RESULTS OF THE EM CORPORATE PROJECT TEAM DISPOSING WASTE, REDUCING RISK

T. Shrader
U.S. Department of Energy
Office of River Protection

R. Knerr
U.S. Department of Energy
Lexington Operations Office

ABSTRACT

In 2002, the US Department of Energy's (DOE) Office of Environmental Management (EM) released the Top-To-Bottom Review of cognizant clean-up activities around the DOE Complex. The review contained a number of recommendations for changing the way EM operates in order to reduce environmental risk by significantly accelerating clean-up at the DOE-EM sites. In order to develop and implement these recommendations, a number of corporate project teams were formed to identify, evaluate, and initiate implementation of alternatives for the different aspects of clean-up. In August 2002, a corporate team was formed to review all aspects of the management, treatment, and disposal of low level radioactive waste (LLW), mixed low level radioactive waste (MLLW), transuranic waste (TRU), and hazardous waste (HW). Over the next 21 months, the Corporate Project Team: Disposing Waste, Reducing Risk, developed a number of alternatives for implementing the recommendations of the Top-To-Bottom Review based on information developed during numerous site visits and interviews with complex and industry personnel.

With input from over a dozen EM sites at various stages of clean-up, the team identified the barriers to the treatment and disposal of low level waste, mixed low level waste, and transuranic waste. Once identified, preliminary design alternatives were developed and presented to the Acquisition Authority (for this project, the Assistant Secretary for Environmental Management) for review and approval. Once the preliminary design was approved, the team down selected to seven key alternatives which were subsequently fully developed in the Project Execution Plan. The seven most viable alternatives were: (1) creation of an Executive Waste Disposal Board, (2) projectizing the disposal of low level waste and mixed low level waste, (3) creation of a National Consolidation and Acceleration Facility for waste, (4) improvements to the Broad Spectrum contract, (5) improvements to the Toxic Substance Control Act (TSCA) Incinerator contract and operations, (6) development of a policy for load management of waste shipments to the Waste Isolation Pilot Plant (WIPP), and (7) development of a complex-wide fee incentive for transuranic waste disposal. The alternatives were further refined and a plan developed for institutionalizing the alternatives in various site contracts.

In order to focus the team's efforts, all team activities were conducted per the principles of DOE Order 413.3, Program and Project Management for the Acquisition of Capital Assets. Although the Order was developed for construction projects, the principles were adapted for use on this "soft" project in which the deliverables were alternatives for the way work was performed. The results of the team's investigation and the steps taken during the project are presented along with lessons learned.

INTRODUCTION

In the spring of 2002, the United States Department of Energy's Assistant Secretary for Environmental Management released the Top-to-Bottom review of clean-up activities around the EM Complex. The review identified a number of areas in which acceleration of clean-up could be accomplished with changes in how work was performed. A number of corporate project teams were chartered to investigate different aspects of the issues identified in the Top-to-Bottom review. One of the teams was chartered to investigate the management of low-level, mixed low-level, hazardous, and transuranic waste. This team became known as the EM Corporate Project Team: Disposing Waste, Reducing Risk.

This project team was made up primarily of Department of Energy personnel from around the complex and included representatives from a number of DOE sites: Richland Operations Office (Hanford), Idaho National Environmental Engineering Laboratory, Nevada Operations Office, Carlsbad Field Office (Waste Isolation Pilot Plant), Rocky Flats Field Office, Fernald Environmental Management Project, Oak Ridge Operations Office, Savannah River Operations Office, and Headquarters. The team also included a limited number of contractor personnel. The personnel selected by the Project Manager had a wide range of experience in waste management issues in order to ensure historical, operational, and regulatory expertise were available to the team. In addition, with the movement of the Department to accelerated closure of sites, there was an increased emphasis on utilizing project management principles and a shift in the corporate approach to performing clean-up activities as a project with defined requirements and end points. Consequently, the activities of the team were to be conducted as if the assignment were a project. As the project progressed, a number of critical decision points were reached for which approval by the Acquisition Authority, the Assistant Secretary for Environmental Management, was required.

Critical Decision – 0 (CD-0): Mission Need

The first step in the pre-conceptional phase of the project was to identify the mission statement, develop the project workscope, define deliverables, and define the project end state. This information was identified in the CD-0 document. When developing the problem statement, it was recognized that management strategies existed for low level, mixed low level, hazardous, and transuranic waste at all of the Department of Energy sites. However, there was not a coordinated strategy for treating and disposing these wastes based on risk. Thus, the solution statement consisted of reducing risk by identifying, planning, and implementing innovative and aggressive activities to improve the coordination and efficiency of the waste treatment and disposal activities around the complex. Examples of specific deliverables included the identification of opportunities for managing waste based on risk rather than source, potential improvements to EM's management structure in order to maximize intersite cooperation, recommending a corporate strategy to address orphan waste, and optimizing the EM sites' interfaces with Federal and commercial treatment and disposal facilities.

Due to the success in managing hazardous waste across the complex, it was not addressed further by the team. For the other waste types, Integrated Disposal Plans were developed to provide long-term solutions to waste management issues. Also, in order to maintain a disciplined approach, the end state of the project was defined as the approval of the proposed management strategies by the Acquisition Authority and the modification of site baselines as required. It was anticipated at the time that these activities would take approximately one year.

Critical Decision – 1 (CD- 1): Conceptual Design

The purpose of the conceptual design phase of the project was to identify the barriers to effective treatment and disposal of waste and to propose a suite of alternatives to resolve these barriers. As such, the project team visited almost two dozen Federal and commercial facilities that generate and/or dispose low level waste, mixed low level waste, and transuranic waste. Based on these visits, as well as the project teams' experience with these waste types, over 100 specific barriers to waste disposal were identified. Upon review of these barriers, the project team was able to validate the conclusions of the Top-To-Bottom Review and document the key barriers preventing DOE from disposing waste quickly and cost effectively. In order to more effectively develop a design, a separate conceptual design package was developed for each of the three major waste types considered by the project team: low level waste (CD-1a), mixed low level waste (CD-1b), and transuranic waste (CD-1c).

With the identification of over 100 different barriers to the disposal of waste, which ranged from requiring legislative action to changes in site/contractor-specific policy, the team determined it was essential to focus the project on a select set of barriers whose resolution would provide DOE with significant benefit. This was accomplished by applying the principles of project management and defining a common set of requirements (corporate, project, and technical) that proposed alternatives would have to meet in order to move forward. These requirements essentially defined the operating parameters of the project team (i.e., the project specifications) with regard to the development of the proposed alternatives and were the key project management principle used by the project team during the conceptual design phase of the project. The Project Team's requirements are as follows:

Corporate: The alternative must support the accelerated clean-up of a site or sites and reduce risk as identified in the EM-approved Performance Management Plans. The alternative must address barriers clearly identified by the individual sites.

Project: The tenets of project management were to be used by the team when developing the alternatives.

Technical: Implementation could be accomplished within existing regulatory structures.
The alternative must address a complex-wide barrier.
The team's work was to be completed by October 1, 2003.
Near term site closure schedules must be supported.
The required actions were under the authority of EM.
A barrier must be resolved or there must be a significant cost savings.
The political, environmental, financial, and safety and health risks for the alternative were acceptable.

CD-1a: Low Level Waste

A significant portion of the complex's low level waste is disposed at two Federal facilities (Hanford and the Nevada Test Site) or a commercial facility (Envirocare in Utah). In addition, at some sites, some of the waste is disposed on site, particularly for clean-up activities performed per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The barriers to the disposal of low level waste differed depending on the site with the majority of issues being raised by sites requiring an off-site disposal option. All sites identified the need for a more streamlined and cost effective approach to low level waste disposal. Four overarching barriers were identified: a lack of an integrated disposal program, differences in Federal facility disposal programs, regulatory inconsistencies, and process inefficiencies. Eleven more specific summary level barriers were identified to fully explain the overarching barriers.

An example of one of the summary level barriers was that legacy waste disposal was not a priority. Because the disposal of low level waste was not regulatorily driven, the disposal of legacy waste (waste in long term storage) was performed on a funds available basis. This approach often meant priority and funding were not given to this waste type and the disposal was delayed to the end of the fiscal year or the workscope eliminated. This resulted in storage and management costs being incurred without any beneficial action taking place to reduce the facility footprint or to reduce risk by disposing of the waste. Ten other summary level barriers were identified.

- Inefficient and duplicative quality assurance program for containers
- Multiple sites and contractors individually seeking solutions for similar problems
- Lack of specific knowledge to disposition high activity low level waste
- Lack of consolidated forecasting
- Lack of coordinated policy for disposal operations
- Differences in waste acceptance processes at disposal facilities
- Lack of a standard protocol for the disposition of classified material/waste
- High cost for disposing small waste quantities
- Metals recycle moratorium raising the cost of disposition
- Inconsistent application of requirements from DOE Waste Management Order 435.1

In order to address these barriers, the team developed two main alternatives for possible implementation. The alternatives contained a number of options for consideration. Each option was assessed against the project requirements and the barriers and either accepted or rejected for further development.

LLW Alternative 1: Integrate Waste Disposition on a Complex-Wide Basis

Disposal decisions as to where waste was disposed and the need for future disposal capacity needed to be addressed on a complex-wide basis in order to improve efficiencies and reduce cost. The National TRU Program has successfully utilized a corporate approach for waste disposal and a similar model could be applicable to low level waste. There were six options for this alternative. (1) Establish a corporate board focused on accelerating low level

waste disposal. (2) Establish an integrated waste generator services organization. (3) Establish a single management structure for low level waste disposal operations. (4) Projectize legacy low level waste disposal. (5) Standardize processes at Federal disposal facilities. (6) Establish and interim storage facility for difficult to dispose or small volume low level waste.

An example of how an option addressed a barrier can be seen from option (1). A corporate board could be chartered, empowered, and required to improve low level waste disposal efficiency and to address issues from a complex-wide perspective. The board would include members from the disposal sites and the generating sites and range in authority from an advisory role to being empowered to direct sites on disposal issues. This option was accepted for further development. Although the other options addressed the barriers, most were rejected for further development because the project requirements were not satisfied by the option. Options (2), (3), and (5) were rejected for further development while options (4) and (6) were accepted along with option (1).

LLW Alternative 2: Standardized Policy for the Management of Classified Material/Waste

Due to confusion on whether classified material that was no longer needed could be declared a waste, many site contractors listed a disposal path for this material as a government furnished service. It was not clear if this material could be declared waste and permanently disposed or had to be placed in a long-term storage program. In order to remove the barrier and provide the DOE Complex with a consistent approach, two options were proposed: (1) develop technical guidance for classified material and identify a path to disposal, and (2) propose a new definition of sanitization of classified material in an authorization act. However, due to the need to obtain agreement from other organizations within the Department of Energy, both of these options did not meet project requirements and were rejected for further development.

CD-1b: Mixed Low Level Waste

In addition to the barriers associated with the disposal of mixed low level waste, additional barriers were identified for the treatment of the waste. Some barriers, such as the need for a corporate approach and a streamlined process, were similar to those identified for low level waste. Four overarching barriers were identified: lack of an integrated disposal program, lack of access to treatment, regulatory constraints, and process inefficiencies. Thirteen specific summary level barriers were identified that more fully explain the overarching barriers.

An example of one of the summary level barriers was that there was no access to a mixed low level waste disposal facility for high activity waste (waste regulated under the Resource Conservation and Recovery Act (RCRA) but which contained a transuranic radionuclide concentration of 10 to 100 nCi/g). Two Federal disposal sites, the Hanford Site State and the Nevada Test Site, had been designated to receive and dispose mixed low level waste from offsite generators. However, these facilities were not available to receive the waste. The Nevada Test Site did not have a RCRA permit and the Hanford Site had not completed National Environmental Policy Act (NEPA) analyses. Only one commercial disposal facility, Envirocare, was available to dispose of mixed low level waste. However, the facility was limited by its license to low activity waste (essentially 10 nCi/g or less). Thus, a large inventory of mixed low level waste had accumulated at various sites awaiting a disposal path and the lack of a disposal facility potentially impacted site closure schedules.

Another example of a summary level barrier was the lack of available or cost effective treatment capacity for some mixed low level wastes. Some mixed low level wastes had been identified as orphan wastes, for which there was not identified treatment capacity (for example, mercury contaminated wastes). Or, when treatment was available, the high costs associated with commercially available treatment drove the sites to continue storing the waste rather than treating and disposing it. Eleven other summary level barriers were identified.

- Shipments of mixed low level waste to TSCA Incinerator were significantly impacted due to delays in burn plan and waste stream approval
- Lack of thermal treatment capacity for tank waste that was not planned to be vitrified
- Inconsistent interpretation and application of RCRA regulations led to decisions that were not cost effective or risk based
- RCRA temporary storage limits were inadequate to allow for compliance
- RCRA regulations inhibit cost effective disposal of treated wastes

- Limited treatment capacity for mixed low level waste and lack of a complex-wide coordinated effort impacted the ability of sites to meet schedules for waste treatment
- Generators did not sufficiently plan or have processes in place to minimize the generation of mixed low level waste
- Waste characterization was often inadequate to meet treatment/disposal requirements resulting in increased costs and duplication of effort
- DOE contractors duplicated audit efforts which resulted in increased costs with no additional benefit
- Inefficiencies for shipment of treated wastes from treatment facilities to final disposal sites impacted DOE access to treatment facilities and increased costs
- Broad Spectrum contract was inefficient and did not adequately address the needs of DOE sites

In order to address these barriers, the team developed seven alternatives for possible implementation. The alternatives contained a number of options for consideration. Each option was assessed against the project requirements and the barriers and either accepted or rejected for further development.

MLLW Alternative 1: Establish Disposal Capacity for High Activity Mixed Low Level Waste

Due to the unavailability of Federal or commercial disposal capability for high activity mixed low level waste, site closure dates might be impacted. In order to address this barrier, four options were considered. (1) Open a new mixed low level waste disposal facility. (2) Optimize the use of existing Federal disposal cells for mixed low level waste. (3) Develop additional commercial mixed low level waste disposal facilities. (4) Projectize mixed low level waste disposition.

An example of how an option addresses a barrier is option (2) in which all sites with existing low level waste disposal facilities should evaluate the potential for the disposal of mixed low level waste using a risk-based approach or, if available, expand the on-site CERCLA disposal capabilities to include mixed low level waste generated in the past. This would have allowed treated waste to be returned to the site for immediate disposal. However, due to the expected regulatory agency objections and needed agreements from agencies outside of EM, this option was rejected for further development. For similar reasons, options (1) and (3) were also rejected. Option (4) however, was chosen for further development.

MLLW Alternative 2: Integrate Waste Disposition on a Complex-Wide Basis

This alternative is similar to an alternative proposed for low level waste and addressed key issues that existed regarding the lack of integration for mixed low level waste decision making by establishing a corporate board charged with integrating mixed low level waste treatment and disposal activities for the EM Complex. A corporate entity would coordinate operations where appropriate, aid in developing management plans for senior decision makers, and create an overall strategy for the treatment and disposal of mixed low level waste. There were three options for this alternative. (1) Establish a corporate board focused on accelerating mixed low level waste treatment and disposal. (2) Establish an integrated waste generator services organization for mixed low level waste disposal operations. (3) Establish a single management structure for mixed low level waste disposal operations.

An example of how an option addressed a barrier was the development of a corporate board [option (1)] that would have ensured an integrated approach to waste disposal decisions. The board would have a chief executive officer who was held accountable for accelerated treatment and disposal. The board would have the ability to direct sites towards treatment and disposal options that benefit the complex as a whole and lower EM's life-cycle cost. The board could have been implemented in any fashion from an advisory capacity to being chartered as a body with the authority and accountability for establishing and implementing an accelerated schedule for mixed low level waste disposal. Because this option met the project requirements, it was chosen for further development. The other two options were rejected.

MLLW Alternative 3: Create a Risk-Based Waste Management System

DOE must move past a culture of compliance to a culture of risk reduction. Environmental risk needs to be assessed and regulatory agencies petitioned for changes or relief where cost effective decisions could be made without

unacceptable risks to the environment or public. Three options were proposed for this alternative. (1) Work with the regulatory agencies to implement a common set of regulations for mixed low level waste. (2) Simplify Land Disposal Restriction treatment standards. (3) Utilize commercial treatment and disposal standards for DOE mixed low level waste. However, because the options required extensive interaction with outside agencies and because the implementation time for all the options was long-term, all were rejected for further development.

MLLW Alternative 4: Improve Access to Mixed Low Level Waste Treatment

The development of Federal treatment capability for mixed low level waste should be considered for the disposition of the legacy and newly generated waste. Or, as an alternative, treatment options with different Federal or commercial entities should be considered. Four options were developed. (1) Acquire or develop a mixed low level waste treatment facility. (2) Establish treatment capability at one of the four regional mixed low level waste treatment sites. (3) Develop a more effective contract structure for the Broad Spectrum contract. (4) Use the Department of Defense Executive Agency for the treatment of mixed low level waste.

Of particular interest was option (3). The Broad Spectrum contract was the mechanism used by the Department of Energy to access commercial treatment capability. However, the contract was limited and required revisions to expand the treatment options. The Chicago Operations Office mixed low level waste contract with Envirocare provided an example of a contract with multiple treatment and disposal options and revision of the Broad Spectrum contract to a similar structure was seen as an option to be pursued. The other three options were rejected for further development.

MLLW Alternative 5: Improve Access to the TSCA Incinerator

The TSCA incinerator was the only available treatment facility for Polychlorinated Biphenyl (PCB) contaminated wastes. It could also be utilized for the thermal treatment of some mixed low level wastes. Continued or expanded access is critical to meeting the treatment and disposal needs for accelerated closure of a number of sites. Thus, two options were developed. (1) Privatize the facility, which was rejected for further development and (2) implement a fee system for out year operations. Because it addressed regulator concerns about resources used for out of state waste and it provided a mechanism for continued operation, option (2) was chosen for further development.

MLLW Alternative 6: Establish a Centralized Storage Facility for Orphan and Difficult to Dispose Wastes or Small Site Wastes

Designate one or two Federal facilities as a hub for mixed low level waste storage pending final treatment and disposal. Consolidate all orphan or difficult to characterize/treat mixed low level wastes or small site wastes at a hub site to take advantage of economies of scale. This centralized waste storage would yield savings in storage costs and enhance coordination of treatment and disposal opportunities. The hub sites should be near treatment facilities or disposal sites to minimize transportation costs. Because of the potential economic benefit, this alternative was accepted for further development.

MLLW Alternative 7: Apply Standardized Risk-Based Decision Making to Certify Mixed Low Level Waste for Direct Shipment to Disposal

It was not unusual for treated waste to be returned to a generation site before final disposal. Steps should be taken to eliminate the extra shipment step. Two options were developed for this alternative. Certify treatment facilities for direct shipment of treated wastes to disposal facilities. (2) Develop individual contracts for disposal by treatment facilities. However, because project requirements were not satisfied, both of these options were rejected for further development.

CD-1c: Transuranic Waste

Although many of the barriers identified for low level waste and mixed low level waste were similar, this was not the case with transuranic waste. Transuranic waste is disposed exclusively at the Federal Waste Isolation Pilot Plant in New Mexico. The transuranic waste operations at the various sites were coordinated through the National

Transuranic Waste Program administered by the Carlsbad Field Office of the Department of Energy. Three overarching barriers were identified: restricted access to WIPP, operations restrictions and inefficiencies at the processing sites, and lack of cross-complex efficiencies. Eight specific summary level barriers were identified that more fully explain the overarching barriers.

An example of a barrier to transuranic waste disposal was the use of performance based incentives that were not coordinated and structured to maximize efficiency of transuranic waste shipping and disposal assets. Although transuranic waste was being disposed, the shipping and processing capability of WIPP was being underutilized. The vertical site specific structure for contractor incentives and lack of linkage to the transportation contracts did not support joint accountability between sites and the contractors. There was little incentive for cross contractor or cross site cost reductions, initiatives, or the development of initiatives that maximized disposal rates at a complex wide level. Seven other barriers to transuranic waste disposal were identified.

- Transuranic waste that cannot be disposed at WIPP
- Lack of equipment and technology for processing transuranic waste
- Restrictions due to the definition of transuranic waste
- Conservative transportation requirements hindering shipping
- Overly constrained WIPP operations due to regulatory interpretations and operational restrictions in the RCRA permit
- Ineffective strategy of incremental change to the WIPP permit
- Lack of a fully integrated TRU Program

In order to address these barriers, the team developed three alternatives for possible implementation. The alternatives contained a number of options for consideration. Each option was assessed against the project requirements and the barriers and either accepted or rejected for further development.

TRU Alternative 1: Improve Access to WIPP through Changes in Waste Definitions or Providing Alternative Disposal Outlets

The Land Withdrawal Act authorized the disposal of defense generated transuranic waste at the WIPP facility. Thus, only defense generated, contact and remote handled transuranic waste is statutorily allowed to be disposed. There was additional waste that could benefit from disposal at WIPP but which require expanding WIPP's current capacity or authorization. Eleven options were developed for this alternative. (1) Encourage load management to dispose waste with no path to disposal. (2) Redefine transuranic waste to > 10 nCi/g. (3) Redefine transuranic waste to > 500 nCi/g. (4) Allow disposal of non-defense transuranic waste at WIPP. (5) Remove the upper radiation limit of 1,000 Rem/hr on packaging. (6) Standardize the policy for the management of classified waste/material. (7) Develop a central storage and characterization site. (8) Centralize the processing and shipping facilities for transuranic waste. (9) Construct a new high activity mixed low level waste disposal facility at WIPP. (10) Establish a waste generator services organization at WIPP. (11) Extend DOE radionuclide authority to a commercial disposal facility.

An example of how an option resolved a barrier can be seen with option (8). One or more Federal or commercial sites would serve as a centralized processing and shipping facility for accelerated disposal that would receive transuranic wastes from other sites, particularly small quantity sites, in order to deinventory those sites and to achieve economy of scale for the processing, certification, and packaging of the waste and to meet accelerated clean up schedules. This eliminates the need to develop costly redundant processing capability at multiple sites. This option was accepted for further development. Also selected for further development was option (1). The other options - (2), (3), (4), (5), (6), (7), (9), (10), (11) - were rejected for further development because they did not meet the project requirements.

TRU Alternative 2: Improve Operations through Changes in Regulatory Interpretations

Many of the regulations governing transuranic waste operations were overlapping and lead to inefficiencies. Regulations for WIPP came from the RCRA Permit, TSCA, and the Land Withdrawal Act. At times, compliance with all often led to overly conservative interpretations with no reduction in the risk to the public or the

environment. An alternate regulatory framework could have led to increased efficiencies while still protecting workers, the public, and the environment. Six options were developed for this alternative. (1) Segregate the disposal of transuranic waste into mixed and non-mixed areas of WIPP. (2) Define RCRA Compliance for WIPP. (3) Exempt WIPP from RCRA. (4) Exempt WIPP from TSCA. (5) Modify the Land Withdrawal Act to ship transuranic waste according to relevant federal requirements. (6) Establish a team to focus on permit modifications for WIPP. However, all of these options were rejected for further development because they would require acceptance from organizations outside of the Department of Energy and thus did not meet project requirements.

TRU Alternative 3: Improve the Business Model through Complex-Wide Integration

The method of developing independent site plans for the characterization and disposal of transuranic waste resulted in inefficiencies across the complex. Better integration and interaction among sites was needed to increase efficiency. Three options were developed. (1) Develop cross-complex contractor performance-based incentives for the disposal of transuranic waste. (2) Develop an integrated complex-wide transuranic waste baseline. (3) Projectize transuranic waste disposal.

Option (3) was rejected for further development. Options (1) and (2) were accepted. Transuranic waste disposal operations were funded by the Carlsbad Field Office. As such, there was little incentive for sites to maintain shipment schedule commitments. A complex-wide fee based incentive would be established to encourage interaction between site contractors and WIPP. WIPP and the sites would establish the goals and performance metrics against which the contractors would be measured with the fee distribution for each contractor determined based on those performance metrics. In addition, site shipping baselines were developed independently and without interaction between sites and the Carlsbad Field Office. Therefore, schedules were splintered, resulting in difficulty allocating resources to meet the complex's needs. Development of an integrated complex-wide baseline would have addressed this issue.

CRITICAL DECISION – 2/3 (CD-2/3): FINAL DESIGN/PROJECT EXECUTION PLAN

The next phase of the project was the most critical, the final design for the selected alternatives. After the down selection process of CD-1, the alternatives and options chosen for further developed were researched and refined. The proposals were fully developed with cost and schedule impacts, defined completion points, a work breakdown structure of the activities required for implementation and completion, a risk management strategy, and the performance metrics and measures to determine the success of implementation. Seven alternatives were chosen for development for low level waste, mixed low level waste, and transuranic waste. The requirements presented earlier remained unchanged.

Low-Level Waste/Mixed Low-Level Waste Executive Waste Disposal Board

A Department of Energy Environmental Management corporate entity would be created for the accelerated and cost effective treatment and disposal of low level waste and mixed low level waste. A management structure, the Executive Waste Disposal Board, would be developed to address the barriers to effective integration of operations identified for low level and mixed low level waste treatment and disposal. The Board would specifically address the lack of a complex-wide integrated approach to resolving these barriers. In addition, the Board would coordinate operations where appropriate and direct the treatment and disposal of low-level waste and mixed low-level waste from a corporate perspective. The Disposal Board members would consist of personnel from different EM sites who would be held accountable for the accelerated treatment and disposal of these wastes.

In order to facilitate effective complex-wide operations, the Disposal Board would have a number of primary responsibilities including the following. Annually collect and analyze data on low level and mixed low level waste inventories, disposal forecasts, and treatment schedules for all EM operations utilizing validated baselines and consistent metrics. Direct site disposal and/or adjust treatment schedules as required to meet closure schedules in a cost effective manner. Review and concur on site level commitments to regulators for the off-site treatment and disposal of low level and mixed low level waste.

The development of this Board addressed a number of the previously identified barriers. From CD-1a, the following low level waste barriers were addressed: multiple sites and contractors individually seeking solutions for similar

problems, legacy waste disposition was not a priority, lack of specific knowledge to dispose high activity low level waste, lack of consolidated forecasting, lack of coordinated policy for disposal operations, differences in waste acceptance processes at disposal sites, high cost for disposing small waste quantities, lack of a standard protocol for the disposition of classified material/waste. All of these barriers were caused by a lack of complex-wide integration or the lack of a consistent policy for all sites. A Corporate Board representing all sites would develop solutions to eliminate these barriers.

Similarly, from CD-1b, the following mixed low level waste barriers were addressed: limited treatment capacity for mixed low level waste and lack of a complex-wide coordinated effort impacted the ability of sites to meet schedules for waste treatment, waste characterization was often inadequate to meet treatment/disposal requirements resulting in increased costs and duplication of effort, inconsistent interpretation and application of RCRA regulations lead to decisions that were not cost effective or risk based, generators did not sufficiently plan or have processes in place to minimize the generation of mixed low level waste, and inefficiencies for shipment of treated wastes from treatment facilities to final disposal sites impacted DOE access to treatment facilities and increased costs. All of these barriers resulted from either the lack of coordinated efforts or the need to disseminate information and lessons learned around the complex.

The endpoint for the project team was the completion of the first meeting of the Board. The team would be expected to support the Board in developing agendas and roles and responsibilities. After the first meeting, the Board was expected to be self-sustaining.

Projectize Low level and Mixed Low Level Waste Disposal

Due to the lack of regulatory drivers for the disposal of low level waste, a large legacy inventory has accumulated at various EM sites. This inventory required storage and surveillance and the associated fiscal resources. To resolve this problem, the disposal of legacy low level waste could be removed from the scope of existing contracts and reissued as a stand alone project on either a complex-wide or regional basis. This contract would focus on removing the legacy low level waste inventories from the applicable EM sites. The contract would encompass waste characterization, packaging, shipping, disposal, and coordination with the Federal and commercial disposal facilities.

Similarly, for mixed low level waste, challenges regarding limited disposal options, expensive treatments, and orphan waste were hindering the sites' ability to dispose of mixed low level waste and to meet accelerated closure schedules. To take advantage of economies of scale, the disposal of mixed low level waste would be removed from the scope of existing contracts and reissued as a stand-alone project on either a complex-wide or regional basis. The contract would focus on removing the mixed low level waste inventories from the sites. The contract would encompass waste characterization, treatment, packaging, shipping, disposal, and coordination with the Federal and commercial disposal facilities.

The need to clearly define the scope of the projects was identified as a key parameter. These contracts were required to include all activities necessary to dispose the waste. Additionally, the contracts were to clearly define the specific volumes/populations of waste that were within the scope so that the ability to measure successful completion of the project could be readily determined. In addition, the contract completion date was also defined as September 30, 2006 to align with many of the closure schedules around the complex. In order to realistically allow for this work to be completed, the notice to proceed had to be issued no later than May 1, 2004. Further, because site support would be required, the project contractor would have to work with the sites to ensure waste is disposed on a schedule that meets closure dates and the decommissioning and demolition of facilities. Finally, because the contracts were expected to reduce overall costs through economies of scale and focus of mission, a 10% threshold and 30% objective cost savings was required and failure to meet these savings in contract bidding may have resulted in the canceling of the proposed contract. Together, these parameters represent the performance required to ensure EM had implemented an aggressive process for solving waste problems and is accomplishing its goal of accelerating cleanup activities and reducing risk.

The development of the low level waste project contract addressed a previously identified low level waste barrier; legacy waste disposition was not a priority. Due to the lack of regulatory requirements the disposal of low level

waste was often descoped and the funds applied to other projects. A single project dedicated solely to this activity was to have resolved this issue.

For mixed low level waste, the project addressed two previously identified barriers: there was no readily available or cost effective treatment capacity for some mixed low level waste and generators did not sufficiently plan or have processes in place to minimize the generation of mixed low level waste. The implementation of this contract may have required the use of a Federal or commercial consolidation facility. Because mixed low level waste costs were often driven by treatment costs, and because high unit costs were often associated with the treatment, a single contract would allow for consolidation of efforts and economy of scale.

The endpoint for the project team was the awarding of the contracts and the issuance of the associated notice to proceed. The contracts would be administered by a headquarters organization or a field site.

Toxic Substance Control Act Incinerator

Due to the need for greater efficiency in accessing the TSCA Incinerator, changes were proposed for the waste receipt protocols, a fee structure for funding the TSCA Incinerator operations was developed, and the establishment of a waste generators service organization and associated fee was proposed. The TSCAI Waste Receipt and Study Protocol is an agreement between the Oak Ridge Office and the Tennessee Department of Environment and Conservation (TDEC) concerning the waste treated at the TSCA Incinerator. Annually, TDEC reviews and approves the burn plan on a waste stream basis. Some waste stream approvals, particularly from out of state, have been slowed to the point of impacting site closure schedules. In an effort to streamline the process, the agreement would be revised to provide a clear interpretation of the Protocol which provides the limits and reasons for state delays in the acceptance or comments on burn plans and waste applications. However, in order to address site funding equity issues and to facilitate a revision, a charge back system would be implemented in fiscal year 2004 and 2005 to recover the cost for activities required to meet off-site generator specific needs or to increase TSCA Incinerator throughput above the existing baseline to meet the accelerated closure of the EM sites. Further, an access fee to fund any mixed waste thermal treatment operations in fiscal year 2006 would be implemented. The charge back system would be based on the Nevada Tests Site access fee for the disposal of low level waste, which has proved successful in encouraging sites to budget for specific volumes of waste and to meet those commitments. Finally, in order to aid generators in meeting the TSCA Incinerator waste acceptance criteria, a waste generator services organization would be established to provide technical assistance for characterization, preparation of application packages, burn plan forecast development, and assistance in meeting transportation requirements. The costs associated with this activity would be charged back to the generators. However, the extra costs to the complex were expected to be somewhat offset by the savings associated with streamlined preparation process.

The improvements in the access to TSCA Incinerator expected from these changes addressed a previously identified mixed low level waste barrier; shipment of mixed low level waste to TSCA Incinerator was significantly impacted due to delays in burn plan and waste stream approval.

The project endpoint for this alternative was the revision of the Waste Receipt Protocol to meet key performance parameters and to establish clear authorities and time frames for state reviews of the burn plan and waste applications and the issuance of a letter of direction from Headquarters to TSCA Incinerator users to plan and budget for the waste generator services organization and access fee implementation.

National Consolidation and Acceleration Facility

The use of a centralized Federal or commercial consolidation facility was seen as essential for the disposal mixed low level waste and transuranic waste on a schedule to meet accelerated closure goals. In order to provide a path for the consolidation of difficult to dispose wastes on the critical path for sites closure in a centralized location, one or more Federal or commercial sites would serve as a National Consolidation and Acceleration Facility. The Facility would provide the services needed to prepare the waste for treatment, processing, and disposal. This may have required consolidated storage to achieve economy of scale or to wait for the establishment of a treatment technology. The establishment of the Acceleration Facility avoided the need for developing infrastructure and expertise at each site for characterization, processing, and packaging of the applicable wastes. Preferably, the

Acceleration Facility would be at a site with a longer-term mission and appropriate NEPA analyses already completed.

One of the significant issues for the development of an Acceleration Facility was host state resistance, particularly at Federal facilities. The Facility would assume responsibility for any activities necessary to characterize, treat, and dispose of the waste. However, in order to avoid the appearance of dumping the waste at the Acceleration Facility, mechanisms that define the process to access an Acceleration Facility were developed and included controls to ensure additional accelerated cleanup and disposal criteria were established. The establishment of a protocol of standard criteria with the National Governors Association or a similar organization would address equity issues. Examples include the following. For every cubic meter of waste received by the Acceleration Facility from an off-site generator that was expected to be onsite for less than one year, two cubic meters of the same type of waste would be shipped out or disposed onsite. Or, for every cubic meter of waste received at the Acceleration Facility from an off-site generator that was expected to be onsite for longer than one year, five cubic meters of the same type of waste would be shipped out or disposed onsite.

A number of previously discussed barriers from all three CD-1 packages were addressed by the development of the National Consolidation and Acceleration Facility. These included the following: high cost for disposing small waste quantities, no access to a high activity mixed low level waste disposal facility, no readily available or cost effective treatment capacity for some mixed low level wastes, lack of thermal treatment capacity for tank waste that was not planned to be vitrified, limited treatment capacity for mixed low level waste and lack of a complex-wide coordinated effort impacted the ability of sites to meet schedules for waste treatment, RCRA temporary storage limits were inadequate to allow for compliance, inefficiencies for shipment of treated wastes from treatment facilities to final disposal sites impact DOE access to treatment facilities and increase costs, and transuranic waste that cannot be disposed at WIPP.

The project endpoint for this alternative was the selection of the National Consolidation and Acceleration Facility the issuance of direction to the Facility to make any required changes. The negotiations with the affected stakeholder and regulatory agencies would be performed in parallel. Any decision on the location and scope of the Facility will be made in compliance with applicable NEPA analyses.

Broad Spectrum Alternative

The Broad Spectrum contract was the existing mechanism for accessing treatment for mixed low level wastes. However, due to issues associated with the contract, a change in the approach to contract accessibility was proposed along with an expansion of the treatment categories available under the existing contract. The revised Broad Spectrum contract was to be modeled after the Chicago Operations Office mixed low level waste contract with Envirocare. In order to address liability issues, the administration of the new contract was to be performed directly by the Department of Energy instead of a site contractor. This would address perceived preferential access to limited treatment capacity. Finally, a revision was needed due to the addition of new treatment vendors. The benefits of this expanded capacity and competition could not be realized under the current contract, as it was limited to the originally selected vendors.

The new contract was to be designed to incorporate required performance parameters. The contract was to be issued directly by the Department of Energy to avoid issues with flow down of terms and conditions across contractors. Each vendor selected would provide annual reporting on the use of the contract to the contract administrator to enable assessment and analysis of waste treatment progress and needs. No guarantees of waste volume would be made. The treatment categories available under the contract were to be expanded with respect to radionuclide content and the treatment of orphan wastes. Sites would be directed to preferentially use this contract. Certificates of treatment would be sent directly from the vendors to the generators and vendors would have to be licensed permitted facilities ready to treat waste at the time the contract was issued. In order to maximize competition and to provide an opportunity to all viable treatment vendors, including small businesses, a Basic Ordering Agreement (BOA) was proposed. The BOA was proposed because it would allow access to multiple providers of the same treatment capability, thus improving competition.

The revision of the Broad Spectrum contract addressed a number of the mixed low level waste barriers identified earlier. Specifically, the following barriers were addressed: no readily available or cost effective treatment capacity

for some mixed low level waste streams, lack of thermal treatment capacity for tank waste that was not planned to be vitrified, limited treatment capacity for mixed low level waste and lack of a complex-wide coordinated effort impacts the ability of sites to meet schedules for waste treatment, and Broad Spectrum contract was inefficient and did not adequately address the needs of DOE sites. It was expected the revised contract would expand treatment options and availability.

The end point for the project team was the acceptance of the revised acquisition plan and schedule by the Acquisition Authority. The negotiations and implementation would be performed by the designated contract administration organization.

Load Management of High Activity Mixed Low Level Waste

There was no identified disposal facility for high activity (10 to 100 nCi/g of transuranic radionuclide concentration or in general greater than Nuclear Regulatory Commission (NRC) Class A waste) mixed low level waste. However, there is a possible disposal option through load management of the waste with transuranic waste destined for disposal at the WIPP facility. In order to utilize this option, a framework for cost effective decision making from a corporate perspective was developed. Note that only mixed low level waste that was historically part of a transuranic waste stream was determined to be eligible for load management. The waste would be packaged with exiting transuranic waste such that the resulting payload container would have a transuranic radionuclide concentration of > 100 nCi/g and would meet the WIPP waste acceptance criteria, and thus could be disposed at WIPP. For other wastes, aggressive treatment techniques would be employed that would allow for disposal as low activity mixed waste at an existing facility. The treatment must occur at a facility that can accept the higher activity waste and must be processed to meet the waste acceptance criteria of the disposal facility. However, dilution to avoid classification for disposal is not permitted or proposed at NRC-licensed facilities. Thus, any reduction in radionuclide concentrations of the waste had to be secondary to the treatment of the waste or to meet the treatment facility's concentration limits. Compliance with the commercial disposal or treatment facilities' NRC license and with RCRA Permit was required.

Load management addressed two of the previously discussed barriers associated with mixed low level and transuranic waste: no access to a high activity mixed low level waste disposal facility and transuranic waste that cannot be disposed at WIPP. Although there still may be some mixed low level waste not eligible for disposal through this alternative, a significant portion of the complex's volume could be reduced through implementation.

The project team end point for this alternative was the development of the decision-making framework and the transfer to the appropriate organization, the Transuranic Waste Corporate Board or the Executive Waste Disposal Board. In addition, the load management framework would be distributed by EM headquarters to the field for implementation.

Complex-Wide Fee Incentive

In contrast to the low level and mixed low level waste disposal facilities, the transuranic waste disposal facility, WIPP, directly funds the transportation and disposal of transuranic waste. Thus, there is less incentive for shipping sites to maintain committed shipping schedules because there is no monetary impact for failure and no rewards for successfully meeting the schedules. In order to address this issue, a fee based incentive process on a complex-wide basis would be established to encourage interaction between site contractors and WIPP to further accelerate transuranic waste shipments. After the development of a set of complex-wide shipping goals, contractor performance will be assessed and the fee distribution determined based on performance. As opposed to fee paid by a site office to its site contractor, this fee pool is potentially shared by all contractors across all sites. To address the need to meet commitments, a cost recovery system has also been developed for quality deficiencies on the part of the shipping sites and for site specific activities required at WIPP. Thus, the three key elements of this alternative were the alignment of complex-wide performance measures for transuranic waste shipping sites and WIPP performance, the development of a complex-wide integrated fee pool for incentivizing further acceleration of transuranic waste disposal, and the implementation of a cost recovery system for unused EM corporate resources provided for the disposal of transuranic waste.

This complex-wide fee based alternative addressed one transuranic waste barrier; performance based incentives were not coordinated and structured to maximize efficiency of transuranic waste shipping and disposal assets. By changing the fee pool to allow access from multiple sites, more flexibility is provided and more incentive is available for any site to accelerate shipments in order to fully utilize WIPP resources.

The project team end point for this alternative was the adoption of revised shipping commitments by EM, the funding and allocation of a fee pool for accelerated transuranic waste shipments, and the implementation of the cost recovery program. The administration of the fee pool and the cost recovery system was to be performed by a headquarters or field element.

Critical Decision – 4 (CD-4): Project Execution and Completion

The CD-2/3 Final Design/Project Execution Plan package was reviewed and partially approved by the Acquisition Authority. Although acknowledged to be a good idea, the formation of the Executive Waste Disposal Board was rejected and not pursued further by the project team. The TSCA Incinerator alternative was approved for implementation as designed. The remaining alternatives were accepted in principle, but were not to be implemented as designed. Instead, the alternatives were to be institutionalized in various site contracts. Thus, the team was directed to review the complex's key site contracts and to develop specific changes to these contracts that would implement the desired behavior of the remaining accepted alternatives. This adjustment to the proposed final design aligned the project team with new EM management strategies for successful acceleration of waste disposal. The development of these proposed contract changes and the issuance of the turnover to operations report were considered the key parts of the CD-4 phase of the project.

Although the remaining alternatives were approved in concept, once the team began developing specific proposed site contract language, it was determined that two of the alternatives were not practical or feasible to establish within site contracts. Due to the length of time from the identification of issues surrounding legacy low level waste and project closeout, the issues had been aggressively addressed by the affected sites, negating the need for a separate project contract for the disposal of low level waste. Also in late 2003, a new Indefinite Delivery/Indefinite Quantity contract for mixed low level waste treatment was being developed by another Corporate Project Team. By combining team efforts, the contract mechanisms were strengthened to allow access to all sites and to address the barriers identified by this team. This eliminated the need for a separate project contract for the disposal of mixed low level waste and changes to the Broad Spectrum Contract.

Specific site contract language was developed for the remaining alternatives. Changes were proposed to appropriate site contracts for the establishment of the National Consolidation and Acceleration Facility. The proposed changes included specific contract language to incentive the Facility to bring in waste and process it quickly, while allowing generator sites to use the Facility, but with fiscal penalties. Changes were also proposed for a number of sites to implement accelerated transuranic waste shipments and to implement load management techniques in order to reduce the high activity mixed low level waste inventory. These changes essentially provided a mechanism that allowed cost comparisons for different waste disposal options in order to ensure that disposal of waste at the WIPP was corporately cost effective. Although language for accelerated shipments addressed the issues surrounding the complex-wide fee initiative, the cross complex fee pool was not established. Finally, proposed revisions to the Oak Ridge contract were developed to implement the TSCA Incinerator alternative. These changes would incentivize the approval of TSCAI burn-plans and suggest funding mechanisms for future year operations.

Other activities related to Project Closeout included the development of a transition to operations report, transition training, and demobilization. The transition to operations report consisted of final project costs (approximately $1 M) and final verifications by team members that the proposed alternatives were being implemented as designed when transferred to the specified EM Headquarters office. Also, the report provided information on the specific organizations that were briefed on the team's activities and who would be responsible for implementation of the alternatives. Any required training on the alternatives was provided to the appropriate organizations through turn-over meetings. Finally, a phased approached was taken for project demobilization with team members released as their final duties were completed.

Lessons Learned

Throughout the project, there were a number of times in which the team had to realign scope in order to meet the expectations of the Acquisition Authority. Because the principles of Project Management were being used, the team tried to follow the DOE Project Management Order as much as possible. A number of lessons learned have been developed for the application of this Order and for operating this type of team in general.

Establish Project Requirements Prior Starting any Substantial Work

Several months into the project, the team realized that the project requirements had not been clearly identified. Because of this, the project endpoints could not be defined and rework was required to collect additional needed information. Once the team recognized that the challenges it was encountering in developing the conceptual design were rooted in poorly defined requirements and endpoints, the team was able to concentrate its energy on clarifying both. For example, early in the project the team determined that waste inventory data was not required. However, the defining of the requirements and the subsequent identification of barriers and proposed alternatives to address the barriers necessitated the need to gather waste inventory data. Thus, future similar projects should not start or preclude any field or data gathering efforts until the project requirements and endpoints have been clearly and rigorously defined.

Personnel Resources Formally Assigned to the Project Team

Because all of the Federal project team members were assigned from headquarters and field sites, many were constantly challenged by the need to balance their responsibilities to the position of record with those of the project team. Rarely were team members relieved of other work responsibilities. In the future, team members should be formally detailed to a project team and relieved of normal duty assignments.

Technical Diversity of Team Members Ensured a Well-Rounded Perspective and Thorough Analysis of Alternatives

The project team members represented the various elements of the EM program: site operations, waste disposition facilities, and headquarters. This helped ensure that the unique perspectives held by the representatives of each element were considered as alternatives were developed and evaluated. As the project progressed, additional members were added to replace retiring members and to further round out the team as needed. This model proved very effective and should be followed in the formation of any future similar project teams.

The Organizational Roles of the Project Team Members Helped Ensure the Projects Success

The project team was comprised of a Project Manager, Deputy Project Manager, an Administrative Assistant, and nine members. The assigning of a dedicated Administrative Assistant proved invaluable in coordinating the team's activities and assuring the quality and timeliness of deliverables. Likewise, the Project Manager and Deputy Project Manager provided the overall project leadership necessary to ensure the team members could focus on specific assignments with minimal distractions. These three positions should be considered for future project teams.

Effective Communication

Because the team included members from across the Complex, and thus the country, communication was an unexpected challenge for the team. Throughout the project's duration, the team adapted to the most effective means of communication. For example, the team held regularly scheduled weekly conference calls to collect project updates from team members, exchange information, and assure all the members were current with the latest information. Even if there was little progress from an individual team member for the week, the updates ensured a consistent approach to all assignments. Also, it was found that sub-team meetings of one or two members were very effective in developing and performing detailed analysis of various alternatives. Finally, the team initially attempted to hold working meetings via televideo conference. However, due to the often competing demands of team members at home sites, it was decided that team meetings would be held at a single location with all members present. This lead to better communication and the elimination of distractions and allowed the team members to focus on completing assignments. Although there was an incremental project cost increase due to travel costs, this

was offset by an overall reduction in team members' job-hours, which were the leading cost element for the project. Thus, it was critical to have a consistent meeting location with good facilities. Since a Department of Energy site location was chosen for this project, the team minimized costs by reducing the planning requirements and eliminating conference room meeting costs.

Project Benefits

A final note should be made about the benefits of the project. The implementation of any the proposed alternatives should result in the elimination or a reduction in a number of barriers to waste disposal, with a resulting schedule and cost savings and a further acceleration of site closures. However, in many ways, an even more important benefit of this project was the teaching of project management principles to EM personnel. The new EM closure contracts stress project management and there is a corresponding need for a Federal staff with these skills. By virtue of participation on these teams, the 50-100 Federal personnel who participated on all of the teams have developed, to a varying degree, the skills needed to oversee future EM workscope. Finally, many of the team members were lower grade personnel with the Department of Energy. These teams and the subsequent interaction with senior management personnel facilitated the identification and development of staff leadership skills for the future.

CONCLUSION

Over a 21-month period, the Corporate Project Team: Disposing Waste, Reducing Risk performed a detailed survey of waste management practices around the DOE Complex. The information gathered was used to identify barriers to effective and efficient disposal of waste, a key element in the cleanup of sites. Seven alternatives were developed to resolve these barriers. (1) The creation of an Executive Waste Disposal Board. (2) Projectizing the disposal of low level waste and mixed low level waste. (3) The creation of a National Consolidation and Acceleration Facility. (4) The development of improvements to the Broad Spectrum contract. (5) Implementing improvements to the TSCA Incinerator contract and operations. (6) The development of a policy for load management of waste shipments to the Waste Isolation Pilot Plant. (7) The development of a Complex-wide fee incentive for transuranic waste disposal. The ideas and processes that these alternatives embodied were institutionalized through proposed contract language for existing and future contracts for the clean-up of EM sites, thereby ensuring that the desired behaviors and resolution of corporate barriers to waste disposal will be realized upon implementation of the proposed contract language.

The Federal staff of this project team, along with those of other teams, benefited greatly from the experiences gained on the team. Most importantly, as a result of these teams, there are now 50-100 personnel throughout the EM complex with significant experience in planning and executing a project. These skills will be critical for the future development and management of EM clean-up contracts.