	Radioactive liquid tank waste (and other forms, such as sludge and saltcake) volume is counted when the inventory is reduced. This measure refers to waste traditionally called "high-level" waste, such as waste in the 177 tanks at Hanford. The inventory of radioactive liquid waste in tanks should not reflect any volume changes due to processing.

No.	Performance Metric	Description
6	Liquid waste tanks closed	Tanks are counted when they reach the point of closure; closure is any end state as defined in a final, approved record of decision, and may include clean closure or in-place closure for the wastes described in the previous measure.
7	High-level waste (HLW) packaged for disposition	Containers/canisters ready for disposal.
8	Spent nuclear fuel (SNF) packaged for disposition	Heavy-metal mass of SNF ready for final disposition; packaging for transport is not included unless no further packaging is required after transport (units: metric tons of heavy metal [MTHM]).
9	Transuranic (TRU) waste disposed	Number of cubic meters of TRU/TRU mixed waste shipped for disposal at the Waste Isolation Pilot Plant (WIPP).
10	Low-level/low-level mixed waste (LL/LLMW) disposed	Number of cubic meters of LL/LLMW disposed. Disposal quantities should include onsite disposal of a site's own waste, waste shipped to a commercial facility for disposal, and waste shipped to another DOE site for disposal. Waste generated by ongoing processing operations should be included.
11	Material access areas (MAAs) eliminated	Number of DOE 5633.3B MAAs eliminated. When an MAA is eliminated, DOE-required MAA safeguards and security standards are no longer applied to the area.
12	Nuclear facility completions	Number of nuclear facilities that have reached their end state within the EM program. This end state should correspond to one of the following: decommissioning, deactivation, dismantlement, demolishment, or transfer of responsibility for the facility to another program or owner. Facilities should not be reported more than once. If a facility is included in the radioactive or industrial facility measure, it should not be reported in the nuclear facility measure.
13	Radioactive facility completions	Number of radioactive facilities that have reached their end state within the EM program. This end state should correspond to one of the following: decommissioning, deactivation, dismantlement, demolishment, or transfer of responsibility for the facility to another program or owner. Facilities should not be reported more than once. If a facility is included in the nuclear or industrial facility measure, it should not be reported in the radioactive facility measure.
14	Industrial facility completions	Number of industrial facilities that have reached their end state within the EM program. This end state should correspond to one of the following: decommissioning, deactivation, dismantlement, demolishment, or transfer of responsibility for the facility to another program or owner. Facilities should not be reported more than once. If a facility is included in the nuclear or radioactive facility measure, it should not be reported in the industrial facility measure.
15	Remediation complete	A release site is considered complete after regulatory approval has been obtained and no additional EM resources are required, except for long-term stewardship. This will occur after an assessment or evaluation (i.e., no-action decision) or after active remediation has been completed.
16	Geographic sites eliminated	A site in its entirety (e.g., Fernald) is "complete" when active remediation has been completed in accordance with the terms and conditions of cleanup agreements (e.g., records of decision, permits). Stewardship or non-EM activities may be ongoing after site completion.

Table 3 presents EM's 16 performance metrics and the program-wide performance expectations for FY 2004, FY 2005, FY 2006, FY 2007, and FY 2008. It also provides the expected life-cycle quantities of material within the entire EM legacy waste cleanup program.

Table 3. EM's Short-Term and Life-Cycle Performance Targets

Performance Metrics That Define EM's Cleanup Work Scope	Unit	Completed to Date (Pre-2004 Actuals	Short Term Targets					Life-cycle Quantity[a]
			FY04	FY05	FY06	FY07	FY08	
Pu packaged for long-term disposition	containers	4,549	1,323	165	42	0	0	5,850
eU packaged for disposition	containers	2,054	925	669	1,980	760	222	9,101
Pu/U residues packaged for disposition	kg bulk	107,659	253.500	75.900	0	0	0	107,782
DU&U packaged for disposition	metric tons	7,651	0	0	28,821	28,635	28,635	742,149
Liquid waste eliminated	k-gallons	0	1,300	1,900	1,800	1,900	1,900	88,000
Liquid waste tanks closed	tanks	2	9	9	13	2	2	241
HLW packaged for disposition	containers	1,727	250	250	250	250	250	18,735
SNF packaged for disposition	MTHM	1,446	633.054	0.873	2.358	2.937	20.533	2,420.431
TRU disposed	m^3	14,081	12,952	13,678	14,309	16,445	15,219	141,314
LLW/LLMW disposed	m^3	402,568	89,815	107,067	52,606	86,477	23,246	1,155,360
MAAs eliminated	areas	7	1	1	1	1	0	14
Nuclear facility completions	facilities	22	6	14	15	18	34	518
Radioactive facility completions	facilities	149	39	66	25	5	14	799
Industrial facility completions	facilities	653	105	201	51	118	97	2,647
Geographic sites eliminated	sites	76	0	2	10	1	3	114
Remediation complete	sites	5,186	200	283	485	259	311	10,374

[a] Performance to date may differ from original life-cycle estimate.

Performance targets for each site's life-cycle cleanup effort are provided in Annex B. Appendix 1 presents an annual projection of cleanup performance at individual sites. (As noted earlier, Appendix 1 will be updated annually to report cleanup performance against the life-cycle performance targets.)

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IV. Establishing a Visible, Responsible, and Accountable Cleanup Program

The Top-to-Bottom Review team identified uncontrolled cost and schedule growth as a significant shortcoming of EM's program to clean up legacy waste. Except for the national debt and federal and military pension benefits, cleanup of legacy waste is the largest U.S. Government liability. The Top-to-Bottom Review team concluded that unless a massive restructuring of the program was carried out, DOE would be unable to complete its cleanup mission, and the cost of the EM program would continue to increase. Immediate and aggressive actions were thus required.[7]

To gain programmatic control of the cleanup program, EM established a performance-based focus on real risk reduction for cleanup at field locations and the implementation of internal initiatives at Headquarters. In the past, the EM organization had been dominated by process-related actions that in many cases contributed little to real risk reduction. EM's present approach to cleanup, as described in this document, assigns high visibility and importance to actions that contribute directly to work completion.

Tasking to achieve cleanup performance will be conveyed to contractors in performance-based contracts. Contractor fee will be determined by comparing cleanup performance against contractually defined performance expectations. Exceptional performance will be recognized with exceptional fee to the responsible contractor.

To achieve a performance-based cleanup program and prevent the reemergence of programmatic shortcomings identified in the Top-to-Bottom Review, EM's organizational structure and agenda focus on increasing program visibility, responsibility, and accountability.

A. Visibility

EM now provides widespread visibility for its cleanup plans, goals, objectives, and quantitative performance targets. In the past when performance targets were not achieved, cleanup plans were often revised, either at the cleanup site or at Headquarters, to reschedule the cleanup objectives for the following year. A clear understanding of the cause of the performance shortfall often was not provided or required. Annual performance adjustments became commonplace; thus, the program's schedule and costs grew uncontrollably.

Changes to EM's performance targets will now be rare, occurring only when major work scope is added to or removed from the EM cleanup program. EM's increased visibility on

[7] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. I-2.

performance will be achieved with the annual update and distribution of Appendix 1. Performance against targets will be graphically illustrated to make any variances easily recognizable. Cleanup performance that is ahead of or behind schedule will be displayed, and the root causes of negative variances will be identified and corrected.

B. Responsibility

EM now assigns responsibility for its objectives, goals, and performance targets to individual federal employees. Field cleanup responsibility, including completion date objectives and annual performance targets, is assigned to the geographic site manager. Programmatic oversight, integration activities, and EM's internal business initiatives are assigned to individual employees at Headquarters.

In this document, individual responsibility for cleanup activities, internal initiatives, and acceleration objectives is assigned by name (see Appendix 1). As employees change their assignments because of career development, continuity of responsibility for these initiatives will be documented in the updates of Appendix 1.

C. Accountability

EM now provides accountability for performance at the federal organization and contractor levels. Annual performance appraisals of senior EM managers include specific performance metrics that address accomplishments at:

- Improving safety performance
- Improving operational oversight
- Meeting performance metric expectations
- Improving accountability and predictability

Federal accountability is also achieved through a human capital strategy that recognizes performance against assigned initiatives. EM provides employees with a work environment that emphasizes opportunities for professional growth, technical training, and individual accountability. For individuals who succeed in EM's performance-based environment, future leadership assignments are made on the basis of proven performance and management competencies.

Contractor accountability is achieved by comparing cleanup performance against the cleanup expectations contained in the performance-based contract. Performance is objectively measured, documented, and recognized.

V. EM Internal Initiatives

EM's vision for completing its cleanup mission with a performance-based focus encompasses the following internal business initiatives:

- Performance-oriented organization
- Safety emphasis
- Risk reduction
- EM becoming a better customer

As these internal business initiatives commence, they will be identified, planned, and implemented using the project management principles set forth in DOE Manual 413.3-1. This approach will continue the effort to "change the way EM thinks about work planning and execution,"[8] which started with the initiation of the EM corporate projects in FY 2002.

Although EM's internal initiatives are not structurally the same as capital asset projects, each such initiative will, at a minimum, be managed as a project and include the following project management elements described in DOE Manual 413.3-1:

- Clearly identified responsibility, by name, of the individual in charge of the initiative.
- Formal designation of an integrated project team to provide the range of technical competencies needed to support the initiative.
- Designation of an Acquisition Executive to assess, adjust (if necessary), and approve project direction and progress.
- Phased development of the initiative, occurring in a manner similar to that of the critical decision process identified in DOE Manual 413.3-1. The following phases and key elements will be used and coordinated through the Acquisition Executive:

[8] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. III-28.

Phase	Key Elements
Initiation	• Mission needs identification, definition, and approval • Requirements identification • Tailoring of the management approach
Definition	• Conceptual design • Risk analysis • Execution planning
Execution	• Final design • Resource-loaded execution schedule
Transition and closeout	• Transition and institutionalization of any products and/or processes • Lessons learned • Knowledge transfer

The Acquisition Executive for these EM internal initiatives will be either the EM Principal Deputy Assistant Secretary or the EM Chief Operating Officer, depending on which branch of the EM organization has been assigned responsibility.

Once project actions have been completed, new processes will be institutionalized by incorporating them into the EM SOPP. EM's formal change control process has already been institutionalized in SOPP RM 1.1, *Resource Management: Configuration Management Change Control Process for the Environmental Management (EM) Program*.

A. Performance-Oriented Organization

The Assistant Secretary agreed with the conclusion of the EM Top-to-Bottom Review team that organizational lack of responsiveness and effectiveness was a primary cause of the cleanup program's uncontrolled life-cycle cost and schedule growth. To reverse this trend, the Assistant Secretary restructured EM to be more performance-oriented and functionally responsive. Table 4 lists the goals of this organizational initiative.

The organization was restructured to ensure that the functions outlined in the report of the Top-to-Bottom Review team would serve as the framework for the daily work activities of EM staff. Figure 2 identifies the new organizational relationships, which became effective on December 14, 2003. The functions and missions of the individual offices are provided on the EM website, at <http://www.em.doe.gov/vgn/images/portal/cit_1819/17/40/21537FINAL_MF_05192003.pdf>.

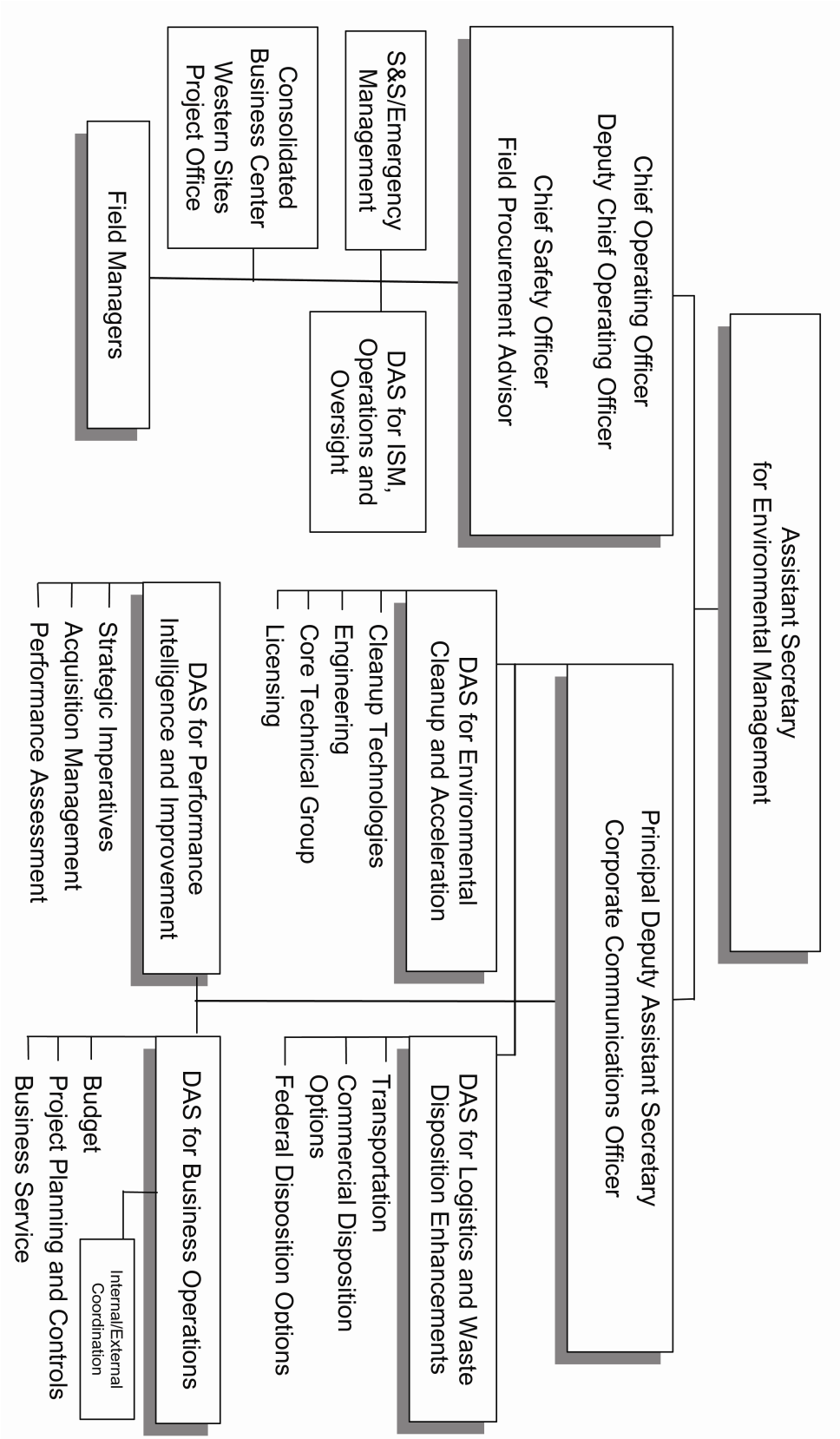
The creation of new organizational functions was focused on operations oversight (including Integrated Safety Management [ISM], safeguards and security, and emergency management); logistics and waste disposal (including federal and commercial disposal);

environmental cleanup (including cleanup technologies, engineering, and licensing); organization performance management (including acquisition, performance evaluation, and strategic initiatives); and business management (including budget planning and controls, regulatory affairs, and business services). These areas have been identified as most critical to accelerated cleanup and closure.

Table 4. Organizational Goals

Goal No.	Goal	Responsibility
A.1	Change how EM thinks about work planning and execution. To this end, establish a continuing standard of performance within EM. The focus of this effort is on permanently correcting the work planning and execution shortcomings identified in the report of the Top-to-Bottom Review team of February 2002.[a]	Deputy Assistant Secretary (DAS) for Performance Intelligence and Improvement
A.2	Identify motivated, capable federal employees for future leadership positions within the EM organization. Establish a continuing effort within EM that identifies, selects, trains, and assigns such individuals.[b]	DAS for Performance Intelligence and Improvement
A.3	Select, qualify, and assign Federal Project Directors to EM cleanup projects. This should be done at sites where EM does not have a management presence, and a strong, EM management presence is needed to ensure that site cleanup is accomplished on schedule and at cost.	DAS for Performance Intelligence and Improvement
A.4	Develop and implement a workforce strategy. This strategy should recognize and deal with the decreasing federal workforce requirements as EM completes its cleanup mission, and should address both the Headquarters and field federal organizations.	DAS for Performance Intelligence and Improvement

[a]U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, pp. V-19, II-4.
[b]U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, pp. II-5.



Note: DAS = Deputy Assistant Secretary; ISM = Integrated Safety Management; S&S = Safeguards and Security.

Figure 2. Office of Environmental Management Organization Chart

The vision for improving EM's responsiveness and effectiveness includes more than this structural reorganization, however; it also involves changing EM's fundamental thinking about work planning and work execution.[9] In this context, EM's path forward includes initiatives aimed at the following goals.

Change How EM Thinks About Work Planning and Execution *(Goal A.1)*

The Top-to-Bottom Review team reported that EM's internal processes were inconsistent and had contributed to uncontrolled schedule and cost growth. The team recommended that EM take action to improve its up-front understanding and planning of work by applying the project management principles presented in DOE Manual 413.3-1 to all of its core work areas. Therefore, EM will incorporate the principles of DOE Manual 413.3-1 in the way it conducts work planning and execution, both in the field and within corporate initiatives undertaken by the Headquarters organization.

Identify Motivated, Capable Federal Employees for Future Leadership Positions within the EM Organization *(Goal A.2)*

EM's focus on accelerated risk reduction provides the workforce with new opportunities to participate in the success of a technically demanding program. To support these increased expectations, EM will provide a work environment that emphasizes opportunities for professional growth, technical training, and individual accountability. Additionally, it will be made clear that increased career prospects and personal growth opportunities will be available to individuals who succeed in this environment.

Select, Qualify, and Assign Federal Project Directors to EM Cleanup Projects *(Goal A.3)*

A clearly defined chain of command does not exist at several EM cleanup locations because of a recent DOE reorganization resulting from the formation of the National Nuclear Security Administration. At a multiprogram site, the inability to direct and control cleanup is a result of the complicated and layered organizational relationships that exist between EM (as the Program Secretarial Office [PSO] conducting the cleanup) and the Lead PSO, which owns the site and acts as a host for EM as a tenant. Ultimately, the Assistant Secretary, who is responsible and accountable for the success of the cleanup program, cannot properly function as the Acquisition Executive with a direct communication path to the Federal Project Director.

At several sites where this complicated chain of command exists, EM is unable to control directly the way its work is planned, directed, or executed. Instead, EM funds cleanup where, regardless of whether there are EM staff at the site, there is no management link between the cleanup workers and EM. Moreover, at sites with EM staff, those individuals may or may not be able to

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[9] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. III-28.

direct the contractor responsible for executing work. This lack of management structure means that EM has no way to hold the small sites accountable for the implementation of its policies and for the development and execution of credible plans leading to the completion of cleanup. At these sites, a Federal Project Director, as set forth in DOE Manual 413.3-1, will be assigned.

Develop and Implement a Workforce Strategy *(Goal A.4)*

As EM completes its cleanup mission, associated federal workforce requirements will correspondingly decrease. EM's management challenge is to retain capable federal employees in a program that will experience decreasing federal resource requirements. A forward-looking, innovative human capital strategy[10] is needed to adapt to EM's resource needs while retaining capable federal employees.

B. Safety Emphasis

EM is responsible for safe conduct of operations at all its facilities and in all its cleanup activities and supporting work initiatives. Even though EM's path forward includes initiatives for acquisition strategy, contract management, risk reduction, project management, performance targets, and performance oversight, continuous improvement in safety is the single most important factor in the success of this program. An overriding requirement for all cleanup and closure projects is the health and safety of workers and the public. Contractors that cannot or will not meet the high standards set by DOE will not perform DOE–EM work.

The legacy waste cleanup program continues to display Occupational Safety and Health Administration (OSHA) and radiation control safety-related statistics (e.g., Total Reportable Cases, Lost Workday Reportable Cases, skin contaminations) that are among the lowest of all government and industrial programs. The rigorous DOE safety standards employed during the operation of nuclear weapons production facilities will be applied to the legacy waste decontamination and decommissioning (D&D) and cleanup efforts. Table 5 lists the goals of EM's safety initiative.

Table 5. Safety Goals

Goal No.	Goal	Responsibility
B.1	Continually improve safety performance.	DAS for ISM and Operations Oversight
B.2	Expand the Integrated Safety Management approach to higher-level work planning.	DAS for ISM and Operations Oversight
B.3	Clarify government responsibilities for oversight of contractor work.	DAS for ISM and Operations Oversight
B.4	Exploit past lessons learned in which safety issues are involved.	DAS for ISM and Operations Oversight
B.5	Comply with DOE orders and requirements during the cleanup process.	DAS for ISM and Operations Oversight

[10] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. II-5.

Continually Improve Safety Performance *(Goal B.1)*

EM recognizes that it will need to control cost and schedule pressures that could lead to acceptance of less rigorous industrial safety performance standards. EM's approach to safety will not be limited to excellent safety statistics. A totally integrated approach to safety will be pursued, involving both contractor and government organizations. In the EM cleanup program, major changes are required in the work activities performed at facilities, including packaging and removal of radioactive materials, preparation of the facility for D&D, and actual completion of cleanup to achieve the desired end state. Because of the transient and evolving nature of the work, careful attention to work planning, conduct of operations, and hazard analysis is required to prevent mistakes, equipment failures, and violations of safety requirements that could lead to accidents. EM's approach to safety will be guided by an all-encompassing vision of continuous performance improvement of its safety program and a requirement for extensive management participation.

A key factor in continuously improving safety performance is the identification of opportunities to achieve what are now viewed as impossible levels of performance and safety. Such opportunities include, but are not limited to, approaches that eliminate electrical safety violations, lockout/tagout deficiencies, ladder mishaps, job-related injuries, skin and internal radiological contaminations, and transportation incidents with radiological/hazardous materials.

Expand the Integrated Safety Management Approach to Higher-Level Work Planning *(Goal B.2)*[11]

DOE has accepted the concepts and principles of ISM, and DOE and its contractors have made significant progress in implementing ISM each time a work package is prepared. If the focus is on individual work packages, however, insufficient attention is paid to higher-level work planning, where decisions are made about what work is appropriate and desirable. ISM thinking must also occur at these higher levels of management at which major work identification and contracting decisions are made. Higher-level reviews provide the opportunity to eliminate unnecessary or less-safe work by making it possible to plan new and better approaches instead of just focusing on improving existing work packages. By expanding the ISM approach beyond the preparation of individual work packages, thinking at higher levels of management can result in breakthrough safety improvements.

Clarify Government Responsibilities for Oversight of Contractor Work *(Goal B.3)*[12]

Government oversight of the cleanup work being done continues to be a source of confusion, with ineffective cleanup performance as the major symptom. At many sites, EM's administration of contracts and oversight of contractor work are inconsistent, ranging from

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[11] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. II-4.
[12] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. V-19.

excessive involvement (considered as non–value-added tinkering by some contractors) to inadequate surveillances for fixed-price contract work. Additionally, oversight at cleanup locations where the management and operating (M&O) contract format is employed is ineffective. The contract administration and oversight process should be reviewed, clarified, and communicated clearly to contractors and government employees. Recognition that the contract is the main tool for appropriate oversight can clarify most of the existing confusion. DOE must be a knowledgeable, demanding customer, but must work within the boundaries of its contracts.

EM's contractor oversight should be patterned after DOE's safety oversight process. It should include established goals and work-monitoring processes, identified formal and informal oversight practices, and certified technical competencies of government monitors.

Exploit Past Lessons Learned in Which Safety Issues Are Involved *(Goal B.4)*[13]

The dynamic and changing nature of the work at cleanup sites requires rigorous and timely communication of lessons learned throughout the EM complex. Many safety-related occurrences could have been prevented had the work planners been aware of similar occurrences elsewhere. Much of the EM staff (Headquarters and field) is unaware of specific examples of inadequate work scope definition and ineffective government oversight that led to delays in real risk reduction for workers and the public.

Additionally, lessons learned when major safety violations incurred significant injury and/or death are not as thoroughly understood throughout the EM complex as they should be.

Lessons learned should be developed at the corporate level and should provide a frank description of what went wrong or well, and how EM intends to benefit from the experience. In parallel, recurring events that could be precursors of safety-related occurrences (e.g., lockout/tagout occurrence, unplanned contact with an energized line) should be evaluated on a routine basis. These corporate lessons learned should become required learning for all EM management and workers.

Comply with DOE Orders and Requirements during the Cleanup Process *(Goal B.5)*[14]

The Defense Nuclear Facilities Safety Board has compiled a list of DOE orders it considers important to safety. These orders should be evaluated for applicability to all EM cleanup projects. EM should initiate a review of the broad-based inclusion of DOE orders in its cleanup contracts and clarify contractor requirements relevant to cleanup. As cleanup proceeds from deactivation to environmental remediation, DOE orders and requirements pose a formidable barrier. Safety documentation and standards developed to support a facility's original mission must be interpreted to permit cleanup to progress. The present interpretation

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[13] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. V-20.
[14] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. V-20.

process is cumbersome and resource-intensive. Criticality safety and security downgrading are major challenges because most managers do not have the technical experience to lead the review process. In some cases, moreover, such as the conduct-of-operations order, the application of the order will be significantly different for operating facilities and for facilities undergoing D&D. Nevertheless, good conduct of operations is essential to safe work. The interpretation process for DOE orders and requirements must be developed as a streamlined recurring event that supports the cleanup effort.

C. Risk Reduction

The report of the Top-to-Bottom Review team of February 2002 noted that the major emphasis of EM's cleanup program was on managing risk rather than actually reducing risk to workers, the public, and the environment.[15] Managing risk is not cost-effective because both the unmitigated risks and the cost to mitigate those risks are continually increasing. As a result, annual costs to protect the health and safety of workers and the public increase without any actual reduction in risk being achieved. Consequently, EM has elected a path forward that places a clear emphasis on reducing and eliminating rather than managing risk. This aggressive risk reduction approach will result in faster cleanup, improved health and safety for workers and the public, and lower life-cycle costs. The organizational focus is now on completing cleanup activities and the actual removal and disposal of legacy waste materials.

The successful completion of cleanup projects is directly related to risk reduction. Prerequisites for planning a cleanup project with a high probability of completion within cost and schedule are (1) an agreed-upon risk-based end state, (2) stabilization of high-risk materials, (3) removal of special nuclear materials (SNM) to a consolidation site, and (4) establishment of disposal paths for all materials to be removed from the site. Table 6 shows EM's goals for the risk-reduction initiative.

Table 6. Risk Reduction Goals

Goal No.	Goal	Responsibility
C.1	Identify risk-based cleanup end states to support site closure.	DAS for Environmental Cleanup and Acceleration
C.2	Complete cleanup at closure sites.	
C.2.1	Provide oversight to ensure that EM completion (i.e., cleanup activities and administrative documentation) is achieved for the following small sites as defined in EM-1 memo of February 12, 2003, "Definition of Environmental Management Completion": General Atomics, General Electric Vallecitos Nuclear Center, Kansas City Plant, Argonne National Laboratory-West, Argonne National Laboratory-East, and Salmon Site.	EM Manager, Western Sites Project Office

[15] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. II-1.

Goal No.	Goal	Responsibility
C.2.2	Provide oversight to ensure that Rocky Flats, Fernald, and Mound stay on track to close no later than September 30, 2006.	EM Chief Operating Officer
C.3	Accelerate risk reduction.	
C.3.1	Identify alternative processes, such as steam reforming, calcination, saltstone, or other grouting techniques, as well as bulk vitrification, to be considered for stabilizing low-activity and transuranic (TRU) tank wastes.	DAS for Environmental Cleanup and Acceleration
C.3.2	Remove spent nuclear fuel from the K-Area Basins at Hanford, and drain and decontaminate the basins.	DAS for Environmental Cleanup and Acceleration
C.3.3	Reduce the need to process tank waste.	DAS for Environmental Cleanup and Acceleration
C.3.4	Accelerate the disposition of low-activity wastes.	DAS for Logistic and Waste Disposition Enhancements
C.3.5	Place priority on treating high-curie-content wastes for off-site treatment and disposal.	DAS for Logistic and Waste Disposition Enhancements
C.3.6	Conduct technical risk evaluations for a range of remedial options for intermediate-level (10–500 nanocuries per gram) TRU wastes.	DAS for Logistic and Waste Disposition Enhancements
C.3.7	Decontaminate and decommission all high-risk, highly contaminated facilities on an expedited basis.	DAS for Environmental Cleanup and Acceleration
C.4	Consolidate special nuclear materials out of EM sites by 2004. On an expedited basis, deinventory nuclear materials from Rocky Flats, Hanford, Ohio, and Idaho.	EM Chief Operating Officer
C.5	Get wastes to disposal facilities quickly.	
C.5.1	Streamline EM's packaging and transportation system. This will include establishing an EM core competency in packaging and transportation.	DAS for Logistic and Waste Disposition Enhancements
C.5.2	Accelerate the packaging and transportation of contact-handled TRU waste.	DAS for Logistic and Waste Disposition Enhancements
C.5.3	Accelerate the packaging and transportation of remote-handled TRU waste.	DAS for Logistic and Waste Disposition Enhancements
C.5.4	Accelerate the packaging and transportation of low-level and low-level mixed waste.	DAS for Logistic and Waste Disposition Enhancements
C.6	Reduce the cost and time to complete the EM cleanup program.	
C.6.1	Disseminate the Rocky Flats risk-reduction lessons learned. Also follow up on recommendations, approved by the Assistant Secretary, from the "Focusing EM Resources on Cleanup" EM corporate project.	DAS for Performance Intelligence and Improvement
C.6.2	Disseminate the Savannah River Site lessons learned for high-level waste dispositioning.	DAS for Performance Intelligence and Improvement
C.6.3	Shrink the EM footprint.	DAS for Environmental Cleanup and Acceleration

Identify Risk-Based Cleanup End States to Support Site Closure *(Goal C.1)*

The cleanup program includes action to develop and deliver for approval an integrated approach to shifting DOE's cleanup program from one dominated by individual compliance-based activities to one focused on achieving clearly defined, risk-based end states. In August 2003, DOE published a policy on the use of risk-based end states (DOE Policy 455.1). This policy is important for several reasons. As clearly demonstrated at the Rocky Flats Environmental Technology Site, when all parties agree on an end state, risk reduction can be prioritized and accelerated. Furthermore, faster cleanup can be achieved because a focus on the end state allows improvements in work planning and integration, avoids interim hold points, and results in improved safety and significant schedule reductions with accompanying cost savings. The policy is also important because it requires an extensive mapping program showing contamination sources and the nature of the contaminants over a wide area. This information will serve as a useful guide not only to DOE and its contractors, but also to the regulators as they assess potential risk reduction and make difficult decisions on end states. Once a risk-based end state has been defined for a site and agreed to by stakeholders, all cleanup-related activities will be directed at its achievement.

The effort to identify a risk-based end state encompasses the analytical and communication tools needed for this technically based process. The development and implementation of a risk-based end-state process is being coordinated with EM, the states, and the Environmental Protection Agency (EPA).

Complete Cleanup at Closure Sites *(Goal C.2)*

Cleanup completion activities at small sites will continue to receive significant senior management attention. In the past, EM's solution to completing cleanup at small sites has often entailed merely requesting more money. After an in-depth review of each small site and its cleanup challenges, it became clear to EM that the path forward for the closure of small sites involves developing and executing credible cleanup plans, including an agreed upon risk-based end state (see above). Major closure sites with near-term completion dates are also included in this category.

The cleanup program now focuses on identifying, developing, and executing credible measures for achieving site cleanup and closure in accordance with individual site Performance Management Plans. This effort is structured in three phases, which are represented within the EM budget process with three funding accounts: (1) sites scheduled to close by 2006, (2) sites scheduled to close by 2012, and (3) sites scheduled to close by 2035. Although Site Managers are responsible for developing and executing site closure plans, oversight to ensure that corporate goals are achieved is assigned to specific positions within the EM Headquarters organization. EM completion as defined in EM-1 memo of February 12, 2003 ***"Definition of Environmental Management Completion"* shall be achieved. *(Goals C.2.1, C.2.2)***

Accelerate Risk Reduction *(Goal C.3)*

Individual site managers are responsible for developing and executing site closure plans. However, some activities have a significant impact on risk reduction and a strong influence on the overall technical risk, schedule, and cost of the national cleanup program. The integrated planning, scheduling, and execution of these activities are the responsibility of specific individuals within the EM Headquarters organization. In particular, responsibility for ensuring consistency between priorities at individual sites and national priorities lies within EM Headquarters. The activities for which EM bears responsibility are detailed below.

Identify alternative processes, such as steam reforming, calcination, saltstone, or other grouting techniques, as well as bulk vitrification, to be considered for stabilizing low-activity and transuranic (TRU) tank wastes *(Goal C.3.1)*. The major cost driver in the EM complex is related to plans to retrieve, treat, and vitrify waste in the tank farms. Wastes are now being classified according to total curie content and the curie content of long-lived isotopes, and will be treated accordingly. Although current legislation requires classification based on the source of the tank waste, it must be recognized that the tank farms contain tanks of liquid that do not meet the source requirement for definition as HLW. Only those wastes with high-curie, long-lived isotopes are planned to be vitrified.

Remove spent nuclear fuel from the K-Area Basins at Hanford, and drain and decontaminate the basins *(Goal C.3.2)*. The effort to remove SNF from the Hanford K-Basins and the subsequent removal of water and sludge from the basins will be accelerated, significantly reducing risk at the site. Other SNF is currently stored safely, but movement to dry storage and preparation for disposal at the national repository will be accelerated.

Reduce the need to process tank waste *(Goal C.3.3)*. HLW processing is the single largest cost element in the EM program today. At least two proven, cost-effective solutions to each HLW stream in the complex will be developed. For example, (1) waste loadings in glass logs will be increased, (2) more cost-effective technologies will be used for low-activity wastes, and (3) disposal criteria will be developed for nonglass HLW.

Accelerate the disposition of low-activity wastes *(Goal C.3.4)*. To accelerate risk reduction on a near-term basis, consideration will be given to stabilizing waste in tanks containing low-activity waste, including TRU wastes.

Place priority on treating high-curie-content wastes for off-site treatment and disposal *(Goal C.3.5)*.

Conduct technical risk evaluations for a range of remedial options for intermediate-level (10–500 nanocuries per gram) TRU wastes *(Goal C.3.6)*.

Decontaminate and decommission all high-risk, highly contaminated facilities on an expedited basis *(Goal C.3.7)*. This strategy is based on technical risk evaluations and realistic criteria for a risk-based end state (see above). Illustrative examples include the following:

- Buildings 707 and 371 at Rocky Flats
- Hot cells at Battelle-Columbus
- Plutonium Finishing Plant and K-Basins at Hanford
- F-Canyon at SRS
- K-25 building at Oak Ridge

Consolidate Special Nuclear Materials out of EM Sites by 2004 *(Goal C.4)*

Several EM cleanup sites have significant quantities of SNM that require major expenditures to meet safeguards and security requirements. Since most of these materials have no programmatic need, they must either be disposed of as waste or transferred for storage to an appropriate DOE program office that may have a future need for them.

Many of the EM legacy sites were part of the cold war production complex. During the production era, plutonium was considered a major asset. Aggressive measures were instituted to recover plutonium for weapons production. Also, significant quantities of enriched uranium were recovered and used in the DOE complex. As a result, large amounts of plutonium and enriched uranium that are considered excess today are kept in the inventory under stringent safeguards and security.

The initiative to dispose of plutonium-bearing waste and to package and consolidate SNM has been treated as a priority at the highest levels of DOE. This effort is urgent both because it is vital to homeland security and because it is essential to the achievement of cleanup and closure. Elimination of the need for stringent safeguards and security at multiple sites by transferring the SNM to a central facility will permit faster and more cost-effective cleanup. Since the release of the report of the Top-to-Bottom Review team, significant progress has been made in this area at Rocky Flats, SRS, and Hanford, and efforts are now being expedited at Idaho as well.

Get Wastes to Disposal Facilities Quickly *(Goal C.5)*

EM's performance-based cleanup approach provides one metric by which the organization's ability to get waste to disposal facilities quickly is measured. Simply stated, "no site closure plan should be delayed because of an inability to package and transport waste materials."

Getting waste to disposal facilities quickly involves streamlining and making efficient use of packaging and transportation systems, as well as integrating the management and control of disposal facility resources. In some cases (HLW and low-level mixed waste containing 10–

100 nanocuries of TRU), a lack of disposal sites may delay or prevent disposal.[16] However, improvement in moving wastes to disposal sites is required for the following waste streams:

- Contact-handled transuranic waste
- Remote-handled transuranic waste
- Low-level waste and low-level mixed waste

Streamline EM's packaging and transportation system *(Goal C.5.1)*. DOE must ensure that its packaging and transportation program provides for safe and secure transport of all materials. However, DOE's internal processes impede actual transport and disposal of waste without increasing the safety or security margin. As a result, waste and nuclear materials continue to be stored in locations that could otherwise be cleaned up and demolished. EM needs to establish a streamlined approval process and program authority in this area.

Additionally, EM will establish a core competency at EM Headquarters to expedite container certification, coordinate efforts with other agencies, and provide support for field offices.[17]

Accelerate the packaging and transportation of contact-handled TRU waste *(Goal C.5.2)*. Characterization, packaging, shipment, and disposal of TRU waste have increased dramatically since the release of the report of the Top-to-Bottom Review team. Since February 2002, shipments received at the Waste Isolation Pilot Plant (WIPP) have increased from 10 per week to an average of 22 per week. From the perspective of volume of waste shipped, the number of TRUPACTs received increased from 18 to 47 per week over the same period (a 167 percent increase).

At Rocky Flats, 8,706 cubic meters of TRU waste was packed for shipment from February to May 2002. Idaho achieved a major milestone by shipping the last increment of 3,100 cubic meters to WIPP in December 2002. Hanford packaged 2,120 kg of residues for shipment to WIPP from February to December of 2002. And SRS packaged 210 cubic meters of TRU waste for shipment in the first quarter of FY 2003.

Shipments of TRU waste to WIPP will be accelerated, and characterization will be improved to reduce the time and cost required. Also, improvement of the process will ensure that only those wastes that are clearly TRU and not low-level waste will be shipped to WIPP. Both WIPP and the national repository are valuable national assets, and an effort will be made to see that only those materials which need to be disposed of in those facilities are shipped to them.

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[16] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. V-8.
[17] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. V-25.

Accelerate the packaging and transportation of remote-handled TRU waste *(Goal C.5.3)*. The inability to ship remote-handled TRU waste to WIPP has caused significant delays at several sites. WIPP has received regulatory approval from EPA, and a permit modification is under review by the State of New Mexico. Programmatic evaluations and decisions are necessary to determine the most effective method of shipping and receiving this waste at WIPP. Trade-offs include faster emplacement and less worker exposure for shielded containers at WIPP, compared with fewer packaging requirements for remote-handled containers at the generating sites.

Accelerate the packaging and transportation of low-level and low-level mixed waste *(Goal C.5.4)*. Large quantities of low-level waste have been disposed of since the report of the Top-to-Bottom Review team was released. The waste has been disposed of both on site, and off site at Envirocare in Utah and at the DOE sites in Nevada and Richland, Washington. Active disposal cells are in use at SRS, Idaho, Hanford, Fernald, West Valley, Oak Ridge, and several smaller sites.

While there are no major technical issues preventing disposal of low-level waste, there are logistical and transportation issues due to the large quantities involved. As shown in Appendix 1, 336,000 cubic meters had been disposed of by the end of FY 2002, and another 300,000 will be disposed of by the end of FY 2005. In general, the most efficient transportation is by rail, but no rail services are available to the Nevada site, and waste must be trucked there. The availability of modern technology, involving the use of lined cells and permanent caps over cells when disposal is complete, has in most cases resulted in agreement among regulators, DOE, and local communities with regard to the construction and use of on-site shallow-ground disposal cells. Nevertheless, a need still exists for large central disposal sites.

A solution for a subset of low-level mixed waste (in the range of 10–100 nanocuries/gram plutonium) does not yet exist, and a number of sites have orphan material for which there is no disposal path and that could potentially prevent closure of a site.[18] Most of the issues involved are related to regulators and concerns regarding state equity. Ongoing discussions are being held with both Washington State and the State of Nevada to resolve these issues.[19]

Reduce the Cost and Time to Complete the EM Cleanup Program *(Goal C.6)*

Reducing the cost and time required to complete the EM cleanup program involves identifying and applying successful cleanup techniques throughout the national complex. Many techniques have already been identified, developed, and successfully applied. These techniques involve the following:

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[18] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. III-11.
[19] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. II-5.

- Disseminating Rocky Flats risk-reduction lessons learned
- Disseminating SRS lessons learned for HLW dispositioning
- Shrinking the EM footprint

Disseminate the Rocky Flats risk-reduction lessons learned *(Goal C.6.1)*. Many initiatives for streamlining risk reduction were proven effective at Rocky Flats, and these lessons learned are now being appropriately applied to other EM sites. In 1997, Rocky Flats cleanup was estimated to cost $17.1 billion and last until FY 2045. As of 2002, site closure was estimated to cost $7.1 billion and be completed in FY 2006. The major initiatives producing this dramatic acceleration at Rocky Flats were identified, and their potential application to other EM cleanup locations was examined.[20]

An EM corporate project team (for the project "Focusing EM Resources on Cleanup") visited each EM cleanup site to review work activities, management processes, and contract administration practices. This team assessed the applicability of Rocky Flats lessons learned, and the sites were directed to implement those lessons learned deemed beneficial and appropriate. Detailed actions were identified that could dramatically redirect resources to actual cleanup activities.[21]

Disseminate the Savannah River Site lessons learned for high-level waste dispositioning *(Goal C.6.2)*. HLW process activities at DWPF at SRS have generated a long, impressive list of technically based lessons learned. The application of these lessons learned to future HLW vitrification facilities will be evaluated.

Shrink the EM footprint *(Goal C.6.3)*. EM conducts its cleanup activities in 31 states at DOE sites that encompass an area of over 2 million acres—equal to the size of Rhode Island and Delaware combined. Initially, when the nuclear weapons complex was in operation, these large land areas were needed to provide safety and security. Now that production operations have ceased and environmental remediation activities are under way, however, many of these large land areas are uncontaminated and are no longer needed to ensure safety and security. The initiative to shrink EM's footprint is intended to appropriately identify and divest EM of these large, unnecessary land areas. The objective is to reduce overhead costs and redirect this funding to active cleanup activities.

D. EM Becoming a Better Customer

The Top-to-Bottom Review team reported that EM's business processes lacked the focused intensity required to complete cleanup work and expeditiously reduce risk to workers

[20] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. III-15.
[21] U.S. Department of Energy, CD-4 Final Decision with Recommendations, "Focusing EM Resources on Cleanup," EM Corporate Project, Washington, D.C., November 2003.

and the public. Additionally, when uncertainties were unavoidably incorporated in work plans, EM's business processes allowed potential cost and schedule impacts to remain hidden, thus escaping the scrutiny of senior management.[22]

EM's business processes were reviewed and, as needed, streamlined and restructured to provide for focused, unambiguous pursuit of risk reduction for workers and the public. Each process now includes straightforward methods for recognizing, measuring, analyzing, and controlling elements that inhibit success. EM will focus on the following areas to become a better customer:

- Improving EM's contract management
- Developing and implementing a long-term, integrated acquisition strategy
- Getting cleanup scope, schedule, and cost under control
- Transitioning EM corporate projects into the new EM organization
- Seeking regulatory clarification
- Enhancing the National Environmental Policy Act (NEPA) process within EM
- Refocusing the Science and Technology Program

EM's goals related to becoming a better customer are listed in Table 7.

Table 7. EM Becoming a Better Customer Goals

Goal No.	Goal	Responsibility
D.1	Improve EM's contract management.	
D.1.1	Make performance-based contracting a core business process for EM.	Principal Deputy Assistant Secretary
D.1.2	Provide requests for proposals (RFPs) that attract best-in-class contractors.	Principal Deputy Assistant Secretary
D.1.3	Deliver high-quality RFP products to contractors.	Principal Deputy Assistant Secretary
D.1.4	Develop methods for recognizing, measuring, analyzing, and controlling defects in the RFP process.	Principal Deputy Assistant Secretary
D.1.5	Conduct a review of recent EM RFPs for defects.	Principal Deputy Assistant Secretary
D.1.6	Develop formal lessons learned and a best-practices program for EM's contract acquisition process.	Principal Deputy Assistant Secretary
D.1.7	Determine whether EM's contractor fees are adequate to attract best-in-class contractors.	Principal Deputy Assistant Secretary

[22] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. V-18.

Goal No.	Goal	Responsibility
D.1.8	Match the Federal Acquisition Regulations (FAR) contract type to the work to be performed.	Principal Deputy Assistant Secretary
D.1.9	Use an Integrated Safety Management (ISM) approach for work planning for the RFP "Section C" process.	Principal Deputy Assistant Secretary
D.1.10	Use an EM integrated project team and the principles contained in DOE Order 413.3 to define the scope of work for RFPs.	Principal Deputy Assistant Secretary
D.1.11	Base contract type and performance on the government's uncertainty and risk evaluation.	Principal Deputy Assistant Secretary
D.1.12	Explore the use of commercial contract formats.	Principal Deputy Assistant Secretary
D.1.13	Identify a streamlined process for interpreting DOE orders during cleanup.	Principal Deputy Assistant Secretary
D.1.14	Define government oversight in a contract clause.	Principal Deputy Assistant Secretary
D.1.15	Clarify the fee denial and negotiation process.	Principal Deputy Assistant Secretary
D.1.16	Develop formal quality and performance standards for Source Evaluation Boards.	Principal Deputy Assistant Secretary
D.1.17	Use contractor oral presentations as a supplement to written proposals, not an alternative.	Principal Deputy Assistant Secretary
D.1.18	Allow a discussion of exceptions and deviations as part of the contract proposal process.	Principal Deputy Assistant Secretary
D.1.19	Execute government oversight as defined in the contract clause.	Principal Deputy Assistant Secretary
D.1.20	Eliminate the use of subjective performance-based incentives.	Principal Deputy Assistant Secretary
D.1.21	Document the original performance negotiation process so EM's strategy is clear and transparent for future EM contracts.	Principal Deputy Assistant Secretary
D.2	Develop and implement a long-term, integrated acquisition strategy.	
D.2.1	Institutionalize the Contract Management Advisory Council (CMAC) and its role in the EM acquisition process.	Principal Deputy Assistant Secretary
D.2.2	Develop and implement a long-term, integrated acquisition strategy for the EM cleanup program.	Principal Deputy Assistant Secretary
D.3	Get cleanup scope, schedule, and cost under control.	
D.3.1	Establish formal configuration control of the cleanup program scope, schedule, and cost.	DAS for Business Operations
D.3.2	Identify cleanup goals using a requirement-driven process.	DAS for Performance Intelligence and Improvement
D.3.3	Develop a credible, consistent approach to identifying and managing uncertainty.	DAS for Performance Intelligence and Improvement

Goal No.	Goal	Responsibility
D.4	Transition EM corporate projects into the new EM organization.	New project managers will be identified to assume active EM corporate projects
D.5	Seek regulatory clarification on the definition of high-level waste.	DAS for Environmental Cleanup and Acceleration
D.6	Enhance the National Environmental Policy Act process within EM.	DAS for Environmental Cleanup and Acceleration
D.7	Refocus the Science and Technology Program.	DAS for Environmental Cleanup and Acceleration

Improve EM's Contract Management *(Goal D.1)*

The initial focus in EM's restructuring of its business processes was on ensuring that EM's near-term solicitations reflect its effort to reduce risk to workers and the public. The first request for proposals (RFP) to include this new focus was that for the Miamisburg Environmental Management Project, released in August 2002.

The Top-to-Bottom Review identified 21 specific items[23] to improve the overall EM contracting process ***(Goals D.1.1 through D.1.21)***.

Develop and Implement a Long-term, Integrated Acquisition Strategy *(Goal D.2)*

A key finding of the Top-to-Bottom Review team focused on the manner in which EM developed, selected, and managed many contracts. The team reported that this process was not focused on accelerating risk reduction and applying innovative approaches to the cleanup work. DOE's contracting strategies and practices made poor use of performance-based contracts to carry out EM's cleanup mission. Processes for contract acquisition, establishment of performance goals, funding allocation, and government oversight were managed as separate, informally related activities rather than as an integrated corporate business process. The result was performance standards that were applied inconsistently and ineffectively.

EM's overall acquisition strategy will be results oriented. The existing goal is to safely complete cleanup and disposal by 2035. Progress will be measurable in a number of ways, but specifically by an actual reduction in source terms as indicated by corporate performance measures (see Appendix 1). Contracts will be extended and modified, as appropriate, when

[23] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. V-4.

excellent performance is demonstrated; contracts will be recompeted when better performance is required. The use of small businesses is an important part of this strategy and is expected to drive innovation and cost performance. Also, at sites where both cleanup efforts and programmatic missions are being performed, EM will unbundle the cleanup work from ongoing missions and select contractors with the special skills needed for cleanup work, while the Office of Nuclear Energy, Science and Technology, the Office of Science, and the National Nuclear Security Administration will continue to select contractors with the necessary skills to carry out their missions.[24]

The Assistant Secretary fully supports the need to improve EM's performance-based contracting activities. Achieving the needed improvements will require a broad overhaul of EM's entire acquisition process, including the methodologies for formulating acquisition strategy, developing RFPs, identifying performance-based incentives (PBIs), and providing government oversight of contractor performance. As a result, the Assistant Secretary initiated the following activities to overhaul EM's acquisition process:

- A systematic review of EM's entire acquisition process
- A prompt evaluation of opportunities for improvement in EM's in-process and upcoming contracts
- Review and modification of all EM performance incentives authorized for FY 2003
- Formation of the Contract Management Advisory Council (CMAC) to institutionalize EM's acquisition reform activities ***(Goal D.2.1)***

EM's long-term, integrated acquisition strategy will be developed ***(Goal D.2.2)*** to include the following elements.

Integrating project management, financial management, contract management, and government oversight. EM's acquisition strategy will be thoroughly reviewed and restructured, as necessary, to integrate the project management, financial management, and contract management processes. The end product must be responsive to management's needs by considering project development phases, resource availability, contractor motivations, clear work goals, and objective performance measurement standards. As a business process, EM's acquisition strategy must also include a proactive self-improvement process that detects, measures, analyzes, and provides constructive feedback.

Unbundling work. EM will separate its cleanup work from the work of other DOE offices (i.e., Office of Nuclear Energy, Science, and Technology; Office of Science; and National Nuclear Security Administration).

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[24] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. III-28.

Driving innovation and improving cost performance. To remove barriers preventing competition among smaller and smaller businesses, EM will identify discreet work elements that will be set aside for small and specialty businesses. These will not be the typical copy, janitorial, or support staff services, but substantive cleanup-related tasks.

Adopting a market-based approach that actively promotes rather than stifles innovation through competition. At sites that are not making progress on accelerated risk reduction, contracts will be terminated and recompeted. In fact, unless there is clear evidence of outstanding performance, EM will initiate contract recompetition actions.

Emphasizing results-oriented recognition of outstanding performance. At sites where the cleanup contractor has demonstrated outstanding performance through innovation and attainment of risk-reduction end states, the contracts will be extended, consistent with applicable requirements, and opportunities for obtaining more PBI fees will be developed.

Get Cleanup Scope, Schedule, and Cost under Control *(Goal D.3)*

The Top-to-Bottom Review team noted that over the past 10 years, EM had experienced difficulty in planning and carrying out the cleanup mission. As a result, in just 4 years the life-cycle cost of the program had increased from $147 billion to $225 billion, and if EM had continued business as usual, the cost could easily have increased to $300 billion. During that same time period, moreover, schedule slippages had been occurring yearly.[25]

To gain control of the scope, schedule, and cost of the cleanup program, EM is changing its internal management systems and infrastructure. This effort includes the following elements.

Establish formal configuration control of the cleanup program scope, schedule, and cost *(Goal D.3.1)*. Configuration control procedures are described in SOPP RM 1.1, *Resource Management: Configuration Management Change Control Process for the Environmental Management (EM) Program*. The EM Change Control Board will approve all changes to EM's cleanup objectives and performance targets, and visibility for all changes will be provided in the annual update of Appendix 1. To complete this initiative, the Configuration Control Board will provide to all site closure projects guidance that includes a series of lessons learned regarding the required elements of successful change to a site closure baseline and associated performance targets.

Identify cleanup goals using a requirement-driven process *(Goal D.3.2)*. DOE Manual 413.3-1 provides basic standards of performance for structuring a work requirements process. This model includes principles for determining cleanup goals and managing uncertainties. EM intends to tailor the planning and work execution principles contained in this order to its major cleanup efforts, including facility disposition projects, environmental

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[25] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. I-1.

restoration projects (e.g., waste sites, groundwater), and continuous operations (e.g., waste repacking, waste treatment).

Develop a credible, consistent approach to identifying and managing uncertainty *(Goal D.3.3)*. Cost growth and schedule delays are not limited to the sites planned for closure by 2006. Cost and schedule growth are symptomatic of a much broader condition that frequently exists within the EM cleanup program involving uncertain work scope. Uncertain work scope results when cleanup goals are not clearly established, contamination levels are not known or understood, or vulnerable technologies are selected. EM's cleanup mission is a challenging responsibility, but uncertainties that can impact cost and schedule must be recognized, addressed, and controlled by management.[26] Within the EM cleanup program, uncertainty will be identified, assessed, and mitigated in accordance with the principles set forth in DOE Manual 413.3-1.

Transition EM Corporate Projects into the New EM Organization *(Goal D.4)*

The Top-to-Bottom Review team identified unfocused and inconsistent work planning processes as a principal contributor to EM's uncontrolled cost and schedule growth. The Assistant Secretary fully committed to restructuring EM's work planning processes[27] in accordance with a vision that involves changing EM's fundamental thinking about work planning and execution. In this context, the Assistant Secretary authorized EM corporate projects to pursue the following objectives:

- Change how EM thinks about work planning and execution.
- Identify motivated, capable federal employees for future leadership positions within the EM organization.
- Respond to specific recommendations of the Top-to-Bottom Review team.

The EM corporate projects initiated and authorized by the Assistant Secretary will be transitioned into the new EM organization. After transitioning, projects will continue to be managed in accordance with the principles of DOE Manual 413.3-1. Two projects are complete and have transitioned into the new EM organization; six projects are still in progress and will be transitioned. These projects are listed below, with the project manager shown in parentheses.

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[26] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. V-16.
[27] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. III-28.

Completed Projects

- Managing Waste to Reduce Risk—Other Than SNF and HLW (Reinhard Knerr, Carlsbad)
- Focusing EM Resources on Cleanup (Mike Weis, EM Headquarters)

Projects in Progress

- Getting More Performance from Performance-Based Contracts (Charlie Dan, Rocky Flats)
- Integrated/Risk-Driven Disposal of Spent Nuclear Fuel (Christine Gelles, EM Headquarters)
- Managing Waste to Reduce Risk—High-Level Waste (Joel Case, Idaho National Engineering and Environmental Laboratory)
- Safeguards and Security/Nuclear Material Consolidation (Matt McCormick, Richland)
- A Cleanup Program Driven by Risk-Based End States (Dave Geiser, EM Headquarters)
- Accelerating the Closure of Small Sites (also known as the National Focus Project) (Cynthia Anderson, Savannah River Site)

Seek Regulatory Clarification on the Definition of High-Level Waste *(Goal D.5)*

EM is working with regulators to review and revise regulatory agreements and approaches to regulatory compliance at all cleanup sites to support accelerated risk reduction. EM has received letters of endorsement from federal or state regulators in 12 states, and has reached agreement in Tennessee and Colorado on revised regulatory approaches. State and federal regulators have also helped DOE develop individual site Performance Management Plans. DOE has made this shift to accelerated risk reduction within the existing regulatory framework. This initiative has already led to a significantly increased emphasis on risk reduction.

As new cleanup strategies are developed to reduce risk more rapidly and more cost-effectively, DOE will continue to work with regulators so that regulatory agreements can be revised to incorporate these new, more-effective approaches. The new approaches will require shipment of various wastes from several locations to hubs for treatment and/or repackaging, and in some cases, for permanent disposal in approved disposal cells at those locations. Since these plans will involve state equity issues, DOE will work closely with the Western Governors Association and the National Governors Association to keep the governors fully informed and will work to gain their support.

DOE has proposed an action that will require new legislation or legislative changes and is directly related to the accelerated cleanup and closure program. A proposed amendment clarifies the definition of "high-level radioactive waste" contained in Section 2(12) of the Nuclear Waste Policy Act of 1982, 42 U.S.C. 10101(12), by stating explicitly that material resulting from reprocessing (as well as any material commingled or contaminated with it) is not HLW if the Secretary of Energy, in consultation with the Nuclear Regulatory Commission (NRC) and after a period of time for public comment, determines that the material need not be permanently isolated by disposal in a deep geologic repository designed for the disposal of SNF to protect the public health and safety. The original 1982 definition implied but did not state that the Secretary, in consultation with the NRC, is authorized to determine on that basis which reprocessing wastes are sufficiently radioactive to require disposal in the repository as "high-level radioactive waste."[28]

Enhance the National Environmental Policy Act Process within EM *(Goal D.6)*

In the EM program, the NEPA process often takes excessive time to complete. The average time required to complete an Environmental Impact Statement (EIS) in the period 1994 to 2001 was approximately 28 months. Such long time periods invariably result in delays in risk reduction and increases in cost. DOE Order 451.1B calls for final completion of most EISs within 15 months of issuance of the Notice of Intent. Many of EM's EISs are too narrowly scoped and do not adequately evaluate the breadth of options to be considered in the decision-making process.

The NEPA process can be enhanced to support decision making more effectively and in a timely and cost-effective manner. The process of preparing an EIS should be a deliberate one managed by senior EM officials. NEPA-related efforts should be initiated earlier in the project planning process. Once the decision has been made to prepare an EIS, EM management needs to drive the process to ensure adequate scope; necessary technical analysis; and discussion of alternatives based on safety, performance assessments, costs, accelerated risk reduction, and environmental protection. To carry out this process, EM Headquarters needs to provide assistance to the field in expediting and reducing the associated time requirements. DOE's NEPA guidance and protocols should be revised accordingly, in consonance with NEPA and its implementing regulations, with a view toward developing a more streamlined, flexible, cost-effective process.[29]

Refocus the Science and Technology Program *(Goal D.7)*

While funding for the Science and Technology Program is allocated at Headquarters, the program does not have strong DOE technical direction. It in fact is a collection of programs rather than a single program designed to support the DOE mission. In the past, it encompassed a

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[28] U.S. Department of Energy, *Top-to-Bottom Review of Environmental Management Program: Status of Implementation*, Report to Congress, Washington, D.C., October 2003, p. III-36.
[29] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. V-21.

number of focus groups, such as decontamination and decommissioning; however, national laboratories directed each group, and the success of the groups varied from laboratory to laboratory. Many of the laboratory programs had little DOE oversight.

The EM mission requires focused and strong support in research and development (R&D) and applied technology. Alternatives to baseline technologies need to be developed that can reduce programmatic risks, improve schedules, and reduce costs. Programs at EM's lead national laboratories should be evaluated for relevance to the cleanup and closure efforts.[30]

[30] U.S. Department of Energy, *A Review of the Environmental Management Program*, Washington, D.C., February 4, 2002, p. V-27.

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VI. Key Uncertainties and External Factors

Both program uncertainties and external factors can influence the closure planning guidance presented in this document.

A. Program Uncertainties

Budget Support

Since the release of the report of the Top-to-Bottom Review team in February 2002, increased programmatic focus and the use of innovative performance-based contracts have enabled EM to reduce comparable life-cycle costs (in constant FY 2003 dollars) from $192 billion in FY 2001 to $142 billion in FY 2003, an overall reduction of $50 billion. These actions also have contributed to shortening the schedule for completion of cleanup by 35 years, from 2070 to 2035. Currently EM is conducting a technically based review to identify additional opportunities for cost and schedule reductions.

The performance goals contained in this document are based on the annualized cost estimates identified in Appendix 1. Funding scenarios that differ from those estimates will require dedicated analysis to identify any impact on performance.

Cleanup Standards

The end state for cleanup at many sites has not been fully determined. Priority efforts should be ongoing at all sites with cleanup programs to establish agreed-upon end states. The extent of cleanup strongly affects scope of work, schedule, and cost.

Technology

Technological development is inherently unpredictable. Suitable cleanup technologies do not always currently exist, and the development and deployment of innovative technologies could help reduce risk, accelerate schedules, and lower costs. Additionally, selection of processes that are dependent upon unproven technologies can result in failure.

Uncertain Work Scope

Uncertainties are inherent in the environmental cleanup program given the complexity and nature of the work. There are uncertainties in our knowledge of the types of contaminants, their extent, and their concentrations.

B. External Factors

Regulatory Requirements

Compliance with environmental laws and regulations and agreements with the states drive DOE's cleanup decisions. In many cases, these requirements are not risk-based and do not reflect consideration of the future use of the site. The laws and regulations are subject to change, and agreements with states may be renegotiated.

Legislative Requirements

In many cases, wastes are being managed in a costly manner that is not in proportion to the risk posed to human health and the environment; in the case of HLW, the court's interpretation of the National Waste Policy Act is preventing any cost-effective disposal of the waste. Legislation is needed to permit cleanup activities to be aligned with the risk posed to human health and the environment by the material involved. Current requirements force wastes to be managed based on their source, and as a result, wastes from different sources are managed differently even when they pose similar health risks. Another example is the lack of a definition for a de minimis class of waste. Large quantities of waste containing small amounts of radionuclides and hazardous chemicals that pose negligible risk to public health and the environment are managed at considerable cost as if they were highly hazardous.

Disposal Sites

Disposal sites may not be available in a timely manner, thus preventing or delaying site closures. Current potential delays exist for HLW, low-level mixed waste, and certain orphan wastes containing hazardous waste.

VII. Program Evaluation

As discussed in Section II, EM's cleanup objectives and performance targets as presented in this document are under formal change control procedures set forth in EM's SOPP RM 1.1, *Resource Management: Configuration Management Change Control Process for the Environmental Management (EM) Program*. The EM Change Control Board approves all changes to EM's cleanup objectives and performance targets. Visibility for all changes will be provided in the annual update of Appendix 1.

Within the EM cleanup program, performance evaluations are conducted at several levels and frequencies. Table 8 identifies these evaluations.

Table 8. Program Evaluations

Type	Description	Responsibility for Accomplishment and/or Oversight
Periodic Performance Target Review	The Chief Operating Officer conducts a review of individual site closure baseline performance with field managers. The discussion focuses on accomplishment of performance targets, in addition to cost and schedule variances. These reviews are conducted every 3 months.	Chief Operating Officer
Performance Baseline Validation Reviews	DOE validates each life-cycle baseline for execution of the Earned Value Management System for work performed. Once approved, the baseline is placed under configuration control for performance reporting.	DAS for Performance Intelligence and Improvement
Monthly Performance Report	For all EM projects, a monthly performance report is developed for the Assistant Secretary's review.	DAS for Performance Intelligence and Improvement
Site Cleanup Baseline Performance and Execution Review	EM reviews site cleanup baseline performance and execution against each approved baseline every 9 months. The focus of the review is on assessing execution of the approved baseline.	DAS for Performance Intelligence and Improvement
Closure Review	A closure review is conducted to examine the closeout and completion of the cleanup project's work scope.	DAS for Performance Intelligence and Improvement
Programmatic Oversight	The EM Headquarters organization will provide oversight of site cleanup activities in whatever form and frequency are required to insure the management principles of DOE Manual 413.3-1 are being applied to add value to the cleanup effort, rather than to produce wasteful, bureaucratic compliance.	DAS for Performance Intelligence and Improvement

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VIII. Five-Year Budget and Performance Integration

DOE's current approach to program planning involves providing projections of resource requirements and performance expectations for a 5-year period. However, the EM cleanup program forecasts its performance expectations for the total life-cycle. Although this life-cycle plan contains programmatic uncertainties and is dependent on several external factors, as discussed in Section VI, it provides EM with the following advantages:

- The management team is constantly focused on identifying and achieving a cleanup end state.
- Insight is gained into opportunities for intersite integration, safety innovations, and application of technical lessons learned.

EM's life-cycle cleanup plan is described in detail in Appendix 1. This plan provides a technical basis for EM's annual budget request, the focus of which is to fund cleanup activities to achieve EM's cleanup goals, objectives, and performance expectations. EM's budget structure is designed to provide clear linkage among budget, performance, and reporting.

In FY 2004, EM implemented a revised budget structure to distinguish clearly the work scope and resources that directly support EM's core accelerated cleanup and risk-reduction mission from those that do not. As illustrated in Figure 3, EM's budget structure consists of five appropriations: Defense Site Acceleration Completion, Defense Environmental Services, Nondefense Site Acceleration Completion, Nondefense Environmental Services, and Uranium Enrichment D&D Fund. Accelerated cleanup and risk-reduction initiatives are consolidated predominantly into three appropriations: Defense Site Acceleration Completion, Nondefense Site Acceleration Completion, and Uranium Enrichment D&D Fund. The two accelerated completion appropriations include three programs: FY 2006 Acceleration Completions, FY 2012 Acceleration Completions, and FY 2035 Acceleration Completions. The other two appropriations, Defense and Nondefense Environmental Services, fund activities that indirectly support EM's accelerated cleanup and closure mission. More-detailed information on EM's budget structure and its objectives is contained in the annual budget request submitted to the Congress each February.

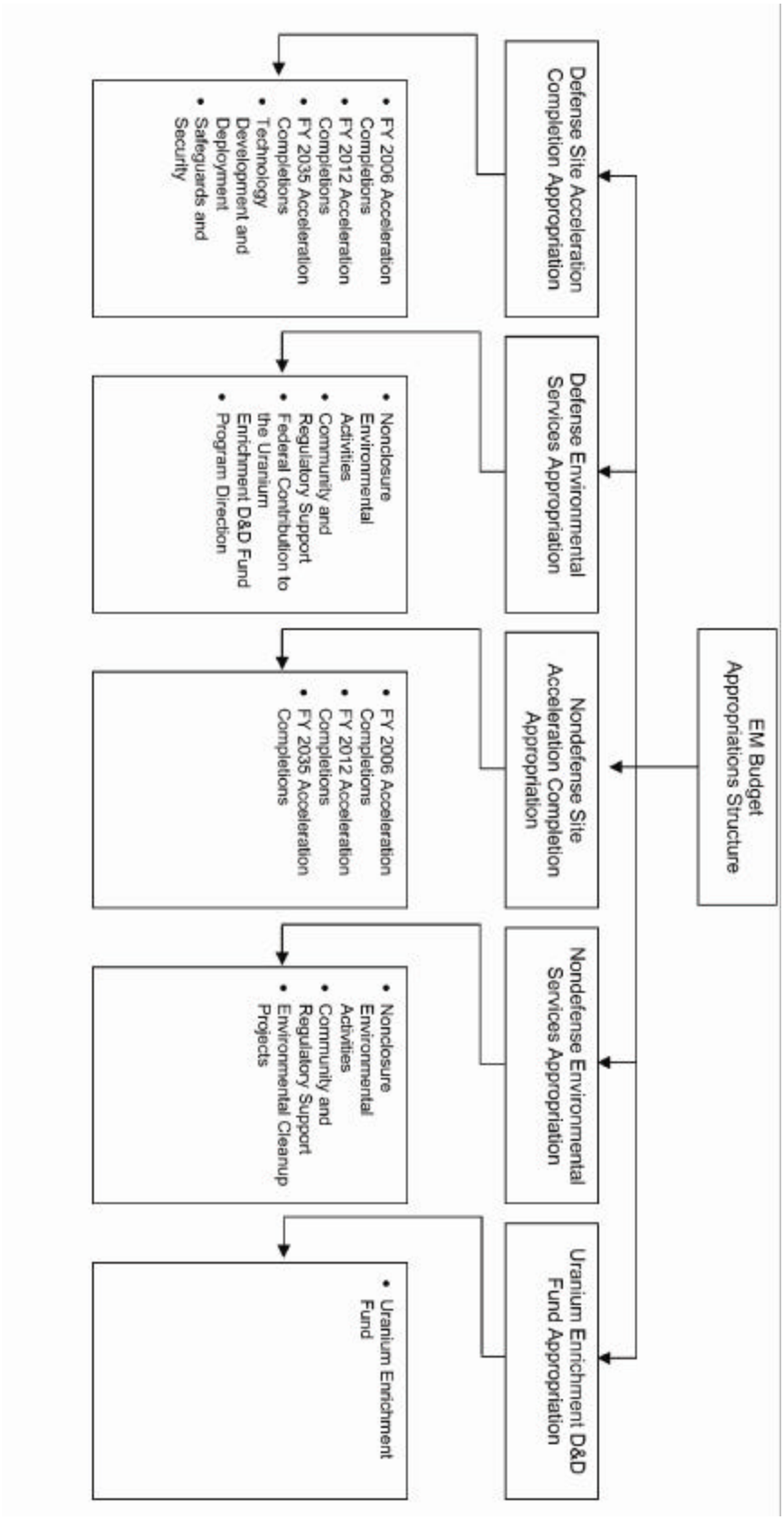

Figure 3. EM Budget Appropriations Structure

Annex A. Summary of EM Cleanup Sites and Closure Dates

No.	State	Location	Planned Completion Year
1	NE	Hallam Nuclear Power Facility	1969
2	OH	Piqua Nuclear Power Facility	1969
3	NM	Bayo Canyon	1982
4	NJ	Kellex/Pierpont	1982
5	CA	University of California	1982
6	NM	Acid/Pueblo Canyons	1984
7	NM	Chupadera Mesa	1984
8	PA	Canonsburg	1986
9	NJ	Middlesex Municipal Landfill	1987
10	NY	Niagara Falls Storage Site Vicinity Properties	1987
11	NM	Shiprock	1987
12	IL	National Guard Armory	1989
13	UT	Salt Lake City	1989
14	WY	Spook	1989
15	IL	University of Chicago	1989
16	UT	Green River	1990
17	OR	Lakeview	1990
18	WY	Riverton	1990
19	AZ	Tuba City	1990
20	CO	Durango	1991
21	TN	Elza Gate	1992
22	ID	Lowman	1992
23	NM	Pagano Salvage Yard	1992
24	OR	Albany Research Center	1993
25	NY	Baker and Williams Warehouses	1993
26	PA	Aliquippa Forge	1994
27	TX	Falls City	1994
28	CO	Grand Junction Mill Tailings Site	1994
29	IL	Granite City Steel	1994
30	AZ	Monument Valley	1994
31	AK	Project Chariot	1994
32	CA	Salton Sea Test Base	1994
33	CT	Seymour Specialty Wire	1994
34	OH	Alba Craft	1995
35	NM	Ambrosia Lake	1995
36	OH	Associate Aircraft	1995
37	PA	C. H. Schnoor	1995
38	MA	Chapman Valve	1995
39	MI	General Motors	1995
40	OH	Herring-Hall Marvin Safe Co.	1995
41	NM	Holloman Air Force Base	1995

No.	State	Location	Planned Completion Year
42	HI	Kauai Test Facility	1995
43	UT	Mexican Hat	1995
44	FL	Peak Oil PRP Participation	1995
45	OH	B&T Metals	1996
46	OH	Baker Brothers	1996
47	CO	Gunnison	1996
48	TN	Oak Ridge Associated Universities	1996
49	CA	Oxnard Facility	1996
50	NM	South Valley Superfund Site	1996
51	IL	Fermi National Accelerator Laboratory	1997
52	CA	Geothermal Test Facility	1997
53	NM	Inhalation Toxicology Laboratory	1997
54	NJ	New Brunswick Site	1997
55	CO	New Rifle	1997
56	CO	Old Rifle	1997
57	FL	Pinellas Plant	1997
58	IL	Site A/Plot M	1997
59	CO	Slick Rock Old North Continent	1997
60	CO	Slick Rock Union Carbide	1997
61	MA	Ventron	1997
62	ND	Belfield	1998
63	ND	Bowman	1998
64	PR	Center for Energy and Environmental Research	1998
65	CO	Maybell	1998
66	CO	Naturita	1998
67	IA	Ames Laboratory	1999
68	NJ	Princeton Plasma Physics Laboratory	1999
69	CA	Sandia National Laboratories	1999
70	OH	Columbus Environmental Management Project-King Avenue	2000
71	UT	Monticello Remedial Action Project	2000
72	ID	Argonne National Laboratory-West	2001
73	CA	General Atomics	2001
74	CO	Grand Junction Office	2001
75	MO	Weldon Spring Site	2002
76	KY	Maxey Flats Disposal Site	2003
77	MS	Salmon Site	2003
78	AK	Amchitka Island	2005
79	CA	Laboratory for Energy-Related Health Research	2005
80	OH	Ashtabula Environmental Management Project	2006
81	OH	Columbus Environmental Management Project-West Jefferson	2006
82	OH	Fernald Environmental Management Project	2006
83	MO	Kansas City Plant	2006
84	CA	Lawrence Berkeley National Laboratory	2006
85	CA	Lawrence Livermore National Laboratory-Main Site	2006
86	OH	Miamisburg Environmental Management Project	2006

No.	State	Location	Planned Completion Year
87	CO	Rocky Flats Environmental Technology Site	2006
88	NM	Sandia National Laboratories	2006
89	CA	Stanford Linear Accelerator Center	2006
90	CA	Energy Technology Engineering Center	2007
91	NY	Brookhaven National Laboratory	2008
92	CA	Lawrence Livermore National Laboratory-Site 300	2008
93	TX	Pantex Plant	2008
94	IL	Argonne National Laboratory-East	2009
95	NV	Central Nevada Test Area	2010
96	NV	Project Shoal Area	2010
97	CO	Rio Blanco Site	2010
98	UT	Moab (Atlas Site)	2011
99	CO	Rulison Site	2012
100	NY	West Valley Demonstration Project	2012
101	NM	Gasbuggy Site	2014
102	CA	General Electric Vallecitos Nuclear Center	2014
103	NM	Gnome-Coach Site	2014
104	NY	Separations Process Research Unit	2014
105	NM	Los Alamos National Laboratory	2015
106	TN	Oak Ridge Reservation	2015
107	OH	Portsmouth Gaseous Diffusion Plant	2025
108	SC	Savannah River Site	2025
109	NV	Nevada Test Site	2027
110	NV	Tonopah Test Range Area	2027
111	KY	Paducah Gaseous Diffusion Plant	2030
112	WA	Hanford Site	2035
113	ID	Idaho National Laboratory	2035
114	NM	Waste Isolation Pilot Plant	2035

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Annex B. Life-Cycle Work Scope by Geographic Location

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
CH	Argonne National Laboratory-East	Radioactive facility completions	No. facilities						63	78
CH	Argonne National Laboratory-East	Remediation complete	No. release sites	4					443	443
CH	Argonne National Laboratory-West	Remediation complete	No. release sites						37	37
CH	Brookhaven National Laboratory	Radioactive facility completions	No. facilities	1	6				3	10
CH	Brookhaven National Laboratory	Remediation complete	No. release sites		8				68	76
CH	Chicago Operations Office	LL/LLMW disposed	m^3						537	537
CH	Chicago Operations Office	Remediation complete	No. release sites						30	30
CH	Lawrence Berkeley National Laboratory	Remediation complete	No. release sites	5	6	15			161	181
CH	Stanford Linear Accelerator Center	Remediation complete	No. release sites	3					16	20
ID	Idaho National Laboratory	eU packaged for disposition	No. containers	313	34	35	125	155	260	1,029
ID	Idaho National Laboratory	DU&U packaged for disposition	MT			0.04				0.04
ID	Idaho National Laboratory	Liquid waste eliminated	gallons (1000s)							900
ID	Idaho National Laboratory	Liquid waste tanks closed	No. tanks	1	1	1	2	1		11

Note: Acronyms and abbreviations appearing in this table are defined in Annex C.
[a] Definitions of each performance measure are provided in Table 2 in the main text.
[b] Performance to date may differ from original life-cycle estimate.

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
ID	Idaho National Laboratory	HLW packaged for disposition	No. containers							4200
ID	Idaho National Laboratory	SNF packaged for disposition	MTHM		0.073	1.158	1.337	17.933		252.556
ID	Idaho National Laboratory	TRU disposed	m^3	7,615	7,864	9,004	9,010	9,133	3,404	66,139
ID	Idaho National Laboratory	LL/LLMW disposed	m^3	8,540	5,240	5,655	5,145	5,185	27,814	98,550
ID	Idaho National Laboratory	MAAs eliminated	No. MAAs							1
ID	Idaho National Laboratory	Nuclear facility completions	No. facilities						13	86
ID	Idaho National Laboratory	Radioactive facility completions	No. facilities	3	1		1	1	5	37
ID	Idaho National Laboratory	Industrial facility completions	No. facilities	4	3	3	3	6	52	242
ID	Idaho National Laboratory	Remediation complete	No. release sites	3	3		6		142	270
ID	Idaho Operations Office	Remediation complete	No. release sites						233	233
KC	Kansas City Plant	Remediation complete	No. release sites			1			42	43
LA	Los Alamos National Laboratory	TRU disposed	m^3	1,400	1,400	1,400	1,400	1,200	606	9,200
LA	Los Alamos National Laboratory	LL/LLMW disposed	m^3						5,895	5,909
LA	Los Alamos National Laboratory	Radioactive facility completions	No. facilities							1
LA	Los Alamos National Laboratory	Remediation complete	No. release sites	4	49	139	68	44	1,325	2,124
LS	Lawrence Livermore National Laboratory	TRU disposed	m^3	105						203

Note: Acronyms and abbreviations appearing in this table are defined in Annex C.
[a] Definitions of each performance measure are provided in Table 2 in the main text.
[b] Performance to date may differ from original life-cycle estimate.

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
LS	Lawrence Livermore National Laboratory	LL/LLMW disposed	m^3	1,100	650	375			2,607	4,669
LS	Lawrence Livermore National Laboratory	Remediation complete	No. release sites	9	6	6	3	1	168	193
NN	Energy Technology Engineering Center	LL/LLMW disposed	m^3	390	600	152			235	1,335
NN	Energy Technology Engineering Center	Radioactive facility completions	No. facilities	1	2				3	6
NN	Energy Technology Engineering Center	Industrial facility completions	No. facilities		1				19	13
NN	Energy Technology Engineering Center	Remediation complete	No. release sites	3	3				4	10
NN	Former Albuquerque Operations Office	LL/LLMW disposed	m^3						1,319	1,319
NN	Former Albuquerque Operations Office	Remediation complete	No. release sites						155	155
NN	Former Oakland Operations Office	LL/LLMW disposed	m^3						272	272
NN	Former Oakland Operations Office	Remediation complete	No. release sites						3	3
NN	General Atomics	SNF packaged for disposition	MTHM						1.000	1.000
NN	General Atomics	LL/LLMW disposed	m^3						1,716	1,716
NN	General Atomics	Remediation complete	No. release sites						2	2
NN	Inhalation Toxicology Laboratory	LL/LLMW disposed	m^3	35	35				165	105
NN	Inhalation Toxicology Laboratory	Remediation complete	No. release sites						9	9

Note: Acronyms and abbreviations appearing in this table are defined in Annex C.
[a] Definitions of each performance measure are provided in Table 2 in the main text.
[b] Performance to date may differ from original life-cycle estimate.

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
NN	Laboratory for Energy-Related Health Research	LL/LLMW disposed	m^3	4					944	948
NN	Laboratory for Energy-Related Health Research	Industrial facility completions	No. facilities	1						1
NN	Laboratory for Energy-Related Health Research	Remediation complete	No. release sites	1					16	17
NN	Separations Process Research Unit	TRU disposed	m^3							50
NN	Separations Process Research Unit	Nuclear facility completions	No. facilities							4
NN	Separations Process Research Unit	Remediation complete	No. release sites							6
NN	South Valley Superfund Site	Remediation complete	No. release sites						1	1
NV	Nevada Site Office	Remediation complete	No. release sites	46	48	59	18	97	716	2,082
NV	Nevada Test Site	TRU disposed	m^3	198	197		321			734
OH	Ashtabula Environmental Management Project	LL/LLMW disposed	m^3						104	104
OH	Ashtabula Environmental Management Project	Radioactive facility completions	No. facilities			8			20	25
OH	Ashtabula Environmental Management Project	Industrial facility completions	No. facilities			6			1	7
OH	Ashtabula Environmental Management Project	Remediation complete	No. release sites			3				3

Note: Acronyms and abbreviations appearing in this table are defined in Annex C.
[a] Definitions of each performance measure are provided in Table 2 in the main text.
[b] Performance to date may differ from original life-cycle estimate.

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
OH	Columbus Environmental Management Project	Nuclear facility completions	No. facilities			1				1
OH	Columbus Environmental Management Project	Radioactive facility completions	No. facilities	2					12	14
OH	Columbus Environmental Management Project	Remediation complete	No. release sites			1			1	2
OH	Fernald Environmental Management Project	LL/LLMW disposed	m^3	15					7,085	7,100
OH	Fernald Environmental Management Project	Radioactive facility completions	No. facilities	4	1	2	2		19	29
OH	Fernald Environmental Management Project	Industrial facility completions	No. facilities	1						1
OH	Fernald Environmental Management Project	Remediation complete	No. release sites		1	1	2		2	6
OH	Miamisburg Environmental Management Project	DU&U packaged for disposition	MT						0.008	0.008
OH	Miamisburg Environmental Management Project	LL/LLMW disposed	m^3						3,947	3,947
OH	Miamisburg Environmental Management Project	Nuclear facility completions	No. facilities		5	3				8

Note: Acronyms and abbreviations appearing in this table are defined in Annex C.
[a] Definitions of each performance measure are provided in Table 2 in the main text.
[b] Performance to date may differ from original life-cycle estimate.

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
OH	Miamisburg Environmental Management Project	Radioactive facility completions	No. facilities	7	4					11
OH	Miamisburg Environmental Management Project	Industrial facility completions	No. facilities	21	25	2			74	116
OH	Miamisburg Environmental Management Project	Remediation complete	No. release sites	3	37	23			118	178
OH	Ohio Field Office	HLW packaged for disposition	No. containers						275	275
OH	West Valley Demonstration Project	Liquid waste tanks closed	No. tanks							2
OH	West Valley Demonstration Project	TRU disposed	m^3			240	240	212		692
OH	West Valley Demonstration Project	LL/LLMW disposed	m^3		500	4,600	4,600	10,122	4,022	23,844
OH	West Valley Demonstration Project	Remediation complete	No. release sites							1
OR	Oak Ridge Reservation	eU packaged for disposition	No. containers							673
OR	Oak Ridge Reservation	DU&U packaged for disposition	MT			2,291	2,291	2,291		56,988
OR	Oak Ridge Reservation	TRU disposed	m^3	250	178	134	34	34		646
OR	Oak Ridge Reservation	LL/LLMW disposed	m^3	10,564	7,719	4,836	3,501	694	72,135	100,244
OR	Oak Ridge Reservation	Nuclear facility completions	No. facilities		7			4	2	28

Note: Acronyms and abbreviations appearing in this table are defined in Annex C.
[a] Definitions of each performance measure are provided in Table 2 in the main text.
[b] Performance to date may differ from original life-cycle estimate.

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
OR	Oak Ridge Reservation	Radioactive facility completions	No. facilities	5	12				6	48
OR	Oak Ridge Reservation	Industrial facility completions	No. facilities	17	27	3	3	26	84	172
OR	Oak Ridge Reservation	Remediation complete	No. release sites	20	8	90	3	71	260	654
PP	Paducah Gaseous Diffusion Plant	eU packaged for disposition	No. containers							182
PP	Paducah Gaseous Diffusion Plant	DU&U packaged for disposition	MT			18,040	18,040	18,040		453,312
PP	Paducah Gaseous Diffusion Plant	LL/LLMW disposed	m^3	75	875	825	3,260	1,200	5,543	17,331
PP	Paducah Gaseous Diffusion Plant	Radioactive facility completions	No. facilities							2
PP	Paducah Gaseous Diffusion Plant	Remediation complete	No. release sites	1					86	237
PP	Portsmouth Gaseous Diffusion Plant	eU packaged for disposition	No. containers							1,450
PP	Portsmouth Gaseous Diffusion Plant	DU&U packaged for disposition	MT			8,304	8,304	8,304		205,567
PP	Portsmouth Gaseous Diffusion Plant	LL/LLMW disposed	m^3	1,143	9,089	7,488			16,400	33,543
PP	Portsmouth Gaseous Diffusion Plant	Remediation complete	No. release sites			1		1	149	163
PX	Pantex Plant	Industrial facility completions	No. facilities				4	0	1	5
PX	Pantex Plant	Remediation complete	No. release sites			31	92	18	76	237

Note: Acronyms and abbreviations appearing in this table are defined in Annex C.
[a] Definitions of each performance measure are provided in Table 2 in the main text.
[b] Performance to date may differ from original life-cycle estimate.

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
RF	Rocky Flats Environmental Technology Site	Pu packaged for long-term disposition	No. containers						1,895	1,700
RF	Rocky Flats Environmental Technology Site	Pu/U residues packaged for disposition	kg bulk						103,901	103,901
RF	Rocky Flats Environmental Technology Site	TRU disposed	m^3	2,344	2,096	1,591			8,275	12,355
RF	Rocky Flats Environmental Technology Site	LL/LLMW disposed	m^3	53,882	68,120	16,468			155,392	254,962
RF	Rocky Flats Environmental Technology Site	MAAs eliminated	No. MAAs	1					7	7
RF	Rocky Flats Environmental Technology Site	Nuclear facility completions	No. facilities	1	2	2			1	6
RF	Rocky Flats Environmental Technology Site	Radioactive facility completions	No. facilities	14	36	4			14	54
RF	Rocky Flats Environmental Technology Site	Industrial facility completions	No. facilities	40	113	4	3		199	317
RF	Rocky Flats Environmental Technology Site	Remediation complete	No. release sites	8	30	16			197	240
RL	Hanford Site	Pu packaged for long-term disposition	No. containers	900					2,600	3,400
RL	Hanford Site	eU packaged for disposition	No. containers			1,310			1,648	2,958
RL	Hanford Site	Pu/U residues packaged for disposition	kg bulk	176					3,437	3,467
RL	Hanford Site	DU&U packaged for disposition	MT						3,100	3,100

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[b] Performance to date may differ from original life-cycle estimate.

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
RL	Hanford Site	SNF packaged for disposition	MTHM	631.800	0.800	1.200	1.600	2.600	1,443.010	2,130.950
RL	Hanford Site	TRU disposed	m^3	200	983	700	1,400	1,400	337	28,369
RL	Hanford Site	LL/LLMW disposed	m^3	3,323	3,875	2,335	2,069	1,374	36,482	69,391
RL	Hanford Site	MAAs eliminated	No. MAAs		1	1				2
RL	Hanford Site	Nuclear facility completions	No. facilities	2		8	1	7	3	172
RL	Hanford Site	Radioactive facility completions	No. facilities	2	3	9	1	13	2	415
RL	Hanford Site	Industrial facility completions	No. facilities	3	13	8	12	52	164	855
RL	Hanford Site	Remediation complete	No. release sites	37	49	62	48	73	265	1,618
RP	Office of River Protection	Liquid waste eliminated	gallons (1000s)							54,000
RP	Office of River Protection	Liquid waste tanks closed	No. tanks	6	8	12		1		177
RP	Office of River Protection	HLW packaged for disposition	No. containers							9,200
RP	Office of River Protection	TRU disposed	m^3		120	400	3,200	2,400		7,600
RP	Office of River Protection	LL/LLMW disposed	m^3			2,500				310,000
RP	Office of River Protection	Nuclear facility completions	No. facilities							18
RP	Office of River Protection	Radioactive facility completions	No. facilities							28
RP	Office of River Protection	Industrial facility completions	No. facilities							102

Note: Acronyms and abbreviations appearing in this table are defined in Annex C.
[a] Definitions of each performance measure are provided in Table 2 in the main text.
[b] Performance to date may differ from original life-cycle estimate.

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
RP	Office of River Protection	Remediation complete	No. release sites						5	322
SN	Sandia National Laboratory	LL/LLMW disposed	m^3						8	8
SN	Sandia National Laboratory	Radioactive facility completions	No. facilities						1	1
SN	Sandia National Laboratory	Remediation complete	No. release sites	40	32	26			152	263
SR	Savannah River Site	Pu packaged for long-term disposition	No. containers	423	165	42			54	750
SR	Savannah River Site	eU packaged for disposition	No. containers	612	635	635	635	67	146	2,809
SR	Savannah River Site	Pu/U residues packaged for disposition	kg bulk	77.5	75.9				321.323	414
SR	Savannah River Site	DU&U packaged for disposition	MT			186			4,551	23,182
SR	Savannah River Site	Liquid waste eliminated	gallons (1000s)	1,300	1,900	1,800	1,900	1,900		33,100
SR	Savannah River Site	Liquid waste tanks closed	No. tanks	2					2	51
SR	Savannah River Site	HLW packaged for disposition	No. containers	250	250	250	250	250	1452	5060
SR	Savannah River Site	SNF packaged for disposition	MTHM	1.254					1.972	35.925
SR	Savannah River Site	TRU disposed	m^3	840	840	840	840	840	1,459	15,326
SR	Savannah River Site	LL/LLMW disposed	m^3	10,744	10,364	7,372	67,902	4,671	59,946	219,526
SR	Savannah River Site	MAAs eliminated	No. MAAs				1			4

Note: Acronyms and abbreviations appearing in this table are defined in Annex C.
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[b] Performance to date may differ from original life-cycle estimate.

Office	Location	Performance Measure[a]	Unit	Performance Targets					Completed to Date (pre-2004 actuals)	Life-Cycle Scope[b]
				FY04	FY05	FY06	FY07	FY08		
SR	Savannah River Site	Nuclear facility completions	No. facilities	3	0	1	5	1	3	195
SR	Savannah River Site	Radioactive facility completions	No. facilities	0	1	2	1		1	40
SR	Savannah River Site	Industrial facility completions	No. facilities	18	19	25	93	13	59	816
SR	Savannah River Site	Remediation complete	No. release sites	13	3	11	13	6	304	515

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Annex C. Glossary of Acronyms and Abbreviations

CFR	Code of Federal Regulations
CMAC	Contract Management Advisory Council
DAS	Deputy Assistant Secretary
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DU&U	depleted uranium and uranium
DWPF	Defense Waste Processing Facility
EIS	Environmental Impact Statement
EM	Office of Environmental Management
EPA	U.S. Environmental Protection Agency
eU	enriched uranium
FY	fiscal year
FY 2003 dollars	constant dollars (i.e., not inflated) at their value in fiscal year 2003
HLW	high-level waste
ISM	Integrated Safety Management
kg	kilogram(s)
LL/LLMW	low-level/low-level mixed waste
m^3	cubic meters
M&O	management and operating
MAA	material access area
MT	metric ton(s)
MTHM	metric ton(s) of heavy metal
NEPA	National Environmental Policy Act
NRC	Nuclear Regulatory Commission
PBI	performance-based incentive
RFP	request for proposals
SNF	spent nuclear fuel
SNM	special nuclear material
SOPP	Standing Operating Policies and Procedures
SRS	Savannah River Site
TRU	transuranic (waste)
WIPP	Waste Isolation Pilot Plant