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A REVIEW OF THE ENVIRONMENTAL MANAGEMENT PROGRAM

UNITED STATES DEPARTMENT OF ENERGY

PRESENTED TO THE

ASSISTANT SECRETARY FOR ENVIRONMENTAL MANAGEMENT

by the

TOP-TO-BOTTOM REVIEW TEAM

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Executive Summary

The Environmental Management (EM) program is responsible for cleaning up 114 sites involved with research, development, production, and testing of nuclear weapons. Taken together, these sites encompass an area of over 2 million acres—equal to the size of Rhode Island and Delaware combined. At the beginning of fiscal year 2002, the Department of Energy (DOE) had completed active cleanup at 74 of these sites. But these sites were small and the least difficult to deal with, and the remaining large sites continue to present enormous challenges.

The dimensions of the challenges facing EM are revealed by recent cost estimates from EM's own internal documents. EM's 1998 *Paths to Closure* report estimated a life-cycle cost for the cleanup program of $147 billion. That estimate was, however, too optimistic: as structured today, the life-cycle estimate now stands at $220 billion. Without breakthrough business processes, the EM cleanup program cost estimate could easily increase to more than $300 billion. Additionally, only about one-third of the EM program budget today is going toward actual cleanup and risk reduction work. The remainder is spent on maintenance, fixed costs, and other activities required to support safety and security.

The schedule estimates from just a few years ago have also proven to be overly optimistic. Numerous sites are already unable to meet their commitments in the 1998 report. Indeed, more than 40 percent of the sites had extended their closure date by more than 1 year by the time the 2000 update of the report was produced. Moreover, the three largest sites—Savannah River, Idaho National Engineering and Environmental Laboratory, and Hanford—have such long-term completion dates (2038, 2050, and 2070, respectively) that the estimates for cost and schedule are highly uncertain and subject to change.

The reality of an extended cleanup schedule is that eventually it will lead to more prolonged and potentially severe public health and environmental risks. It is clear that with the current path, the cost of the program will continue to increase, with the real possibility that the ultimate cleanup and closure goal will never be met. While these outcomes are not acceptable, they are not inevitable. At Rocky Flats, Colorado, a risk-based management approach combined with a clear mission, a culture of urgency, and a performance-based contract can result in a site cleanup 50 years ahead of the original schedule and $30 billion below the original baseline.

In this context, the Secretary of Energy directed that a review of the EM program be undertaken. In response, the Assistant Secretary for Environmental Management created the Top-to-Bottom Review Team (Team) in August 2001. The Team was tasked to conduct a programmatic review of the EM program and its management systems, with the goal of quickly and markedly improving program performance. The results of the Team's review make clear that there is a systemic problem with the way EM has conducted its activities: the EM program's

major emphasis has been on managing risk, rather than actually reducing risk to workers, the public, and the environment. Since the program's inception in 1989, more than $60 billion has been spent without a corresponding reduction in actual risk.

Underlying the detailed findings of the Team's review as set forth in this report is that the EM program has not been driven as a project with a completion mindset along with an appropriate sense of urgency. As a consequence, process rather than cleanup results has become the basis for performance metrics, contracts, cleanup approaches, and agreements. In fact, it has been said that the EM program should be viewed as the "Un-Manhattan Project." If the cleanup of the weapons complex were undertaken with the same sense of national urgency, and therefore speed, as its initial construction, what would the program look like? While the specific steps to safely manage such an effort over the next 4 years need to be developed, the Team's proposed framework for the effort reflects the perspective of urgency as compared with the current time frame for cleanup, which would span several generations. The following four major findings of the Team's review need to be placed in this overall context:

- *The manner in which EM develops, solicits, selects, and manages many contracts is not focused on accelerating risk reduction and applying innovative approaches to doing the work.* DOE's contracting strategies and practices make 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 are managed as separate, informally related activities rather than as an integrated corporate business process. This results in performance standards that are inconsistently and ineffectively applied.

- *EM's cleanup strategy is not based on comprehensive, coherent, technically supported risk prioritization.* Many wastes are managed according to their origins, not their risk. This approach has resulted in costly waste management and disposition strategies that are not proportional to the risk posed to human health and the environment. The current framework and, in some cases, interpretation of DOE Orders and requirements, laws, regulations, and cleanup agreements have created obstacles to achieving cleanup that reduces risk to human health and the environment as quickly as possible. Instead, they have resulted in resources being diverted to lower-risk activities. Additionally, there is no programmatic strategy for cleanup and closure, only a collection of individual site strategies that results in costly duplication and assignment of priorities on a local rather than national basis. Large quantities of surplus special nuclear materials are stored at numerous EM sites. This scattered storage configuration is not optimum for safety and security, is expensive, and is difficult to manage.

- *EM's internal business processes are not structured to support accelerated risk reduction or to address its current challenge of uncontrolled cost and schedule growth.* Presently estimated to cost about $220 billion, DOE's financial liability under current cleanup plans will continue to grow in cost and schedule if significant changes to the program are not made. Without higher performance standards and breakthrough business processes, cost growth and schedule delays will continue to obstruct cleanup, and the risk to workers, the public, and the environment will not be

reduced. The National Environmental Policy Act (NEPA) process for EM projects and programs is often time-consuming and costly without providing the sound analysis and rational alternatives needed to support good decision making. Similarly, current packaging and transportation policies and procedures are resulting in delays in the removal of materials from sites, causing increased cost and delayed risk reduction.

- *The current scope of the EM program includes activities that are not focused on or supportive of an accelerated, risk-based cleanup and closure mission.* These include DOE-wide activities or programs that exceed EM's specific cleanup needs and ongoing work aimed primarily at expanding the mission of a site or supporting the mission work of other DOE programs. In addition, the Science and Technology Program is not focused on providing the support needed for EM to achieve its mission. Rather, the scope includes non–EM-related research and development and grants.

To address the above weaknesses, the Team recommends an aggressive course of action to change the EM program's approach to its cleanup and closure mandate. All the recommended changes are designed to focus the program on one result—reducing risk to public health, workers, and the environment on an accelerated basis.

- *Improve DOE's Contract Management.* Effective contracting practices are essential to improve the performance of the EM program. DOE should undertake a review of its existing acquisition processes and make the necessary revisions or amendments in line with the following principles:

  - EM's acquisition strategy should integrate its project management, financial management, contract management, and DOE oversight processes.
  - The quality of the contract solicitation process should be improved to attract broad contractor participation.
  - The nature and extent of uncertainty and risks should be clearly identified, and the type of contract aligned accordingly.
  - Identification and management of risk should be formally evaluated as part of the contractor selection process.
  - Emphasis on real risk reduction should be increased by focusing fees on end points rather than intermediate milestones, and subjective performance incentives should be eliminated.
  - Use of commercial contract formats should be explored; such formats would translate complex DOE Orders and requirements into clear statements easily understood in the private sector.
  - Clearer and more predictable processes for DOE contract administration and work oversight must be developed and, if appropriate, incorporated into the contract.

- *Move EM to an Accelerated, Risk-Based Cleanup Strategy.* DOE should initiate an effort to review current DOE Orders and requirements, as well as regulatory agreements, for their focus on accelerated risk reduction. DOE should commence discussions with states and other regulators with a view to achieving regulatory agreements that accelerate risk reduction based on technical risk evaluation. The following steps should be incorporated into this new strategy:

  - Cleanup work should be prioritized to achieve the greatest risk reduction at an accelerated rate.
  - Realistic approaches to cleanup and waste management should be based on technical risk evaluation, with consideration given to anticipated future land uses, points of compliance, and points of evaluation.
  - Cleanup agreements should be assessed for their contribution to reducing risk to workers, the public, and the environment.
  - Waste acceptance criteria at facilities for permanent disposal should be reevaluated to identify other waste streams that could be sent to these facilities without increasing risk to workers, the public, or the environment.

- *Align DOE's Internal Processes to Support an Accelerated, Risk-Based Cleanup Approach.* The accelerated execution of a risk-based cleanup strategy will require a sense of urgency, along with well-managed and -directed internal processes. The Team recommends that DOE initiate the following actions to transform its processes and operations to reflect this urgency and time sensitivity:

  - EM must improve its up-front understanding and planning of work. It also must raise its standards of performance by applying the project management principles presented in DOE Order 413.3 to all of its core work areas, including those at the program level.
  - EM must expand the application of Integrated Safety Management (ISM) beyond individual work packages to higher-level work planning, where decisions are made about what work and associated contracts are appropriate and desirable.
  - Lessons learned should be developed at a corporate level to provide a frank description of significant project issues, and should become required learning for all EM managers.
  - DOE must review its Orders, clarify requirements relevant to cleanup, and apply them in a manner consistent with the work at hand.
  - The Assistant Secretary for Environmental Management should have authority to allocate funds to high-priority projects offering significant risk reduction.
  - DOE needs to streamline and expedite its NEPA process and make broad use of functionally equivalent processes.

- DOE must streamline its packaging and transportation program for safe and secure transport of all materials. An improved approval process needs to be established, along with designated program authority in this area.
- Streamlined management at small sites should be implemented to minimize risks sooner and reduce life-cycle costs.
- For the EM program to accomplish its technically demanding mission, it will be necessary to institute a dramatic increase in expectations, performance standards, and accountability for EM staff.

■ *Realign the EM program so its scope is consistent with an accelerated, risk-based cleanup and closure mission.* EM should redeploy, streamline, or cease activities not appropriate for accelerated cleanup and closure. Many of these activities may be worthy of DOE or federal government support. If so, they should be transferred out of EM to another part of DOE or another federal agency. EM's Science and Technology Program should be refocused to directly address the specific, near-term applied technology needs for cleanup and closure. Longer-term or more basic research and technology activities, programs, and laboratories not directly supportive of cleanup and closure should be transferred to other DOE programs. EM should also accelerate the consolidation of nuclear materials stored inefficiently at numerous facilities and sites throughout the country. Accelerated consolidation of these materials would enhance safety and security, reduce threats, reduce risk, and save money.

The above recommendations represent the next major step toward an improved EM program that can fulfill DOE's commitments to clean up the Cold War legacy. DOE can implement a number of these recommendations on its own and quickly. Others will require close work with Congress, state and federal regulators, the communities surrounding DOE sites, and other DOE stakeholders. Accomplishment of the EM mission will require major engineering efforts. Additional resources will be required in the next few years, but this investment will result in reducing risk more quickly and will produce major savings in life-cycle costs.

To summarize, the EM mission cannot be accomplished by continuing "business as usual." There must be major changes in all elements of the EM program. Once the necessary consensus for this approach has been achieved with regulators, stakeholders, and Congress, risk reduction will be accomplished by stabilizing high-risk materials; by decommissioning and decontaminating high-risk facilities; and by accomplishing cleanup and closure, including transfer of excess land areas to other entities for management. National security will be improved through the consolidation of all special nuclear materials in modern safeguarded facilities and through the accelerated disposal of transuranic waste currently stored at numerous sites around the country.

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I. Introduction

During the past 12 years, the Department of Energy's (DOE) Environmental Management (EM) program has expended tens of billions of dollars without a corresponding reduction in actual risk. In fact, in some cases the waste inventory awaiting treatment and disposal has increased, and a number of high-risk facilities continue to deteriorate without firm plans for decontamination and decommissioning. Because of this apparent slow progress, the Secretary of Energy directed that a review of the EM program be undertaken.

In response, the Assistant Secretary for Environmental Management (EM-1) created the Top-to-Bottom Review Team (Team) in August 2001. The Team was to conduct a programmatic review of the current EM program and its management systems with the intended goal of quickly and markedly improving performance. The Team's review focused on three core principles intended to guide the EM cleanup program:

- The business of EM is safe cleanup and closure.
- EM needs to conduct and complete its work quickly.
- The EM cleanup and closure business will be run like a business.

To obtain a more accurate view of the EM program, the Team reviewed all the program elements. It participated in formal briefings to EM-1 by EM operations/field office managers and senior contractor officials, as well as Headquarters deputy assistant secretaries; briefings and discussions with employees at most Headquarters and EM field offices; and formal site visits of the major EM facilities. During the latter visits, the Team held discussions with government and contractor employees, as well as several state representatives, and toured key operations and facilities at the sites. The Team also reviewed program documentation.

II. Key Observations and Recommendations

The Team's overall observation is that the EM program's major emphasis is on managing risk rather than actually reducing risk to workers, the public, and the environment. Four major areas of weakness contribute to this observation:

- The manner in which EM develops, solicits, selects, and manages many contracts is not focused on accelerating risk reduction and applying innovative approaches to doing the work.
- EM's cleanup strategy is not based on comprehensive, coherent, technically supported risk prioritization.
- EM's internal business processes are not structured to support accelerated risk reduction or to address its current challenge of uncontrolled cost and schedule growth.
- The current scope of the EM program includes activities that are not focused on or supportive of its core mission of risk reduction and closure.

Each of these four areas of weakness is defined by one or more issues identified by the Team as posing major impediments to the accomplishment of EM's program goals. Brief statements of these issues are presented in Section III; more detailed discussion, including a call to action specific to each issue, is provided in Section V. The remainder of this section offers the Team's recommendations for addressing each of the above four areas of weakness to accelerate the reduction of risk to workers, the public, and the environment. These recommendations represent the next major step toward an improved EM program that can fulfill DOE's commitments to clean up the Cold War legacy. DOE can implement many of these recommendations on its own and quickly, although doing so will require major changes in DOE's way of doing business. Other recommendations will require close work with Congress, state and federal regulators, the communities surrounding DOE sites, and other DOE stakeholders. Section IV sets forth a proposed implementation strategy and details fundamental steps that must be taken to move forward.

Improve DOE's Contract Management

While recognizing progress made since EM's 1994 contract reform initiative, the Team found that EM's contracting strategies and practices must make better use of performance-based contracts to carry out the cleanup mission. Processes for contract acquisition, establishment of

performance goals, funding allocation, and government oversight are managed as separate, informally related activities rather than as an integrated corporate business process. This results in performance standards that are inconsistently and ineffectively applied. EM relies almost exclusively on contracts for accomplishing the actual physical work of cleanup and closure. Thus, effective contracting practices are essential to improve the performance of the EM program. The Team recommends the following steps to enhance the use of performance-based contracts:

- Review and restructure, where necessary, EM's acquisition strategy to integrate its project management, financial management, contract management, and DOE oversight 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.

- Improve the quality of the contract solicitation process to attract broader contractor participation. This effort must take a systems engineering approach to focus on the Request for Proposal (RFP) process and improve product quality and schedule reliability. The RFP process must also provide for self-improvement feedback. Moreover, to be satisfactory, improvements must be made to provide a clearer and more streamlined acquisition process.

- Require clarity in contracts with respect to work scope, regulatory requirements, and quantitatively defined end points. To the extent possible, DOE contracts should reflect a risk-based approach to cleanup requirements when quantitatively defined end points cannot be provided.

- Clearly identify the nature and extent of uncertainty and risks, and align the type of contract accordingly.

- Eliminate the use of subjective performance incentives.

- In situations where risks and uncertainties exist, require contractors to identify and manage risk. The RFP should request contractors to describe their risk management processes, and those processes should be formally evaluated as part of contractor selection.

- Increase emphasis on real risk reduction by focusing fees on end points rather than intermediate milestones.

- Explore increased use of commercial contract formats, in which complex DOE Orders and requirements would be translated into clear statements easily understood in the private sector.

- Develop a clearer and more predictable process for DOE contract administration and a formal work oversight description, and, if appropriate, incorporate these requirements into the contract.

The Team recommends that DOE undertake a review of all existing contracts for their alignment with these principles. DOE should take any and all steps necessary to revise or amend those contracts to improve this alignment. Doing so may mean revising performance measures, revising the incentive and reward structures of a contract, and in some cases renegotiating or terminating a contract entirely. The Team believes all of these changes can be made under current DOE authority.

The effort to review existing contracts is not intended to reduce fees available to EM contractors, but to acknowledge that the contractors are probably capable of accomplishing much more risk reduction than is required under their present contracts. EM must get more risk reduction performance from its contractors and, when appropriate, increase performance-based fees.

Move EM to an Accelerated, Risk-Based Cleanup Strategy

EM's cleanup strategy, in general, is not risk-based. Many wastes are managed according to their origins, not their risk. The framework and, in some cases, interpretation of DOE Orders and requirements, laws, regulations, and cleanup agreements have resulted in DOE's diverting resources to lower-risk activities. The Team recommends that DOE take the following steps to move toward a risk-based cleanup approach:

- Cleanup work should be prioritized to achieve the greatest risk reduction at an accelerated rate.
- Realistic approaches to cleanup should be based on technical risk evaluation, with consideration given to anticipated future land uses, points of compliance, and points of evaluation.
- Cleanup agreements should be assessed for their contribution to reducing risk to workers, the public, and the environment.
- Waste acceptance criteria at facilities for permanent disposal should be reevaluated to identify other waste streams that could be sent to these facilities without increasing risk to workers, the public, or the environment.

These changes must be accompanied by changes in DOE's own internal approach to cleanup (as discussed next). The Team recommends that DOE initiate an effort to review current DOE Orders and requirements, as well as regulatory agreements, for their focus on accelerated risk reduction. DOE should commence discussions with states and other regulators with a view to achieving regulatory agreements that accelerate risk reduction based on technical risk evaluation.

The Team believes many of the above reforms can be achieved within the current statutory framework. If DOE identifies specific statutory obstacles to achieving an accelerated,

risk-based approach to cleanup, it should propose to Congress the specific changes in current law that would be necessary to carry out this approach.

Align DOE's Internal Processes to Support an Accelerated, Risk-Based Cleanup Approach

The Team found that DOE's own internal processes are inconsistent with an accelerated, risk-based approach to cleanup. The hazards at DOE sites and the enormous liability associated with those hazards dictate the need for a sense of urgency and for well-managed and -directed internal processes that will enable swift execution of cleanup and closure activities. The Team recommends that DOE initiate the following actions to transform its processes and operations to reflect this urgency and time sensitivity:

- *Improve work planning*—EM must take action to improve its up-front understanding and planning of work, to improve contract administration and work oversight, and to reduce or eliminate work that does not reduce risk. To address its uncontrolled cost and schedule growth, EM must raise its standards of performance by applying the project management principles presented in DOE Order 413.3 to all of its core work areas, including those at the program level.

- *Expand the application of Integrated Safety Management (ISM)*—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. By focusing 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 the higher levels of management at which major work identification and contracting decisions are made, because this is where ISM thinking will achieve breakthrough safety improvements.

- *Learn from the past*—Much of the EM Headquarters and field staff is unaware of specific examples where inadequate work scope definition and ineffective government oversight delayed real risk reduction for workers, the public, and the environment. Lessons learned should be developed at a corporate level to provide a frank description of significant project issues, and to identify how EM intends to apply the lessons learned to benefit the overall cleanup program. Corporate lessons learned should become required learning for all EM managers.

- *Apply DOE requirements in a manner consistent with the work at hand*—DOE must review its Orders and clarify requirements relevant to cleanup. A prototype for this effort is the deactivation and demolition of a large administration building (Building 111) at the Rocky Flats Environmental Technology Site. This requirements review must also lead to the development of a streamlined process for interpreting DOE Orders and requirements for more complex cleanup projects.

- *Streamline and accelerate DOE's implementation of the National Environmental Policy Act (NEPA)*—DOE's actions under NEPA are cumbersome and time-consuming and may not provide sound analyses of alternatives. The result is delays in accomplishing work, increased project costs, and inadequate information to support good decision making. DOE needs to streamline and expedite its NEPA work and make broad use of functionally equivalent processes.

- *Streamline DOE's packaging and transportation program*—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. DOE needs to establish a streamlined approval process and program authority in this area.

- *Accelerate the closure of small sites*—With relatively little additional investment, the risks at remaining small sites can be eliminated sooner, and the life-cycle costs to complete these cleanup projects can be reduced significantly. DOE should move to consolidate and streamline management of these sites and to ensure that contracts and internal business processes drive their safe, accelerated closure.

- *Develop a human capital strategy*—A dramatic increase in performance standards and clarification of specific expectations for the EM program will provide EM's workforce with new opportunities to participate in the success of a technically demanding program. To support these increased expectations, EM must provide a work environment that emphasizes opportunities for professional growth, technical training, and individual accountability. Additionally, it must be made clear that increased career prospects and personal growth opportunities are available to individuals who succeed in this environment. EM leaders must be selected on the basis of proven performance and management competencies, together with clear potential for accepting increased responsibility and accountability. The Team encourages the Assistant Secretary for Environmental Management to consider the hiring opportunities provided by Congress in the Excepted Service program when making leadership assignment decisions.

The Team believes most of the above changes can be initiated within 90 days. Results should be reviewed in 18 months.

Realign the EM Program So Its Scope Is Consistent with an Accelerated, Risk-Based Cleanup and Closure Mission

The Team found that EM is responsible for elements that may not be related to an accelerated cleanup and closure mission. EM's success requires a laser-like focus on its core mission of cleanup and closure. Such a focus requires assessing the relevance of nonrelated or supporting

missions to an accelerated, risk-based cleanup program. To this end, the following steps should be taken:

- *Accelerate the consolidation of activities that require safeguards and security infrastructure*—EM currently devotes significant funds and administrative energy to safeguarding nuclear materials stored inefficiently at numerous facilities and sites throughout the country. Accelerated consolidation of these materials would enhance safety and security, reduce threats, reduce risk, and save money.

- *Refocus the EM technology program*—EM's technology program is not focused to meet the current needs of the cleanup program. This program needs to be refocused to directly address the specific, near-term applied technology needs for cleanup and closure. Longer-term or more basic research and technology activities should be transferred to other DOE programs, such as the Office of Science. Programs and laboratories not directly supportive of cleanup and closure should be moved to other parts of DOE or eliminated entirely.

- *Divest EM from non–cleanup and closure activities*—EM should stop funding efforts aimed mainly at expanding the mission work of other DOE programs. EM should redeploy, streamline, or cease activities not directly supporting an accelerated, risk-based cleanup and closure program. This includes DOE-wide activities or programs that exceed EM's specific cleanup needs and ongoing mission work aimed primarily at expanding a site's non-cleanup mission or supporting the mission work of other DOE programs. Many of these activities may be worthy of DOE or federal government support. If so, they should be transferred out of EM to another part of DOE or another federal agency.

III. Issue Statements

As noted earlier, the Team identified twelve issues that define the four areas of weakness set forth in Section II. Brief issue statements are presented below; detailed discussion, including a call to action to address each issue, is included in Section V.

Improve DOE's Contract Management

Issue #1—Getting More Performance from Performance-Based Contracting. Performance-based contracting is the single best opportunity for enhancing the economy and efficiency of EM's operations; however, it is employed inconsistently and with varying effectiveness in achieving risk reduction for workers, the public, and the environment. Contracting is a two-party exercise that requires improvements by both DOE and the contractor.

Move EM to an Accelerated, Risk-Based Cleanup Strategy

Issue #2—Managing Waste to Reduce Risk. The current framework and, in some cases, interpretation of DOE Orders and requirements, laws, and regulations create obstacles to achieving cleanup that reduces risks to human health and the environment as quickly as possible.

Issue #3—Developing a Programmatic Strategy for Accelerating Site Closure. There is no programmatic strategy for closure of DOE sites with no future mission or those scheduled to be phased out in time. Rather, only a collection of individual site strategies exists. This fragmented approach results in costly duplication of effort and assignment of priorities on a local rather than national basis.

Issue #4—Improving Agreements to Allow Program Success. Too often regulatory agreements have failed to achieve the expected risk reduction and accelerated site closure. In some cases, provisions in the agreements have not focused on the highest risk.

Issue #5—Safeguards and Security: Reducing the Threat at EM Sites. Large quantities of special nuclear materials are stored at numerous EM facilities and sites that have no programmatic need for these materials. A great deal of combustible and dispersible transuranic waste is also stored at many EM sites awaiting certification and disposal. This scattered storage configuration is not optimum for safety and security, is expensive, and is difficult to manage.

Issue #6—Long-Term Stewardship for Protection of Public Health and the Environment. DOE needs to plan adequately for a long-term stewardship program at sites where cleanup has been completed to ensure protection of public health and the environment.

Align DOE's Internal Processes to Support an Accelerated, Risk-Based Cleanup Approach

Issue #7—Using Breakthrough Business Processes to Accelerate Risk Reduction. EM's existing business processes are not structured to address its most serious management challenges—uncontrolled cost and schedule growth. As structured today, the EM program is presently estimated to cost about $220 billion; DOE's financial liability under current cleanup plans will continue to grow in cost and schedule if significant changes to the program are not made. Without breakthrough business processes, cost growth and schedule delays will continue to obstruct cleanup, and the risk to workers, the public, and the environment will not be reduced. The cost estimate could easily increase to more than $300 billion.

Issue #8—Implementing the National Environmental Policy Act Process to Better Support EM Decision Making. The National Environmental Policy Act (NEPA) process as currently implemented for EM projects and programs is often time-consuming and costly without providing the sound analysis and rational alternatives needed to support good decision making by DOE senior management.

Issue #9—Integrated Program for Accelerating Cleanup of Small Sites. The EM program includes several "small sites" for which completion of cleanup can be accelerated and life-cycle costs reduced if consolidated management focus is applied.

Issue #10—Packaging and Transportation to Support Accelerated Risk Reduction. Current packaging and transportation policies and procedures are resulting in delays in the removal of materials from sites, causing increased cost and delayed risk reduction.

Realign the EM Program So Its Scope Is Consistent with an Accelerated, Risk-Based Cleanup and Closure Mission

Issue #11—Focusing EM Program Resources on Cleanup. EM has been funding and managing several types of activities that may not be appropriate for an accelerated, risk-based cleanup program. As a result, both budget resources and staff and management attention may not be fully applied to the cleanup and closure mission.

Issue #12—Refocusing the Science and Technology Program. The Science and Technology Program is not focused on providing the support needed for EM to achieve its mission.

IV. Implementing the New Strategy

The overarching guideline for implementation should be to accelerate risk reduction while protecting the health and safety of workers and the public, protecting the environment, and improving national security. The major issues to be addressed to meet this goal have been briefly described in Section III and are discussed in detail in Section V. The accomplishment of the work involved will necessitate major engineering efforts. To this end, a carefully balanced financial strategy must be in place. Additional resources will be required in the next few years, but this investment will result in reducing risk more quickly and will produce major savings in life-cycle costs. The strategy will be designed to permit focusing cleanup on accelerated risk reduction while deliberately scheduling major project expenditures to prevent large increases in funding for the total EM program in any one year.

The Team has reviewed current plans for all sites and proposed changes required to implement accelerated risk reduction. Under this proposed strategy, risk reduction will be accomplished by stabilizing high-risk materials; by decommissioning and decontaminating high-risk facilities; and by accomplishing cleanup and closure, including transfer of large excess land areas to other entities for management. National security will be improved through the consolidation of all special nuclear materials in modern safeguarded facilities and through accelerated disposal of transuranic (TRU) waste currently stored at sites around the country.

Accelerated risk reduction programs will require the development of a pragmatic approach to cleanup based on real risk reduction.

Stabilizing High-Risk Materials

High-risk materials include all highly radioactive waste stored in tanks, spent nuclear fuel, all special nuclear materials, and some TRU waste. The major cost driver in the EM complex is related to the current baseline plan to retrieve, treat, and vitrify waste in the tank farms. To accomplish this plan would require the operation of vitrification plants at the Hanford Site, Idaho National Engineering and Environmental Laboratory (INEEL), and Savannah River Sight (SRS) for many years and would cost more than $50 billion. Under the proposed EM program, these same wastes will be classified according to total curie content and the curie content of long-lived isotopes and treated appropriately. Only those wastes with high-curie long-lived isotopes will be vitrified. Alternative processes such as steam reforming, calcination, saltstone, or other grouting techniques should be considered for stabilizing tank waste containing low-activity and TRU wastes.

Special nuclear materials present both a health and safety risk and a safeguards and security risk. These materials, primarily plutonium metals and oxides and highly enriched uranium (HEU), are currently stored throughout the EM complex and must be safeguarded even though EM has no programmatic need for them. The materials must be stabilized to ensure safety and then packaged for long-term (50 years) storage. Stabilization of plutonium materials usually consists of heat treatment to produce a stable oxide and remove moisture. In some cases, however, it may be necessary to dissolve the materials and chemically process them to produce plutonium metal. The plutonium material can then be packaged in suitable containers (e.g., 3013 welded cans) and stored in vaults. Under the proposed EM plan, stabilization and packaging of stored plutonium will be accelerated at SRS, Rocky Flats Environmental Technology Site, and Hanford. In addition, a major improvement in national security could be achieved through consolidation of plutonium in a modern safe and secure facility. All HEU could be consolidated at the Oak Ridge Y-12 Plant.

Spent nuclear fuel exists primarily at three locations in the EM complex—INEEL, SRS, and Hanford. At both INEEL and Hanford, all spent fuel is being removed from wet storage basins, treated or packaged as necessary, and placed in dry storage. Under the proposed plan, those efforts will be accelerated, water and sludge will be removed from the basins and treated, and the basins will undergo decontamination and decommissioning. SRS will continue wet storage but will consolidate all spent fuel into a single basin. In all cases, most of the spent fuel will be disposed of in a repository. Some of the fuel at SRS will be chemically processed to be used in the HEU blend-down program.

To meet current acceptance requirements at the Waste Isolation Pilot Plant (WIPP) and transportation requirements for shipment to WIPP, some TRU waste must be treated to remove organics. In addition, a limited amount of TRU waste is highly radioactive and must be handled remotely. Efforts to dispose of these materials in WIPP will be accelerated. Based on technical risk evaluations, some low-level TRU waste may be safe for disposal in a manner similar to low-level or mixed low-level waste.

Deactivation, decontamination, and decommissioning of high-risk facilities at the closure sites will be required. Under the new baseline, all EM excess high-risk facilities at sites with long-term missions will be decontaminated and either placed in safe condition for continuing surveillance or demolished, depending upon the results of risk assessment.

Accelerating Cleanup and Closure

Three major sites—Rocky Flats, Fernald Environmental Management Project, and Miamisburg Environmental Management Project—have current baseline plans to reach closure between 2006 and 2010. This work should be accelerated to close all three sites by 2006. In addition, there are about 15 small sites that can be closed by 2006 by the provision of funding and priority to complete the work. Packaging and transportation of special nuclear materials and TRU waste is vital to meeting this goal. Therefore, a core competency should be established at EM Headquarters to expedite container certification, coordinate efforts with other agencies and DOE organizations, and provide support for efforts assigned to the field offices.

Sites with ongoing missions or long-term cleanup and closure commitments (more than 20 years) should stabilize any high-risk materials, reduce or eliminate any new waste streams, deactivate high-risk facilities with no mission, and reduce the footprint and associated landlord requirements. In addition, consistent with current commitments, these sites should establish long-term on-site interim or monitored retrievable storage plans, pending permanent disposal.

EM should develop solutions or end-state programs, such as vitrification and packaging for disposal in a repository, in an orderly, cost-effective manner as a national program—not as individual site programs. Current cleanup requirements stem from a multitude of DOE Orders, federal and state laws, and cleanup standards set by the Environmental Protection Agency or other regulatory and/or quasi-regulatory bodies. Many of these requirements and agreements were established without an understanding of the magnitude of the required cleanup of contaminated sites and the stabilization of nuclear materials in accordance with these standards, as well as the associated costs. In addition, since the end of the Cold War, decisions on the future, enduring, and new missions of various DOE weapons programs and EM sites have been evolving. DOE now has a much more comprehensive understanding of what needs to be done, how long it will take, and what it will cost in both the EM and national defense program areas.

As the EM program has evolved since its inception in 1989, significant effort has been expended on understanding the full scope of the cleanup program. However, in the process of defining the cleanup program and the approaches to be employed, DOE accepted the existing requirements and agreements in some cases without regard to their appropriateness. Now that DOE has better knowledge of the scope of the cleanup program and the activities required to reduce risk, the underlying assumptions should be revisited as to their value for accelerating risk reduction. As an example, DOE Order 435.1 is being interpreted conservatively relative to cesium-137. If dispositon of cesium-137 were determined based on technical risk evaluation, more material could be disposed of in near-surface vaults, tanks could be closed more quickly, and risk reduction would be accelerated.

V. Issues

This section provides detailed discussion of the twelve issues set forth in Section III. For each issue, background information is presented, followed by a call to action for the issue's resolution.

#1 Getting More Performance from Performance-Based Contracting

Issue

Performance-based contracting is the single best opportunity for enhancing the economy and efficiency of EM's operations[1]; however, it is employed inconsistently and with varying effectiveness in achieving risk reduction for workers, the public, and the environment. Contracting is a two-party exercise that requires improvements by both DOE and the contractor.

Background

It is DOE's practice to have contractors carry out the vast majority of construction, scientific, and engineering activities within EM's presently structured $220 billion cleanup program. The current focus on performance-based contracting started in 1994 when the DOE Contract Reform Report recommended the use of performance-based contracting to the maximum extent practicable. EM's present contracting policy ties elements of the contractor's profits to the achievement of specific technical performance objectives, delivery schedules, or cost-control objectives, as well as subjective elements.

During fiscal years 2000 and 2001, most EM contractors earned more than 90 percent of the available performance fee, indicating they were successfully achieving the performance goals established by DOE in their contracts. In contrast, risk reduction and closure performance have not been successful.

To be successful, performance-based contracting must be part of a larger acquisition process that includes careful project planning, understanding of contractor motivations, detailed performance work statements, and an accurate performance measurement process.[2] The integration of performance-based contracting with the acquisition process is consistent with the

[1] DOE/IG-0491, *Special Report on Management Challenges at the Department of Energy*, November 2000.
[2] *DOE Acquisition Guide, Performance Based Contracting Update*, August 2001.

Office of Management and Budget goal of "improving DOE's project and contract management," identified as one of 12 agency-specific priority management objectives for fiscal year 2001.

When EM's current performance-based contracting activities are viewed as part of the overall acquisition process, the following observations result:

- EM competes for cleanup services in a public marketplace that includes many non-DOE contractor opportunities. Figure 1 illustrates that larger, faster-growing construction-type opportunities are available to EM contractors. Additionally, EM's market share decreased from 12 percent in 1997 to 8 percent in 2000. Thus a thoughtful marketplace strategy is required if EM is to attract the best contractor services available.

- Many DOE managers believe that fees for specific performance made available to facility contractors may not have been adequate to attract best-in-class contractors.[3] This issue is significant and warrants additional examination by EM.

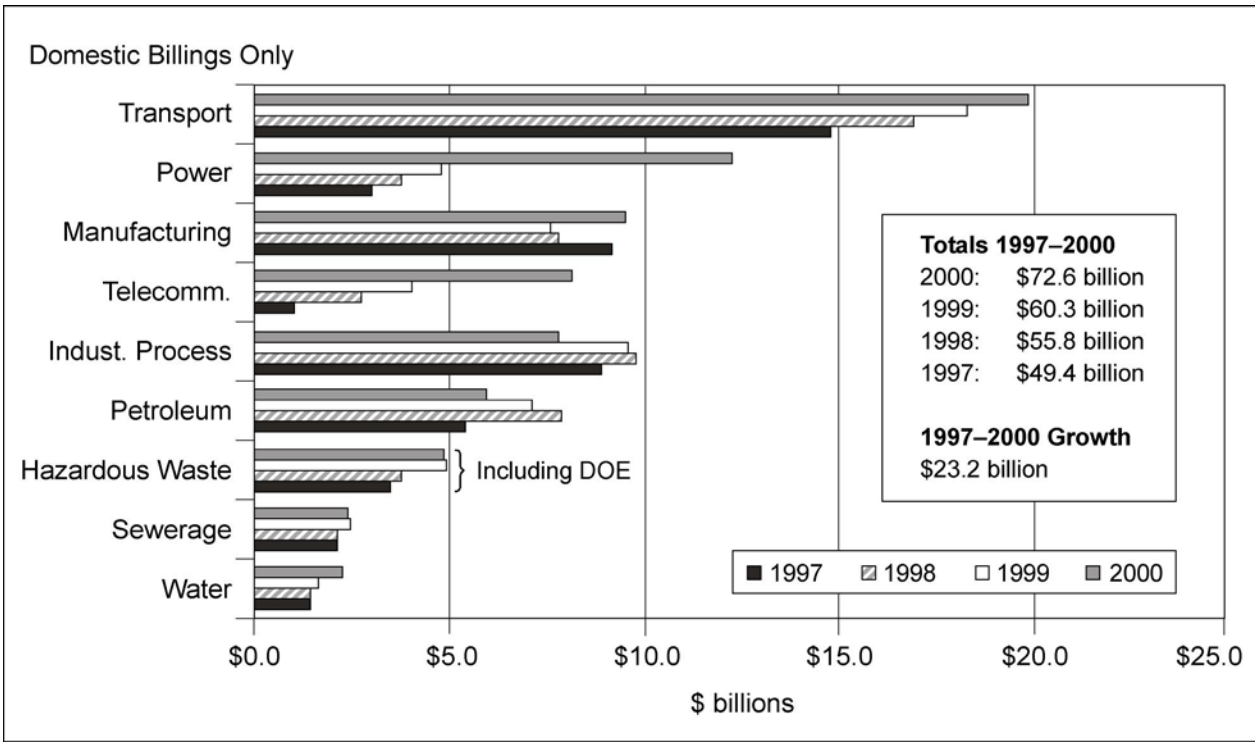


Figure 1. Marketplace Where EM Competes for Cleanup Services
(Source: Engineering News Record, May 21, 2001)

[3] DOE, Office of Management, Budget, and Evaluation, *Analysis of DOE Contractor Base: Focus on EM*, November 2001.

- Frequent changes and schedule delays occur during EM's contract acquisition process. Requirement changes and schedule delays are costly for large companies and present a major obstacle for small firms to do business with DOE. Contractor proposal costs can be up to $10 million for a large EM contract and up to $1 million for a major small-business contract.

- The use of performance-based incentives to improve contractor performance is a complex process that requires contracting experience, understanding of contractor motivations, and a clear vision of EM's cleanup objectives. Without an established corporate policy, the application of performance initiatives in a contract appears inconsistent and not supportive of EM's goal of reducing risk to workers and the public. For example, DOE/Office of the Inspector General (IG) conducted audits of the performance incentive fee process at three DOE sites.[4] Using the 1994 Contract Reform initiative and the Federal Acquisition Regulation (FAR), Part 37.601, as procedural references for establishing performance objectives, two areas of concern were identified:

  - The practice of identifying recurring performance-based incentives (i.e., similar performance fee payments year after year) without an increase in performance expectations
  - The practice of lowering a performance incentive goal without reducing the associated monetary incentive

  The purpose of performance-based incentives should be clarified in a corporate policy statement.

- Government administration of contracts and oversight of contractor work are inconsistent and often misunderstood when performance-based contracts are used. The DOE Acquisition Guide acknowledges that use of highly incentivized contracts (e.g., cost plus incentive fee, firm fixed price) shifts more of the risk to the contractor, but does not eliminate the need for government oversight. This point is clearly illustrated by recent shortcomings identified in government oversight of fixed-price contracts.[5]

- The shift to performance-based contracting requires changing many long-standing management practices and relationships between DOE and its contractors. Performance-based contracts incentivize contractors to use their unique problem-solving skills to complete EM's cleanup goals safely and expeditiously. The only way contractors earn their fee is by accomplishing the cleanup goals incentivized in their contract. This is a significant shift from the old management and operating (M&O) contracting method, whereby the fee paid was based largely on the contractor's level of effort and relationship with its DOE counterparts. To reinforce EM's emphasis on risk reduction, all contractor fees should be based on objectively

[4] DOE/IG-0510, *Use of Performance-Based Incentives at Selected Departmental Sites*, July 2001.
[5] DOE/IG-0481, *The D&D Contract at ETTP*, September 2000.

determined performance metrics that gauge the achievement of real cleanup. Subjectively determined performance metrics should be eliminated because they can reward or penalize contractors for level of effort and interpersonal relationships, rather than cleanup completed.

- The negotiation process for performance incentives should be fully documented so that EM's rationale supporting fee strategy, as it evolves during the contract negotiation process, is clear and transparent. This rationale will then serve as a reference during future fee negotiations to prevent the perception that EM is changing fee payment rules after the contract has been signed.

- The fee denial and renegotiation process is not well defined and results in excessive efforts by both the government and contractors in resolving fee determination questions.

Call to Action

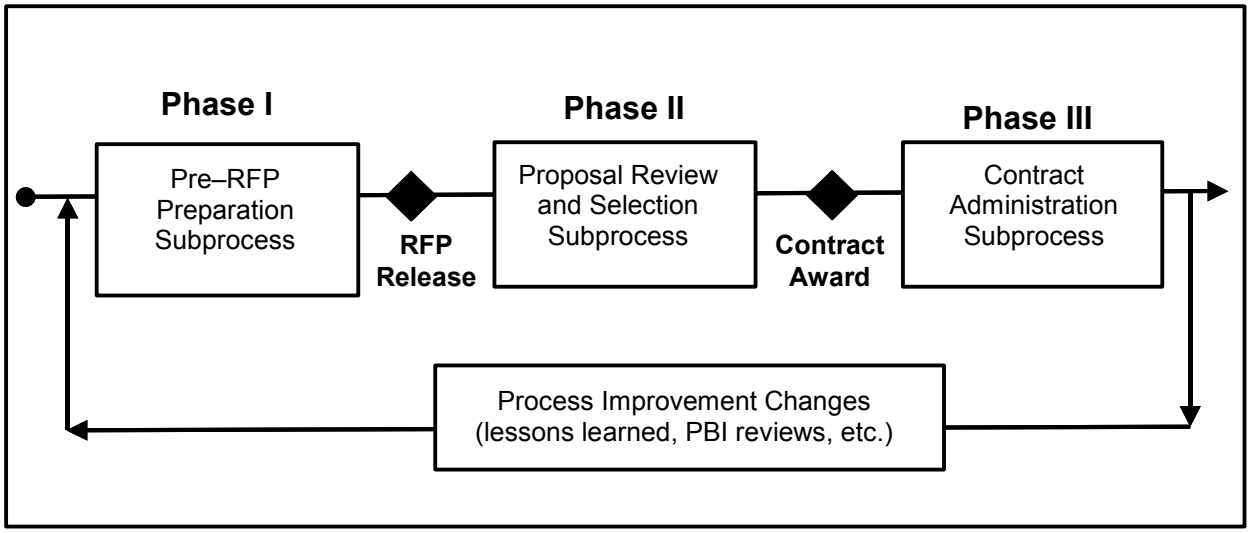
Current performance-based contracting activities should be reviewed and, where necessary, restructured to provide for focused, streamlined, and unambiguous pursuit of risk reduction for workers and the public. This review should treat performance-based contracting as part of a fully integrated corporate contract acquisition process that considers project management, contract management, financial management, and DOE oversight processes (see Figure 2).

As a corporate business process, performance-based contracting should be managed with a focus on customer satisfaction, elimination of defects, and improved profitability (i.e., fully achieving EM's goal of risk reduction with a less-expensive effort). Steps taken should include, but not be limited to, those described below.

Overall Contract Acquisition Process

- Make performance-based contracting a core-competency business process for the EM organization. Every EM manager must have a detailed understanding of how EM risk reduction goals are translated through the DOE acquisition process into quantifiable deliverables identified in a contract.

- Recognize that EM competes for cleanup services in the public marketplace. A strategy should be developed that considers the motives and interests of contractors. Its objective should be to provide Requests for Proposal (RFPs) that attract best-in-class contractors and achieve clear, unambiguous risk reduction for workers and the public.



Note: RFP = Request for Proposal; PBI = performance-based incentives.

Figure 2. General Contract Acquisition Process

- Consider the contractor as the primary customer of the RFP acquisition process. Management should focus on achieving customer satisfaction by delivering high-quality RFP products on time, at the lowest possible cost to the customer.[6]

- Develop objective methods for recognizing, measuring, analyzing, and controlling defects in the contract acquisition process. This effort should be conducted formally, with results used as feedback to improve the overall process, and should include understanding customer expectations, needs, and values.

- To obtain a sense of the effectiveness of the EM acquisition process, conduct a review of recent EM RFPs for process defects using metrics such as:

  – Schedule delays in the RFP–contract award process

  – Technical and organizational changes to the RFP after initial distribution

  – Inconsistencies among sections of the RFP, specifically:

    - Section C, "Statement of Work"
    - Section L, "Instructions to Offerors"
    - Section M, "Subcontract Award Criteria"

    Inconsistencies should be determined by reviewing questions submitted by contractors.

[6] *Six Sigma*, ISBN 0-385-49437-8, January 2000, p. 77.

- Develop formal lessons learned and a best-practices program for the EM contract acquisition process. This should include, but not be limited to, risk sharing between the contractor and DOE, as illustrated by Rocky Flats Environmental Technology Site Government Furnished Services and Items; risk identification and management within the Miamisburg Environmental Management Project (MEMP) baseline; and oversight of the East Tennessee Technology Park fixed-price contract.

- Examine the DOE/Office of Management, Budget, and Evaluation observation that historically, fees made available to facility contractors may not have been adequate to attract best-in-class contractors.

- Examine contract types available in the FAR, and develop a process for matching the work to the appropriate contract type.

Phase I: Pre–RFP Preparation Subprocess

- Use an Integrated Safety Management (ISM) approach to work planning. This applies to EM in the RFP preparation process and to the contractor in the technical approach submission process.

- Establish an EM Integrated Project Team to define the work scope and illuminate known uncertainties and risks prior to the initial RFP release. The contractor's view of uncertainty and risk should be requested and evaluated as part of the RFP process.

- Use the government's uncertainty and risk evaluation when deciding the type and performance basis of the contract.

- Explore the use of the commercial contract format developed by the contractor at Rocky Flats for decontamination and decommissioning (D&D) of Building 111. This process eliminated any reference to DOE Orders in the statement of work by translating the DOE Order requirements into clear requirements statements. The effort attracted many nontraditional DOE contractors and successfully reduced D&D costs by 66 percent.

- Identify a streamlined process for interpreting complex DOE Orders (e.g., safety basis requirements) during the cleanup process.

- Explore the use of a contract clause that clearly defines the government methods of contract administration and oversight for the contract being considered.

- Clarify the fee denial and negotiation process, and include the clarification as a contract clause.

Phase II: Proposal Review and Selection Subprocess

- Develop formal quality standards and expectations for Source Evaluation Board staffing, including senior management involvement.
- As a preference, use contractor oral presentations as a supplement to written proposals, not an alternative. Oral presentations should be used to elaborate, emphasize, and justify topics already included in a written proposal. Additionally, in such presentations, DOE should make greater use of presenting problems to the offerors as a way of measuring the adequacy and depth of knowledge of the contractor team.
- Allow a broad discussion of exceptions, deviations, and conditional assumptions as part of the proposal process. DOE should foster a continuing dialogue to ensure that it receives the best innovations industry can offer.

Phase III: Contract Administration Subprocess

- Execute DOE oversight as described in the contract clause.
- Eliminate the use of subjective performance-based incentives.
- Document the original performance negotiation process so that EM's fee strategy, as it evolves during the contractor negotiation process, is clear and transparent. Future fee discussions should be conducted in accordance with the contract clause, using the original negotiation documentation as a reference.

#2 Managing Waste to Reduce Risk

Issue

The current framework and, in some cases, interpretation of DOE Orders and requirements, laws, and regulations create obstacles to achieving cleanup that reduces risk to human health and the environment as quickly as possible.

Background

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. The EM program includes many instances of wastes managed more stringently and at higher cost than is warranted by the health risks posed. Selected examples follow:

- Low-activity high-level waste (HLW) is managed as if high-cost retrieval and vitrification were the only option available to protect the public. This waste is less hazardous than some low-level waste (LLW) that is considered acceptable for lower-cost near-surface disposal. This problem arises because HLW is defined based on its source rather than its constituents and their concentrations. In essence, there is no concentration below which HLW ceases to be HLW. Furthermore, the current conservative interpretation of cesium-137 as a "key radionuclide" under DOE Order 435.1 is preventing consideration of viable low-risk, low-cost alternatives to the disposition of some waste containing that radionuclide. Present requirements and assumptions will result in retrieval and vitrification of low-hazard waste for negligible public health and environmental benefit. Decisions based instead on technical risk evaluation would permit alternative treatment for some wastes. These actions would enable faster cleanup and substantial risk reduction at an accelerated rate.

- Shipments of transuranic (TRU) waste are often delayed because of size or weight limitations. Other limitations include the presence of organics, head-space gas measurements, and a very expensive certification process (up to $20,000 per 55-gallon drum). Substantially less costly methods could be employed to manage TRU waste while protecting the public, workers, and the environment.

- There is no 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. This is because the waste cannot be shown conclusively to contain no hazardous substances. Basing release of these materials on technical risk evaluation could allow reuse or disposal in less costly facilities. Under present requirements, these wastes are classified as LLW or mixed LLW.

- Some mixed LLW either is being disposed of at greater cost than warranted by risk as determined by performance assessment (e.g., gloveboxes from the Rocky Flats Environmental Technology Site) or has no disposition pathway. Providing disposal pathways for all such wastes would reduce risks and costs and accelerate site closures.

A major reason the EM program includes many cleanup activities that are not aligned with the risk posed by the material involved is that many radioactive and hazardous chemical wastes are managed based on their source, rather than assessment of risks to human health that

arise from waste management or disposal. As a result, wastes from different sources are managed differently even when they pose similar health risks.

Call to Action

The existing framework and, in some cases, interpretation of certain DOE Orders and requirements, laws, and regulations are not conducive to supporting a programmatic strategy for risk reduction and accelerated site cleanup, and have led to a baseline that is not executable. The financial liability for implementing the present EM baseline is estimated at $220 billion, and estimates of the funding to complete the program increase each year. More important, risks are being reduced at a slow rate.

A superior approach would be to focus consistently on reducing risk to the public, workers, and the environment. In consultation with regulatory agencies and stakeholders, cleanup strategies should be developed on the basis of technical risk evaluation. Approaches to remedial action, immobilization, and isolation should be selected to be commensurate with the risk posed by the waste. The success of the program should be measured on the basis of risk reduction. This paradigm shift, a focus on risk reduction, must allow flexibility and prudent use of discretion. In addition to accelerated risk reduction, this paradigm shift will also result in reduced life-cycle costs and time to program completion.

#3 Developing a Programmatic Strategy for Accelerating Site Closure

Issue

There is no programmatic strategy for closure of DOE sites with no future mission or those scheduled to be phased out in time. Rather, only a collection of individual site strategies exists. This fragmented approach results in costly duplication of effort and assignment of priorities on a local rather than national basis.

Background

EM's site closure program is large, complex, and expected to cost hundreds of billions of dollars and last many decades. The program has not been well integrated, but rather managed as a loose association of individual field sites. As a result, there is costly duplication of effort, and end-state criteria are not standardized. The program is often driven by defining specific forms of treated waste, particularly for high-level liquid waste, without establishing technical criteria for determining when such forms are needed and without evaluating the performance of alternative forms.

Cleanup of the sites is often further complicated by a lack of realistic future land-use assumptions, and by scenarios that assume that highly contaminated areas will be subject to farming, drilling of wells, or residential use. In contrast, the cleanup of commercial industrial sites has assumed continued industrial use. "Brownfield" cleanups are being pursued to support faster cleanups and the productive reuse of property. Another major factor affecting DOE cleanups is points of compliance for groundwater contamination. To the extent that the points of expected compliance with state and U.S. Environmental Protection Agency (EPA) standards are located near areas unlikely ever to be released for public use, unrealistic goals for cleanup are established.

A number of issues, such as definition of HLW, revision of DOE Order 435.1, certification of shipping containers, and modification of waste acceptance criteria for repositories, need to be resolved at the national level. Resolution of many of these issues can be accomplished without significant expenditure of funds. It will be necessary, however, to use the best talent to establish acceptable criteria that will ensure safe cleanup and disposal of waste at an accelerated rate.

The business of EM is safe cleanup and closure. The overriding goal is to reduce risk and protect public health and safety. To accomplish that goal, priorities and the associated funding needs should be established at Headquarters after consultation with the sites, and should be based on the process of risk reduction, not merely controlling risk. When establishing priorities, emphasis should be placed first on the highest risks to human health and safety. As an example, in most cases the highest priority would be placed on removing liquids and solidifying wastes from tanks or basins of questionable integrity.

The approach to closure should depend on the type of site being closed. All near-term closure sites (those with no future mission) should be given priority in accelerating cleanup to a predetermined end state and in accordance with long-term monitoring provisions. Thus DOE and regulators need to agree upon a risk reduction program to protect public health and safety and a monitoring program that will ensure the continuation of that protection. At long-term closure sites with massive or complex requirements, closure should be pursued in an orderly, efficient manner based on an integrated national program. Sites with a long-term mission should move to (1) reduce or eliminate new waste streams, (2) stabilize materials, (3) decontaminate and decommission high-risk facilities with no mission, and (4) reduce the site's footprint and "mortgage" costs associated with security and maintenance.

Call to Action

In consultation with regulators and stakeholders, DOE should move on an urgent basis to define and implement a national strategy for cleanup that will reduce risks to the public and accelerate site closure. The strategy for risk reduction should be based on technical risk evaluation.

Zones where land will continue to be withdrawn from public access and where DOE will maintain long-term stewardship should be clearly delineated. Points of compliance should be placed outside controlled areas and cleaned up to standards based on planned future use. To accelerate risk reduction on a near-term basis, consideration should be given to stabilizing buried waste and tanks containing low-activity waste, including transuranics. Priority should be given to treating wastes with high curie content for off-site disposal and treatment. Technical risk evaluations should be conducted to evaluate a range of remedial options for intermediate-level (10–500 nanocuries per gram) TRU wastes.

All high-risk, highly contaminated facilities should be decontaminated and decommissioned on an expedited basis. Contracting approaches should be changed to provide incentives for closure. The proposed programmatic strategy should be based on technical risk evaluations and realistic criteria for an end state or interim end state. While local environmental and geological features must be considered, the goal should be to establish national criteria that are consistent throughout the system.

#4 Improving Agreements to Allow Program Success

Issue

Too often regulatory agreements have failed to achieve the expected risk reduction and accelerated site closure. In some cases, provisions in the agreements have not focused on the highest risk.

Background

More than 10 years ago, when the states, DOE, and EPA entered into agreements to clean up and close many DOE sites, the intent was to set targets for future cleanup actions with the understanding that preliminary work was needed to characterize the extent of contamination. Based on that information, potential cleanup options would be reviewed. In some cases, agreements were developed with detailed milestones and records of decision that prejudged characterization results and focused on near-term milestones rather than addressing the highest risks. As a result, meeting these milestones diverted resources from achieving long-term goals, and in a few cases, it actually increased the risk to the public and workers. There also are examples of agreements requiring end points that cannot be measured, do not reduce risk to the public, and significantly increase risk to workers.

In some cases, more-effective solutions to risk reduction have not been pursued because of DOE's unwillingness to reopen records of decision. In some cases, DOE has simply accepted or even advocated local positions without considering the national interest. Implementation of cost-effective methods is often delayed because of the tendency to assume that less costly means less effective. As a result, improved technology is not being fully utilized, realistic end states are

not being established, and intended future uses of contaminated areas have not been agreed upon at some sites.

The Team observed that another factor leading to delays and increased costs is related to use of the Resource Conservation and Recovery Act (RCRA) instead of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for closure. In general, CERCLA has a prescribed process that includes public participation and the development of a project plan with a negotiated end point for cleanup. The CERCLA process encourages site-wide planning with consideration of cost and feasibility. The CERCLA process also eliminates the need for costly, duplicative National Environmental Policy Act (NEPA) evaluations.

Call to Action

The current program assumes long-term schedules at large sites—such as Hanford, Idaho National Engineering and Environmental Laboratory (INEEL), and the Savannah River Site (SRS)—that are highly uncertain and involve high costs for maintenance and security. Current estimates indicate only one-third of the budget is spent on actual cleanup. The baseline program at many sites is open-ended, and major reductions in risk cannot occur for many years. Existing approaches that are faster, cheaper, and more technically sound and would reduce risk to the public and workers on a near-term basis should be pursued. If DOE can develop and present specific proposals to the states and EPA, with accelerated risk reduction set as the goal, agreement can be reached on a path forward. The result would be a program for closure that would achieve major risk reduction in the near term. The goal is closure with a shared vision for a realistically achievable end state and long-term stewardship where needed.

#5 Safeguards and Security: Reducing the Threat at EM Sites

Issue

Large quantities of special nuclear materials are stored at numerous EM sites that have no programmatic need for these materials. A great deal of combustible and dispersible transuranic waste is also stored at many EM facilities and sites awaiting certification and disposal. This scattered storage configuration is not optimum for safety and security, is expensive, and is difficult to manage.

Background

Nuclear material at EM sites is kept in storage areas that are not optimum for efficient safe and secure storage. For example, special nuclear material is stored at SRS, the Rocky Flats Environmental Technology Site, the Hanford Site, and INEEL. Each of these sites therefore requires expensive infrastructure to maintain appropriate safe and secure storage of these

materials. At Hanford, for example, the cost to store plutonium safely is more than $40 million per year. This scattered storage configuration diverts EM cleanup dollars because of the high annual fixed costs involved (more than $200 million per year) in maintaining this infrastructure, productivity losses in the cleanup program, and the need to react to safety and security requirements.

DOE has taken several steps to consolidate its nuclear materials, supported by environmental impact statements (EISs). Actions to implement these decisions have been hampered by a lack of certified shipping containers, as well as the overall low priority placed on such actions by DOE.

In addition to special nuclear materials, there are thousands of TRU waste drums stored in above-ground EM facilities that require high-priority funding for safety and security. While most of these storage facilities are inexpensive to maintain, there are dozens of them across the complex, so the cumulative annual fixed cost is significant. Certification and disposal of TRU waste are major cost drivers for the EM program. Efforts to expedite shipments to the Waste Isolation Pilot Plant (WIPP) and streamline regulatory procedures would result in obvious cost savings.

Finally, some spent fuel elements are stored in wet storage basins that are old and have the potential to leak. The fuel basins at the Hanford K-Area are next to the Columbia River and contain about 2,100 metric tons of fuel and millions of curies of radioactivity. Hanford has started moving the fuel to a more secure and safe dry storage location away from the river. At the current rate of movement, however, it will take more than 3 years to complete the transfer. In addition, possible single-point failures for key fuel-handling components pose much risk to the schedule.

Call to Action

The consolidation of EM nuclear waste, plutonium, and highly enriched uranium should be expedited. In this effort, EM should take advantage of the experience and infrastructure developed in removing plutonium and highly enriched uranium from Rocky Flats. This infrastructure can be applied to other sites, including Hanford. The accelerated effort proposed here would include the procurement and certification of shipping containers and integration of transportation infrastructure. In addition, the options for managing and dispositioning waste should be reevaluated based on new technology and design features needed to protect human health and the environment.

Finally, the shipment of stored TRU waste to WIPP and the removal of spent fuel stored at Hanford's K-Area basins should be accelerated, and the basins drained and decontaminated. The deactivation, decontamination, decommissioning, and demolishing of high-risk plutonium facilities, such as the Plutonium Finishing Plant at Hanford, should also be accelerated.

#6 Long-Term Stewardship for Protection of Public Health and the Environment

Issue

DOE needs to plan adequately for a long-term stewardship program at sites where cleanup has been completed to ensure protection of public health and the environment.

Background

As EM completes cleanup at sites for which it is responsible, certain limitations will preclude remediation to pre-existing conditions or residential standards:

- *Technical limitations*—Technologies may not exist to reduce or completely eliminate the volume of contaminants.
- *Economic limitations*—Consistent with the CERCLA remedial selection criteria, cost considerations may result in some contamination remaining after cleanup.
- *Worker health and safety*—Some remediation strategies pose higher risks to workers than those posed to the public by taking limited action.
- *Ecological damage*—Some remediation strategies may result in greater environmental impacts than leaving the contamination undisturbed or using containment measures.

In addition, agreed-upon cleanup strategies and standards that protect health and the environment often result in some residual contamination remaining in the environment. Moreover, at several sites, waste will be disposed of in on-site landfills and other engineered waste disposal facilities that require long-term stewardship.

Long-term stewardship involves activities associated with the physical and institutional controls and other mechanisms necessary to ensure protection of public health and the environment at sites where DOE has completed cleanup but the site cannot be free released. These activities include operating, maintaining, and monitoring landfill caps, groundwater pump and treat, and other engineered remediation systems; ensuring the effectiveness of fences, ordinances, and deed restrictions in preventing human intrusion; and other tasks, such as land management and community liaison. In fiscal year 2000, EM spent approximately $64 million on long-term stewardship for 34 completed sites and 24 partially completed sites, totaling 410 square miles. The total amount spent by 2050 is estimated to be $100 million for 129 completed sites (including the returned Formerly Utilized Sites Remedial Action Program [FUSRAP] sites) encompassing 842 square miles.

While EM is performing cleanup, for the most part, under CERCLA and RCRA authorities, these laws and their implementing regulations do not prescribe a process for postclosure/remedial operation, maintenance, and monitoring (i.e., long-term stewardship). In addition, each site is characterized by unique circumstances, such as selected remedies, end states, and future uses, that can influence long-term planning. As a result, there is no single cohesive set of guidelines for long-term stewardship. These issues as well as others, such as land transfers, information management, funding, natural resource management, and sustainability, have been raised by EM's Office of Long-Term Stewardship and its October 2001 long-term stewardship study.

Call to Action

The lack of a program strategy and a prescribed long-term stewardship process is resulting in uncertainty in the EM program and plans that may be excessive and other than risk-based. For example, at Weldon Spring, where cleanup will be completed later this year after a nearly $1 billion 16-year effort, the State of Missouri and DOE still need to agree on the final record of decision and stewardship plan. At West Valley, agreement is still needed with the State of New York on various aspects of cleanup and future control of the site. The Uranium Mill Tailings Radiation Control Act (UMTRCA) provides a model for an effective long-term stewardship process, as evidenced by the program's monitoring and surveillance being performed under Nuclear Regulatory Commission license at 26 Title I sites for $5 million annually.

EM needs to establish a long-term stewardship strategy and to develop policy and guidance that will result in consistent, predictable, risk-based implementation. The policy and guidance should be in accordance with the goals of RCRA and CERCLA and should be rooted in the programmatic strategy for accelerated site closure recommended under issue #3. Consideration should be given to using the UMTRCA process as a model, recognizing that risk should be used as an end-point determinant.

While long-term stewardship should be a consideration in formulating cleanup decisions, long-term stewardship activities, including operations, maintenance, monitoring, and land and information management, are not the focus of the EM mission of completing site cleanup. In addition, 64 of the 129 sites for which EM is to provide long-term stewardship are owned by entities other than DOE, and 20 have Lead Program Secretarial Offices other than EM. EM should develop a strategy for transferring lands that are not owned by DOE or associated with DOE missions but for which it is slated to perform long-term stewardship to other governmental organizations with land management missions. Policy should be formalized that assigns to the Lead Program Secretarial Offices the responsibility for long-term stewardship once cleanup has been completed at DOE-owned sites.

#7 Using Breakthrough Business Processes to Accelerate Risk Reduction

Issue

EM's existing business processes are not structured to address its most serious management challenges—uncontrolled cost and schedule growth. As structured today, the EM program is presently estimated to cost about $220 billion; DOE's financial liability under current cleanup plans will continue to grow in cost and schedule if significant changes to the program are not made. Without breakthrough business processes, cost growth and schedule delays will continue to obstruct cleanup, and the risk to workers, the public, and the environment will not be reduced. The cost estimate could easily increase to more than $300 billion.

Background

The 1999 EM cleanup plan scheduled 41 contaminated DOE sites for completion by 2006. Just 2 years later, schedule delays reduced this commitment to 25 sites. Additionally, the estimated cost of the outyear EM cleanup program increased by more than $10 billion in 1 year. Figure 3 displays the cleanup completion dates for EM's active sites. Unfocused and inconsistent business processes used to plan and manage cleanup work are the principal contributors to this negative trend.

Cost growth and schedule delays are not limited to the sites planned for closure by 2006. They are symptomatic of a much larger 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.

The October 2000 version of DOE Order 413.3 provided standards of performance for planning work and making key project management decisions. The Order acknowledged that many EM cleanup projects involve complex work activities with time-sensitive regulatory requirements stemming from RCRA and CERCLA. A streamlined management process was provided for these projects, with noteworthy flexibility for tailoring requirements and making decisions.

To date, little progress has been made in applying the principles and standards of performance of DOE Order 413.3 to EM's cleanup activities, particularly with regard to up-front planning of waste management, environmental restoration, and facility disposition activities. The result is an inconsistent work scope identification process that allows for hidden work with associated cost growth and schedule delays. Government oversight has not yet been able to restrain this negative trend. Consequently, EM's work planning process lacks an intense,

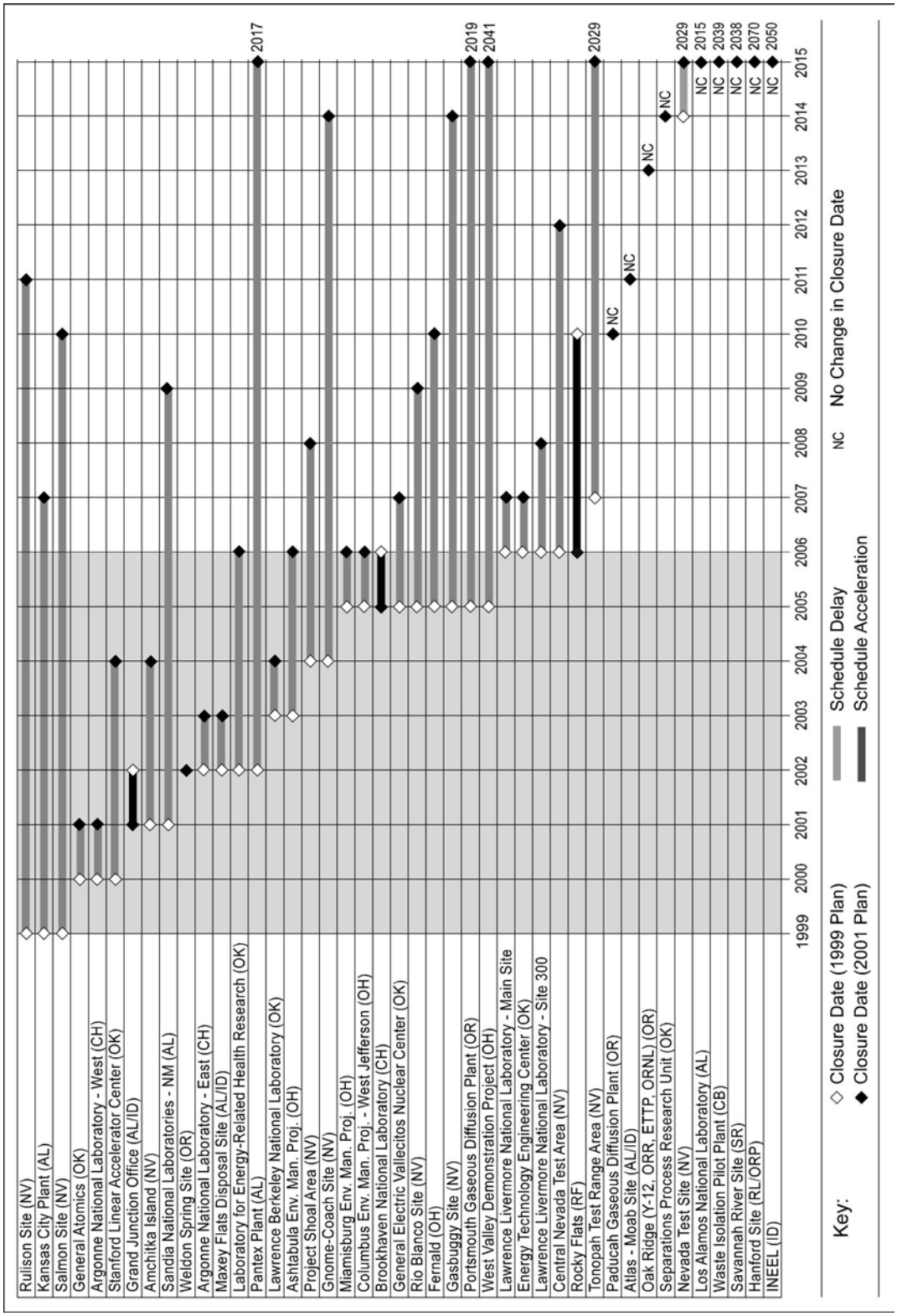


Figure 3. Closure Goals for Active EM Cleanup Sites (and DOE Field Offices with Management Responsibility)
(Source: Integrated Planning, Accountability, and Budgeting System data as of November 2, 2001)

business-like focus on work completion and expeditious reduction of risk to workers and the public. Several examples of this unfocused condition can be cited:

- *Uncertainty regarding contamination levels*—An EM site was scheduled for completion of cleanup no later than September 30, 2005, at an estimated cost of $427 million. This commitment was based on a contractor-proposed cleanup baseline that was reviewed and approved by DOE. To date, estimated cleanup costs have grown to more than $1 billion, and completion is now planned for 2009. Subsequent investigation revealed the cleanup baseline had been established and approved with limited knowledge and understanding of the extent of soil and building contamination. The result was an unachievable commitment to clean up this site by 2005.[7]

- *Uncertainty regarding site closure requirements*—An EM site was removed from EM's active site list in 1999; $112 million of active remediation work is still required to resolve soil and groundwater contamination, including organics contaminating groundwater. Even though the site is termed "closed" as an EM cleanup site, EM remediation work will continue until 2014.

- *Confusion regarding government oversight responsibilities*—Government oversight responsibilities for contractor work under a fixed-price contract were not clearly understood by DOE. An erroneous belief that government risk was minimal because the contract was fixed-price resulted in insufficient oversight of the contractor's work. Inadequate contractor performance was eventually discovered when the contractor incurred 61 percent of the contract price after completing only 14 percent of the project work. Contributing to the confusion were contractual provisions restricting government access to the contractor's financial reports and books.[8]

Call to Action

Current EM business processes lack the focused, business-like level of intensity required to complete cleanup work and expeditiously reduce risk to workers and the public. Additionally, when uncertainties are unavoidably incorporated in work plans, current business processes allow potential cost and schedule impacts to remain hidden, thus escaping the scrutiny of senior management.

EM's business processes should be reviewed and, where needed, streamlined and restructured to provide for focused, unambiguous pursuit of risk reduction for workers and the public. Each process should include straightforward methods for recognizing, measuring, analyzing, and controlling elements that inhibit success. The initial focus should be on business processes that can provide immediate, significant clarification of EM's efforts to reduce risk to workers and the public, such as the following:

[7] DOE/IG-0501, *Remediation and Closure of MEMP*, May 2001.
[8] DOE/IG-0481, *The D&D Contract at ETTP*, September 2000.

- *Business Process #1: Identifying Cleanup Goals*—DOE Order 413.3 provides basic standards of performance for structuring a work identification business process. This model includes principles for determining cleanup goals and managing uncertainties. However, it is configured for line item construction projects and must be tailored to EM's major lines of cleanup:
  - Facility disposition projects
  - Environmental restoration projects (e.g., waste sites, groundwater)
  - Continuous operations (e.g., waste repacking, waste treatment)
- *Business Process #2: Getting More Performance from Performance-Based Contracting*—Performance-based contracting is one of EM's greatest opportunities for enhancing the economy and efficiency of its operations[9]; however, it is employed inconsistently and with varying effectiveness. This process should be reviewed to ensure that it fully exploits the contractor's problem-solving talents for reducing risk to workers and the public (see Issue #1, Getting More Performance from Performance-Based Contracting).
- *Business Process #3: Expanding the Integrated Safety Management Approach to Work Planning*—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. By focusing 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. An example that best illustrates the ISM thought process is at an EM site where cutting up of gloveboxes for disposal as LLW is occurring. The waste acceptance criteria (WAC) at the disposal facility exclude lead; therefore, workers must remove all lead shielding prior to glovebox disposal—a labor-intensive process that increases worker exposure and risk of injury. Application of ISM thinking at higher levels of management has resulted in a challenge to the lead exclusion in the WAC to improve worker safety during the glovebox disposal process. It is well worth the administrative effort to investigate and, if possible, change the paradigm (e.g., change the WAC to accept lead).
- *Business Process #4: Clarifying Government Oversight Responsibilities*—Government oversight of work being done must be clarified to eliminate confusion and increase effectiveness. EM's administration of contracts and oversight of contractor work is inconsistent, ranging from excessive involvement (considered as non–value-added tinkering by some contractors) to inadequate surveillances for fixed-price contract work. The contract administration and oversight process should

[9] DOE/IG-0491, *Special Report on Management Challenges at the Department of Energy*, November 2000.

be reviewed, clarified, and communicated clearly to all parties. It should be patterned after DOE's safety oversight process and include:

- Established goals and work monitoring processes
- Identified formal and informal oversight practices
- Certified technical competencies of government monitors
- Description of the DOE work oversight process in a contract clause

■ *Business Process #5: Exploiting Past Lessons Learned*—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 the delay of real risk reduction for workers and the public. Lessons learned should be developed at a corporate level to provide a frank description of what went wrong or well, and how EM intends to benefit from the experience. These corporate lessons learned should become required learning for all EM management. Events to be addressed should include, but not be limited to:

- Contract administration and oversight for Pit 9 (INEEL)
- Understanding of initial contamination levels for Building 233-S D&D (Richland)
- Contractor oversight during the Office of River Protection privatization effort
- Contract administration and oversight at East Tennessee Technology Park (Oak Ridge)
- Risk identification and management within the MEMP baseline (Ohio)
- Technical planning and development during the In-Tank Precipitation effort (SRS)
- Risk sharing between the contractor and DOE for Government Furnished Services and Items commitments (Rocky Flats)
- ISM thinking during the national integration of the WIPP Project (WIPP)

■ *Business Process #6: Interpreting DOE Orders and Requirements During the Cleanup Process*—DOE must review its Orders and clarify requirements relevant to cleanup. A prototype for this effort is the deactivation and demolition of Building 111 at Rocky Flats. In this case, all DOE requirements were converted to simple statements contained within the RFP. Only those requirements necessary to accomplish the project safely were included in the contract. The RFP attracted broad contractor response. The project was successfully completed for less than one-third of the government's cost estimate.

As cleanup proceeds from deactivation to environmental remediation, DOE Orders and requirements present 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 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. The interpretation process for DOE Orders and requirements must be developed as a streamlined recurring event that supports the cleanup effort. The Orders and requirements must act as a beacon to guide EM to safe, effective cleanup, not as a stop sign that hinders progress.

- *Business Process #7: Focusing Cleanup Funds*—As EM completes cleanup at various sites, it should relocate "Closure Site" life-cycle funds to short-term, highly visible risk reduction projects. Sites should compete for these funds, with funding decisions being made by the Assistant Secretary for Environmental Management.

- *Business Process #8: Communicating Cleanup Business Information*—Noteworthy variances exist between field and Headquarters systems that collect, store, and report cleanup program information. The EM Headquarters system, the Integrated Planning, Accountability, and Budgeting System (IPABS), receives inputs from each field organization to provide a centralized location of cleanup information for DOE officials and the Congress. This information is also used to provide taxpayers with an estimate of remaining environmental cleanup liability. For various reasons, major program variances exist between the field's actual cleanup plans and the Headquarters IPABS system. Major differences must be eliminated if decision makers are to have a valid representation of EM's goals, schedules, and cost estimates.

#8 Implementing the National Environmental Policy Act Process to Better Support EM Decision Making

Issue

The National Environmental Policy Act (NEPA) process as currently implemented for EM projects and programs is often time-consuming and costly without providing the sound analysis and rational alternatives needed to support good decision making by DOE senior management.

Background

Many major decisions for the EM program are supported by environmental documentation such as environmental assessments and EISs produced in accordance with NEPA and DOE's supplemental implementing regulations (10 Code of Federal Regulations Part 1021). NEPA's purpose is to ensure that federal agencies consider potential environmental impacts and reasonable alternatives before making decisions regarding federal actions. The implementing regulations set forth this process and may result in preparation of an EIS and an associated record

of decision if the agency determines that an action is a major federal action having a significant impact on the environment.

In DOE, the NEPA process does not always serve the purpose for which it was created. The average time required to complete an 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. For example, the Team found that a programmatic EIS being prepared to evaluate the impact of dispositioning DOE scrap metal was focused on steel and other metals with surface contamination, while such valuable metals as copper and nickel that may be volumetrically contaminated were not being considered. In addition, for some EISs prepared for EM actions, the selection of the preferred alternative was not based on technical or risk assessments, but on the basis of what would be "acceptable" to the public or the regulators. This strategy can complicate the ability of management to assess overarching Departmental impacts resulting from a particular action.

Several issues arise with regard to preparation of EISs:

- Unrealistic concern about litigation tends to be a driver relative to EIS preparation and content, rather than defining the appropriate level of analysis of environmental impacts required to meet program goals and decision-making needs.
- Preparation of EISs, including internal DOE reviews, is a lengthy and costly process.
- Initial alternatives may not be adequate to support Departmental goals and decision making; thus reanalysis may be necessary.
- Delays in taking action while NEPA analyses are being prepared may have adverse impacts on human health and the environment and can result in additional program costs.
- Immediate responses that can mitigate or alleviate defined hazards during completion of the NEPA process are not pursued where appropriate.

Call to Action

It is clear that EM's NEPA process can be enhanced to support decision making more effectively and in a timely and cost-effective manner. This is an opportune time to undertake improvements since nine EISs are currently being prepared for EM actions. Of these, four—the Hanford Solid Waste EIS, the Idaho High-Level Waste and Facilities Disposition EIS, the Depleted Uranium Hexafluoride Conversion Facilities EIS, and the Disposition of Scrap Metal EIS—are particularly important since the associated projects or activities may commit DOE to significant funds or set forth major policies.

The process of preparing an EIS should be a deliberate one managed by senior EM officials. Unrealistic concerns about litigation should not receive greater emphasis than the effects of increased, technically based risk analysis. NEPA considerations should be initiated earlier in the project planning process. Once the decision has been made to prepare an EIS, EM management needs to oversee 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 should be reviewed accordingly, in consonance with NEPA and its implementing regulations, with a view toward developing a more streamlined, flexible, cost-effective process.

#9 Integrated Program for Accelerating Cleanup of Small Sites

Issue

The EM program includes several "small sites" for which completion of cleanup can be accelerated and life-cycle costs reduced if consolidated management focus is applied.

Background

As of the end of fiscal year 2001, EM had completed cleanup at 74 of the 114 contaminated geographic sites for which it now has responsibility. Several of the remaining sites can be considered "small sites." They include sites with annual budgets generally of less than $20 million and with closure dates (excluding long-term surveillance and monitoring and such activities as pump and treat) within the next 5 to 10 years. These sites are located in several states (e.g., California, Illinois, New York, and Texas) and are managed by a number of DOE operations offices, notably Oakland, Chicago, and Albuquerque. In general, missions other than EM, such as science and national nuclear security, are the primary focus of these sites.

With relatively nominal increases in annual budgets for these sites, completion of cleanup, along with risk reduction, can be accelerated at the same time that life-cycle costs are reduced. For example, for an additional $26.5 million per year from 2002 through 2008, the sites for which the Oakland Operations Office is responsible could be closed on an accelerated basis at a life-cycle savings of $462 million. These sites include Lawrence Berkeley National Laboratory, the Laboratory for Energy-Related Health Research, and the Stanford Linear Accelerator Center, at which cleanup would be completed in 2004, an acceleration of 3 to 5 years. At Lawrence Livermore National Laboratory Main Site and Site 300, cleanup would be done in 2007 and 2008, respectively, a respective acceleration of 20 and 9 years. Providing an additional $10 million for fiscal years 2002 through 2005 to the Chicago Operations Office would result in completion of cleanup of Brookhaven and Argonne National Laboratories in 2005 (not including decontamination and decommissioning of the Brookhaven High Flux Beam

Reactor). This would be 3 years ahead of the plan based on the fiscal year 2002 budget target, saving $100 million in life-cycle costs.

There are several challenges, however, that could hinder the attainment of this acceleration:

- The approach to cleanup at each of the sites differs because the cleanup is driven by different regulatory regimes, such as RCRA, CERCLA, and a variety of state authorities.
- DOE's responsibility for cleanup of the sites resides in different operations offices; each works individually with its regulators and within its office's budget targets.
- Uncertainty remains regarding end points because cleanup goals and final remedies at some sites have not been established; stakeholder interests add to this uncertainty.
- Some sites have orphan waste without a clear disposition path or other waste (e.g., remote-handled TRU waste) for which a disposition path will not be available until after the accelerated closure date.

Call to Action

The small sites should be given priority attention. Examples include Brookhaven National Laboratory, the Pantex Plant, and Lawrence Livermore National Laboratory, under which lie contaminated groundwater plumes in drinking water aquifers; municipal well fields are downgradient of the latter two sites. In addition, cleanup at these sites diverts management attention from the sites' main missions, which are devoted primarily to nuclear security and scientific research. Renewed efforts to accelerate the cleanup would reduce risks to public health and the environment more quickly and enable funding to be directed to accelerated cleanup at longer-term sites. Such efforts would also allow management to focus on the long-term national defense and scientific missions of DOE and the more difficult cleanup issues at the larger sites. DOE should pursue plans to consolidate management and allocate additional funding for such acceleration efforts.

While additional funding can facilitate expedited cleanup at the small sites, issues associated with cleanup strategies must first be resolved, including stewardship responsibilities and uncertainties associated with end points, as well as regulatory, stakeholder, and technical uncertainties. (These issues are also discussed under issues #3 [Developing a Programmatic Strategy for Accelerating Site Closure], #4 [Improving Agreements to Allow Program Success], #6 [Long-Term Stewardship for Protection of Public Health and the Environment], and #7 [Using Breakthrough Business Processes to Accelerate Risk Reduction]). Additionally, steps should be taken to optimize the cleanup of small sites for greater efficiency. These steps include streamlining management authorities and responsibilities currently located within several field offices, promoting consistency in cleanup strategy, providing budgetary and contractor flexibility, and dispositioning orphan waste.

#10 Packaging and Transportation to Support Accelerated Risk Reduction

Issue

Current packaging and transportation policies and procedures are resulting in delays in the removal of materials from sites, causing increased cost and delayed risk reduction.

Background

Responsibility for package certification and shipment of materials is divided among a wide variety of DOE programs and sites, which in turn must negotiate with a broad range of entities. Shipments by EM involve negotiations with states and American Indian tribes, the National Nuclear Security Administration (NNSA), and multiple rail lines, as well as the Department of Transportation and the Nuclear Regulatory Commission. For those packages for which DOE is the regulator, package certification is performed by DOE certification offices within EM and NNSA. There is no single point of leadership on these issues; thus individual sites bear much of the burden for negotiation with package certifiers, shippers, states, and American Indian tribes. At the same time, there appears to be no coherent policy or complex-wide priority setting on these issues.

The lack of organizational responsibility and accountability for packaging and transportation has resulted in long delays in package certification (e.g., 9975, DT22), which in turn has caused delays in the removal of materials from sites. The inability to predict when certified containers will be available makes it difficult to schedule safe secure transports (SSTs) and to negotiate shipments with states, American Indian tribes, and rail lines. Furthermore, inappropriate requirements and overly conservative interpretations of requirements add cost without providing commensurate risk reduction. For example, when shipping plutonium materials in 3013 containers (designed for safely storing plutonium for 50 years), no credit is given for the robustness of those containers. In addition, options that would benefit many sites (e.g., use of ATMX cars for rail shipment of TRU waste; intermodal transport of LLW to the Nevada Test Site [NTS]) are not being pursued aggressively. Finally, there is a need for a coherent shipping strategy so that multiple sites need not negotiate independently with the same state and so that DOE will derive greater benefit from its various discussions with the states.

Illustrative of this issue is the critical role played by transportation barriers in the accelerated closure of the Rocky Flats Environmental Technology Site. Neither DT22s nor SSTs have been available when desired to support accelerated closure. Since no central organization oversees these issues, the site has been left to negotiate many of them for itself. Other sites face a similar situation.

Call to Action

A better approach to packaging and transportation should be developed, including both EM internal actions and improved coordination with other involved parties. Having such an approach will accelerate the removal of materials from sites, with associated risk reduction and cost savings. There is a need for centralized core competencies at EM Headquarters with clear authority and accountability to allow for efficient, expedited decisions and inter-site and inter-program coordination. A risk-based approach to package certification and shipment must be undertaken. Specific benefits anticipated from such improvements include rapid consolidation of special nuclear materials (e.g., providing DT22s and SSTs to move plutonium materials from Rocky Flats); expedited shipment of TRU waste (e.g., shipment in ATMX railcars instead of by truck); expedited disposal of LLW (e.g., shipment by rail for disposal at NTS instead of by truck); and accelerated site closure.

#11 Focusing EM Program Resources on Cleanup

Issue

EM has been funding and managing several types of activities that may not be appropriate for an accelerated, risk-based cleanup program.

Background

EM is responsible for managing and supporting activities that are in addition to its core cleanup mission, such as:

- DOE-wide activities or programs that exceed EM's specific cleanup needs
- Ongoing mission work aimed primarily at expanding the mission of a site or supporting the mission work of other DOE programs
- State, community, and stakeholder support
- Support for broad government objectives and higher education, such as grants to universities and research institutions that do not directly support EM mission requirements
- Science and technology activities and various technology applications not directly related to cleanup

While many of these annually appropriated activities—totaling more than $450 million, or about 7 percent of the EM budget—are important to government operations and possibly to a 70-year

cleanup program, they may not provide the applicable support to an accelerated cleanup program. They may also divert EM's management and resource focus away from achieving accelerated risk-based cleanup and closure.

Call to Action

While the Team is not diminishing the value of these specific activities, the financial and administrative resources required for EM implementation and oversight represent a major commitment. Efforts should be made to review the appropriateness of these activities and their organizational placement in light of an accelerated cleanup program and to adapt them accordingly. Consideration should be given to segregating these activities and other similar ones under the auspices of an environmental services function or other organizations in DOE. Doing so will bring about opportunities to integrate these activities with like activities in other programs and lend them visibility.

#12 Refocusing the Science and Technology Program

Issue

The Science and Technology Program is not focused on providing the support needed for EM to achieve its mission.

Background

The EM Science and Technology Program encompasses three broad categories. The first is a $200 million Headquarters-funded science and technology program. This program supports a multitude of small tasks at many universities and is a contributor to funding of the national laboratories; it also supports a number of Congressionally mandated programs at other laboratories and universities. The second category consists of funding provided directly to the national laboratories from funds allocated to the site offices. The third category is applied technology work conducted directly in support of ongoing projects and programs. In addition, the EM programs provide consultants to support the smaller sites.

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. It has a number of focus groups, such as decontamination and decommissioning, but a laboratory directs each group, and the success of the groups varies from laboratory to laboratory. Many of the programs of the national laboratories have little DOE oversight. Project support to the laboratories is directly under the control of the project, and in some cases is placed there because of convenience instead of an effort to select the best technology source. Overall, the total program expenses exceed $500 million per year.

Call to Action

The EM mission requires focused and strong support in R&D and applied technology. Continued support of nonrelated programs and laboratories dilutes mission needs and diverts management attention away from core functions. R&D programs should be refocused to support intermediate and long-term needs for cleanup and closure. Vulnerabilities in baseline technologies should be assessed and applied technologies provided to resolve those vulnerabilities. Alternatives to baseline technologies should be developed that can reduce programmatic risk, improve schedules, and reduce costs. Programs at EM's lead laboratories should be evaluated for relevance to the Department's cleanup and closure efforts.

In addition, nonrelevant programs and laboratories should be reassigned to more appropriate leads within DOE, such as the Office of Science. Project-supported work at the laboratories should be reviewed to ensure integration with the national program.

Glossary of Acronyms

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
D&D	decontamination and decommissioning
DWPF	Defense Waste Processing Facility
EIS	environmental impact statement
EPA	Environmental Protection Agency (United States)
FAR	Federal Acquisition Regulation
HEU	highly enriched uranium
HLW	high-level waste
INEEL	Idaho National Engineering and Environmental Laboratory
ISM	Integrated Safety Management
LLW	low-level waste
MEMP	Miamisburg Environmental Management Project
MOX	mixed uranium–plutonium oxide
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Administration
NTS	Nevada Test Site
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal
SRS	Savannah River Site
SST	safe secure transport
TRU	transuranic (waste)
WAC	waste acceptance criteria
WIPP	Waste Isolation Pilot Plant