Hill International

Independent Review and Assessment of the Miamisburg Environmental Management Project

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Project Team:
Hill International, Inc.
JUPITER Corporation
Deloitte & Touche LLP

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Contents

EXECUTIVE SUMMARY

The National Research Council Report to Congress "*Assessing the Need for Independent Project Reviews in the DOE,"* dated February 6, 1998, provided guidance on the scope, purpose, and content of the External Independent Review Reports performed for specific projects that are part of the Independent Assessment of Department of Energy Projects stated in House Appropriations Subcommittee Reports 105-271 and 105-749.

The purpose of an External Independent Review of Department of Energy (DOE) projects is to objectively determine whether the scope of the projects, the underlying assumptions regarding technology and management, the cost and schedule baselines, and contingency provisions are valid and credible within the budgetary and administrative constraints under which the DOE must function.

This review proceeded based upon lines of inquiry identified in the areas of:

- Technical Scope
- Cost Estimates
- Project Schedule
- Project Work Plans
- Business Management System

The Review Team found both DOE Miamisburg Environmental Management Program (MEMP) and Babcock & Wilcox of Ohio (BWO) personnel to be experienced, dedicated, and cooperative. DOE MEMP and BWO management were knowledgeable about their project's technical scope, scheduling and costs. Uncertainties and potential problems were openly discussed with the Review Team.

The Review Team found the Mound 2000 approach (discussed further below) to be an excellent management practice that facilitates the Remedial Investigation/Feasibility Study process. The Core Team, consisting of the DOE MEMP, US Environmental Protection Agency (USEPA) and Ohio EPA (OEPA), jointly decides the necessity and the level of the investigation and response action, subject to stakeholder review. The Core Team collectively approves the site investigation and remediation activities regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process. This Core Team approach saves considerable time and effort.

The MEMP has a credible Baseline. The U.S. Army Corps of Engineers (USACE) performed a validation review of the Baseline estimate. The USACE team determined the MEMP Baseline to be validated. However, the BWO Baseline does not include any allowance for contingency or management reserve. The absence of contingency or management reserve is contrary to DOE Good Practice Guidelines. The Review Team was informed that DOE did not include contingency in the Baseline or project budget so as to establish a reasonable target and challenge the project team to seek cost effective ways to complete the work within that target.

BWO has performed an uncertainty analysis and a contingency analysis. While no contingency or management reserve was included in the Baseline, BWO calculated that a 10% contingency

equal to $59 million would be appropriate. The Review Team is of the opinion that a contingency of 20% to 30% for a project of this type is more appropriate and should be considered in the MEMP budget.

Both DOE MEMP and BWO have established detailed management policies and procedures including Project Control System Manual with Baseline Change Control Plan and MEMP Contract Administration Plan. These management policies and procedures are generally consistent with the requirements and intent of both the DOE Good Practice Guides and industry practice. However, at the time of this review, MEMP was working with EM 73 to prepare a Records Management Plan, as it does not have an acceptable program in place.

A large amount of additional building characterization is still necessary to fully characterize the extent of contamination within the buildings. The Baseline generally appears to have a reasonable level of effort planned for further characterization. Further characterizing the radiological contamination in the Main Hill Tritium (Buildings T, SW, and R) and Test Fire Valley (Buildings WD and HH) will present significant challenges for the project, which contain high levels of contamination and some equipment and materials for which no characterization information is available. In addition, there is the potential for significantly greater volumes of contaminated soil beneath the buildings than assumed in the Baseline, which can have a significant cost impact on the overall Life Cycle Cost for the project. Since Buildings T, SW and R are on the project critical path, it is of the utmost importance that they be given high priority for further characterization and the development of work plans.

The T Building is currently slated for decommissioning, decontamination, and transfer to the MMCIC. The decision to remediate T Building is based primarily upon a 1996 feasibility study prepared by Parsons Infrastructure and Technology Group, Inc., and Mound Technical and Environmental Services, Inc (Parsons) which used a decontamination release level of 1,000 disintegrations per minute (dpm)/100 cm^2 activity level. A decontamination level of 10,000 dpm/100cm^2 is assumed in the Baseline, which if used in an alternatives analysis, would have a large impact on the results. The Parsons report, which initially considered five alternatives, evaluated two in detail, decontamination and decommissioning (D&D); and decay in place. The Parsons report estimated the cost for the two alternatives to be similar, at about $41 million. The decision to D&D the T Building was based upon the analysis and cost estimates for the two alternatives as well as stakeholder considerations. The Review Team recommends that the potential alternatives for the disposition of the T Building be reevaluated, including the alternatives of entombment of acceptable waste in place and decontamination and decommissioning (D&D) for restricted re-use. If the re-analysis of the alternatives indicates an alternate disposition of the T Building is technically feasible and cost beneficial, the alternative should be addressed with the stakeholders.

Considerable uncertainty exists regarding the nature and extent of soil contamination. Actual soil volume that requires removal or treatment could be significantly different than what is in the current Baseline. The level of effort for subsurface characterization in the Baseline appears reasonable. The Review Team recommends that soil characterization activities be performed as soon as possible.

PRS-66 is a former disposal site located under an existing parking lot onsite. The final disposition of PRS-66 can have a very large impact on the schedule and increase the cost of the project by as much as $38 million.

An effective process is in place to remove the organic contaminants from groundwater in the area of the landfill. However, part of the remediation system (the air sparging system) is currently non-operational. The impact of this condition should be factored into the estimated time frame for remediating this area, the Baseline revised accordingly, and the long-term stewardship costs and schedules reevaluated.

Disposition and transfer off-site of the Transuranic (TRU) waste from the MEMP facility represents a challenge to the Mound Site Closure Baseline projections. There is currently no confirmed receiver site for the TRU waste. It appears that if the ATMX railcar is used to transport the TRU waste to alternative receiver sites, the baseline cost estimates, which currently contemplate the use of mobile processing, are conservative. This would result in a cost savings to the Baseline. Alternatively, with all of the uncertainties surrounding the use of the Mobile Processing unit, the total end costs may be significantly greater than estimated. DOE/MEMP approved the Baseline Change Proposal for the shipment of TRU waste to another DOE site and blending suspect TRU soil with low level waste (LLW) soil for disposal as LLW. This change will reduce the baseline cost by approximately $5.3 million if DOE Headquarters can secure the ATMX railcar exemption and confirm the receiver site.

Agreements on regulatory compliance and cleanup levels governing the remediation of the Mound Plant appear clear and firmly in place. In 1995, the CERCLA program was reorganized to increase the efficiency of the environmental restoration effort. The initiative, termed "MOUND 2000," has accelerated cleanup of the site so that the land can be released for economic development much sooner than originally planned. This process is an excellent management practice with a positive impact on the project.

The technical procedures reviewed by the Review Team showed a good level of detail. These technical procedures provide the Mound project a level of consistency across the various projects, should foster efficiency by minimizing duplicative efforts, provide an effective method of management control of the technical effort, and ensure integrated safety management.

The project schedule is adequate for planning and scheduling the work at the overall project level, but not at the sub-project level. The portions of the sub-projects with high schedule and/or cost risk, e.g., Buildings R, SW, HH, WD and 38 and PRS-66, should be scheduled in greater detail in order to successfully plan, monitor and control the work.

The project schedule is aggressive. The Review Team was informed that DOE intentionally negotiated with BWO to obtain an aggressive schedule in conjunction with the incentives to meet that schedule in order to obtain site transfer as early as possible.

A slow start has been experienced at Buildings R and SW, for which a schedule recovery plan has been developed to regain 6 months of delay on the critical path. The plan relies heavily on the ability of BWO to increase its qualified professional and craft staffing for the Main Hill Tritium Project, while maintaining adequate levels of qualified staff for all areas of the overall

project into the future. BWO and DOE may be overly optimistic about obtaining sufficient resources to meet the original Baseline schedule. Based upon the history and the nature of the project, it is the opinion of the Review Team that resources will continue to be a significant hurdle throughout the balance of the project.

Considering the slow start of critical work, areas of high schedule and/or cost risk, and the difficult task of maintaining adequate qualified staffing, the probability of attaining project completion by September 29, 2004, appears to be low.

The Baseline cost and cost control system contains an appropriate level of detail and relevance to effectively manage the project. Actual information is kept up to date; the cost system is integrated with and updated with the scheduling system.

The project faces a number of risks, which could adversely affect the project budget and schedule. These risks include R Building, SW Building, T Building, and PRS66. Given the nature and potential impact of these risks, the Review Team has a serious concern whether the project can be completed within the current budget.

Many of the risks have been recognized by DOE MEMP and at the time of this review the following measures had been initiated:

- A recovery schedule has been prepared indicating a final site transition date consistent with the original Baseline. While this is a reasonable response to the projected delays, the recovery plan is very ambitious and dependent on staffing and concurrent work assumptions that to date have been difficult to achieve.

- Both DOE MEMP and BWO are preparing employees incentive plans aimed at retaining and attracting key personnel that will be necessary through final transition of the site.

- The DOE Program Office working with DOE MEMP expects to receive an exemption for the ATMX railcars as well as a confirmed receiver site for the TRU waste in the near future.

- The project team has prepared a contingency plan to temporarily store and stage the TRU waste onsite if a transportation method and receiver site are not in place to support the T building schedule. It should be noted that while this alternative will mitigate the impact to the project, it may still have a negative impact to the project cost and schedule.

1.0 INTRODUCTION

In accordance with the National Research Council (NRC) Report to Congress "*Assessing the Need for Independent Project Reviews in the DOE,"* dated February 6, 1998, the External Independent Review (EIR) was performed for the Miamisburg Environmental Management Project (MEMP).

The EIR is performed in two tasks. Task A, which consists of document reviews and interviews, is to address the readiness for execution of the EIR, and Task B is to provide the results of the execution of the External Independent Review. EIRs are accomplished by contract to an External Independent Reviewer entity meeting rigorous organizational conflicts of interest and other requirements. The Department of Energy Office (DOE) of Field Integration (FI) manages the EIR process.

Task A of the External Independent Review was performed by a review team comprised of professionals from Hill International, JUPITER Corporation and Deloitte & Touche (Review Team). Professional qualifications of the Review Team are contained in Appendix A to this report. The purpose of the Task A review was:

- To review the availability of project documentation and determine preliminary lines of inquiry to be followed in the second phase of the External Independent Review, and

- To determine the readiness of the project for the Task B External Independent Review.

The Task A report concluded that the MEMP was prepared for a detailed Task B evaluation. The Task A report also provides specific Lines of Inquiry (LOIs) to be analyzed during the Task B. The LOIs covered five general Areas of Review:

- Technical Scope
- Cost Estimates
- Project Schedule
- Project Work Plans
- Business Management System

Based upon the findings in the Task A report, the Review Team received authorization to perform the Task B evaluation. In the performance of the Task B evaluation, the Review Team conducted interviews with DOE MEMP, and Babcock & Wilcox of Ohio (BWO) staff, DOE Environmental Management (EM) 73 staff, FI-20 staff as well as representatives from the Miamisburg Mound Community Improvement Corporation (MMCIC), Defense Contract Audit Agency (DCAA), U.S. Corps of Engineers and the U.S. Environmental Protection Agency (USEPA) and Ohio EPA (OEPA). A list of individuals interviewed for the Task B efforts is included in Appendix B.

In addition, the Review Team evaluated project documents maintained at the site. A list of documents reviewed during the course of this evaluation is included in Appendix C.

1.1 Purpose

The Department of Energy *Office of Field Management Good Practice Guide GPG-FM-015* defines the purpose for project reviews as:

> *A structured review process provides knowledge to make necessary decisions, and demonstrate and confirm project's accomplishments at various stages in its life cycle and its ultimate success through achievement of the following review objectives:*
>
> - *ensure readiness to proceed to subsequent project phases(s);*
> - *ensure orderly and mutually supportive progress of various project efforts;*
> - *confirm functional integration of project products and efforts of organizational components*
> - *enable identification and resolution of issues at the earliest time, lowest level, and lowest cost;*
> - *support event-based decisions; and*
> - *control risk.*

1.2 Historical Perspective & Scope

The Mound Laboratory was constructed in 1948 in Miamisburg, Ohio approximately ten miles southwest of Dayton, Ohio. The site's historical mission included production, development, and research in support of the DOE's weapon and energy-related programs. This work continued at Mound over the next forty years until the DOE decided to transfer its Defense Mission from Mound in 1993.

MEMP was comprised of 152 buildings on approximately 306 acres of land. The Great Miami River flows through the city of Miamisburg and the five-county region surrounding the MEMP. The river valley is highly industrialized, and the remainder of the region is characterized by farmland, residential areas, small communities, and light industry. The Miamisburg downtown area, city and township residences, five schools, and several parks are located within one mile of the site.

The Environmental Restoration Program was established at Mound in 1984 to evaluate the nature and extent of potential contamination, and identify potential exposure pathways and potential human and environmental receptors. The USEPA placed the Mound Facility on the National Priorities List (NPL) in November of 1989 because of chemical contamination present in the site groundwater and the site's proximity to the Buried Valley Aquifer. DOE, USEPA, and the OEPA developed a procedural framework for the assessment and remediation of the site under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) that was documented in the Federal Facility Agreements (FFA) of 1990 and 1993.

Presently, the Mound site, which is now referred to as MEMP, is a government-owned site operated by BWO for the DOE. The project is managed by the DOE's Ohio Field Office. BWO was awarded the operating contract on October 1, 1997. Current MEMP objectives include environmental restoration and the transition of the site to the community for reuse as a commercial facility. As a result of the economic development activities by the MMCIC, over thirty private businesses are operating at the site.

The environmental restoration and transition activities at MEMP are organized into nine sub-projects. These sub-projects are briefly summarized below:

- The Main Hill Tritium Project includes the safe shutdown and decontamination of T Building, and the safe shutdown of HH (tritium components), SW and R Buildings.

- The Main Hill Rad Project includes the demolition of Buildings R, SW, H, E Annex, and B Stack

- The Main Hill Non-Rad Project includes the transition of 20 buildings and the demolition of 20 buildings. These buildings are located primarily on the Main Hill, but other infrastructure related buildings are located throughout the plant.

- The SM/PP Hill Project includes the demolition of Buildings 36, 37, 38, and 21, and the consolidation of Radioisotope Thermoelectric Generator (RTG) operations to Building 50.

- The primary activities under the Test Fire Valley Project include the decontamination and demolition of Buildings WD and HH, and the transition of Buildings 22, 23, 61, and 72.

- The Soil Project includes the characterization and remediation of Potential Release Sites (PRSs) not related to buildings.

- The Legacy Waste Project is tasked with the expeditious removal of all waste that was in the waste management inventory as of October 1, 1997 to facilitate execution of the project.

- The Isotope Power Systems (IPS) Program is tasked with the consolidation of activities into an upgraded Building 50, and realignment of resources and facilities to support the RTG Minimum Capability Plan and other ongoing IPS Missions.

- The Facility Engineering Maintenance & Utility Operations consists of facility services, utility services, special projects, utility reroute, and project staff.

In addition to the above, MEMP also performs certain direct funded projects associated with MMCIC, the Ohio Field Office Support, Worker Transition/Relocation, Large Scale Declassification, and Counter Intelligence.

The current BWO baseline budget for the MEMP is presently budgeted at $629,740,262[1]. The amount includes the following projects:

Environmental Restoration	
Main Hill Tritium	$190,582,505
Main Hill Rad	$25,355,428
Main Hill Non-Rad	$19,210,383
SM/PP Hill	$30,095,019
Test Fire Valley	$55,389,739
Soils	$50,482,809
Legacy Waste	$36,505,348
Operations	
Tritium Transition Operations	$16,539,141
IPS Program	$35,339,481
Facility Engineering Maintenance & Utility	$119,907,467
Miscellaneous Direct Funded	$40,658,555
Funded Projects	
Main Hill Tritium (Large Scale Demo)	$5,511,390
Soils (Selentec)	$115,943
Non-Defense Funded	
Main Hill Tritium (New Cave)	$4,047,054
Total	$629,740,262

Site transfer of the MEMP is baselined at September 29, 2004.

1.3 Approach

The LOIs developed during the Task A efforts were used as the basis for the current evaluation. The Review Team provided an objective review of the project scope, underlying assumptions, cost and schedule baselines, program management strategies and practices at the MEMP. The review was initiated with the review and analysis of key project documents. Interviews were conducted with selected project and headquarters staff. Information obtained from the interviews and project documents was analyzed with regard to DOE standards and guidelines, applicable codes and standards as well as industry management practices. Where applicable, actual performance was compared to established plans.

The following report contains Observations summarizing the results of the analysis performed. Where appropriate, deficiencies with regard to practices, regulations, codes, orders, requirements or agreements were noted as Findings. The following also contains Recommendations for improvements or corrective actions that may be required.

[1] Based on BWO PTS reports through May 1999.

2.0 AREA ASSESSMENTS

2.1 Technical Scope

The primary focus of the technical scope review was to evaluate whether the technical aspects of the project, as planned, are adequately designed to support the BWO Baseline project cost, schedule, and environmental goals. The Baseline Cost estimate and project schedule are discussed in Sections 2.2 and 2.3 of this report.

2.1.1 Site Characterization Data, Uncertainty, and Baseline Assumptions

2.1.1.1 Summary

One major line of inquiry for the Review Team was to examine the existing characterization data to evaluate whether the unknowns and uncertainty associated with levels of contamination have been adequately addressed in the assumptions used to develop the Baseline. The Task B investigation focused on the areas of known and potential contamination, which have not been completely characterized but it is intended to be further characterized as the project proceeds.

This was a critical area of inquiry for the Review Team. The degree of uncertainty on the project is to a large degree dependent on the extent of unknown levels and quantities of contamination onsite. Certain assumptions are included in the Baseline regarding the levels and quantities of contaminated media onsite, which form the basis of the project budget. The Review Team evaluated these assumptions to see if they were technically sound. The Review Team also evaluated the scope and planning of additional characterization activities included in the Baseline. Additional characterization information allows the project participants to more fully define the scope and quantities of work to be performed so that work planning and budgeting activities can proceed. The process of planning and executing additional site characterization needs to be scoped out in terms of sufficient labor, materials and equipment, and the work adequately sequenced to allow for informed and timely decisions as the work proceeds.

The Baseline scope of work has been broken down into a series of multiple building remediation sub-projects covering general geographical areas onsite and one non-building sub-project covering the entire site's soil remediation, including any associated groundwater. Refer to Section 2.2.1.1 for a description of the work breakdown structure (WBS). The following discussion is broken down in a similar way, categorized into Building Projects and Soils Project. Detailed discussions are provided for the critical buildings and soils sub-projects.

2.1.1.2 Building Projects

General

Observations

Existing characterization information for the contaminated buildings at the Mound Plant to a large degree consists of a historical compendium of information related to the processes and operations known to have occurred at the plant. This historical information was derived from a review of documentation and interviews with current and past plant personnel. Limited physical

sampling and analysis for radiological, Toxic Substances Control Act (TSCA), and Resource Conservation and Recovery Act (RCRA) constituents has also been performed to confirm known and suspected areas of contamination. Much of what is known about the onsite operations is compiled in the following reports:

- *Mound Site Radionuclides by Location (MD-22153, June 1995).*
- *Operable Unit 9; Site Scoping Report; Volume 7; Waste Management, Final, February 1993.*

Project staff informed the Review Team that all reasonably accessible suspect areas within the buildings have been surveyed, but that no invasive/destructive testing has been performed. A large amount of additional building characterization is planned to fully characterize the extent of contamination within the buildings. The Baseline for the contaminated buildings slated for decommissioning and decontamination all include specific WBS work activities for:

- Reviewing existing characterization data to determine the need for supplemental characterization.
- Planning and performing supplemental characterization of radiological, chemical and RCRA hazards.

The typical plan is to perform further characterization in order to have sufficient information for the development of detailed decommissioning and decontamination work plans. Additional characterization is also typically planned during the execution of the decommissioning and decontamination work to guide the work effort. The typical plan also includes a verification sampling activity after completion of the decontamination work.

The level of effort in the Baseline is based on using discrete standard assemblies (labor, materials, and equipment) for characterizing, decommissioning, decontaminating, and demolishing the buildings. The standard assemblies vary by type and complexity of equipment and building. Final costs are based on rolled up amounts based on the number of each type of assembly contained within each package of work activity.

Based upon the information reviewed, the Baseline has a reasonable level of effort planned for further characterization of the buildings. It is sufficiently detailed and scopes out the work forces, materials, and sampling events to execute the assumed work effort.

For some of the buildings, the Review Team found that subsurface characterization activity is to be completed after the issuance of the Action Memorandum, which presents recommendations for response actions. This is inconsistent with the Mound 2000 process, whereby the Action Memorandum is issued only after executing and evaluating the results of additional characterization. The Action Memoranda must, therefore, be prepared to allow for additional characterization as part of the removal action. Alternatively, additional time and budget must be allotted for developing an additional Action Memorandum for the soils portion of the remedial effort. Included as part of the building projects, is the remediation of the subsurface soils beneath the buildings and within a 15-foot perimeter.

Further characterizing the radiological contamination in the Main Hill Tritium (Buildings T, SW, and R) and Test Fire Valley (Buildings WD and HH) will present significant challenges for the project. These challenges will be manifested not only as a consequence of the complexity of the operations and high level of contamination expected in these buildings, but also due to the high degree of uncertainty for some areas of the buildings. This is particularly true for Buildings T, SW, and R that contain some equipment and materials for which no characterization information is available, such as the Old Cave beneath the SW Building which contains unknown materials entombed in-place. This presents the potential for greater quantities of decontamination work and decontamination wastes than assumed in the Baseline.

However, the Review Team believes that the greater risk facing the buildings decommissioning and decontamination effort is the complexity of the tasks, which require careful planning to ensure safety, and can potentially result in delays to the project because of unknown existing conditions. Since the project is burdened with very large time related fixed costs, any delays in executing the work on these critical buildings can result in very large additional costs to the project.

Remediation of the soil beneath and immediately surrounding the buildings is included within the building decommissioning and decontamination projects. However, there is practically no subsurface sampling data for the soils beneath the buildings. The Baseline assumes 1 – 3 feet of soil remediation below building slabs. Consequently, it appears that the assumption of one foot of soil remediation is based on professional judgement. This assumption appears reasonable for radionuclide contaminants, which are generally not very mobile in the soil matrix. This does not apply, however, to tritium. In the case of tritium, the potential can be quantified. An estimate based on 1976 core drilling data was that ~1000 curies of tritium is in the soil under Buildings R and SW. Tritium is very water-soluble and can be very mobile. In addition, many RCRA organic and inorganic contaminants can be very mobile within the soil matrix. The fact that these soluble contaminants are currently found in seeps along the hillsides on and offsite indicates that these contaminants are very mobile and have traveled up to 1,200 feet away from the sources of the contamination. There is, therefore, the potential for large amounts of contaminated soil beneath the buildings.

The cost for offsite transportation and disposal of contaminated soil can prove to be a significant cost item for the Life Cycle Cost of the project, if large quantities of tritium and RCRA contaminants contaminated soil are encountered beneath the critical buildings.

Findings

None.

Recommendations

Ensure that adequate resources are allocated to the timely execution of the characterization efforts required for the critical buildings (Buildings T, SW, and R). Since these particular buildings are on the project critical path, it is of the utmost importance that they be given high priority for further characterization and the development of work plans.

Evaluate the probability of and the potential cost impact of remediating a much larger quantity of soil, taking into consideration the significant cost impact of offsite transportation and disposal on the overall Life Cycle Cost for the project.

Review the Baseline to determine whether appropriate budget and schedule has been incorporated for additional Action Memoranda associated with Removal Actions for the soil remediation required beneath buildings.

Test Fire Valley

Observations

WD and HH Buildings are the most heavily contaminated buildings within the Test Fire Valley project. WD and HH Buildings are slated for decommissioning, decontamination, and demolition.

WD Building is the Mound site treatment facility for low specific activity radioactive wastes. It is a 28,800 square foot multi-story facility with both active and inactive wastewater treatment processes and is contaminated with radionuclear materials. The building contains the alpha wastewater treatment, beta wastewater treatment, laboratory and bench-scale research, Low Specific Activity (LSA) waste drum repackaging, a glass melter furnace, and a packed bed reactor. As part of the Baseline, additional characterization including invasive testing, as necessary, is planned.

Decontamination and demolition activities for WD Building include removal of underground storage tanks, exhaust stack removal, as well as building demolition including foundations.

The Site Scoping Report identifies a series of potential release sites with possible soil contamination (PRSs 174, and 179 through 182) in and around the area of the WD Building. Potential contaminants include radiological and RCRA contaminants.

The Baseline for the WD Building includes an activity entitled “Characterize Foundation and Area Soils,” which covers the collection of samples and the analysis for the radiological and RCRA parameters, as needed, to control the removal of any contaminated soil. The characterization effort is limited to surface soil sampling and analysis. The characterization is significantly less in scope than the other major Test Fire Valley building, HH Building, where core samples are planned in addition to surface soil sampling and analysis. The limited characterization effort for the WD Building is based on historical information that suggests that extensive contamination beneath the building due to system failures is unlikely.

HH Building is a 15,300 square foot reinforced concrete block building. Historically, the building has been used for many chemical processes, including its original purpose for processing highly acidic and highly contaminated liquid radioactive wastes from the T Building. Liquid waste from this process was collected in a sump in Room 6 and transported to WD Building using an underground pipeline. During the 1950s, Polonium processing was performed in the building, as well as several projects involving the separation of Pa-231 and Th-210 and other isotope separation processes from uranium byproduct materials. Decontamination and removal of salvageable equipment will be performed as part of the Exit Project. Wastes

generated during decontamination and demolition will include low level radioactive, RCRA hazardous, and TSCA (asbestos) wastes.

The Site Scoping Report indicates that there is evidence of areas of known and potential soil contamination in and around the area of the HH Building (PRSs 147 [Building Soils], 150 [HH-15 Sump], 151 [HH-6 Sump], and 152 [Beta Wastewater]). A June 2, 1999 PRS Status report, however, indicates that PRS-147 has been dispositioned as "No Further Action" (NFA). The HH Building soils were identified as a potential release site as a result of the Soil Gas Survey and Geophysical Investigations (Reconnaissance Sampling Report, dated February 1993). However, in 1996, PRS 147 was determined to require No Further Assessment. The following recommendation was given for the change: PRS 147 was initially identified as a result of the Soil Gas Survey which detected toluene levels ranging from 5 to 23,142 ppb. Of the four samples collected in the area, none were above the calculated soil gas guideline value for toluene of 414,600 ppb. This means that the level of toluene contamination present in soil at PRS 147 cannot adversely affect the quality of groundwater at a potential drinking water source through leaching. No detection of toluene was indicated in the downgradient seep No. 602, which is approximately 250 feet from PRS 147.

The Baseline for the HH Building includes an activity entitled "Characterize Foundation and Area Soils," which covers the collection of samples and the analysis for the radiological and RCRA parameters. An extensive surface and subsurface investigation is included in the Baseline, including investigation of the soil beneath and around the building (to 15 ft. beyond perimeter) and beneath the HH-T tunnel.

For the WD and HH Buildings, foundation and area soils characterization is to be performed after completion of the Action Memorandum. This sequence does not fit within the framework of the Mound 2000 Approach, wherein the Action Memorandum is prepared only after characterization is completed.

Only one foot of contamination below the WD and HH Buildings is assumed in the baseline. The Review Team was not made aware of any existing subsurface characterization data that could have been used to develop an estimate assuming one foot of excavation. It appears that this estimate is based on professional judgement. The cost of offsite transportation and disposal of low-level radiologically contaminated soil may present a significant potential cost impact to the Life Cycle Cost of the project, if a large quantity of contaminated soil is encountered. It is our understanding that offsite transportation and disposal costs are not included in the BWO contract and that offsite vendors providing these services are paid directly by the DOE. While these cost are not part of the BWO contract, there is still a potential significant risk to the overall project cost related to the extent of soil contamination encountered.

Findings

None.

Recommendations

Refer to the recommendations provided in the beginning of the sub-section entitled "General".

R and SW Buildings

Observations

Both the R and SW Buildings are slated for demolition within the Main Hill Rad project upon transfer from the Main Hill Tritium project after decommissioning and decontamination. The R Building is a 55,000 square foot one-story block and brick building. Housed in the building are laboratories used for radioactive and non-radioactive work. R Building contains uranium, plutonium, americium, protactinium, radium, radon, actinium, and tritium. Contaminated Significant Safety Systems in the R Building will be decontaminated and removed as part of the Main Hill Tritium project prior to its transfer to the Main Hill Rad project. R Building has been split into two areas for remediation, Areas A and B. Area A contains active radioactive material work and is the area slated for Tritium remediation. Other areas within Area A consist of rooms where former plutonium work was performed. Area B consists of offices and storage areas.

The R Building Main Hill Tritium Project Baseline includes the remediation of contaminated soils under the building that will require the use of the Effluent Recovery System or the Tritium Emissions Reduction Facility.

The Site Scoping Report indicates evidence of a potential release from drains in Rooms 121, 144, 146, and 148 of R Building. Consequently, there is the potential for soil contamination, reportedly consisting of Radium-226 and Actinium-227. The Baseline includes an activity "Characterize Foundation and Area Soil," which covers the development of a Sampling and Analysis Plan (SAP), collecting and analyzing the samples, and the review and approval of the data.

SW Building is among the most heavily contaminated onsite. It is a 43,000 square foot two-story building that was used primarily for handling tritium. The decommissioning and decontamination of this building is a very complex undertaking. Under the Main Hill Tritium Project, the building is divided into eight areas for remediation. Area E, which contains gloveboxes and equipment recently used for metallographic support of tritium operations at the site, is considered to be a significant hazard due to the stable metal tritides.

The Baseline does not include an estimate to remediate known contamination in and under SW-13 floor, within Area E, because of uncertainty associated with the extent of contamination. The Baseline indicates that this area requires extensive characterization and a Baseline Change Proposal will be submitted after completion of the characterization work.

Beneath rooms SW-18 and 19 (Area F) is the "Old Cave," which was used to process actinium. This cave contains materials entombed in place, which are currently unknown.

PRSs to be remediated within the Main Hill Tritium project include PRSs 134 through 137 and 139 through 141 (wastewater tanks, drum storage area, and others). Project staff informed the Review Team members that an underground drain line containing tritium at one time leaked, and as a consequence considerable amounts of soil contamination will likely be encountered beneath SW Building. Only one foot of soil removal, however, is included in the Baseline (1,782 cy) for the SW Building as part of Main Hill Rad Project scope of work.

Soil characterization work for the R Building is slated to start February 12, 2002 and finish by July 3, 2002. However, the Action Memorandum for this building is scheduled for completion by April 1, 2002. This sequence does not fit within the framework of the Mound 2000 Approach, wherein the Action Memorandum starts only after characterization is completed. If a separate Action Memorandum is planned for the subsurface contamination, then no provisions have been made in the Baseline for performing it.

For both the R and SW Buildings, the work scope presented in the Exit Plan for characterizing the subsurface appears reasonable regarding the number of samples assumed and the associated labor hours to execute the work.

It appears that the major portion of the uncertainty associated with the R and SW Buildings are related to the extent of soil contamination beneath the building. Only one foot of contamination below the building is assumed in the baseline. The Review Team was not made aware of any existing subsurface characterization data that could have been used to develop an estimate using one foot of excavation. It appears that this estimate is based on a professional judgement.

The cost associated with the transportation and disposal of contaminated soil may present a significant cost impact to the Life Cycle Cost of the project. While this cost is not part of the BWO contract there is still a potential significant risk to the project overall cost.

Findings

None.

Recommendations

Refer to the recommendations provided in the beginning of the sub-section entitled “General”.

T Building

Observations

The T Building is currently slated for decommissioning, decontamination, and transfer to the MMCIC. The building is a unique underground two level structure. The interior area is approximately 100,000 square feet. The building has a 15-foot thick reinforced concrete roof covered with 3 feet of soil. The floors are 8 feet thick reinforced concrete, the exterior walls are reinforced concrete 16 feet thick and the interior walls are 30 inch thick concrete. The bottom floor is over 63 feet below ground surface.

The T Building is scheduled to be transitioned to MMCIC with radionuclide contamination removed to levels suitable for industrial use. In discussions with DOE and BWO managers onsite, it appears that the decision to remediate T Building, placed considerable reliance upon the report: *Pre-Conceptual Engineering Study, Technical Building,* Parsons Infrastructure and Technology Group, Inc., Mound Technical and Environmental Services, September 26, 1996; and the related reports: (a) *Technical (T) Building D&D Pre-Conceptual Engineering Study, Addendum,* EG&G Mound Applied Technologies, October 31,1996 and (b) *Tritium Complex D*

& D Pre-Conceptual Engineering Study, Cost Benefit Analysis for Optimum D & D Approach, EG&G Mound Applied Technologies, December 19, 1996.

The Parsons study did not evaluate the following alternatives:

- No Action
- Delayed Decontamination and Disposal (D&D)
- In situ disposal

The Parsons study evaluated two alternatives in detail:

- D&D
- Decay in Place

The Parsons Report is based primarily on achieving a tritium release level maximum of 1,000 disintegrations per minute (dpm)/100 cm^2. The decay in place estimate was based on a partial cleanup effort in order to start from a tritium activity level that would eventually decay to the release level (1,000 dpm/100 cm^2) in 100 years. The revised release level is 10,000 dpm/cm^2. Furthermore, the Parsons report was based on 25g of tritium in T Building. Recent estimates are 10g-15g.

The Review Team was informed that based upon the cost estimates of the two alternatives contained in the reports prepared by Parsons and input from the MMCIC, the decision to decontaminate and transition the building was made.

The costs for the D&D and Decay in Place alternatives described in the Parsons report are similar ($41 million each, plus contingency). The present Mound Baseline includes a cost of $44.5 million for the remediation of T Building. The Parsons report states that the costs are independent of the release criteria, but that is only correct if it requires 100 years to meet the revised release criteria.

The Parsons Reports cites 40 CFR 191 as a regulatory constraint of 100 years "for the maximum amount of time that institutional controls will be maintained by the government." However, 40 CFR 191 does not stipulate a mandatory period of 100 years of institutional controls (paragraph 191.14.a).

Since the amount of tritium may be roughly half of the amount assumed in the Parsons Report, decaying in place to a 10,000 cpm/cm^2 will take significantly less time to reach than the 1,000 cpm/cm^2. Therefore, the period of long term monitoring and maintenance will be less. This can result in a significant impact on an analysis of a decay in place alternative.

In addition, the Parsons Report did not consider other radionuclides in T Building. Discussions with site personnel indicated that tritium represents only part of the radioactive contaminants and may not be the most difficult contaminate to cleanup. Other than tritium, radionuclide contamination in T Building has not been quantified except at individual locations discovered during the course of other work activities. Incomplete characterization contributes to the uncertainty in defining the work required for the remediation of T Building.

Once it is remediated, T Building poses problems for any tenant. The 30-inch thick interior walls limit reconfiguration of office or work space. The ventilation requirements are unusually complex and expensive to operate and maintain for a building this size.

The T Building has very limited commercial use. Neither MEMP nor MMCIC representatives divulged any known commercial use for the building to the Review Team. The Mound Reuse Plan does not indicate a use for the building and identifies it as one of the buildings to be demolished. It is possible that after the expense of remediating the building and turning it over to MMCIC it will either sit idle indefinitely or be used inefficiently.

The Review Team is concerned that the various in situ disposal options and the D&D for restricted use alternatives were eliminated without sufficient analysis despite being technically viable with potential cost benefits. The Parsons Report identifies in situ disposal alternative or entombment as a "technically viable and cost beneficial" option. The report did not analyze this option apparently due to anticipated stakeholder opposition and the fact that it would require approximately 250 years for the tritium in the building to decay to an unrestricted release status. The T Building would have known contaminants and is virtually impenetrable. Thus, an entombment or partial entombment alternative appears to be a viable technical alternative.

Findings

None.

Recommendations

Reevaluate the potential alternatives for the disposition of the T Building. Presently it appears that Entombment/Partial Entombment and D&D for restricted use as discussed in the Parsons Report are technically feasible alternatives, which should be revisited. Additional characterization data will likely be required to make objective cost comparisons.

An objective alternatives analysis for T Building may include, among other alternatives:

- Entombment of acceptable waste that will meet regulatory and stakeholder approval.
- Use as a storage facility for federal use.
- The impact of the currently used release criteria of 10,000 dpm/cm^2 should be re-evaluated.

2.1.1.3 Soils Projects

General

Observations

Similar to the building projects, much of what is known about soil, groundwater, and surface water/sediment contamination is based on information collected from historical records and interviews with site personnel. An extensive amount of physical characterization has also been

performed to characterize the many PRSs onsite. Additional PRSs continue to be identified as the project progresses. The Baseline includes an allowance for additional PRSs and is included in WBS 1.2.7.30, "Phase II Follow-on."

As of May 25, 1999, there were 419 PRSs identified, of which 158 have been remediated or dispositioned (binned), as NFA required. A total of 185 PRSs have been assigned to the D&D program, which are the buildings projects previously described. These PRSs are those located within the footprint, plus a 15-foot perimeter around the buildings.

Multiple sampling events have been performed onsite, starting as early as 1982 when the Radiological Site Survey, Operable Unit 9 Scoping Report fieldwork was begun, through 1998 when the Baseline was prepared.

For areas of known or suspected subsurface contamination in both the soils projects and the contaminated buildings projects, the Baseline includes specific WBS work activities for:

- Reviewing existing characterization data to determine need for supplemental characterization.

- Planning and performing supplemental characterization of radiological, chemical and RCRA hazards.

The typical plan is to perform further subsurface characterization in order to have sufficient information for dispositioning the PRSs and for development of detailed work plans. The typical plan also includes a verification sampling activity after completion of the removal action.

Considerable uncertainty exists regarding the nature and extent of soil contamination. Actual soil volume that requires removal or treatment could be significantly different than what is baselined.

Sufficient data for many of the PRSs does not exist to adequately define the extent of contamination and define the approximate limits of remediation. At some PRSs all of the contaminants may not have been detected. Therefore, budget and schedule estimates have a large degree of uncertainty for several PRSs. It has been assumed for several buildings that the soil underneath the buildings is contaminated. The extent of contamination under the buildings and what has migrated away from the building through preferential pathways is unknown. It appears that the budget and cost estimates were estimated primarily based on process knowledge, with limited sampling information.

Findings

None.

Recommendations

Perform soil characterization activities as soon as possible to reduce uncertainties and future schedule risk.

It will be beneficial to expedite the soil characterization for the entire site in order to determine the approximate volume, contaminants, and physical properties of the contaminated soil for the entire site. Maximum efficiency can be achieved by exploiting the economics of scale and avoiding multiple mobilization.

PRS-66

Observations

PRS-66 is a former disposal site under the parking lot and vicinity located southeast of Buildings 29 and 98 and north of Building 51. This area, which was formerly a steep ravine, was used for many years for the onsite disposal of debris. The ravine depth to bedrock is reportedly up to 70 feet deep. Among the items that are reported to be in the ravine are:

- Thorium-232 contaminated flatbed truck.
- Potentially 10,000 empty drums that once contained thorium-232.
- Polonium-210 contaminated washing machine.
- Miscellaneous ferrous debris.
- Equipment used in repackaging thorium sludges.
- Construction debris.
- Septic tank that contained radium and actinium contaminated soil at north end of area 7. (It should be noted that a removal was completed at Area 7, (PRS 86), and that the septic tank and actinium waste were removed).
- Soil contaminated with thorium-232.

The BWO Baseline scope of work for PRS-66 consists of conducting a removal action by performing "smart sampling" and selectively removing soils from thorium contaminated "hot spots," leaving the bulk of the soil in place with institutional controls to limit access to the remaining contamination.

Potential Release Site PRS-66 has undergone many revisions in scope, with other PRSs either removed or added to the package. Originally, PRS-66 was generally known as Area 7, when the site was being handled under Operable Units (OUs) within the traditional Remedial Investigation/Feasibility Study (RI/FS) CERCLA process.

Currently, what is known as PRS-66 in the BWO Baseline includes the original Area 7, including PRS-40, which is contained within the PRS-66 bounded area. The Baseline Soils Project covers this work under WBS 1.2.7.27 "Building 66 Lot (PRSs 40, 66, and 75)." PRS-75 (Railroad Siding), is not contiguous with PRS-66 located further south in the Valley. PRS-40 reportedly contains Plutonium-238 soil contamination as high as 7,000 pCi/g, greatly exceeding the Mound as Low as Reasonably Allowable Achievable (ALARA) value of 25 pCi/g.

A magnetic geophysical survey of the site shows a large magnetic anomaly located at the north-central area of PRS-66. No intrusive sampling of this area has been performed, despite the fact that it is suspected to be the location of potentially 10,000 empty drums contaminated with thorium and polonium, a flat bed truck contaminated with thorium, and discarded exhaust system ducts (demolition debris) from remodeling work at the T Building.

Of the soil samples analyzed from PRS-66 parking lot area, only a few samples thus far exceed the Guideline value of 5 pCi/g, with values of up to 20.52 pCi/g of thorium-232. Thus, the limited analytical test results appear to support the current baseline assumption that the area be remediated of selected hot spots, leaving the bulk of the soil in place.

A review of the Baseline information indicated that a component of the detailed estimate was omitted from the Baseline. This omission, which was verified by the BWO project team, has been quantified at approximately $500,000. This omission was brought to the attention of the BWO project team, who informed the Review Team that a data entry error occurred when preparing the COBRA budget estimate and that a Baseline Change Proposal is currently being prepared to correct it. This omission is currently being addressed by BWO.

A review of the groundwater sampling results shows that radionuclide groundwater contamination exists (thorium-228, thorium 232 and tritium), but below the Guideline Values. The PRS-66 Data Package makes reference to both the Area 7 Investigation Field Report and the Groundwater Seeps Report, but the samples from the Area 7 Investigation Field Report were taken from boreholes (not groundwater monitoring wells), which makes the quality of the samples suspect. There is a line of downgradient monitoring wells which do not indicate elevated levels of thorium-228, thorium 232 or tritium.

The groundwater sampling at PRS-66 appears to be very limited. However, except for tritium, the radionuclides are generally not very mobile in the groundwater regime and the concern with migration of the contamination in groundwater is minimal. Low levels of tritium were found in the groundwater at PRS-66 from samples taken at the extreme north and south ends of the area.

The information reviewed indicates minimal contamination of the surface and near surface soils and minimal groundwater contamination. These conditions support the current Baseline assumption that most of the soil and buried wastes within PRS-66 can be left in place with some minor hot-spot remediation. Additional characterization of PRS-66 is necessary, however, to be able to make a final determination of whether this is technically a viable alternative. Additional characterization is included in the Baseline budget and schedule. Thus, it appears that the assumptions in the Baseline for the final disposition of PRS-66 are reasonable. There is, however, a large measure of uncertainty since the site has not been fully characterized.

Estimates recently prepared by BWO indicate that the cost of total removal of material from PRS-66 can be in the range of $30 to $38 million. Consequently, this area poses significant risk to the Baseline Cost.

In a June 2, 1999 Binning Status Report (log), PRS-66 has been binned for Further Assessment (FA). A Sampling and Analysis Plan (SAP) is currently being developed that will more fully characterize PRS-66 and will hopefully address any potential stakeholder concerns about leaving a large volume of contaminated material in-place. The current draft SAP includes a total of 428 soil borings ranging in depth from 10 to 40 feet below grade and approximately 1600 soil samples. This is significantly greater in scope than what is assumed in the Baseline, which includes only a total of 550 samples. The currently proposed sampling plan is estimated to exceed the Baseline budgeted sampling plan by approximately $1 million and will likely require more time to implement.

An item of significant concern is that even after additional characterization, there is still a large element of uncertainty regarding the materials buried in PRS-66, since it was essentially used as a dump for the site for many years. Given the variety of the reported contaminants (truck, washing machine, equipment, drums, etc.) in the ravine, it will be very difficult to develop a reasonable sampling and analysis program that will provide complete information about the contents and concentration/activity of the contaminants. It could be argued that no amount of historical research and characterization could provide a full picture of what and how much contaminated material is buried in this area.

If, however, after further characterization the buried materials can be considered generally non-mobile in the groundwater, then the remaining environmental concern would be direct contact during construction operations onsite. This concern can be taken care of by simply installing a buffer zone of clean soil over the top of the area (maybe 3 to 5 ft. thick) and establishing institutional controls (deed restrictions). This alternative is consistent with the Baseline assumption, which essentially leaves most of the material in-place. However, some or all of the additional characterization and hot-spot removals may not be necessary for this alternative, as the materials will be entombed in-place. Continued long term monitoring of groundwater quality may be warranted for this alternative.

The BWO Baseline work breakdown structure for WBS 1.2.7.27 Building 66 Lot presents the development of SAP, a Health and Safety Plan (HASP), and work permits. Schedule time and budget are included for these tasks, including appropriate review by the DOE and external parties. The WBS 1.2.7.27 Building Lot 66, however, does not appear to fit within the framework established for the Mound 2000 Approach Work Plan. The Mound 2000 Approach contains a well defined task structure for the disposition of Potential Release Sites, which for PRSs binned FA requires the development of a SAP, executing the SAP, reassessing the PRS with the newly acquired data, and if the PRS is designated for Removal Action (RA) an Action Memorandum prepared. The preparation, distribution, and approval of an Action Memorandum is not included in the existing Baseline.

A review of the schedule also reveals that the WBS 1.2.7.27 building 66 Lot is behind schedule. According to the baseline schedule, the work plans should have been completed and excavation started by May 27, 1999. Information obtained from interviews indicates that the SAP is still being formulated at this time. It also our understanding that officials at DOE headquarters are reconsidering whether the buried materials should be completely removed from PRS-66. As presented above, removal of the bulk of the buried materials in PRS-66 would have a significant impact on project costs and may present some schedule challenges as well.

Findings

None.

Recommendations

For PRS-66, correct the perceived inconsistencies in the Baseline, as follows:

- Ensure that the current Baseline schedule and budget include activities for the preparation and approval of an Action Memorandum.

- Correct the omission between the detailed estimate and the Baseline Budget.

- Evaluate the assumed cost and schedule for implementation of the sampling plan and revise the Baseline as necessary. The currently proposed sampling plan is significantly greater in scope than assumed in the Baseline.

- Perform a cost/benefit evaluation of potential alternatives. The alternatives evaluation should consider as significant factors (a) the scope and cost of additional sampling events to further characterize the area and (b) the cost of long term stewardship. Alternatives evaluated should include: the installing of the buffer/cap and/or partial soil removal, versus complete area removal. A detailed assessment of alternatives should be performed. It is possible that the alternatives analysis will show that the cost and time invested to rid DOE of the long term monitoring, maintenance, liability and risk may be a prudent course of action.

- Finalize and execute the SAP and make final decisions on the disposition of PRS-66. Perform additional characterization to adequately define the volumetric extent, concentration/activity and identification of the contaminants.

- Allow for adequate time for the budgeting approval process and for possible budgeting constraints, given the large potential impact to the Life Cycle Cost of the project.

Groundwater

Observations

The Buried Valley Aquifer (BVA) lies partially under but primarily west of the MEMP. The BVA was designated a sole-source aquifer by USEPA in 1988. The aquifer supplies all the drinking water for the communities that it serves. The BVA is Ohio's largest sole-source aquifer.

East of the BVA and under the MEMP site is a localized aquifer, often referred to as a perched aquifer in site documents. Site maps indicate a limited horizontal overlap of the two aquifers. The vertical distance between the two aquifers in the limited area of overlap appears to be approximately ten feet. The contaminants found in offsite BVA wells are possible evidence of hydraulic connection between the perched aquifer and the BVA. The data collected indicate that contaminants that are in the perched aquifer under the Mound Main Hill can find their way to the BVA, albeit at low concentrations.

Inorganic compounds, volatile organic compounds (VOC) and radionuclides are present in offsite groundwater monitoring wells and seeps at low concentrations and activity levels. The highest offsite inorganic and VOC concentrations are southwest of Main Hill. With a few sporadic exceptions during the past three years, the inorganic and VOC concentrations detected offsite are below the Safe Drinking Water Act Maximum Contaminant Levels (MCL). In all of

the well data examined, radioactivity levels are below the International Commission on Radiological Protection Derived Concentration Guides.

One of the most contaminated offsite monitoring wells is well number 389. The only contaminant of concern in the well is trichloroethylene (TCE). Although the TCE contaminant level is low, generally around the MCL, the source of contamination is unknown.

The majority of offsite groundwater seeps have measured values of tritium above the federal secondary safe drinking water standard. A few seeps also exceed the MCL for specific organic compounds.

Onsite, groundwater and vadose zone contamination associated with the landfill have been undergoing remediation through soil vapor extraction (SVE) and hydraulic capture. An air sparging system has been used with limited success. Because of clogging of the well screens and the relatively low efficiency of the operation, the air sparging system was shut down. Although the VOC mass removal rate in the area of the landfill indicates a rapidly declining rate of removal, the soil vapor extraction system has not been shut down to test for a rebound effect.

Several onsite monitoring wells show the existence of VOCs and iron in groundwater above MCLs. Tritium is detected in several onsite monitoring wells below the USEPA Standard of 20 nCi/L.

Excavated trenches on the Main Hill, referred to as capture pits, allow seeping groundwater to accumulate for sampling purposes. The majority of groundwater sampling locations categorized as capture pits have measured values of tritium above the USEPA Standard. A few capture pits also exceed the MCL for specific organic compounds.

Groundwater contamination at MEMP is evident in several onsite monitoring wells, capture pits and seeps. Offsite contamination has been routinely detected in seeps and one monitoring well. An effective process is in place to remove the organic contaminants from groundwater in the area of the landfill. The successful implementation of the SVE system is fairly localized. It appears that groundwater contamination suspected to emanate from the contaminated soils under and around SW Building will not be treated until the SW Building is remediated.

Groundwater contamination suspected to result from the SW building represents a considerable amount of uncertainty in budget and schedule allocated for groundwater remediation and long term monitoring.

The effect of shutting down the two remaining onsite production wells will possibly alter groundwater flow and may cause changes in contaminant migration. Also, the effect of shutting down the groundwater pumping system is unknown. Frequently shutdowns of a few to several months result in a rebound of contaminant concentrations, which lead to extended groundwater treatment. Also, failure of the air sparging system, which is currently non-operational, may delay the groundwater remediation effort.

The BVA is the only source of water for the surrounding communities. The consequences resulting from contaminating the BVA would be significant. Because of the uncertainties

described and the limited overall progress, there is a large degree of uncertainty with regard to completion of the groundwater treatment onsite.

There is no consideration in the budget to continue monitoring and treating the groundwater beyond the transition of MEMP to MMCIC. Given the importance of the BVA and the existence of known and suspected carcinogens in groundwater, monitoring is almost certain to be required by OEPA and/or USEPA for possibly over 20 years beyond closure. Additionally, there is a likely probability that groundwater treatment will be required beyond the currently assumed Baseline.

Findings

None.

Recommendations

Review the Baseline assumptions and the Life Cycle cost assumptions regarding long term stewardship costs. The fact that the air sparging system is currently non-operational should be factored into the long term stewardship costs and schedules.

Perform a risk assessment of public access to the offsite tritium and organic compound contaminated seeps. Descriptions from site personnel indicate that underbrush and terrain make the seeps difficult to access. However, the public accessibility presents a potential liability.

2.1.2 Remedial Alternatives, Waste Disposal and Long Term Stewardship

Summary

The evaluation of remedial alternatives requires that all appropriate cost factors be incorporated into the analysis. The cost of waste disposal and long term stewardship for radiologically contaminated sites, such as MEMP, are of particular importance because they can potentially constitute the largest portion of the cost of remediation. The Review Team examined the general process of remedial alternative analysis performed at MEMP and how these factors are incorporated into the evaluation process.

The Review Team also evaluated, in detail, the technical constraints on available waste disposal options. Assumptions made in developing the Baseline are examined in the context of these technical constraints to evaluate whether the assumptions made were reasonable.

2.1.2.1 Remedial Alternatives Evaluation Process

Observations

Remedial alternatives are addressed at different levels of detail within the general framework of the Mound 2000 Process. Preliminary ideas on proposed remedial alternatives are addressed during the binning process, as set forth in the Mound 2000 Process. For example, the cost of a removal action is evaluated against the cost of further characterization of a particular PRS. For PRSs binned for RA more detailed remedial alternatives are evaluated and cost estimated as part

of the Engineering Evaluation/Cost Analysis (EECA), which is performed and presented along with the issuance of an Action Memorandum.

Detailed studies are also performed, including value-engineering studies, which may address certain remedial alternatives. An example of this type of study is the *"Mound Transuranic Waste Disposition Feasibility Study, Feb. 25, 1999,"* prepared by BWO. This study presents a series of remedial alternatives for the disposition of the transuranic wastes. In this study, the cost of the different alternatives are presented, including the complete Life Cycle Costs, which would involve those costs for transportation and disposal which are paid directly by the DOE to outside vendors. These types of detailed studies were also found to have the cost associated with long-term stewardship factored into the analyses.

BWO has a fee incentive within its contract, which obliges them to perform value-engineering studies and thus look at available cost efficient alternatives. Studies are performed at the project-level by project engineers, either as individual project studies or studies spanning multiple projects. As an example, the Review Team was informed that a value engineering study is in progress for the demolition of the stacks. This study spans multiple projects.

Findings

None.

Recommendations

The Review Team has no recommendation regarding this issue.

2.1.2.2 Waste Disposal

Observations

Approximately 246 m^3 of Legacy Transuranic (TRU) waste is presently being stored in T Building. The disposition of the waste is uncertain. Removing the waste from T Building is related to the critical path schedule. Presently, there is no acceptable method in place to ship the waste and there does not appear to be a site that is committed to receiving the waste.

The Baseline is based on the use of a Waste Isolation Pilot Plant (WIPP) Mobile Services provider. BWO's February 25, 1999 feasibility study (*Mound Transuranic Waste Disposition Feasibility Study, Feb. 25, 1999*) evaluates a series of waste disposal alternatives and recommends the alternative of using ATMX railcars to transport TRU wastes to an offsite location for storage and processing and eventual shipment to WIPP. A Baseline Change Proposal is currently being processed for this recommended alternative.

The alternatives available are:

Mobile Processing Facility

The concept of WIPP Mobile Services is to provide small TRU generators, such as MEMP with a pre-approved suite of services to characterize, certify, package and transport TRU waste to

WIPP. The Mound Baseline Disposition Map projects that approximately 246 m^3 of TRU waste will be processed in a DOE/Carlsbad Area Office (CAO) supplied Mobile Waste Treatment System onsite at Mound. However, considerable uncertainty exists regarding the availability of a suitable Mobile System, its unit costs and probable lack of experience by the Service Operator with the MEMP form of waste.

The proposed MEMP processing will involve soil blending to reduce TRU waste volume, followed by characterization of package contents in accordance with Transuranic Packaging Technology (TRUPAC) Control Codes and repackaging for shipment directly to WIPP in the TRUPACT-II packaging. This is based on the assumption that WIPP can receive it. Interim storage of material onsite may be required to meet the T Building schedule. Interim storage is not in the baseline schedule. The SM/PP Pad has been identified as the site for the Mobile Processing Unit, however there is an uncertainty due to a possible conflict between the legacy TRU project schedule and the schedule for turnover of land to MMCIC.

ATMX Railcar Shipments

The major uncertainty in this alternative is whether DOE will be successful in their application to the Department of Transportation (DOT) to renew the applicable exemption from DOT- E 5948 authorizing the shipment of packaged radioactive waste, which was last renewed in April 1996, but expired on April 30, 1998. DOE personnel have stated that an application to reinstate DOT-E 5948 was submitted to DOT, and DOT has requested more information. The scheduled date for completion of the reply to DOT is October 1999**.** Apparently the paperwork flow to DOT for the exemption is from the DOE/Albuquerque Operations Office (ALOO) National Transportation Program Office, with MEMP providing ALOO with the technical input to the questions.

Through discussions with a staff member of DOT/Research Special Programs Administration (RSPA), more information has been developed since June 8,1999 regarding the current status of DOT-E 5948. The last revision (Rev 9) was issued by DOT about April 1996, having an expiration date of April 30, 1998. In that revision, three DOE contractors are identified as parties (registered users) of the exemption. They are:

- Lockheed Martin Research Corporation, Oak Ridge
- Lockheed Martin Energy Systems, Oak Ridge
- Dyncorp of Colorado, Golden, Colorado (Rocky Flats)

MEMP is not listed as a party to the most recent version of the exemption. Apparently, the exemption did get renewed in April 1998 for a two year period, but MEMP was not added as a party to the exemption.

DOE/ALOO requested renewal of DOT-E 5948 in a letter to DOT on Jan 30, 1998 (before expiration) and also on October 15, 1998. On December 4, 1998 a letter was sent from DOT to DOE/ALOO requiring contractors requesting party status to provide information on their procedures for maintenance and inspection of ATMX 600 rail cars before they are issued party status.

49 CFR 107.109, which is a timely application provision, states that if at least 60 days before an existing exemption expires the holder files an application for renewal that is complete and conforms to the requirements of this section, the exemption will not expire until final administrative action on the application for renewal has taken place.

Low Level Waste Shipments

Shipments of Low Level Waste (LLW) have been essentially in two categories:

1. Those containing less than 2 nCi/g (0.002 uCi/g or 70 Bq/g) which is the definition of radioactive material for purposes of transportation. These shipments, although not regulated by DOT as radioactive material are considered by MEMP to be DOT Class 9 - Other Regulated Material. This designation is probably driven by the USEPA's standards for a reportable quantity of a hazardous substance in that, even though the specific activity of the materials is less than the stated definition of radioactive material, there is sufficient activity in a shipment to constitute an aggregate reportable quantity per USEPA requirements (10 mCi of Pu-238 or Pu-239).

These LLW materials are routinely shipped to the commercial state licensed Envirocare Waste Burial Facility in Clive, Utah. Open gondola type railcars are used with the material (restricted to solids with pieces not more than 8" in any dimension) placed within a double-envelope of nested heavy gauge polyethylene bags.

2. Material exceeding 2 nCi/g (0.002 uCi/g), but not exceeding 100 nCi/g TRU are shipped routinely to the DOE LLW site at the Nevada Test Site (NTS) using exclusive use trucks. The materials are generally classed as a Low Specific Activity (LSA) - II material. Materials suspected to exceed the 100 nCi/g TRU limit will be brought below the limit by soil blending with soils of known characterization and activity. The materials will be packaged in Type A packaging for shipment by truck to NTS.

Disposition and transfer offsite of the TRU waste from the MEMP facility represents a challenge to the Mound Site Closure Baseline projections due to the significant uncertainties surrounding the methodology and packaging system used for the TRU waste.

The available transportation options and their related uncertainties are:

1. Whether the DOE Mobile Processing Facility which is planned for preparation and qualification of the TRU for shipment in TRUPACT-II containers will ever come to pass, and if it does, can it successfully process all of the Mound TRU waste to meet WIPP waste acceptance criteria. MEMP and DOE EM 73 personnel have very little confidence that this will ever be a viable alternative for MEMP waste.

2. Whether the ATMX railcar system will be available to transfer the present packages directly to another DOE facility for subsequent TRUPACT-II packaging and shipment to WIPP.

It is clear that from a scheduling standpoint, the T Building remediation schedule is a major driving force. All currently proposed options incorporate soil blending. The soil blending would be performed in a Consolidated Waste Processing Facility (CWPF) that has been operating since

early FY 1998. The facility was designed for LLW repackaging and is being considered for TRU Waste packaging and processing.

Offsite transport using ATMX rails cars to the Oak Ridge Reservation (ORR) for interim storage is considered by DOE to best meet schedule objectives. It eliminates dependence on WIPP site availability or Mobile Processing availability. Other possible sites are Idaho National Engineering and Environmental Laboratory (INEEL) and Savannah River Site (SRS). However there is no known formal agreement with ORR, INEEL or SRS to receive MEMP's TRU waste.

There is also a high degree of uncertainty over possible resumption of shipments to the INEEL facility. Rail shipments from MEMP to INEEL using ATMX railcars were suspended over ten years ago due to INEEL's closure to receive waste by the Governor then in office. Since WIPP has recently started to receive wastes, some of which is from INEEL, DOE apparently feels that the current Governor may be willing to relax the former restriction.

BWO and DOE/ALOO have done an excellent job of determining the types, forms, quantities and locations of Legacy wastes at the Mound Facility. Their analyses of the options and alternatives for transfer for disposal are realistic and sound.

There are uncertainties over the method of transferring the TRU presently in storage in the T Building. The uncertainties are whether to rely on the Mobile Processing Unit onsite and shipment in TRUPACT-II versus transfer of packaged TRU essentially as-is in ATMX railcars. Additionally, there is uncertainty regarding the ATMX exclusion and the waste acceptance at an as yet unconfirmed site.

It appears that if the ATMX is used, the present cost estimates based on use of mobile processing are conservative, with total end costs being lower than predicted. Alternatively, with all of the uncertainties surrounding the use of the Mobile Processing unit, the total end costs may be significantly greater than estimated.

Good progress has been made on the processing and transfer for disposal of the other three forms of legacy waste, specifically: excess chemicals, excess nuclear materials and mixed wastes.

Findings

None.

Recommendations

Determine as soon as possible whether the DOT exemption is currently active under the timely application provision and whether DOT is leaning toward formal renewal after reviewing the information DOE/ALOO is expected to complete by October 1999.

It would be timely for DOE/ALOO and MEMP to facilitate discussions with DOT/RSPA regarding the status of renewal of the ATMX Exemption DOT-E 5948 to determine:

- Whether the exemption technically is active at present due to the timely application of 49 CFR 107.109.

- If the exemption is still currently active, can party status be granted to an applicant before the formal renewal is issued? If so, can such party status be granted to MEMP, which was not listed on the most recent exemption?

- Whether DOT currently foresees major technical or political problems in issuing the renewal of the exemption after review of the information they have requested from DOE/ALOO, which BWO has stated will not be completed until October 1999.

2.1.3 Policies, Procedures, and Compliance Issues

Summary

On large-scale cleanup projects, many technical decisions are made on cleanup levels, health and safety planning, and field-work planning. It is of critical importance that procedures and policies are in place to guide and manage the execution of these decisions. Cleanup levels need to be clear and firm so that consistent technical decisions are made on cleanup actions and so that estimated costs for remedial work can be reliably made. The Review Team examined samples of the policies and procedures being used at MEMP in order to assess the general management of this technical effort.

2.1.3.1 Compliance Issues

Observations

The MEMP is a site remediation project required under CERCLA and is subject to regulation by other state and federal laws. The general framework of regulatory compliance for the execution of the Exit Plan is governed by the FFA.

Preliminary CERCLA assessment of contamination at the site identified approximately 125 locations of actual or suspected releases. These locations were grouped into OUs based on waste type and/or geographical proximity. Originally, nine OUs were established. As CERCLA activities progressed, changes to the number and composition of the OUs were warranted. In 1995, the CERCLA program was reorganized to increase the efficiency of the environmental restoration effort. The initiative, termed "MOUND 2000," has accelerated cleanup of the site so that the land can be released for economic development much sooner than originally planned. The MOUND 2000 process addresses buildings and PRSs individually. Approximately 400 PRS have been identified.

A Core Team, comprised of USEPA, OEPA, and DOE representatives, reviews the status of each building and PRS based upon an information package that serves as the basis for decision-making. The Core Team reaches a consensus decision to categorize each PRS in one of the following ways: (1) *no further assessment* (NFA) is required, i.e., the site is protective of human health and the environment, (2) a *response action* (RA) is warranted, or (3) there is insufficient information to make a determination and no further action is taken. If it is determined that further assessment is needed, the additional data necessary to make a decision are collected and presented to the core team. If it is cost-prohibitive to obtain the necessary data, a decision to initiate a response action may be made. A response action is a clean-up action tailored to the

PRS of interest. Core team decisions to initiate a response action or that no further assessment is required are presented to stakeholders.

The MEMP has chosen to depart from the standard CERCLA RI/FS process by implementing a process that focuses upon individual release sites (the Mound 2000 Process). PRS is defined and evaluated to determine if it is acceptable for immediate release, or needs further characterization. PRSs are areas where knowledge or historical use indicates that the site may be contaminated with radioactive and/or hazardous material. After a PRS is characterized and if necessary remediated, a no further action Record of Decision (ROD) is sought. The PRS is the primary basis on which decisions are made.

Decisions on cleanup levels are ultimately made by the core team using risk-based guideline values developed specifically for use at the Mound Plant ("Risk Based Guideline Values, March 1997"), along with other Applicable or Relevant and Appropriate Requirements (ARARs). The Guideline Values are based on the target values ranging for excess cancer risk of 1.0E-4 to 1.0E-6 (one in ten thousand to one in one million).

The Review Team was informed that there is currently a worker health and safety risk issue that is unresolved regarding dose levels from exposure to stable metal tritides.

Although the site remediation is in an early stage, the PRS process appears to work well at the MEMP and has the support of the USEPA and OEPA. The Review Team did not find any significant deficiencies in the program and it appears that adequate management procedures are in place to insure a successful site remediation.

The Mound 2000 Approach is an effective mechanism for accelerating projects through the CERCLA process. The MOUND 2000 process accelerates clean up of the site by focusing on discrete areas and streamlining decision-making. The MOUND 2000 process allows communication of concerns and background between role players and involves all stakeholders. DOE MEMP, as well as USEPA, and OEPA should be commended for this important step in expediting the approval process. Because of the excellent coordination and working relationships among the MOUND 2000 Team members, retention of these key team members is essential.

The FFA specifically gives the discretionary authority to proceed using the removal action procedure established in the Mound 2000 Process. The FFA also establishes a coordination mechanism between the CERCLA and RCRA issues to be addressed onsite. Thus, the agreements on regulatory compliance appear to be firm and complete.

The Guideline Values have been reviewed and approved by both the OEPA and the USEPA, and are routinely used by the Core Team members to make cleanup decisions. Thus, the cleanup levels governing the remediation of the Mound appear to be generally clear and firmly in place.

Presently, there is no established dose factor for stable metal tritides. This effects decisions regarding the appropriate level of personal protection for workers. Because of this issue, there is a stop work order in SW Building areas that have tritides. SW Building is on the critical path. The Review Team was informed that BWO is currently developing workarounds to mitigate the impact of this condition.

Findings

None.

Recommendations

The length of time required to obtain tritide dose factors is unknown. Estimates from site personnel ranged from a couple months to several months. The process appears to be out of BWO's control. It was not determined if DOE could expedite the process. Aside from the workarounds that are being implemented, two alternatives should be investigated.

- Perform an evaluation of the cost of proceeding with the work with increased level of personal protection equipment (PPE) verses the potential cost of delaying the project.
- Evaluate the possibility of using the dose factor of a contaminant with similar physical and chemical properties.

2.1.3.2 Technical Policies and Procedures

Observations

Technical Document Control and Information

Documents are currently stored in various locations onsite. During our review it was difficult to identify and locate some of the project records.

Technical information for any given location onsite is contained in multiple reports, using multiple designations such as OUs, Areas, Buildings, Rooms, etc. The PRS data packages appear to be the only vehicle for the assembly of all relevant technical data for review.

The Mound project has an extensive series of standard operating procedures, which are used to plan and execute many technical work tasks.

The samples of the technical procedures reviewed by the Review Team showed a good level of detail. As an example, Technical Manual MD-10502, General Work Plan for Building Decontamination and Demolition or Decontamination and Transition at the Mound Site, Rev.1, April 12, 1999, provides a detailed procedure, including checklists, for the development of structure-specific safe shut down, decontamination, and demolition plans.

BWO recently issued the Integrated Work Control Program, ISMA Implementing Procedure PP-1059-A, which provides a mechanism for integration of the various Mound procedural systems for technical work planning, health and safety, and environmental controls and compliance.

These technical procedures provide the Mound project a level of consistency across the various projects, should foster efficiency by minimizing duplicative efforts, provide an effective method of management control of the technical effort, and ensure integrated safety management.

Findings

None.

Recommendations

Technical Document Control and Information

Establish a reliable system for document indexing storage and retrieval. The system should be cataloged to allow easy identification and retrieval of documents without the need of personal project knowledge.

PRS packages should be prepared with composite plans and tabulations to quickly identify where and to what depth samples were taken, and to establish these locations in the context of the hydrogeologic setting onsite.

Technical Procedures

The Review Team has no recommendations regarding this issue.

2.2 Cost Estimate

Summary

The BWO Baseline was submitted to DOE MEMP for validation in December 1998. The Baseline was prepared to achieve several functions, including the measurement of contract and fee performance; preparation of the Integrated Comprehensive Plan; generation of monthly project status reports; and, presentation of the basis for annual funding requests.

Various aspects of the Cost Baseline were reviewed as part of the Task B process and addressed as observations in this report under two subsections: Baseline Cost Development and Baseline Cost Management. Specifically, the review areas address the following topics.

Baseline Cost Development

- Work Breakdown Structure
- Estimating assumptions and tools
- Estimate integration with schedule
- Cost escalation
- Estimate risks and contingencies

Baseline Cost Management

- Cost control
- Change control
- Cost of schedule recovery
- Non-project events
- USACE Baseline validation

- Baseline cost achievement
- Baseline and Total Project Cost (TPC) reconciliation

2.2.1 Baseline Cost Development

2.2.1.1 Work Breakdown Structure

Observations

Among the first steps in the development of BWO's Baseline was the preparation of the Project's WBS. BWO's WBS system, presented in the "BWO Project Control Systems Manual," was based on PRS packages, various work plans, building drawings, and site maps. Specifically, BWO's WBS is organized as follows:

- Level 1 represents all work done at the Mound site;
- Level 2 separates Environmental Restoration work, Operations, and other Direct Funded efforts not included in either of the other two Level 2 elements;
- Level 3 further subdivides the effort into the major sub-projects that are being undertaken;
- Level 4 is used for designating buildings or comparable project components; and,
- Level 5 is used for major activities such as work planning, safe shutdown, characterization, and decontamination and transition.

The WBS is sufficiently detailed to incorporate all project costs, and is structured to produce detailed and summary cost reports at various levels of detail for the projects and sub-projects down to level 5.

2.2.1.2 Estimating Assumptions and Tools

Observations

With the preparation of the WBS, Baseline development activities focused on cost estimating and the use of Timberline's Precision Estimating Software (Timberline). Unit rates were obtained from Means Cost Estimating Guides (Means) which are commonly used in the construction industry. Timberline combines Means unit rate data with user-defined variables and formulas for specific tasks. Within this framework, customized assemblies for Mound work were developed in the Timberline system using productivity factors, debris packing factors, and relevant data from previous site experience.

The customized assemblies were based on a Mound- specific database. The database consisted of a series of cost estimating relationships (CERs) which, collectively, defined the tasks necessary for the completion of the Mound project. The CERs typically consisted of one or more parameters that defined the amount of work required, combined with a productivity rate for

accomplishing the work. New and existing assemblies were developed according to the following steps, as listed in the BWO Project Controls System Manual:

1. Analyze the task to be accomplished
2. Develop a standard work process for accomplishing the task
3. Identify the key steps in the process with required material items
4. Determine the appropriate resources and times to accomplish the steps
5. Identify the variables for user input for the cost model
6. Develop and verify the formulas used in the model

In order to complete an estimate for a given project, the estimator was required to identify the appropriate assemblies that apply to a particular project. For example, demolishing a building might require the use of several assemblies, including an assembly to clean contaminated walls; an assembly to remove electrical conduit; an assembly for waste disposal; etc. The estimator then provided the specific input to each assembly, and essentially "assembled" the estimate from the different assemblies, until all effort required to accomplish the project was included in the estimate.

2.2.1.3 Estimate Integration with Schedule

Observations

The next step in the development of the Baseline was to integrate the cost estimate with the schedule. The cost estimate is associated with schedule activity identification numbers by means of WBS codes. Information from both the cost estimate and scheduling systems are downloaded to the COBRA software system, which is used to generate cost and budget reports.

Resource information is downloaded from the cost estimating system to the schedule system, but cost data, which is escalated by COBRA is not.

2.2.1.4 Cost Escalation

Observations

Escalation is applied to all costs on an annual basis using rates issued by DOE Headquarters. Escalation is calculated within the COBRA system, and updated on a periodic basis. The latest rates are published on the Internet at DOE's website.

2.2.1.5 Estimate Risks and Contingencies

Observations

At DOE's request, BWO prepared an analysis of risks and uncertainties with the completion of the cost estimate.

Project risks and uncertainties identified by BWO are presented in the "Risk and Uncertainty Analysis" (Binder 4B of the BWO Baseline). Costs associated with these uncertainties are presented in the "Contingency Analysis" (Binder 4B of the BWO Baseline). The Contingency

Analysis was based on the degree of environmental assessment performed at each location, building type, level of contamination, and the planned end state condition; similarly, contingency percentages were developed based on BWO's cost estimator's familiarity with the site, the Environmental Assessment Report (EG&G 1996), and observations noted during building walk-downs. Specific risk analysis tools, such as the Monte Carlo method, were not utilized.

The total contingency costs are estimated at approximately $59 million, roughly equivalent to 10% of project costs. As per an agreement with DOE-MEMP, the cost of these risks and uncertainties **is not included** in the Project Baseline as a specific line item. If additional funds are required, BWO may request these funds of the DOE through the formalized Baseline Change Process, outlined in Appendix A of the Project Controls System Manual (BWO 1998).

2.2.2 Baseline Cost Management

In order to review the management of the validated Baseline costs, a number of areas were considered.

2.2.2.1 Cost Control

Observations

The BWO organization is structured such that a project planner is assigned to each Project to aid in the tracking and reporting of monthly project costs. Upon completion of monthly inputs, individual Project Managers complete and submit variance reports and explanations.

Cost reports can be generated down to Level 5, which provides sufficient data for the overall monitoring and control of the work. At the sub-project level, the work should be monitored and controlled at a lower level for the more complex areas, which can only happen if more detailed schedules and cost breakdown are developed. See the Project Schedule section below for additional discussion of detailed schedules.

2.2.2.2 Change Control

Observations

The Baseline change process was also evaluated to verify the use of a formal, documented, and controlled system, approved by the DOE.

Changes to the Baseline are made only through the formal process detailed in the "BWO Baseline Change Control Plan" (Appendix A, BWO Project Controls System Manual, 1998). A baseline change is described as any change in contract/baseline scope or contract milestones. Initially, an Advance Change Notice (ACN) is prepared by the project team with information on preliminary cost and schedule estimates, scope description, justification, and impact. BWO senior management approves the ACN and forwards a copy to the DOE Contracting Officer. With BWO management's approval, the Project Manager may begin formal preparation of the Baseline Change Proposal (BCP). In brief, the ensuing BCP process consists of the following steps:

1. Evaluate the change in scope, cost, and/or schedule, and include review and sign-off of the changes with the DOE Technical Performance Monitor (TPM) counterpart;
2. Submit the BCP to the appropriate Baseline Change Control Board
3. Incorporate the approved change into the Baseline

To date, twenty BCPs have been submitted to the DOE. Review of selected BCP documents indicate that these requests are being processed as required.

2.2.2.3 Cost of Schedule Recovery

Observations

In addition to project change controls, areas necessitating schedule recovery were examined. Specifically, the cost estimates associated with schedule recovery were checked for reasonableness and appropriateness.

To date, plans for schedule recovery have been formalized only in the case of the Main Hill Tritium Project. The schedule recovery plan includes changes to the work at Buildings R, SW, and T, with major emphasis placed on Area A of Building R, and Areas E and F of Building SW. The recovery plan was necessitated by the slow progress in the development of critical work plans for Buildings R and SW. Slow progress has apparently resulted from insufficient dedication and direction of technical personnel to the critical activities. The remedy requires the addition of more professional and craft personnel to the Main Hill Tritium staff.

The "Main Hill Tritium Project Schedule Recovery Plan" was reviewed to verify that cost estimates were being prepared and implemented. Though means to recover the schedule are thoroughly addressed, cost impacts resulting from recovery actions are not presented in the assessment. Further discussions with Project Control personnel indicate that cost impacts are considered, but only on an informal and cursory basis.

No additional scope is anticipated in the plan, explaining in part the fact that no cost increase is addressed in the recovery plan. The potential cost increases are associated with the increase in risk associated with compression of the work in areas of Buildings R and SW, which include very significant uncertainties. Further risk is associated with increased peak requirements for technical staff, which are currently in short supply. The Program will continue to be challenged by the requirements for adequate skilled professional and craft personnel for the Main Hill Tritium Project, as well as others.

2.2.2.4 Non-Project Events

Observations

As part of the evaluation of overall Baseline costs, other existing situations were considered.

The DOE has recently settled a class action lawsuit (Katherine Levell v Monsanto Research Corp. and EG& G Mound Applied Technologies) involving current and former Mound workers. The litigation alleged a failure to adequately monitor and protect workers from radiation exposures. The settlement includes provisions for the following:

- Life-Time Radiological Occupational Disease Insurance
- Medical health benefits for EG&G retirees
- Enhanced radiation protection of workers at Mound
- Employment protection for existing workers
- A worker radiation dose study

During the course of interviews, the Review Team was informed that the cost of the settlement has been estimated between $7 million to $8 million. A breakdown of the estimated settlement amount was provided by counsel in the office of EM as follows:

Occupational Disease Insurance	$200,000
Monetary Settlement	926,000
Legal Costs	180,000
Administrative Costs	32,000
Health Experts	250,000
Health Insurance	200,000
Radiation Dose Study	$ 5 million to $6 million

The Review Team was also informed that the settlement would be funded from the MEMP budget. The BWO baseline for Matrix Site Support includes $5.1 million for the performance of the dose study. This results in over $3 million unaccounted for in the budget. The Review Team is concerned that without any management reserve or contingency, such non-project events greatly increase the likelihood that the project will not be completed within the budget.

The Review Team was also informed that there are currently two additional lawsuits pending.

2.2.2.5 USACE Baseline Validation

Observations

In December 1998, the USACE completed its "Baseline Validation Report" for the MEMP. The objective of the effort was to review the Exit Plan estimate and assist the site with the validation of the document. The USACE determined the MEMP Baseline to be validated, with seven issues remaining to be corrected and included in the Baseline. These issues, excerpted from the USACE report, include the following:

- "Assemblies for low and medium complexity non-rad equipment disposition produce unit costs that are more expensive than rad equipment disposition. The team would expect the disposition of equipment in non-rad buildings to be less expensive than equipment in rad buildings. The non-rad building assembly contains more crew members than the rad building assembly, which is not logical based on our understanding of the work."

- "Matrix Site Support does not provide adequate explanations for approximately $64 million of "Other Direct Cost" items. This mainly applies to line items for purchased services and subcontracts."

- "Two actions are needed to improve the Basis of Estimate: add "screen shots" to all narratives describing assemblies in the Basis of Estimate document, and provide audit reports in either electronic or hard copy as part of the Baseline."

- "Envirocare and NTS disposal quantities for Soils, TFV, and SM/PP do not agree between the Timberline estimate and the spreadsheet in Miscellaneous Direct Funded."

BWO responded to USACE's recommendations in January 1999. These responses were found to be adequate. Contingency was not among the USACE recommendations.

2.2.2.6 Baseline Cost Achievement

Observations

BWO has indicated that there are five areas which pose the greatest risk to completing the Baseline as approved: Buildings R, SW, HH, WD, and 38, and PRS-66. To date, recovery plans have been prepared for Building R and SW only; however, this plan does not address cost impacts resulting from the recovery. Additionally, the Review Team was informed that potential changes to the scope for PRS-66 may result in a $30 million or more increase.

An analysis of the project cost information by the Review Team identified a ratio of indirect to direct costs significantly in excess of those contemplated in the Baseline and in the approved indirect billing rates. Billing rates are calculated by the ratio of total direct budgeted costs to total indirect budgeted costs. This issue has also been identified by the DCAA auditors assigned to the MEMP. It is our understanding that the DCAA as part of its routine review, has requested an explanation from BWO and a determination regarding whether the approved billing rates are appropriate.

The higher cost ratio is the direct result of performing less direct or projects work than anticipated. The site matrix costs were anticipated to be allocated over a greater dollar volume of direct work than is currently being performed. The higher ratio is an indicator of slower than anticipated performance.

2.2.2.7 Baseline and TPC Reconciliation

Observations

The May 1999 Baseline Management Deliverables list a current BWO budget amount of $629,740,261. DOE FI-20 records depicted a project cost of $867 million. Reconciliation of the project cost was required.

The earliest report provided to the Review Team of project budget for MEMP is the Accelerating Cleanup: Paths to Closure, Draft Site Narratives (Draft Site Narratives) dated February 1998 issued by the Ohio Field Office. This report identifies a project budget (FY97 to completion) in current year dollars totaling $867,354,000. This budget value is also reported in the June 1998 Site Narratives Report. In interviews with the Ohio Field Office budget personnel the Review Team was informed that the basis for the $867 million budget was the EG&G estimated project

cost under the prior contractor EG&G. With the current retention of BWO, the estimate has been revised.

The current BWO baseline as reported in the May 1999 Project Tracking System Reports is $629,740,263. The BWO baseline is the basis for the $728,631,000 life cycle cost estimate (FY 1997 through completion) for the remediation and stewardship of the Miamisburg site in the Accelerating Cleanup: Paths to Closure document. The comparison of the BWO baseline to the Paths to Closure life cycle estimate is not a simple process due mainly to time and funding sources. The difference between the BWO baseline and the life cycle cost estimate in Paths to Closure is due to several factors:

- the BWO baseline includes costs for non-remediation activities which are not funded by the DOE Office of Environmental Management and are therefore not included in Paths to Closure;

- the BWO baseline includes costs for remediation activities which are funded by the DOE Office of Environmental Management's nationally funded technology program and are therefore included in the Headquarters/National Programs, not the Ohio Field Office, portion of Paths to Closure;

- the BWO baseline does not cover the entire FY 1997 through completion time frame that is included in Paths to Closure; the BWO baseline begins in mid FY 1998 and completes in FY 2004; and

- the BWO baseline does not include al of the life cycle costs to complete the remediation of the Miamisburg site; costs for activities outside of BWO's scope of work such as regulatory oversight, Defense Contract Audit Agency oversight, anticipated legal expenses, long-term surveillance and maintenance and minimal contingency are not included in the contractor's baseline, but are budgeted at the Miamisburg Project Office level. The minimal contingency of $17 million which is included in the Project Office cost estimate is inadequate for a project of this nature.

Table 1 provides a high level summary of the BWO baseline ($629,740,262), the current Paths to Closure life cycle cost estimate ($728,631,000) and the outdated EG&G life cycle estimate ($867,354,000). A detailed reconciliation of the BWO baseline to the current Paths to Closure life cycle estimate has been provided by the Ohio Field Office Budget Division and is included as Appendix D.

Table 1

			Paths to Closure	
		BWO Current Baseline (5/31/99)	**June 9, 1999 Draft Site Plan**	**February 1998 Draft Site Plan**
Environmental Restoration				
	Main Hill Tritium	$190,582,505	$193,096,000	$57,769,000
	Main Hill Rad	$25,355,428	$26,020,000	$18,729,000
	Main Hill Non-Rad	$19,210,383	$18,795,000	$9,509,000
	SM/PP Hill	$30,095,019	$37,025,000	$22,981,000
	Test Fire Valley	$55,389,739	$59,283,000	$29,794,000
	Soils	$50,482,809	$73,094,000	$49,121,000
	Legacy Waste	$36,505,348	$83,304,000	$18,108,000
Operations				
	Tritium Transition Operations	$16,539,141	$32,815,000	$19,753,000
	IPS Program	$35,339,481		
	Facility Engineering Maintenance & Utility	$119,907,467	$133,163,000	$67,890,000
	Miscellaneous Direct Funded	$40,658,555		
Funded Projects				
	Main Hill Tritium (Large Scale Demo)	$5,511,390	$7,137,000	
	Soils (Selentec)	$115,943		
Non-Defense Funded				
	Main Hill Tritium (New Cave)	$4,047,054		
	Regulatory Oversight & Site Support		$64,323,000	
	Security Investigations (Closure)		$576,000	
	Exit Support Project			$573,700,000
	Totals	**$629,740,262**	**$728,631,000**	**$867,354,000**

Based upon the above, the Review Team concludes the following with regard to the Cost Estimate.

- The WBS is sufficiently detailed to incorporate all project costs, and for overall monitoring and control of the project.

- The Timberline assemblies, and the individual Baseline cost detail, are appropriate as to level of detail and relevance to the specific task costs.

- The Baseline includes the DOE accepted rates of inflation.

- The cost of risks and uncertainties is not included in the Baseline. Contingency costs, while not included in the Baseline, have been estimated at $59 million. A contingency of 20% to 30% is considered more appropriate for a project of this nature.

- Review of select BCP documents indicate that these requests are being processed as required. The processing of these documents by DOE is critical. For example, DOE's attention to the BCP regarding the transportation and disposal of the transuranic waste levies significant impact on the Baseline.

- Though means to recover the schedule for the Main Hill Tritium Project are thoroughly addressed, cost impacts resulting from recovery actions are not presented in the assessment.

- The Review Team is concerned that without any management reserve or contingency, non-project events greatly increase the likelihood that the project will not be completed within the budget.

- BWO has adequately responded to USACE's recommendations.

- It is considered unlikely that the program can be completed within the current budget considering the number and potential impact of risks, particularly those which may impact the completion date (such as Buildings R and SW).

Findings

None.

Recommendations

- Contingency and Management reserve should be addressed with respect to the DOE guidelines.

- Monthly Cost Performance Reports indicate work scheduled and an estimate of the budgeted cost of work performed. This can be compared to the actual cost of the work performed either for the month or cost to date. These costs should be checked at a lower level, i.e., the Charge Code level, monthly, or at a minimum, on a quarterly basis. A modest inaccuracy in the estimate of budgeted cost of work performed on a WBS code level will cause a false sense of what actually is occurring at the Charge Code level.

- A formalized recovery plan process, which addresses both cost and schedule impacts should be implemented.

2.3 Project Schedule

Summary

The project schedule was developed in conjunction with the cost estimate as part of the development of the BWO Exit Plan. The schedule was developed utilizing the same WBS as the cost estimate.

The project schedule was prepared using Primavera Project Planner (Primavera), a proprietary software system that is widely used, particularly in the construction industry.

This section of the Independent Review and Assessment examines the schedule that was developed for the subject project and its effectiveness in monitoring and controlling the work in conjunction with the cost estimating and budgeting systems. It also provides recommendations for improving the planning, monitoring and control of the work.

Observations

The Baseline schedule for the project is a critical path method (CPM) schedule consisting of approximately 7,000 activities. CPM is based on defining activities, determining the inter-relationships between activities and the length of time to complete each of the activities. Additional information may be included, e.g., start a specific activity not earlier than a particular date, thus establishing the fiscal year that the activity may start.

The CPM schedule establishes the earliest dates that the various activities may start and complete, and the latest dates that they may start and complete without impacting the completion of the entire project. That sequence of activities which takes the longest amount of time, and thus, establishes the earliest completion of the project, constitute what is known as the critical path of the schedule.

The schedule was prepared using Primavera, a proprietary software system which is widely used, particularly in the construction industry. Primavera is a state-of-the-art system for scheduling. It provides for the allocation and monitoring of resources and cost at the activity level. Additionally, it allows for the importing and exporting of resource and cost data to other systems, including the cost system (Timberline) and COBRA, which are used on the project for cost estimating and reporting functions.

Other than the statusing of specific work activities in the schedule, e.g., percent complete and actual start or actual finish dates, changes to the project schedule are permitted only after the formal review and approval by DOE of BCP. A BCP may involve cost increases or decreases, re-allocation of costs and/or schedule changes. The formal process is being followed.

The activities in the project schedule are coded based on the WBS, thereby providing consistent reporting and correspondence with the Timberline and COBRA systems. For example, WBS 1.2.1.13 represents Area F of Building SW of the Main Hill Tritium Project (sub-project), which is further broken down as follows to a fifth level of detail:

1.2.1.13.01	Work Planning
1.2.1.13.02	Safe Shutdown
1.2.1.13.03	Characterization
1.2.1.13.04	Decontamination and Transition

The schedule provides multiple activities for each of the above items, i.e., 5 for Work Planning, 8 for Safe Shutdown, 3 for Characterization and 3 for Decontamination and Transition. The activities cover the following time spans (early dates) in the original issue (Baseline) of the project schedule:

Work Planning	Oct. 1, 1998 – May 9, 2000
Safe Shutdown	Oct. 1, 1998 – March 30, 2000

Characterization	Oct. 1, 1998 – May 9, 2000
Decontamination and Transition	April 3, 2000 – May 9, 2000

Work Planning and Safe Shutdown show a late start of May 12, 1999, or more than 7 months (121 workdays based on 4 workdays per week) later than the early start. This more than 7 months is called total float in the schedule and means that the work could be delayed more than 7 months without impacting the project completion.

The work in Building SW, Area F includes Rooms 2, 2A, 3, 3A, 4, 5, 17, 18 and 19. The schedule data is not broken up into more detail than the 5 levels of the WBS in the Baseline systems. Thus, no detail exists for the specific rooms within Building SW, Area F. Similarly, other areas of the Main Hill Tritium Project and other sub-projects do not have detail for specific rooms or other sub-areas.

Though the Project Managers for each of the sub-projects may develop more detailed schedules for portions or all of their work, very little of this type of effort has been undertaken, except for the Main Hill Tritium Project Schedule Recovery Plan (discussed later in this section).

The project schedule was developed at the sub-project level. The sub-project schedules are combined to form the project schedule. Project planners are assigned to each of the sub-projects and work with the Project Managers and/or Engineers to process update information and make schedule changes.

Resource data in the project schedule is downloaded from the cost system, which is correlated to the project schedule through the schedule activity identification numbers.

The project schedule adequately addresses the overall project plan. It is fully integrated with the budgeting and cost reporting system (COBRA), i.e., information from the schedule is exported to COBRA to use as the basis for establishing the cost of scheduled work.

Though the project schedule is adequate for planning and scheduling the work at the overall project level, it is not sufficiently detailed to be very useful for planning, scheduling, monitoring and control of the work at the sub-project level, particularly on activities requiring significant numbers of professional and craft personnel in areas of high schedule and/or cost risk.

Significant progress has been made in areas with lesser schedule and/or cost risk, such as buildings or areas with minimal contamination and/or easily removed legacy waste. On the other hand, a slow start has been experienced in a number of high schedule and cost risk areas, e.g., Buildings R, SW, HH, WD and 38. The slow start is attributable to a combination of insufficient build-up of professional and craft personnel, and inadequate planning and scheduling of portions of the work at the sub-project level.

The project has recognized 6 months of schedule slippage in the 8-month period from October 1, 1998 through May 31, 1999. The May 1999 Baseline Management Deliverables include Level 3 and 4 schedule graphics which reveal slippage to the transition of Building T from July 14, 2004 to January 6, 2005, and project completion from September 29, 2004 to March 30, 2005 (6 months). Under corrective actions for the Main Hill Tritium Project, the following is recorded:

> *Resources are currently being added to accelerate work package development. In addition, a reorganization has been completed within the project team to assign Project Managers for each building (R, SW, T and HH). A recovery schedule has been completed and implemented to recover the negative schedule variance in R Rad, SW Areas E and F.*

Also included under the Main Hill Tritium Project is the following statement under technical status:

> *Stable Metal Tritides (SMT) issue not resolved, continue to find work arounds to prevent schedule delays.*

Successful schedule recovery will depend upon timely resolution of the SMT issue. Additionally, the conditions determined to be necessary for the protection of workers in areas containing SMT may have significant impact upon productivity, which could also impact the program for schedule recovery.

A draft of the schedule recovery plan and the associated detailed schedules which support the plan reveal that the recovery depends upon increasing professional and craft personnel at an ambitious rate so as to allow much concurrent work at Building R, Area A and Building SW, Areas E and F. The draft includes the following statement:

> *The Main Hill Tritium Project (MHTP) Schedule Recovery Plan consists of detailed revised schedules for R Building- Area (R-Area A) and SW Building – Areas E and F (SW-Areas E and F), critical path dependency Gantt Chart and flow chart, and specific actions with due dates, which must be met to fully implement the Schedule Recovery Plan.*
>
> *The Main Hill Tritium Project Recovery Plan will recover the negative schedule variance on the critical path areas of the project in time to support the overall Mound Exit Plan. Although detailed schedules have been developed in all areas of the project, this plan focuses on the significant negative schedule variances associated with the critical path. These detailed schedules were developed, and are necessary, due to the minimal level of schedule detail associated with the validated baseline. All areas will be closely monitored, as numerous areas have the potential to become the critical path.*
>
> *The areas of interest for this recovery plan are R-Area A, SW Areas E and F. SW-Area E will be back on schedule 5/4/00, and SW-Area F will be back on schedule 4/6/00. These dates support the critical path in SW Building, which includes the start of building the Old Cave containment (scheduled to start 5/10/00). R-Area A will be back on schedule 10/9/02, supporting the transitioning of R-Building on 10/10/02. This area will need to be closely monitored to ensure minimal deviation form (sic) the recovery schedule. The reason for the length of the recovery schedule in this area is that the original baseline required "Equipment Disposition" in R-Area A to begin October, 1998. The equipment removal associated with this task can't be done without approved work packages.*

> *As a predecessor to this task, prudent D&D practices require all excess materials, such as easily removed equipment, desks, chairs, etc. to be removed. This practice creates a safer working environment, as well as limiting additional contamination of these items. Since the predecessor activities were not done as scheduled, and the work packages not begun, "Equipment Disposition" is now eight months behind schedule. Without reassigning significant resources from other areas in the MHTP, the schedule cannot be recovered at an earlier date. Such a reassignment would, in all probability, cause a significant negative schedule variance within other areas on the critical path. Personnel reassignment from other areas of the plant would improve the schedule and is being considered.*

Based on interviews with BWO staff members, the most difficult positions to fill may be Radiation Certified Technicians (RCT), who are apparently in short supply.

The project schedule recognized the criticality of the work at Building R, Area A, but did not recognize the criticality of the work at Building SW, Areas E and F as critical. All of these areas are critical to the timely completion of the project as identified in the more detailed recovery schedules.

The Main Hill Tritium Project schedule recovery plan is well planned and sufficiently detailed to form the basis for completing the work on this sub-project, specifically the transition of Building T by July 14, 2004, and the entire project by September 29, 2004. However, the plan incorporates further schedule risk in that it is based upon an ambitious build-up of personnel and a compressed schedule for Buildings R and SW work planning, safe shutdown, characterization and decontamination and transition, which had already been anticipated as having high schedule and cost risk. No schedule contingency is provided in the schedule recovery plan, and any further schedule slippage will likely result in late project completion and associated cost increases, or costs to accelerate the work. A further risk to the schedule recovery plan is the timely resolution of the Stable Metal Tritides (SMT) issue and the potential impact that increased worker protection may have on productivity levels for remediation efforts in certain areas within Buildings R, SW and T.

A significant schedule risk exists at PRS-66. If it is determined that a significant amount of the contaminated soil at this site must be removed, a BCP will have to be prepared, which would have to address both added costs and the schedule for performance of that work.

Another significant schedule risk is associated with the disposition of TRU waste. A recent evaluation by a specially tasked DOE team concluded that cost and schedule for the baseline approach are underestimated due to changes in the national transuranic waste program that invalidate certain baseline assumptions. BWO has submitted a BCP for soil blending that will reclassify TRU contaminated soil as LLW. Soil represents 44% of the TRU waste by volume. The blended soil will not have to be sent to WIPP via an intermediary such as Oak Ridge for processing. The blended LLW soil can be sent to Nevada Test Site. The remaining 56% of the TRU waste that exceeds 100 nCi/g will be sent to WIPP after processing and meeting the WIPP Waste Acceptance Criteria. The change results in a saving of $5,310,000 and completion in March 2001, instead of May 2004, which would reduce, if not eliminate schedule risk.

Implementation of this change requires renewing of the ATMX DOT exemption and agreement within DOE on shipping the waste to NTS. If the proposal is not implemented, a cost and schedule impact is highly likely, unless another alternative can be devised and approved.

Considering the aforementioned schedule risks and the lack of schedule contingency, the probability of attaining project completion by September 29, 2004, appears to be rather low. The probability may be raised by selective acceleration of critical activities, if adequate funding is available and a BCP is approved. It may also be possible to reduce the time for some critical work by revising plans or methods, either at a cost increase or decrease, if a BCP is approved.

Findings

None. (See Section 2.5.3)

Recommendations

The single most important action that BWO must currently pursue is increasing its qualified professional and craft staffing to meet the requirements of its schedule recovery plan for the Main Hill Tritium Project, and maintaining adequate levels of qualified staff for all areas of the project into the future.

Prompt action should be taken to resolve the issue of requirements for worker protection in areas contaminated with stable metal tritides. Any delay in resolution of this issue is likely to impact the viability of the schedule recovery plan for the Main Hill Tritium Project.

BWO should institute an assessment of all sub-projects to determine which ones should be scheduled in greater detail entirely or in part, similar to what was done in developing the schedule recovery plan for the Main Hill Tritium Project. Emphasis should be given to the more complex portions of the sub-projects which have potential schedule and/or cost risk. The schedule development should be done prior to or in conjunction with work planning for specific areas of the sub-projects to assist the responsible engineers in focusing attention and resources to the more critical work. The more detailed schedules will not replace the project baseline schedule, but will supplement that schedule to allow a greater degree of monitoring and control, and allow more accurate assessment of project status.

The detailed schedules should project at least 6 months into the future to provide a basis for early detection of potential schedule slippage, and early remedial actions to correct such trends. BWO should institute procedures for tracking the detailed schedules and provide training, as necessary, to specific project managers and engineers to assist them in developing and using the schedules.

The detailed schedules should be resource loaded with information on professional and craft staffing requirements to assist in near term assessment of manpower requirements at the sub-project level.

BWO and DOE should expedite actions necessary to resolve final disposition of PRS-66, which has potential cost and schedule impacts. If disposition requires removal of large volumes of contaminated soil, the sooner that planning is initiated, the less chance that the work may pose a schedule risk.

The critical path of the project identified in the schedule recovery plan includes remediation work at Building T. Since there is no immediate plan for re-use of Building T and no compelling reason to suspect that re-use should be planned for 100 years in the future, it seems appropriate to perform a study to determine if an alternate plan can be developed which reduces the amount of remediation necessary, particularly the effort to reduce tritium. Potentially, the planned work at Building T could be modified to reduce cost and reduce schedule risk to the project.

2.4 Work Plan

Work packages were listed as an LOI in the initial Readiness Review Report. The work packages for many projects are incomplete. During the site visit it was discovered that the information sought from the work packages was available from other sources. The results obtained from reviewing only the work packages that are available would have been redundant and incomplete. Therefore, the data presented in the Technical Evaluation section of the report include all of the information intended to be presented in a section devoted to work packages.

2.5 Business Management Systems

Summary

The overall objective of the Business Management portion of this review is to determine whether the project meets the management objectives relevant to the adequacy of the overall management organization, reasonableness of the staffing plan, contracting practices, site transition and document management.

The management of the MEMP was examined through a series of interviews with key personnel, document reviews, and discussion at DOE EM-73 and FI-20 Headquarters, DOE Ohio Field Office, and with both DOE MEMP and BWO personnel. Interviews, examinations of available documentation, personal observations, and requirements identified formed this analysis. Where no applicable requirements were identified or available, this analysis is based on the past experiences of the Review Team and commercial industry engineering and management practices.

Overall, both DOE's and BWO's management is dedicated, knowledgeable, cooperative, and skillful. They have established:

- A formal, technically competent organization that is responsible, has the authority and accountability to execute the project.
- Roles, responsibilities, and interfaces that are clear and well defined.
- A well written, clearly understood, and well documented project control management system.
- Detailed procedures that measure project performance.

The DOE MEMP and BWO have an established documented process to ensure that all personnel are aware of and committed to the success of the project.

However, several areas in both DOE and BWO's business management have been identified for additional emphasis. These include:

- Availability of required (trained) staff
- Staff retention
- Additional life cycle cost reporting
- Transition of Isotope Power Systems

2.5.1 Project Staffing

Observations

BWO does not have a project specific organization and functions manual. With regard to qualifications, BWO has position requirements for each level within the BWO Mound Team. These descriptions identify the skill, education and experience requirements for each of the positions.

To execute the contract and the closure of the Mound site, BWO utilizes a matrix project support structure with a functional staffing organization to support the MEMP.

Key project managers have been assigned to the following projects:

- The Main Hill Tritium Project
- The Main Hill Non-Rad Project
- The Main Hill Rad Project
- The SM/PP Hill Project
- The Test Fire Valley Project
- The Soil Project
- The Legacy Waste Project
- The Isotope Power Systems

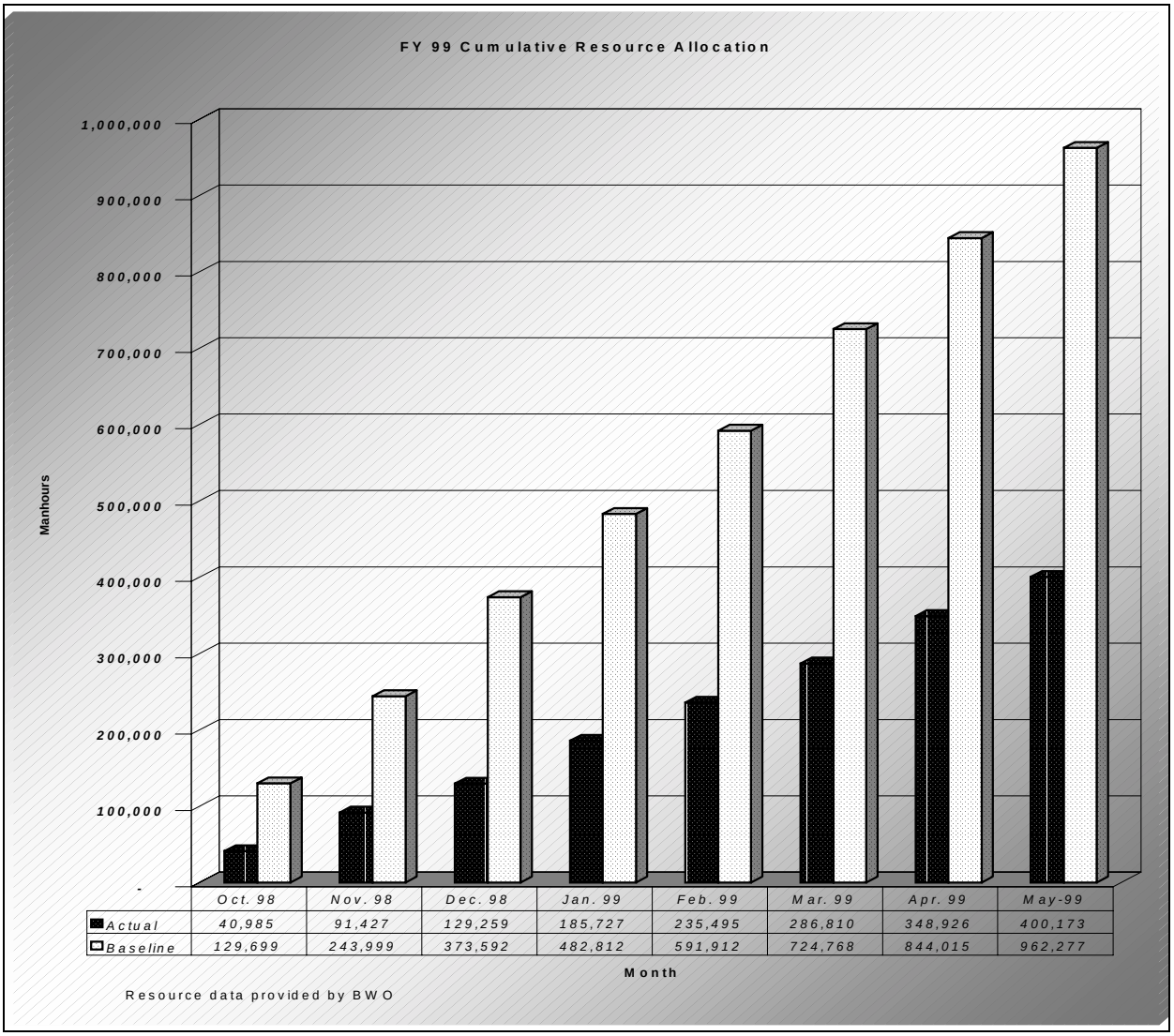
The BWO functional organizations, that provide staff to the matrix project managers, include:

- Health Services
- Emergency Services
- Industrial Safety & Hygiene
- Radiological Controls
- Safeguards & Security
- Environmental Safeguards & Compliance
- Waste Management
- General Superintendent & Equipment
- Project Engineering and Integration
- Finance & Administration

The Ohio Field Office supported by DOE MEMP is responsible for the execution of field project management for this project. Based on the MEMP Contract Administration Plan for Contract

DE-AC24-97OH20044, DOE MEMP has the day-to-day DOE project oversight responsibility and interface with BWO. DOE MEMP has assigned a dedicated Project Manager who has the primary DOE project management oversight function and responsibility. The DOE MEMP Project Manager is responsible for day-to-day monitoring of project activities, providing guidance and direction to BWO, and supplying monthly project status and reporting to DOE, Headquarters. The DOE Project Management Handbook and MEMP Project Control System Manual provides the DOE MEMP Project Manager with guidance on the implementation of the project management responsibilities.

The BWO qualification requirements for the various positions are considered adequate. The BWO project baseline staffing plan appears reasonable for the level and amount of work to be performed. However, to date the actual staffing has fallen significantly behind the planned staffing levels, as shown in Figure 1 below. This staffing shortfall is considered to be a major cause of the current schedule slippage. cause of the current schedule slippage.



	Oct. 98	Nov. 98	Dec. 98	Jan. 99	Feb. 99	Mar. 99	Apr. 99	May-99
Actual	40,985	91,427	129,259	185,727	235,495	286,810	348,926	400,173
Baseline	129,699	243,999	373,592	482,812	591,912	724,768	844,015	962,277

Figure 1

Retention of key employees is of significant concern on any closeout project. This issue is a concern for the Mound project as well. Both DOE and BWO are in the process of identifying measures to attract additional staff and retain all required staff until project completion. During the time of this review no formal plans were available for review.

Mound is currently operating under a union agreement that runs through 2004.

Although staff shortages are impacting project completion, it was noted during interviews that BWO is taking steps to hire qualified personnel, using an established, documented, process. Recruiting for additional positions is currently underway. In general, BWO is encountering difficulties in recruiting because of the nature of the project, their program, and the security clearance requirements.

Staffing issues at the Mound are compounded by the fact that the MEMP will be completed in the year 2004. Retention of key personnel, in the out years, will become more critical. BWO is addressing these concerns through draft staffing and retention plans. BWO's plan includes incentive bonuses to their project managers, relaxation of retirement plan vesting requirements, and improving benefit co-pay requirements. BWO is aggressively pursuing staffing retention options and new initiatives.

BWO is using a Davis-Bacon Act labor rate structure, and their union labor agreement with the Guards and Paper, Allied Industrial, Chemical and Energy Workers (PACE) are in place through the end of the project Section V of the addendum to the November 8, 1995, Partnership Memorandum of Understanding and Collective Bargaining Agreement between PACE International Union and its Local 5-4200 and Babcock of Wilcox of Ohio states:

> *V. "This agreement, the Collective Bargaining Agreement, and the 1995 Partnership Memorandum of Understanding (MOU) shall remain in full force and effect until February 3, 2003, or the expiration of the Company's contract, and;*
>
> *B. On or before March 30, 2001, the Company agrees to meet with the Union <u>for the purpose of determining staffing levels to be guaranteed beyond September 30, 2001</u>.*

Subcontracting blocks of work as a means of supplementing the BWO workforce or accelerating the progress of the work is affected by the current union agreement, which states in part:

> *Many factors are considered prior to subcontracting a particular job or project. Some of the factors include, but are not limited to, the following: availability of special skills, availability of equipment and supplies, the work force to meet project schedules, and the application of the Davis-Bacon act. In each case, prior to subcontracting, a thorough review is given to each job or project. The final decision is made consistent with business needs of Mound and the job security of the current work force.*

> *Management agrees to discuss with the Union on a regular basis any work to be subcontracted as outlined above.*

While the above does not prohibit subcontracting, the Review Team was informed that to date the union has resisted subcontracting efforts. This could serve to delay or virtually eliminate a valuable means of accelerating the overall work.

The Review Team was provided with a copy of the DOE Technical Qualification Program, which identifies the requirements for key positions and evaluates an individual's compliance with those requirements. Based upon a review of these requirements and interviews with key staff and senior DOE MEMP management, there is sufficient expertise and resources to oversee the BWO team.

The DOE MEMP team is also faced with staffing challenges due to attrition. At the time of this review, DOE MEMP was in the process of preparing recommendations for an employee retention plan. While no formal plan was available for review, it is our understanding that the DOE MEMP plan includes incentives to retain federal employees which may include a guaranteed assignment to another DOE facility at the conclusion of Mound.

Findings

The BWO staffing levels are significantly below validated Baseline projections as well as the level required to meet the Baseline schedule.

Recommendations

The BWO Human Resources Manager indicated that BWO is preparing a plan to address the current staffing shortfall. This plan should be formalized as soon as possible and identify the number and classification of personnel to be brought on overtime.

The BWO employee retention measures currently under consideration need to be formalized as soon as possible and should address a range of approved measures that the site Human Resources staff can utilize to retain current key staff and attract the necessary new skills.

BWO should initiate discussions with the union to reach a formal agreement regarding subcontract work.

DOE MEMP should consider approval and implementation of its employees retention plan.

2.5.2 Project Controls/Performance Management

Observations

Project controls and performance management for the MEMP are specified in the MEMP *Contract Administration Plan for Contract DE-AC24-97OH20044*, MEMP *Project Control* System Manual, and BWO *Project Controls System Manual, Technical Manual MD-108485*. The procedures and systems specified in these manuals are consistent with DOE's Good Practice Guides and industry practice and considered appropriate for the MEMP project.

Strong project controls flow directly from a strong cooperative relationship between the parties. Both DOE MEMP and BWO roles, responsibilities, and requirements are well defined.

A standard reporting process involving key project personnel for DOE MEMP and BWO was identified during interviews and documentation reviews. The Monthly Reports and update briefings were reviewed, and they contain appropriate level pertinent information regarding project actual costs versus budget, progress, and a "look ahead" to upcoming project activities. The report and associated briefing are supplied by BWO to DOE MEMP on a monthly basis.

The review of the Baseline indicated a significant departure from the procedures identified in the *Miamisburg Environmental Management Project, Project Control System Manual*, which defines a cost baseline:

> *A cost baseline consists of three segments: (1) the performance measurement baseline (PMB), which is the sum of all detailed planning (BCWS); (2) the contract budget baseline (CBB), which is the sum of the PMB plus management reserve (MR); and (3) the total estimated cost (TEC) for the project, which is the sum of the CBB plus contingency. The relationship between budget baselines is depicted in Figure 3-1.*
>
> *Contingency is the portion of the project's authorized funds that are controlled by DOE-MEMP and withheld for management control purposes rather than designated for the accomplishment of a specific task. Contingency funds are used to cover costs that may result from an incomplete design, unforeseen conditions, or uncertainties. Project managers estimate the contingency and update the amount annually. Use of contingency is predicated on approval of a Baseline Change Proposal by the MEMP Baseline Change Control Board.*
>
> *MR and contingency are not the same. MR is a budget reserve established by the contractor to be used within limits set forth by MEMP's Baseline Change Control Board (BCCB). MR is established to allow the contractor some degree of management latitude in accomplishing the defined work scope. MR is used for funding work that is within the established project scope which is not planned or adequately budgeted.*

Despite the above references to the need and purpose for contingency and management reserve, neither are included in the validated baseline.

Contingency is also addressed in the NRC Report to Congress, *Assessing The Need for Independent Project Reviews in the Department of Energy.*

> *… Many projects, especially in the area of environmental management, are initiated too long before a credible baseline has been developed.*
>
> *A study by IPA found that a lack of good project definition at the front-end has had a major adverse effect on cost and schedule performance. This finding confirmed the findings in other studies. The proper application of contingencies in the cost estimate could help to mitigate some of the risk involved in developing*

> *baselines for environmental management projects, especially when the proposed technology is still evolving. Independent reviews performed early in the process (i.e., at the conceptual stage) can be very helpful for identifying and evaluating alternative approaches so that the project scope, and hence the baseline, is well defined and less subject to change as the project matures.*

Although the MEMP does have a credible Baseline, there is nonetheless a significant amount of uncertainty to warrant contingency. For example, significant risk and uncertainty exist within PRS-66. Although this project is included in the Baseline, additional testing contemplated in the current fiscal year could dramatically change the scope of work resulting in additional costs as high as $40 million.

Contingency as a component in the Baseline is also recognized by DOE Good Practice Guide GPG-FM-016, *Baseline Development*.

While the absence of contingency or management reserve does not invalidate the Baseline, it must be understood that this typical method of mitigating the risk of uncertainty is not included in the current baseline.

Although not included in the baseline cost, BWO did perform a contingency analysis as well as a risk and uncertainty analysis. The contingency analysis concluded that a contingency of 10.12% was appropriate which results in a contingency amount of $59,087,000. The risk and uncertainty analysis concluded the following:

Project	***Estimate Accuracy Range***	
Main Hill Tritium	-5%	+40%
Main Hill Rad	-15%	+40%
Main Hill Non-Rad	-15%	+15%
SM/PP Hill	-15%	+35%
Test Fire Valley	-15%	+40%
Soils	-35%	+35%
Legacy Waste	-15%	+35%
Isotope Power systems	-10%	+10%
Facility Engineering Maint. & Utility Operations	-25%	+25%
Facility Services	-10%	+10%
Utility Operations	-10%	+5%
Utility Reroute	-25%	+25%

The BWO Baseline stated the following regarding the above:

> *The accuracy range associated with the risks and uncertainties should not be added to the total cost of the Exit Plan, but rather used as a guide to help the validation team understand the accuracy of the estimates they are reviewing during baseline validation. The accuracy ranges in this analysis include allowance for contingency calculated in the contingency analysis.*

The control of and appropriateness of baseline changes are a significant issue for an undertaking the size and complexity of the MEMP. BWO has a documented process to control and screen changes prior to submission to the DOE MEMP as a project-specific baseline change proposal. BWO's baseline change proposal process includes:

1. Evaluating the change in scope, cost, and/or schedule; including review and sign off of the changes with the DOE Technical Performance Monitor (TPM) counterpart

2. Submitting the BCP to the appropriate Baseline Change Control Board

3. Incorporating the approved change into the baseline

Once approved by BWO, the baseline change proposal is presented to the DOE MEMP Change Control Board for approval. The DOE MEMP Project, Project Control System Manual (Project Control System Manual) contains procedures for processing BCP's. Approval procedures are based upon the cost of the BCP as shown on Table 2 below contained in the Project Control System Manual.

Table 2 – Summary of Baseline Change Authority Thresholds **Table 6.1**

CCB LEVEL	APPROVING AUTHORITY	TECHNICAL BASELINE and	COST BASELINE or	SCHEDULE BASELINE
Level 1	DOE-HQ BCCB	Change to Work Definition or Quantities	Project (WBS Level 3) cost change greater than 10%	1. Project (WBS Level 3) End Date changes greater than 10% of Duration 2. Exit Plan (WBS Level extends beyond Sept. 2004)
Level 2	DOE-MEMP BCCB	Change to Work Definition or Quantities	WBS Level 4 or all impacted Matrix Site Support Site Level from a single change ≤ $250,000	1. Project Control Milestone Changes 3 months. 2. EA Milestones
Level 3	BWO BCCB	Change to Work Definition or Quantities	(WBS Level 4 or Matrix Site Support Site Level ≤ $250,000	1. Project Control Milestone Changes < 3 months

It should be noted that BWO is in the process of expanding the BCP procedures. However, no document was available for review at the time of this evaluation.

Overall, the MEMP and BWO project controls procedures are consistent with the requirements and intent of the DOE Good Practice Guides and are consistent with good industry practice.

The MEMP and BWO Baseline Change Authority thresholds appear inconsistent with one another, and both are inconsistent with DOE Good Practice Guide GPG-FM-009, *Baseline*

Change Control. It should be noted that the BWO procedure appears to be the most stringent requiring Baseline Change Control Board approvals at lower levels.

Findings

The current Baseline budget does not contain any contingency or management reserve. This is inconsistent with the MEMP Project Control System Manual, DOE Good Practice Guide GPG-FM-016, *Baseline Development* and is also inconsistent with custom and practice in the industry. Failure to include contingency or management reserve does not invalidate the Baseline estimates, but greatly increases the likelihood that the budget estimate will be exceeded.

Recommendations

The MEMP/Ohio Field Office budget should be amended to include contingency. The Ohio Field Office should consider maintaining the original project budget of $867 million to cover necessary contingencies.

Verify that Baseline Change Control procedures are consistent between BWO and MEMP and that both satisfy the requirements of GPM-FM-009, *Baseline Change Control*.

2.5.3 Procurement Strategy

Observations

The BWO contract is based on a cost reimbursable structure which utilizes performance based criteria for calculation of the fee. The objective is to motivate the contractor to meet or exceed expected performance.

Individual performance incentives in the BWO contract are generally based upon meeting or exceeding key schedule dates or milestone events. Many of the individual incentives require completion of specific critical path activities by a date certain within a set budget amount.

As an overall incentive to complete the project earlier than planned, the BWO contract also states:

> *Thus, if the contractor is able to complete the work scheduled over a 5.25 year period in 4.25 years, it would receive 100% of the fee pool for the remaining (unused) year once the Contractor establishes that all DOE requirements have been fully met and DOE agrees that the contractor has reached completion.*

The incentive-based fee structure is considered a good practice consistent with industry practice and favorable experience by DOE on other projects. The incentives stipulate a schedule as well as a cost performance criteria which should serve to motivate BWO to manage the project in an efficient manner.

The existing procurement strategy to use existing in-house staff is reasonable. However, it is expected that in the out years additional subcontracting will be required to meet the peak staffing and support needs.

Findings

None.

Recommendations

DOE should continue to evaluate the individual incentive criteria on a regular basis to ensure that incentives are tied to critical project areas as they may change throughout the course of the Project.

2.5.4 Project Risks

Observations

According to DOE GPG-FM-007 *Risk Analysis and Management*, "…risk analysis should be considered when developing schedule and cost contingency." Office of Management and Budget (OMB) Circular No. A-94 also outlines the treatment of uncertainty.

Although a great deal of effort has been expended on risk analysis, it is unclear which risks the DOE is willing to assume (either partially or entirely), and with the exception of TRU waste disposal which risks are large enough to affect the ability of the project to move forward. The risk analysis does not cover two areas, contingency and management reserve funding.

Risks and uncertainties have been identified, analyzed, and discussed in various MEMP and BWO Documents, including the BWO Exit Plan Baseline, BWO Management Plan for the MOUND Exit Project, Work Plan for Environmental Restoration of the DOE Mound Site, the Mound 2000 Approach, MEMP Ten Year Plan Risk Management Approach/Evaluation of 10 Yr. Plan, and Accelerating Cleanup: Paths to Closure Strategy Site Narratives.

Several risks were considered, evaluated and ranked in one or more of the above documents. However, risk was not considered in developing a schedule and cost contingency, since there is no schedule or cost contingency.

The risks potentially affecting schedule and cost include technical and administrative issues. In addition to the several risks that DOE has identified in the above documents, the Review Team considers the following risks sufficient to warrant contingency in the baseline budget and schedule.

Staffing

As discussed previously, the ability of BWO to retain and attract sufficient personnel with appropriate experience, is a significant risk to project completion.

Technical Issues

Technical project risks have been generally identified and analyzed, and are considered acceptable with the exception of PRS-66 cleanup and Personal Protection Equipment (PPE) requirements. For example, SW 13 area is contaminated with stable metal tritides. DOE has

issued a stop work order until dose level limits and an appropriate PPE requirement can be determined. SW Building is on the critical path. It does not appear that the risk of work stoppage because of health and safety concerns for this area was identified.

The key drivers and the greatest risks and uncertainties to on-time and on-cost project completion lie in the impacts of PRS-66 cleanup, changes in regulatory cleanup criteria, DOT ATMX exclusion, and availability of disposal sites to accept TRU waste. Such items as the amount and extent of the contamination in soils beneath and around the buildings, unknown or abandoned lines or ducts and utility interference, level of PPE required, and additional characterization activities; could all have cost and schedule impacts.

Findings

None.

Recommendations

Risk management is an on going process that should be performed throughout the life cycle of a project or program. DOE should re-evaluate their risks periodically and incorporate the results into the budgets and schedules.

2.5.5 Mound 2000 Approach

Observations

Section 2.1 of this report provided a discussion and assessment of the Mound 2000 process therefore, a detailed discussion will not be repeated here.

As a business management practice the Mound 2000 approach is an effective mechanism which could be emulated by other DOE sites to the extent possible.

Findings

None.

Recommendations

No recommendations are made for this section.

2.5.6 Property Transition

Observations

BWO Exit Plan Baseline, *BWO Management Plan* for the MOUND Exit Project, Work Plan for Environmental Restoration of the DOE Mound Site, The Mound 2000 approach, and Accelerating Cleanup: Paths to Closure Strategy Site Narratives discuss the building disposition process, land transfer process, or specify the future planned uses of the various buildings in the Mound site. MMCIC is responsible for the economic redevelopment and ultimately de-listing the site from the NPL.

The MMCIC has prepared a Miamisburg Mound Reuse Plan (Reuse Plan) dated 1997. In the Reuse Plan, the MMCIC defines its role in the redevelopment of the Mound as:

1. ensure the property is converted to its best use, achieving the economic development objectives of the community, and replacing the economic and fiscal losses that are being affected by the closure of the facility

2. ensure that environmental remediation takes place in a timely manner, and leaves the property in a state that will allow the highest and best use to be achieved

DOE and MMCIC have agreed that "industrial use" will be the Mound Site future land use plan. The Mound Comprehensive Reuse Plan adopted by the City of Miamisburg also incorporates the "industrial use" as the Mound Site future land use.

The basis for the land transfer is a Memorandum of Agreement by and between the USDOE MEMP and the MMCIC (Sales Contract) dated January 23, 1998.

When cleanup of the buildings and other project work are complete, some work will remain in the form of compliance monitoring of residual contamination and possibly some maintenance of the landfill area. The work will eventually become part of the DOE long-term stewardship program.

Overall, the objectives of the MMCIC are consistent with the MEMP goals and objectives. With regard to the disposition of specific buildings or areas, the T Building, IPS area, and PRS-66 are discussed separately in Section 2.1 of this report.

As part of the site disposition process, MEMP has implemented a program to sell off by auction items classified as personal property. This has included portable buildings. To date, this appears to be an effective means of disposing of this type of property. It is our understanding that the MEMP program is being used as a model for other DOE sites.

DOE's land transfer process is consistent with the recommendations for Stewardship outlined in the Guidance for the Spring Update to the EM Corporate Database: *Life-Cycle Planning Data, FY2001 Budget Formation Information, and Paths to Closure*. This guidance manual states in part:

> *One step towards demonstrating EM's intent to meet stewardship obligations and to improve management of this critical activity is to identify the nature, extent, and cost of current and expected stewardship scope. To this end, EM Headquarters is recommending, but not requiring, that, at each site where substantial cleanup work has been completed (including long-term facility stabilization and landfill closure), Operations/Field Offices establish a project baseline summary (PBS) for long-term stewardship activities.*

MEMP has established a PBS with a value of $50,000 per year to perform the monitoring and testing. It should be noted that the office which will maintain the stewardship program when MEMP closes has not yet been determined.

Findings

None.

Recommendations

None.

2.5.7 Budget Allocation

Observations

The Ohio Field Offices manages the budget process for the Mound Exit Plan. The fiscal year 1997 life cycle closure costs for the Mound site were $867,354,000. The fiscal year 2001 life cycle closure costs for the Mound site are $725,000,000.

The project baseline which was validated, has been integrated and correlated with the MEMP budget allocation. The MEMP budget is allocated in essentially equal amounts throughout the duration of the project as shown in Figure 2. To be consistent with the budget, the Baseline has balanced the work to meet budget limits. This has resulted in non-critical, high float activities being performed in the later years. Delaying non-critical activities to the out years of the project merely to meet budget limits increases the cost of the work due to escalation pressures and increases the likelihood of delays to the project completion.

Based on interviews, BWO is working with DOE MEMP to perform work in earlier timeframes as budget variances allow. This practice is essential to reducing the project risk in the out years and should be continued as a formal procedure.

Findings

None

Recommendations

BWO should continue to monitor budget underruns and identify work in the out years, which can be performed earlier. Budget underruns and potential work to fill the deficit should be reported on a regular interval such as quarterly.

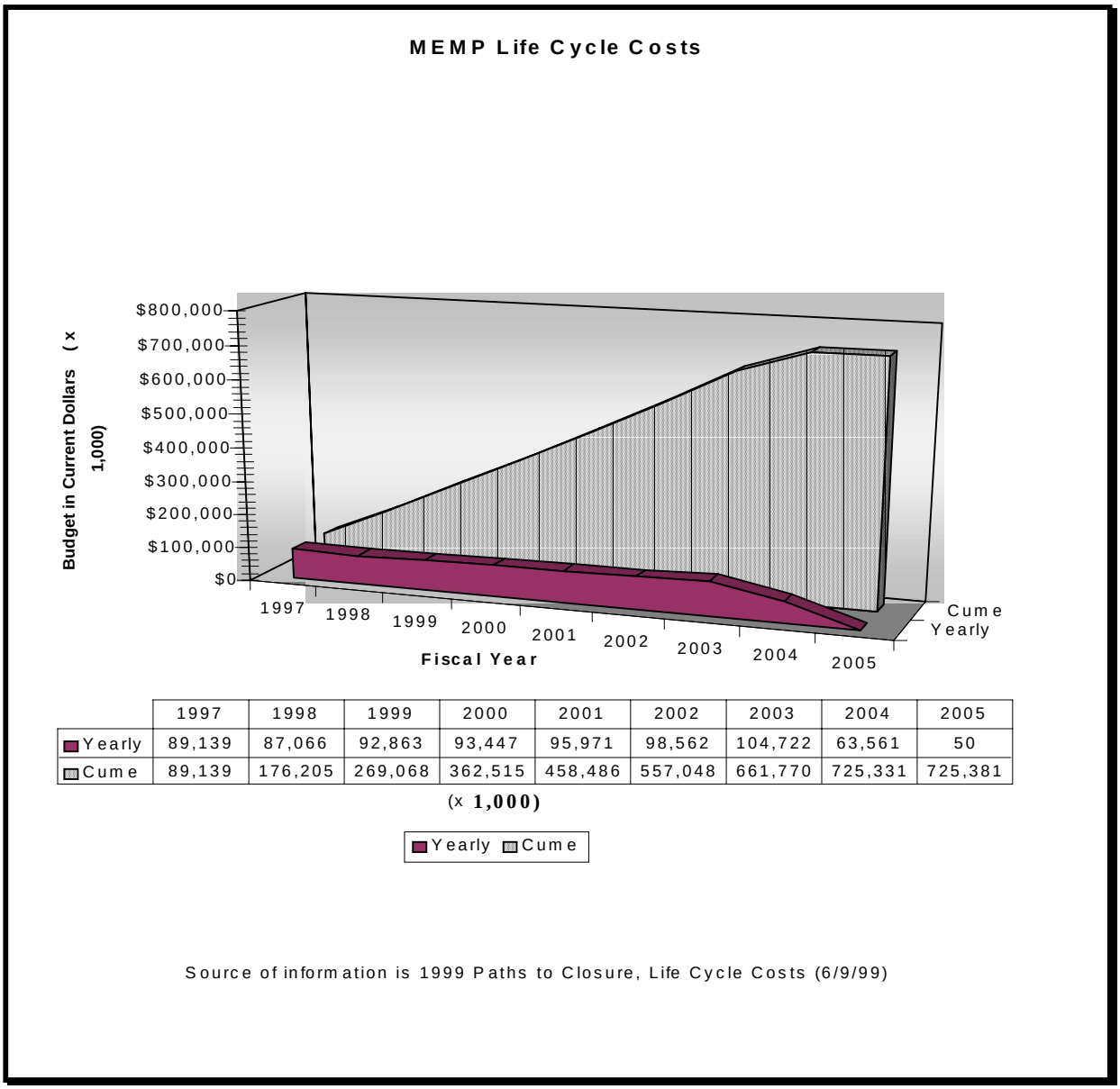
2.5.8 Isotope Power System

Observations

On March 22, 1999, Secretary of Energy, Bill Richardson, announced that the Space Power System Program would remain at the Mound site rather than be transferred to another DOE site, stating:

> *"For 38 years the Mound site has served a key role in the development, production and deployment of radioisotopic generators and heat sources used for NASA's deep space missions. This is an enduring mission for the department that*

we believe can safely and cost-effectively continue as a stand-alone operation at Mound as the rest of the site is decommissioned and turned over to the city of Miamisburg."



	1997	1998	1999	2000	2001	2002	2003	2004	2005
Yearly	89,139	87,066	92,863	93,447	95,971	98,562	104,722	63,561	50
Cume	89,139	176,205	269,068	362,515	458,486	557,048	661,770	725,331	725,381

Figure 2

The baseline includes $36,208,223 to operate the Isotope Power System (IPS) through fiscal year 2003.

At the time of this review, the Review Team was made aware of a preliminary proposal that identified the impact of the above decision on the current baseline.. The Review Team has been informed that a BCP will be submitted once all cost impacts are identified. This should occur in the September – October timeframe. The Review Team was informed that this proposal was sent

to DOE FI-20. BWO considers the IPS proposal to be business confidential and a copy was not available for review. BWO did provide a summary of the proposal; however, no detailed cost information was provided.

The most immediate impact to the baseline will be additional capital costs for equipment and utility service. Estimates of these costs were not provided. The project will realize a minor cost savings as fewer buildings will need to be transitioned or demolished.

IPS is in the process of reviewing and re-allocating the matrix site support costs based upon actual usage. This re-allocation will not change the overall project cost as the matrix site support costs are time-related and relatively fixed in the short term. The IPS is directly funded by DOE Office of Nuclear Energy (NE). Any reduction of the matrix site support costs will be re-allocated to the remaining projects. Projected for FY 2000, the IPS is anticipating a $2 million per year reduction in its matrix site support costs.

Findings

None.

Recommendations

None.

2.5.9 Document Management System

Observations

BWO's document management procedures are documented in *Systems Manual No. 201, Records Management, Retention, and Disposal*. This document was last revised March 1993, by EG&G. This manual has been adopted by BWO and is currently being revised.

MEMP does not currently have an acceptable data/records management plan. MEMP is currently working with DOE EM-73 to prepare an acceptable document management plan.

The BWO Records Management, Retention, and Disposal, Systems Manual No. 21 while in need of updating is generally consistent with the Roadmap to Year 2000. The BWO manual contains records schedules consistent with the DOE schedule.

Findings

The current records management system at MEMP is inconsistent with guidelines published by DOE and the National Archives and Records Administration (NARA). Despite guidelines regarding record retention and management, current practice by DOE MEMP is to maintain all project documents regardless of classification.

Recommendations

DOE MEMP should finalize a records management plan consistent with NARA guidelines.

2.5.10 Quality Control

Observations

In compliance with DOE Quality Assurance Order 5700.6C and QA rule 10CFR830.12, the Mound Quality Assurance Program (Technical Manual MD-10334) was established. The program establishes functions and responsibilities for the quality assurance program and stresses developing and maintaining an effective quality management system with the goal of ensuring safe, reliable services, which meet or exceed the customer's requirements, needs, and expectations.

The program requires developing, implementing, and maintaining a written Quality Assurance Program for each project. A Quality Assurance Program describes the organization, structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing the work. The Plan also describes the management process, including planning, scheduling and resources considerations.

Mound Quality Assurance Program (Technical Manual MD-10334) includes a template and instruction for preparing the written project Quality Assurance Programs.

Findings

None.

Recommendations

None.

2.5.11 Program Management Office

Observations

The Environmental Restoration Program (EM-40) has responsibility for those plants that are closing by assessing their cleanup requirement of facilities and potential release sites that are no longer part of active operations and for cleanup facilities and release sites that are contaminated with various quantities of low-level, mixed radioactive and hazardous substances.

The Office of Site Operations (EM-73) provides programmatic direction and support to the MEMP. There is regular communication between EM-73 and MEMP. Senior DOE MEMP management is satisfied with the level of support and direction provided by EM-73.

The Office of Field Integration (FI-20) provides the following services to the MEMP:

- ***Project Management —*** provide assistance to complete each DOE project within scope, on schedule, and on budget. Gain from FI-20's knowledge of best practices, lessons learned on projects, and expert assessments of different project management systems and techniques.

- ***Facilities*** — provide all Department-wide policy and coordinate crosscutting issues with regard to maintenance management, infrastructure management, and other related systems which are not specifically addressed by the Program Offices.

- ***Cost Estimating*** — serve as the focal point for all cost estimating policy and standardization.

- ***Systems Engineering*** — provide assistance with systematic approaches to managing engineering efforts and facilities throughout the life cycle of a physical asset.

One aspect of EM-73's support of the MEMP is the arrangement for a receiver site for the transuranic waste currently stored in the T Building. This is considered to be a critical item which EM-73 is currently pursuing. The Review Team was informed that a receiver site will be finalized in the near future. This should continue to be a high priority until a firm arrangement is in place due to the potential impact to the baseline.

MEMP interfaces with Program Offices and headquarters on a regular basis. Issues which require attention are documented, tracked and managed using a report entitled, "External Action Requirements Project Completion Commitments." This report identifies the action item, party responsible, action due date and the status. Major issues, identified during the reviews as requiring external assistance, were found on this report.

Findings

None

Recommendations

None.

2.5.12 Training

Observations

BWO Training Plan & Procedures, System Manual 112 has established a detailed training program and provides guidance for managing, developing, implementing and documenting a training program in accordance with Nuclear Safety management (10 CFR 830). The program considers the hazard potential, risk and complexity of the training needed. The program includes initial, annual, remedial, periodic, refresher, and job specific training. Each project has an established training plan that specifies the minimum required training, by position, for each employee working on that project. Additionally, individuals may have additional training requirements depending on their specific job responsibilities.

Continued DOE training is essential to assure strong and consistent application of the processes stated in DOE documentation. The DOE personnel interviewed indicated that the project manager requires a combination of formal (presentations) and informal (reading and questioning) training, which is documented. This combination of training techniques is appropriate.

BWO personnel should receive continuing training on the process changes that currently affect the DOE. Personnel indicated during interviews that new project team members were required to read applicable project documents, understand document contents, and comply with document provisions. BWO has documented training and maintains detailed programs for all individuals involved in the project.

Subcontractor personnel also receive training on the policies, processes, and implementation procedures used at the Mound. Subcontractor training is important to maintain the high level of quality that all project team members are required to uphold.

Findings

None

Recommendations

None.

3.0 CONCLUSIONS

Based upon the analysis in the prior sections of this report, the significant Observations and Findings expressed throughout are summarized below. Items depicted in bold represent Findings expressed previously in this report. (Page number references have been provided for a detailed discussion of the following conclusions).

- A competent and effective team is in place for both BWO and DOE. A high level of coordination and cooperation between BWO and DOE MEMP is evident and risks and challenges to project completion are addressed jointly. (Section 2.5)

- The project has a competent baseline in place for the nature of the work to be performed. The absence of contingency or management reserve in the Baseline cost estimate significantly increases the risk that the current budgets will be exceeded. (Section 2.2)

- The current project management systems and controls are effective with regard to managing the overall project, and documenting costs. (Section 2.5.2)

- The project schedule is not sufficiently detailed for planning, scheduling, monitoring, and control of the work at the sub-project level. (Section 2.3)

- There is significant schedule risk in the current baseline schedule. The risks stem from the uncertainties throughout the site but particularly in the Main Hill work.

- There is considerable concern on the part of the Review Team regarding the ability to complete the project on time and within the current budget given the current status and the shear number and potential cumulative impact of the challenges ahead. Specific notable concerns include:

  - Over an eight month period, the project has lost six months on the critical path. (Section 2.3)

  - **The Baseline Budgets do not include any contingency or management reserve**. (Section 2.5.2)

  - **BWO staffing levels have been insufficient to maintain the Baseline Schedule**. (Section 2.5.1)

  - The work scope for PRS-66 could ultimately increase the project cost by $38 million. (Section 2.1.1.3)

  - There are numerous areas of significant schedule and cost risks in Buildings R, SW, T, HH, WD and 38. (Section 2.1.1.2 and 2.3)

  - At the time of this review, there was no approved receiver site for the transuranic waste. (Section 2.1.2.2)

  - The MEMP budget must accommodate non-work costs such as the Levell settlement. (Section 2.2.2.4)

  - Most of the technically challenging remedial work, areas with the highest degree of uncertainty and highest resource needs are in the upcoming years. (Section 2.3)

- There is potential savings to MEMP if transuranic waste is shipped to the Oak Ridge site. (Section 2.1.2.2)

- **MEMP does not currently have an acceptable records management system**. (Section 2.5.9)

- Based upon the Review Team's evaluation, the project should continue with consideration of the recommendations in the following section.

4.0 RECOMMENDATIONS

The analysis and conclusions contained in this report express concern regarding the ability to complete the project on time and within the current budget. The following recommendations, listed in order of priority, reinforce actions which may have already been initiated and provide additional actions to be considered:

Project Staffing

The single most important action that the BWO must currently pursue is increasing its qualified professional and craft staffing to meet the requirements of its schedule recovery plan for the Main Hill Tritium Project, and maintaining adequate levels of qualified staff for all areas of the project into the future.

The BWO Human Resources Manager indicated that BWO is preparing a plan to address the current staffing shortfall. This plan should be formalized and implemented as soon as possible and identify the number and classification of personnel to be brought on over time.

The BWO employee retention measures currently under consideration need to be formalized as soon as possible and should address a range of approved measures that the site Human Resources staff can utilize to retain current key staff and attract the necessary new skills.

DOE MEMP and BWO should identify blocks of work which could be subcontracted as the need arises.

BWO should initiate discussions with the union to reach a formal agreement regarding subcontract work.

DOE MEMP should move to approve and implement an employees retention plan.

Stable Metal Tritides

The length of time required to obtain stable metal tritide dose factors is unknown. Estimates from site personnel ranged from two to five months. Aside from the workarounds that are being implemented, the following two alternatives should be investigated:

- Perform an evaluation of the cost of proceeding with the work with increased level of personal protection equipment (PPE) verses the potential cost of delaying the project.

- Evaluate the possibility of using the dose factor of a contaminant with similar physical and chemical properties.

Project Scheduling

More complex portions of the sub-projects which have potential schedule and/or cost risk should be scheduled in more detail than shown in the Baseline schedule. The detailed schedules should project at least 6 months into the future to provide a basis for early detection of potential schedule slippage, and early remedial actions to correct such trends. BWO should institute

procedures for tracking the detailed schedules and provide training, as necessary, to specific project managers and engineers to assist them in developing and using the schedules.

The detailed schedules should be resource loaded with information on professional and craft staffing requirements to assist in near term assessment of manpower requirements at the sub-project level.

PRS-66

BWO and DOE should expedite actions necessary to resolve final disposition of PRS-66, which has potential cost and schedule impacts. If disposition requires removal of large volumes of contaminated soil, the sooner that planning is initiated, the less chance that the work may pose a schedule risk.

Transuranic Waste

Determine as soon as possible whether the DOT exemption for ATMX railcars is currently active under the timely application provision, and whether DOT is leaning toward formal renewal after reviewing the information DOE MEMP/ALOO is expected to complete by October 1999.

DOE Headquarters needs to finalize the confirmation of a receiver site.

Disposition of "T" Building

Reevaluate the potential alternatives for the disposition of the T Building. Presently it appears that Entombment/Partial Entombment and D&D for restricted use as discussed in the Parsons Report are technically feasible alternatives, which should be revisited.

Analysis of Entombment alternatives should include cost estimates and identify key elements necessary for implementation and, to the extent they are known, identify stakeholder concerns. The reevaluation should proceed concurrent with ongoing efforts in the "T" Building.

Contingency

A contingency reserve equal to 30% of the Baseline cost estimate should be established within the Ohio Field Office or elsewhere within DOE.

Contract Administration

The BWO contract contains incentive fee criteria for management fees which are tied to key schedule dates. DOE should continue to evaluate the individual incentive fee criteria on a regular basis to ensure that incentives are tied to critical project areas as they may change throughout the course of the Project.

BWO should continue to monitor budget underruns, and identify work in the out years which can be performed earlier. Budget underruns and potential work to fill the deficit should be reported on a regular interval, such as quarterly.

Follow-Up Review

This report indicated that BWO prepared a recovery plan to address the projected schedule delay, which had not been fully implemented at the time of this review. DOE should consider a follow-up review within six months for the purpose of determining the project status and monitoring the progress achieved using the newly implemented recovery plan.

Appendix A

Review Team Members & Qualifications

Appendix A - Review Team Members & Qualifications

James E. Barry, P.E.

Mr. Barry has over 30 years of experience as a manager and executive on process, power and infrastructure projects. Mr. Barry previously served as President and CEO of Fru-Con Construction Corporation, a $420 million per year, full service engineering, procurement and construction company.

Mr. Barry also served in various capacities for Fluor Daniel, Inc. As Vice President and General Manager of the Power Services Business Unit, he had total operating and profit and loss responsibility for a $350 million per year unit that provided engineering, construction and maintenance services on nuclear and fossil power plants for the electric utility industry throughout the U.S.

Mr. Barry received a BS degree in Civil Engineering from the University of California, Davis.

Kenneth J. Dunn

Kenneth J. Dunn, a Hill Project Director, has more than 29 years of experience in construction and project management, contract administration, claims evaluation and environmental management. Additionally, he has over 20 years of experience with civil engineering and construction activities with the U.S. Corps of Engineers covering all aspects of construction operations. Mr. Dunn's experience includes extensive executive level responsibility for program development and execution, financial and personnel management, and resolution of multi-discipline technical and contract dispute issues. His broad background includes civil engineering, project management, coordination of multi-project field activities, operations, quality, and personnel control. In addition, Mr. Dunn is currently responsible for construction management support services for the United States Postal Service as well as for design-build facilities at various locations in the United States.

Mr. Dunn was responsible for providing project and construction management services for the environmental remediation projects at the French Limited Superfund Site, Aberdeen Proving Grounds, Quantico Marine Base Superfund Site; Spring Valley Chemical Munitions Site (formerly used defense site); and Drake Superfund Site. His responsibilities included project planning, scheduling, estimating, purchasing, expediting, contracting, contract administration, cost control and cash flow forecasting.

Mr. Dunn holds a Master of Science degree in Civil Engineering from Wayne State University, a Master of Engineering degree in Construction Management from the George Washington University, and a Bachelor of Science in Engineering Management from Boston University.

José Diaz, P.E.

Mr. Diaz is a Professional Engineer with over 21 years of engineering and project management experience. Mr. Diaz' project experience includes major industrial facilities such as fossil and nuclear power plants, sanitary and industrial waste landfills, superfund remediation sites, and chemical handling and recycling facilities.

As project manager on a recently completed assignment, Mr. Diaz performed a detailed analysis of extensive cost overruns and delays experienced by the site remediation contractor at a radiologically contaminated Superfund site in northern New Jersey.

At another Superfund site located in New York State, Mr. Diaz completed an assignment as project manager, overseeing the activities of the onsite remediation/restoration and offsite treatment, storage, and disposal contractors. As part of this assignment, Mr. Diaz was responsible for the technical and administrative management of a group of professionals for the implementation of an onsite health and safety and offsite community air-monitoring program and the quality control inspection of remedial and site restoration activities.

Prior to joining Hill International, Inc., Mr. Diaz managed a staff of engineers and scientists for an environmental consulting firm. He was responsible for technical and administrative staff management, report and proposal preparation, and project management services. Mr. Diaz supervised projects which included multiple site environmental site assessments required for financial, corporate and real estate transactions; remedial investigations requiring surface water, groundwater, and soil contamination assessment; development of remedial action plans for both soil and groundwater remediation projects; hazardous material and hazardous waste compliance audits and management programs; and wastewater and stormwater sampling and permitting services.

Mr. Diaz holds a Master of Engineering degree and a B.S. in Civil Engineering from Rensselaer Polytechnic Institute.

Frank J. Giunta, P.E.

Mr. Giunta has more than 20 years of experience in engineering and construction consulting. He has been responsible for complex consulting assignments on behalf of public and private owners, engineers, contractors, insurance and financial institutions. These assignments have involved a wide range of projects, which include environmental, process, power, transportation and building construction. Prior to joining Hill, he was engaged as a civil design engineer for a Department of Energy project in southern Ohio. He was responsible for the design of civil structures, including roads, highways, railroads, hydraulic structures, and underground piping systems. He has prepared engineer's estimates and technical specifications.

Mr. Giunta's expertise has been utilized in the evaluation of the adequacy of project management, design issues, professional performance, site conditions, specifications, contract terminations, cost and financial analysis, productivity and schedule analysis.

For project and risk management, Mr. Giunta has been responsible for the design and implementation of project management systems for major internal engineering and construction projects. He developed procedures to identify and manage the risks inherent in large-scale remediation projects. He has provided consulting services to assist clients in the preparation of contract documents.

Mr. Giunta holds an M.B.A. in finance from Drexel University and a B.S. degree in Civil Engineering. He is also an adjunct member teaching courses in the Construction Management Program at Drexel University.

Alfred W. Grella

Mr. Grella has 35 years of professional experience in health protection, health physics, transportation, inspection and enforcement, training, and related regulatory activities. He has worked in private industry with an Atomic Energy Commission (AEC) prime contractor and with the Federal Government. His experience includes 3 years as a compliance inspector with the AEC Region I office and 11 years as a nuclear regulatory specialist and national authority with the U.S. Department of Transportation's (DOT) Office of Hazardous Materials Transportation. His principal areas of expertise include DOT and U.S. Nuclear Regulatory Commission (NRC) transport regulations, International Atomic Energy Agency regulations development, emergency response and accident analysis, and low-level waste generator and packaging requirements.

For the NRC's Office of Nuclear Materials Safety and Safeguards, he was responsible for planning, developing, and auditing the Commission's program for inspection and enforcement of the nuclear transportation activities of its licensees, including major materials users, fuel facilities, and power reactors. He also conducted related training for the inspection staff. He developed the inspection procedures for compliance with the waste generator requirements of 10 CFR 61.

Mr. Grella was the senior NRC staff specialist and authoritative technical expert on nuclear and hazardous materials transportation regulations, including matters relating to the NRC program for inspection and enforcement of the DOT and NRC transport regulatory compliance development procedures used by regional inspectors.

Mr. Grella managed the program of applied research and development (R&D) for the Materials Transportation Bureau. This program involved R&D on hazardous materials transportation, nuclear transportation, and pipeline safety.

Mr. Grella was Chief of the Technology Division of DOT's Office of Hazardous Materials. He planned, organized, and managed the work of the division, which was responsible for the chemical, biological, and health aspects of the regulatory program for the safe transport of hazardous and radioactive materials and for management of the related R&D program.

Mr. Grella managed Sciences Branch of the Office of the Secretary, Office of Hazardous Materials, U.S. DOT. His activities included technical evaluation of the chemical, biological, radiological, and toxicological hazardous aspects of the regulatory program for the safe transport of hazardous materials. Mr. Grella holds a B.A. in Chemistry from the University of Connecticut.

Kristina A. Lala

Ms. Lala, a Consultant in the Chicago office of Deloitte & Touche Fantus Consulting, specializes in construction management, facility strategy, and corporate site selection, drawing from a background in civil engineering and construction.

Ms. Lala has completed numerous facility/site reviews, location strategy engagements, and site selections for manufacturing and industrial clients. She has also conducted headquarters and

back office strategy and relocation assignments. Clients include the United States Department of Energy, The Gap, Chamberlain Group, Cintas Corporation, Enron, Shurfine, Allstate, and General Motors.

Prior to joining Deloitte & Touche, Ms. Lala was an engineer for ARCADIS Geraghty & Miller, Inc. in Chicago. She specialized in construction management, design/implementation, and environmental site investigations. Ms. Lala's project work also included cost estimating, project and construction scheduling, subcontractor and vendor selection, and construction inspection.

In addition, Ms. Lala served as consultant on the Fernald Environmental Management Project in Ohio, and project engineer for a litigation support case involving an army ammunition plant. Project work included investigation of former plant activities, evaluation of environmental impacts, cost and schedule procedures review, and analysis of corrective actions.

Ms. Lala holds a BS degree in Civil Engineering, with an Environmental Concentration from the University of Notre Dame.

Peter Laurin

Mr. Laurin provides environmental management services for JUPITER Corporation. He has managed CERCLA/RCRA Remedial Investigations, Interim Actions, Risk Assessments, Feasibility Studies, and Remediation for soil and groundwater at DOE facilities contaminated with a wide variety of solvents, metals, and radionuclides. He implemented and managed the first thermal desorption of radioactive solvent contaminated soil at Rocky Flats Environmental Technologies Site, a former DOE nuclear weapons site. Mr. Laurin has managed and performed field operations consisting of monitoring well installations, underground storage tank investigations, soil sampling, ground water and surface water sampling, radiation surveys, geological and geophysical surveys. He received awards for saving over $2 million by negotiating changes in a soil and ground water investigation with State and EPA regulators. Mr. Laurin managed environmental projects with annual budgets exceeding $13 million. He has successfully developed and implemented costs saving measures, and has demonstrated effective project management.

Mr. Laurin has investigated billion dollar environmental damage insurance claims at large chemical and electronics facilities. He evaluated proposed work plans and technology and advised the insurance carriers of cost saving measures through the use of less costly alternatives and modified work scope.

Mr. Laurin is experienced with earned value analysis, scheduling, budgeting, change control, cost estimating, and personnel management. He has managed staffs of over 20 engineers, scientists, technicians and contractors. He is proficient in completing legally defensible projects, documentation, and reports. Mr. Laurin has a B.S. in Geophysics and a Masters in Environmental Policy and Management. He has over 30 years experience.

James Martin, Jr.

Mr. Martin is a certified health physicist with over 25 years experience in analyzing the effects of radiation on workers and the public. At JUPITER, he analyzed technical, institutional, and

public issues related to the regulation of reuse or recycle of low-radioactivity scrap materials from decommissioning of nuclear facilities, and critiqued related cost-benefit analyses developed by EPA. For 16 years at NRC, he provided leadership on issues of radiation protection and safety, risk assessment, environmental transport, dosimetry, environmental and health impacts, licensing, and emergency response. He also served as a technical expert on emergency preparedness and radiological protection on five DOE Technical Safety Appraisal Teams. Mr. Martin has assisted in the development of radiation protection and environmental transport training programs for EPA and development of radiological Slope Factor technical reports for the EPA Superfund program. He also developed and presented a training program on emergency response for NRC staff and evaluated NRC contractor reports on reactor containment leakage testing. He also served as a consultant to DOE for EAL/EP/Hazards Assessment Guidance for DOE contractors and observed and critiqued DOE laboratory contractor emergency exercises. Mr. Martin was a DOE representative on the FEMA/FRPCC Subcommittee on Emergency Radiological Instrumentation. He participated in the development of Protective Action Guides and reviewed and critiqued Environmental Impact Statements. Mr. Martin has authored or contributed to over 35 technical publications. Mr. Martin has a M.A. degree in physics.

Alann M. Ramirez, P.E,

Mr. Ramirez is a Vice President of Hill International, Inc., is a professional engineer and attorney. He is responsible for providing project management consulting services, performing contractual and technical analysis of engineering and construction disputes, and is an expert in developing claim strategy. He has assisted in settlement negotiations, performed schedule and delay analyses, and examined issues such as: differing site conditions, constructive acceleration, design errors and omissions, third party interferences, suspensions, change order impacts, productivity analyses, and numerous other issues. His project experience includes wastewater treatment plants, remedial action contracts, airport runways, railways, utility plants, shipyards and other commercial and industrial projects. Mr. Ramirez also has developed an expertise as a design and construction mediator and neutral, having lead the effort on behalf of a major international constructor and an agency of the United States Government in settling a multi-million dispute as the Project Neutral, as well as on a major utility project and another international engineer/constructor. Mr. Ramirez holds a Bachelors Degree in Marine Engineering from the United States Merchant Marine Academy and a Juris Doctor from Delaware Law School, as well as being a graduate of the General Electric Company's Knolls Atomic Power Laboratory Nuclear Power Engineering School.

Robert L. Travaglini

Mr. Travaglini has over 40 years of experience in engineering and construction, including more than 20 years with Hill International. A major portion of career has been devoted to all aspects of project scheduling.

In the mid to late 1960’s and the 1970’s, Mr. Travaglini spent much of his time developing project control systems, programming computers for those systems, and developing and monitoring critical path schedules for various projects.

After joining Hill International, Mr. Travaglini continued to provide scheduling services for the design and construction of various projects. Additionally, he has been involved in analysis of claims on construction projects of all types, including power plants, buildings, chemical manufacturing plants, waste treatment facilities, prisons, hospitals, and mass transit projects with particular emphasis on delay analysis and resulting disruption and impact damages. He has participated in negotiation of claims and has testified as an expert witness in a number of cases.

Mr. Travaglini holds a B.S. degree in Civil Engineering from Drexel University.

Richard E. Way, P.E., CPE

Mr. Way has over 28 years of experience as a Senior Estimator and Project Manager for new construction and renovation of multi-million commercial, historic renovation, transit, educational and governmental facilities. Mr. Way brings comprehensive and in-depth estimating capabilities including pre-bid, design phase, bid and change order estimating, and has been responsible for estimating, bidding and managing various projects, preparing cost studies and estimates, and writing and evaluation of subcontracts. Mr. Way was also president of his own construction company performing all management functions on 51 commercial and governmental projects totaling $3.8 million. His experience with Hill includes a variety of estimating projects for the General Services Administration as well as numerous private projects.

Mr. Way holds a BS degree in Civil Engineering from the University of Illinois.

Appendix B

Personnel Interviewed

Appendix B - Personnel Interviewed

DOE EM 73	
Interviewee	**Title**
Knisley, Ron	Personnel/Industrial Relations Management & Program Analyst
Noone, Patrick	Baseline Change Control Management & Program Analyst
Perrygo, Robert	Budget Financial Systems Analyst
Scott, Craig	Rad General Engineer
Thompson, Jay	Director
Tracy, Terry	Rad General Engineer

DOE FI	
Interviewee	**Title**
Sze, Dan	General Engineer
Tavares, Anthony	Director Office of Project & Fixed Asset. Mgmt.

DOE Miamisburg Environmental Management Project	
Interviewee	**Position**
Brechlin, Patricia	Environmental Protection Specialist
Cheng, Sam	Project Manager Project Mgmt. Division Main Hill Tritium
Church, Ron	Project Manager Project Mgmt. Division Test Fire Valley
Eckman, Dewain	Associate Director
Frazier, Tim	Project Manager Project Mgmt. Division Tritium Operations/IPS
Franklin, Derrick	Contracting Officer
Greenwalt, Jane	Public Affairs Officer Office of Safety & Assessment
Hansen, Kay	Ohio Field Office Budget Team Leader
Holland, Renee	Legal Counsel
Johnson, James	Project Manager Project Mgmt. Division Facility Maintenance /Operations

DOE Miamisburg Environmental Management Project	
Interviewee	**Position**
Kleinrath, Art	Project Manager Project Mgmt. Division Soils/CERCLA
Provencher, Rick	Director
Rothman, Rob	Project Manager Project Mgmt. Division Waste Mgmt./Legacy Waste
Schmaltz, Frank	Project Manager Project Mgmt. Division Main Hill Non-Rad
Sherer, Janice	Quality Engineer Office of Safety & Assessment Performance Assurance & Assessment
Simak, John	Health Physicist Office of Safety & Assessment Environment, Safety & Health
Spesard, Alan	Project Manager Project Mgmt. Division Main Hill Rad
Vincent, Oba	Deputy Director
Watkins, Linda	Site Transition Manager
White, Debra	Project Manager Project Mgmt. Division SM/PP Hill
Zimmerman, Jack	Office of Safety & Assessment Associate Director

MMCIC	
Interviewee	**Position**
Simmons, Carl	Vice President MMCIC

USEPA	
Interviewee	**Position**
Fisher, Tim	

OEPA	
Interviewee	**Position**
Nickel, Brian	

BWO	
Interviewee	**Position**
Armstrong, Ken	Site Transition Manager
Atkins, Dottie	Public Relations
Baker, P. S. (Sandy)	Site Project Manager
Barnhart, Brady	Deputy General Superintendent
Bartee, Joe	Test Fire Valley Rad & Non-Rad
Bauer, Linda	Environmental Safeguards & Compliance Manager
Becker, Mark	
Booth, Jim	Mail Hill Tritium, Project Controls
Burns, Pat	Project Manager Main Hill Tritium
Catania, Vic	Facility Maintenance Manager & Site Operations Manager
Coons, Gary	Test Fire Valley
Earith, Tim	Cost Estimating
Fisher, Mike	Baseline Mgmt.
Gannon, Jim	Finance & Purchasing Manager
Gilliat, Mark	Project Engineering and Integration
Hartley, Vickey	Test Fire Valley
Heath, Tim	Project Manager SM/PP Hill
Henderson, Ron	Soils/SMPP
Higgins, Rich	Manager Integrated, Safety Mgmt. & Quality, Audits & Assessments
Hood, Scott	Main Hill Rad
Howell, Edwin	Manager IPS Production Control & Transport Systems
Jackson, Jim	Human Resources/Industrial Relations Training/Administrative Services Manager
Jones, Alan	Counsel
Krueger, John	Waste Management Manager
Kandrum, Jamie	Legacy Waste
Marker, Roger	BTAS, Inc.
Mattis, Virginia	Finance & Purchasing
Maul, Gerald	Bldg. 38
McKosky, Lucyanne	Training Manager
Morris, Gary	IPS Manager
Neff, Sherri	Legacy Waste

BWO	
Interviewee	**Position**
Park, Woo	Bldg. HH
Phinney, Jim	Project Engineering & Integration Manager
Price, John	Soils Project
Rigano, Jim	
Rogers, Mike	Main Hill Tritium
Sirois, Ken	Radiological Control Manager
Sizemore, Julie	Planner Main Hill Non-Rad
Stickelman, Jon	Project Controls
Thompson, Bud	Main Hill Non Rad Manager
Williams, Monty	Production Control

USACE	
Interviewee	**Position**
Parham, Johnny E.	Civil Engineer CELRN-EP-A

PT&C	
Interviewee	**Position**
Jamison, Tim	

DCAA	
Interviewee	**Position**
Hartings, Frederick	Dayton Branch Manager
Hill, Ron	Senior Auditor
Stupakiewicz, Joseph.	Supervisory Auditor
Werbrich, Joseph	Senior Auditor

OTHER VIP's	
Interviewee	**Position**
Hieberg, E.R. (Vald)	Former U.S. Army Chief of Engineers and non Special Consultant to EM-1

Appendix C

Documents Reviewed

Appendix C - Documents Reviewed

	DE-AC24-970H20044
	Modifications Performance Evaluation
	Plan Summary (External Ind. Proj. Reviews)
	Miamisburg Env. Mgmt. Project Organizational Chart
Doc. #104-0001	Functions Responsibilities & Authorities Manual
Doc. #104-0002	Roles & Responsibilities for the OHIO Field Office
Doc. #104-0003	DOE, Miamisburg Env. Mgmt. Proj. Tech. Mgmt. Plan Rev. 1
Doc. #104-0004	DOE, Miamisburg Env. Mgmt. Proj. Tech. Mgmt. Plan Rev. 1 DRAFT
Doc. #104-0005	Miamisburg Env. Mgmt. Proj. Office Project Control System (PCS)
Doc. #104-0006	MEMP Office Readiness Assessment Procedure (RAP)
Doc. #104-0007	BWO Project Controls System Manual
Doc. #104-0008	MEMP Assessment Procedure
Doc. #104-0009	Weekly Reports
Doc. #104-0010	Sales Contract – DOE & Mound
Doc. #104-0011	Administrative Recording/Info. Repository File Index
Doc. #104-0012	Safety Planning Procedure
Doc. #104-0013	MEMP Line Environment, Safety & Health Oversight Policy
Doc. #104-0014	"An End in Sight" – Work Force Restructuring Plan
Doc. #104-0015	USACE, Baseline Validation Rpt. Proj. Exit Plan
Doc. #104-0016	TOC – MEMP Review & Approval Proc. for AB Docs
Doc. #104-0017	MEMP Contract Admin. Plan
Doc. #104-0018	MEMP Office Oversight Policy
Doc. #104-0019	Re-Engineering at Mount – Initiatives for the future
Doc. #104-0020	FY 2001 Integrated Priority List/Narratives Impacts/Crosscuts
Doc. #104-0021	Mound Reuse Partnership Council
Doc. #104-0022	The 1999 Ohio Staffing Summit
Doc. #104-0023	Accelerating Cleanup: Paths to Closure Strategy – DRAFT
Doc. #104-0024	Memo. of Agreement (USDOE & MEMP & Miamisburg)
Doc. #104-0025	Main Hill Tritium Critical Path
Doc. #104-0026	Revised EM Communications Plan
Doc. #104-0027	Generic Process for the Disposition of Bldgs. that have Potential or Actual Radiological Contamination
Doc. #104-0028	Ohio Field Office FY2001 Integrated Priority List
Doc. #104-0029	DOE/MEMP Ten Year Plan
Doc. #104-0030	BWO Project Controls System Manual
Doc. #104-0031	Project Risk Management
Doc. #104-0032	Environmental Restoration Monthly Progress Rpt
Doc. #104-0033	"What Gets Measured Gets Done" (Ohio Field Office Strategic Plan)
Doc. #104-0034	BWO Mgmt. Plan for the Mount Exit Project (March 1999)
Doc. #104-0035	Annual Schedule Delivery & Enforceable Agreement Milestones (March 1999)

Doc. #104-0036	Work Plan for Environmental Restoration of the DOE Mound Site, The Mount 2000 Approach (February 1999)
Doc. #104-0037	Pre-Conceptual Engineering Study Technical (T) Bldg.
Doc. #104-0038	Progress Tracking System Variance Analysis Rpts.
Doc. #104-0039	BWX Exit Plan Introduction Part 2 of 2 (December 1998)
Doc. #104-0040	BWX Exit Plan Introduction Part 1 of 2 (December 1998)
Doc. #104-0041	BWO Prime Contract for Cleanup
Doc. #104-0042	Technical (T) Bldg. D&D Pre-Conceptual Eng. Study Addendum
Doc. #104-0043	Mound Ten Year Plan (formerly The Integrated Comprehensive Plan) (Semiannual Issue – January 6, 1997)
Doc. #104-0044	Accelerating Cleanup: Paths to Closure Strategy Site Narratives (June 1998)
Doc. #104-0045	
Doc. #104-0046	Building Documentation Charts
Doc. #104-0047	Organizational Chart
Doc. #'s 104-0048, 49, 50	Building Binning Status Summaries
Doc. #104-0051	
Doc. #104-0052	Organizational Charts
Doc #104-0053	Parcel Transfer Plan
Doc #104-0054	Building Ownership Plan
	Process Piping Drawing (1 copy)
	Distribution of U-MHT-1999-029
Doc. #104-0055	USEPA Region V and The State of Ohio (2 copies)
Doc. #104-0056	Risk Based Guideline Values – March 1997
Doc. #104-0057	Uncertainty Mgmt. Expediting Cleanup
Doc. #104-0058	Mound 2000 Residual Risk Evaluation Methodology
Doc. #104-0059	Guide for Project Management – 5/20/97
Doc. #104-0060	April 1999 Baseline Mgmt. Deliverables
Doc. #104-0061	Technical Manual
Doc. #104-0062	BWX Exit Plan – Basis of Estimate Timberline Standard Assemblies 12/1998 – Binder 13
Doc. #104-0063	BWX Exit Plan – Soils Project Part 1 of 2 12/1998 – Binder 10
Doc. #104-0064	BWX Exit Plan – Soils Project Part 2 of 2 12/1998 – Binder 10
Doc. #104-0065	BWX Exit Plan – Main Hill Tritium Project Part 1 of 2 12/1998 – Binder 5
Doc. #104-0066	BWX Exit Plan – Main Hill Tritium Project Part 2 of 2 12/1998 – Binder 5
Doc. #104-0067	Report of Audit of Shutdown and Transition of the Mound Plant – June 1997
Doc. #104-0068	Certification Statement for Reasonableness of Cost & Administrative Review for Feb. 1999
Doc. #104-0069	Mound Plant Potential Release Site Package – PRS #411
Doc. #104-0070	On Scene Coordinator (OSC) Report – April 1998
Doc. #104-0071	PRS 411 Removal Action – April 1999

Doc. #104-0072	Paint Shop Radioactive Hot Spot – Revision 4 – April 1999
Doc. #104-0073	Tritium Complex D&D Pre-Conceptual Engineering Study – Dec. 12, 1996
Doc. #104-0074	Technical (T) Bldg. D&D Pre-Conceptual Engineering Study Addendum – Oct. 31, 1996
Doc. #104-0075	Cost & Schedule Estimating Guide – Sept. 1993
Doc. #104-0076	Performance Evaluation Plan – 2/1/99 through 9/30/99
Doc. #104-0077	Project Cost Estimate – Feb. 1994
Doc. #104-0078	Ohio Field Office Performance Plan – 1996-2005 – Objectives and Goals
Doc. #104-0079	Site Profile – May 1996
Doc. #104-0080	UCNI
Doc. #104-0081	SW-128A Lead Lined Tank Removal
Doc. #104-0082	FY2001 Safeguards & Security Crosscut
Doc. #104-0083	Subcommittee on Energy and Water Dev. of the House Committee on Appropriations
Doc. #104-0084	Transmittal of Mound Transuranic Waste Disposition Feasibility Study
Doc. #104-0085	Main Hill Tritium/Tritium Trans OPS - Project Status Report by Project for Fiscal Year 1999
Doc. #104-0086	CPR Executive Summary – April, 1999
Doc. #104-0087	Test Fire Valley - Project Status Report by Project for Fiscal Year 1999
Doc. #104-0088	Environment, Safety and Security Weekly Reports from BWO Proj. Man.
Doc. #104-0089	Baseline Schedule (1 pg.)
Doc. #104-0090	Cost Curves
Doc. #104-0091	Guidance for Updating the Integrated EM Corp. Database, 1999 Paths to Closure
Doc. #104-0092	Programmatic Environmental Impact Statement Alternatives
Doc. #104-0093	Public Voucher for Purchases and Services other than Personal, 5/30/99
Doc. #104-0094	Public Voucher for Purchases and Services other than Personal, 4/21/99
Doc. #104-0095	Annual Site Environmental Report for Calendar Year 1997, 9/98
Doc. #104-0096	Sales Contract – January 23, 1998
Doc. #104-0097	Mound Plant Operations & Maintenance Plan for the Implementation of Institutional Controls
Doc. #104-0098	Records Management Team – Ohio Support Office Records Mgmt. Plan – Organization – Cradle to Grave
Doc. #104-0099	CERLA Summary Notice of Hazardous Substances Release Block D, 2/99 Final
Doc. #104-0100	Technical Position Report in Support of the Release Block D Residual Risk Evaluation Final Report, January, 1999

Doc. #104-0101	Residual Risk Evaluation Release Block D Revision Summary, Final Report, January, 1999
Doc. #104-0102	Record of Decision for Release Block D, Mound Plant, Final, February, 1999
Doc. #104-0103	Proposed Plan for Release Block D, Mound Plant, December, 1998
Doc. #104-0104	Transmittal No. 64, Guidelines & Discounts Rates for Benefit-Cost Analysis of Federal Programs
Doc. #104-0105	Project Validation Guidance for the FY2001 Budget Process
Doc. #104-0106	Instructions for Completing the Validation Report
Doc. #104-0107	Project Validation: FY2001
Doc. #104-0108	Project Validation Analysis Checklist
Doc. #104-0109	External Independent Review (EIR) Review
Doc. #104-0110	BWO Exit Plan Baseline External Independent Review, May 3, 1999
Doc. #104-0111	Training Implementation Matrix for Mound Exit Project, Rev. #2
Doc. #104-0112	Training Implementation Matrix for Mound Exit Project, Rev. #3
Doc. #104-0113	Table #2 – Non-Reactor Nuclear Facility Personnel, Rev. #2 (April 30, 1998)
Doc. #104-0114	Project Management Qualification Standard, May 1995
Doc. #104-0115	DOE Ohio Field Office Technical Qualification Program, Technical Qualification Record – May 6, 1997
Doc. #104-0116	April Report on Mound Transition, May 21, 1999
Doc. #104-0117	Radiological Protection Position Determination, June 3, 1999
Doc. #104-0118	Records Management, Retention, and Disposal, Systems Manual, Rev. March 1993
Doc. #104-0119	External Action Req. Project Completion Commitments, 6/23/99
Doc. #104-0120	Memorandum of Agreement between USDOE MEMP & MMCIC, January 23, 1998
Doc. #104-0121	Sales Contract between the USDOE and MMCIC, January 23, 1998
Doc. #104-0122	Mail Clerk (Incoming/Outgoing Mail, Concurrences, etc)
Doc. #104-0123	Contract Deliverable C202.b PTS and CPR & C5-5.b Baseline Change Control Log, June 16, 1999
Doc. #104-0124	Certification Statement for Reasonableness of Cost and Administrative Review for March 1999, June 3, 1999
Doc. #104-0125	Amendment of Solicitation/Modification of Contract, May 18, 1999
Doc. #104-0126	Amendment of Solicitation/Modification of Contract, Feb. 1, 1999
Doc. #104-0127	Baselining/Cost Estimating, June 21, 1995
Doc. #104-0128	Miamisburg Mound Reuse Plan, January 1997
Doc. #104-0129	Supplemental Agreement, July 10, 1992
Doc. #104-0130	Agreement, July 10, 1992
Doc. #104-0131	BWO Contract
Doc. #104-0132	BWO Self-Assessment for Fee FY99-1 (10/1/98-1/31/99)
Doc. #104-0133	DOE MEMP Performance Evaluation Report (10/1/98-1/31/99)
Doc. #104-0134	Main Hill Tritium Project Schedule Recovery Plan
Doc. #104-0135	Main Hill Tritium Project Schedule Recovery Plan – DRAFT

Doc. #104-0136	BWO Baseline Change Proposal - #LW519.99 Level 2
Doc. #104-0137	BWO Baseline Change Proposal - #LW524.99 Level 3
Doc. #104-0138	Mound Plant Potential Release Site Package PRS #338
Doc. #104-0139	Final On-Scene Coordinator Report on PRS 86 Removal Action
Doc. #104-0140	Mound Plant Potential Release Site Package PRS #66 Group Supplementary Data
Doc. #104-0141	Mound Plant Potential Release Site Package PRS #40
Doc. #104-0142	PRS #66 Total removal Est. – PRS #66 Draft SAP Segmented Gate Analysis
Doc. #104-0143	Mound Plant Potential Release Site Package PRS #66
Doc. #104-0144	BWO Exit Plant Test Fire Valley Project Part 1 of 2 – December 1998 – Binder 9

Appendix D

Budget Information
from
Ohio Field Office

Appendix D - Budget Information from Ohio Field Office

	BWO Current Budget (5/31/99)	Adjustment Back to 3/17/99 CPR (1)	Adjustment for Waste Disposal (2)	FY 1998 Baseline Amount (3)	FY 1997 Actuals (4)	FY 1998 Actuals (4)	MEMP Contingency Funding (5)	Removal of Non-Closure Funding (6)	1999 Paths to Closure	
Environmental Restoration										
Main Hill Tritium	190,583			7,478	97	9,894			193,096	
Main Hill Rad	25,355			3,073	663	3,073			26,018	
Main Hill Non-Rad	19,210	(786)		3,988	373	3,988			18,797	
SM/PP Hill	30,095			3,348	3,997	4,948	1,333		37,025	
Test Fire Valley	55,390			3,698	1,405	3,788	2,399		59,284	
Soils	50,483			10,394	14,414	12,725	5,867		73,095	
Legacy Waste	36,505		36,066	5,826	6,418	8,564	1,577		83,304	
Operations										
Tritium Transition Operations	16,539			16,539	16,495	16,320			32,815	
IPS Program	35,339							35,339	0	
Facility Engineering Maintenance & U	119,907	(553)		20,584	8,768	20,584	5,040		133,162	
Miscellaneous Direct Funded	40,659							40,659	0	
Funded Projects										
Main Hill Tritium (Large Scale Demo)	5,511							5,511	0	
Soils (Selentec)	116							116	0	
Non-Defense Funded										
Main Hill Tritium (New Cave)	4,047			135	1,228	480	1,516		7,136	
Other										
Regulatory Oversight & Site Support									64,323	**(7)**
Security Investigations (Closure)									576	**(7)**
Totals	**629,739**	**(1,339)**	**36,066**	**75,063**	**53,858**	**84,364**	**17,732**	**81,625**	**728,631**	

(1) Paths to Closure was developed from the 3/17/99 CPR, not the 5/31/99 CPR; therefore, BCPs of $1,339K must be backed out of 5/31/99 amount
(2) The BWO baseline includes waste disposal costs as Miscellaneous Direct Funded, however waste disposition costs are included in PBS OH-MB-03, Waste Manag
(3) The BWO baseline includes only a portion of FY 1998 costs, so these must be removed and replaced with the full FY 1998 costs
(4) Since Paths to Closure defines life cycle as FY 1997 through completion, the FY 1997 and FY 1998 actual costs must be added to the BWO baseline
(5) In developing the 1999 Paths to Closure, a minimal amount of funding in excess of the baseline requirements ($17,732K) was left at MEMP as contingency and will by an upcoming BCP
(6) Activities which are funded from non-closure funding sources are not included in Paths to Closure
(7) Both PBS OH-MB-10, Regulatory Oversight & Site Support, and PBS HQNP-SI01-CL-OH, Security Investigations (Closure), are included in Paths to Closure, but a baseline. These PBSs include EPA regulatory oversight, DCAA audit oversight, anticipated legal expenses, security investigations/reinvestigations, and other MEM The cost of BWO matrix site support for FY 1997 is also included in PBS OH-MB-10.