Rocky Flats Environmental Technology Site
2010 Closure Project Baseline
Validation

Final Report

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PRICEWATERHOUSECOOPERS

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Executive Summary

Background: Kaiser-Hill Company LLC (Kaiser-Hill) is the Management and Integrating contractor for the Rocky Flats Environmental Technology Site. Kaiser-Hill currently is working to a Rocky Flats Closure Project (RFCP) plan that is targeted to close the Rocky Flats site by 2010. Kaiser-Hill has been tasked by the Department of Energy (DOE), Rocky Flats Field Office (RFFO) to develop an accelerated plan to achieve a 2006 closure of the site. In an effort to ensure that the project management principles being used to develop the 2006 closure plan are sound, Kaiser-Hill contracted with PricewaterhouseCoopers both to test the existing approved 2010 Rocky Flats Closure Project for reasonableness by providing assurance that it is an achievable plan for closure of the site and to assess the probability of meeting key closure project milestones.

Approach: The methodology that PricewaterhouseCoopers employed for the Rocky Flats Closure Project Independent Validation integrates best practices from a number of different sources: the Project Management Institute (PMI) publication *A Guide to the Project Management Body of Knowledge (PMBOK Guide);* several textbooks; and our own practical experiences in application of project management principles with numerous clients in a variety of industries.

Conclusions: The Kaiser-Hill Team has made strong progress in bringing project management rigor to the Rocky Flats Environmental Technology Site and in changing the culture of the site from a production mentality to a project mindset, one that recognizes that the Rocky Flats Closure Project has a finite scope and a definite end point. Here are its notable strengths:

- A well-defined, high-level definition of the scope of work and the performance measures based thereon that are used to drive work priorities
- A strong management commitment to project execution and the attention to detail required to meet the performance measures
- Strong control over high-level project scope and the presently identified critical path, i.e., the Rocky Flats Closure Project and the Expanded Management Summary Schedule

- Excellent relationships and communications with the customer and the stakeholders
- A good qualitative identification of overall project risks, both internal and external, and defined mitigation plans for the external risks.
- An integrated safety management system that is at the forefront of the DOE sites

On the other hand, there are also strong indications that the Kaiser-Hill Team has yet to realize the full potential that can be attained from the project management capabilities that are in place. Listed below are the underlying deficiencies preventing the overall Kaiser-Hill project management effort from maturing to its full capability:

- The individual project schedules are not properly integrated into the Closure Project Baseline (CPB) schedule, and the CPB schedule is not properly integrated with the other management systems. This lack of management systems integration undermines the effectiveness of the project management capabilities of the Kaiser-Hill team; it precludes the capability to perform effective resource planning and allocation, critical path analysis, float analysis, or risk analysis.
- In the absence of an ability to perform critical path and quantitative risk analysis, Kaiser-Hill management must set priorities based on management judgment, rather than on a more objective, quantitative analysis of the potential risks to project performance.
- Although a disciplined change control process is used when scope or funding changes are identified, there is a reluctance to use the process, and the process does not adequately address the impact of deferred work scope on future costs.
- Although Kaiser-Hill has put in place a high-level management meeting that addresses human resource issues on a biweekly basis, long-range resource forecasting and planning must be done on a manual basis.
- Cost estimating, charging, and accrual issues present challenges to consistent cost control and management over the long term.
- Analytic risk planning is not possible using the 2010 CPB schedule. This problem flows through to an inability to identify risk, other than by either management judgment or ad hoc analyses; to track risk, except at a high level; or to conduct any effective rolling reassessment and control of risk.

Based on these strengths and deficiencies, PricewaterhouseCoopers believes that while Kaiser-Hill has a moderate probability of closing the Rocky Flats Environmental Technology Site by fiscal year 2010, present cost estimates are less likely to be met.

Finally, although the PricewaterhouseCoopers tasking encompassed only the 2010 CPB, we did note that many of the key deficiencies identified during our analysis, such as the lack of schedule and systems integration and the lack of risk analysis, are being addressed by Kaiser-Hill in the 2006 Closure Plan.

1. Background

When Kaiser-Hill Company L.L.C. (Kaiser-Hill) became the Management and Integrating (M&I) contractor for the Rocky Flats Environmental Technology Site (RFETS) in 1995, it took on a substantial management challenge. Perhaps more than any other site in the Department of Energy (DOE) Nuclear Weapons Complex, the history of Rocky Flats as an operating site, combined with the increasing encroachment of suburban development in proximity to the site, led to the inescapable reality that future site plans for cleanup and closure would be subject to extreme scrutiny. In retrospect, that has proven to be the case and is part of the reason why it is important that an independent validation of the 2010 baseline for site closure be provided.

The concept of accelerated site closure is a fairly recent phenomenon within DOE. As recently as three years ago, DOE's *1996 Baseline Environmental Management Report* provided a schedule for closing Rocky Flats that extended to 2055 at an estimated life-cycle cost of $17.3 billion. In contrast, the current baseline for 2010 closure has an estimated life-cycle cost of approximately $7.3 billion dollars, and a plan for closure by 2006 is under development. The 2010 Rocky Flats Closure Project (RFCP) is defined in the Closure Project Baseline (CPB) and comprises a Work Breakdown Structure (WBS), a detailed scope statement in the Project Baseline Descriptions (PBDs), a schedule that reflects the detailed implementation schedules of subcontractors, a detailed Basis of Estimates (BOE), a Project Management Plan (PMP), and a milestone sequence chart.

The Program Management Plan is closely tied to another important project document, the Rocky Flats Cleanup Agreement (RFCA), which specifies the closure vision and objectives; further, it defines a process for developing closure milestones under applicable Federal law. Since it represents an agreement between Kaiser-Hill and its primary regulators, the RFCA also provides important planning information and assumptions.

RFETS occupies about 6,200 acres in northern Jefferson County, Colorado. Since the inception of operations in the early 1950s, the site has grown to include an industrial

complex of more than 700 facilities and structures. The main production and support facilities are located near the center of the site and occupy approximately 385 acres. Production activities have contaminated many of the facilities and much of the equipment with radioactive and other hazardous materials. The facilities have a total of approximately 3,000,000 square feet of space, of which 1,100,000 square feet were used in the handling and fabrication of plutonium or uranium components for nuclear weapons and are highly contaminated by those materials. The main production and support facilities present the greatest challenge to site-closure activities.

Decontamination and deactivation (D&D) is not the only challenge facing RFETS. Disposition of excess government equipment also requires attention. For example, 3,500,000 classified documents and more than 1,000,000 line items of personal property must be properly dispositioned.

However, the greatest liability on the site (as discussed in the Request for Proposals (RFP)) remains the potential risk to health and safety posed by the presence of large amounts of special nuclear materials (SNM) in various forms. Rocky Flats currently stores approximately 12.9 metric tons of plutonium and more than 6 metric tons of highly enriched uranium. Closing down RFETS is extremely complex, because significant interplay between the site and other DOE sites is required to stabilize and ship the SNM and to gather, package, and ship waste. In addition to the SNM listed above, the site currently has to dispose of approximately 9,000 cubic meters of transuranic waste, 150,000 cubic meters of low-level radioactive waste, 2,300 cubic meters of hazardous waste, and the additional waste material that will be generated during the demolition of the facilities and structures.

2. PricewaterhouseCoopers Tasking

Kaiser-Hill has been tasked by the Department of Energy, Rocky Flats Field Office (RFFO), to develop an accelerated plan to achieve site closure by the year 2006. In an effort to ensure that the project management principles being used to develop the 2006 closure plan are sound, Kaiser-Hill contracted with PricewaterhouseCoopers both to test the existing approved 2010 CPB for reasonableness by providing assurance that it is an achievable plan for closure of the site and to assess the probability of meeting key closure project milestones. Kaiser-Hill requested that the analysis be performed in two stages: (1) an interim report (delivered three months after contract award) that would provide an assessment and confidence level concerning the fundamental project planning and execution processes that were used to develop and begin execution of the 2010 CPB and (2) a final report (delivered five months after contract award) that provides a detailed analysis of each of the elements of the project management practices that Kaiser-Hill has in place. (The specific statements of work are found in Attachment 8.1.)

3. PricewaterhouseCoopers Approach

As discussed in our interim report, our analysis is a combination of the following:

- A systematic technique based on industry accepted principles outlined in *A Guide to the Project Management Body of Knowledge (PMBOK Guide)* [7.2], published in 1996 by the Project Management Institute and referenced by Kaiser-Hill in the *Rocky Flats Closure Project (RFCP) - Project Management Plan*, Rev 02, dated December 10, 1998 [7.3]
- A proven approach based on our standard methodology for environmental attestations (which is, itself, a technical procedure adapted from long-standing standard accounting audit practice)

This analysis involves a review of the client's processes for compliance with regulatory and contractual requirements and accepted industry standards; a systematic assessment to ascertain that the documented processes are faithfully executed; and a detailed review of the results to determine whether they are reasonable.

Our work plan, based on the above standards, systematically addresses each of the areas of review outlined in the above tasking: specifically, the general project management, schedule, and costs. The initial step in the plan identifies the applicable criteria that must be met by the various programs that support the CPB and the specific project plans therein. Detailed sets of questions then guide the assessor through the review to provide confidence that the criteria have been satisfied. This process provides PricewaterhouseCoopers with information regarding each of the projects contained within the CPB to ascertain that they fulfill the following fundamental requirements:

- The applicable regulatory standards for control of SNM, transuranic waste, low-level radioactive waste, hazardous waste, mixed waste, and other waste materials
- The DOE contractual requirements for environment, safety, and health and closure of RFETS
- A sound project plan and appropriate cost and schedule controls as outlined in the PMBOK Guide and applicable accounting standards

Our approach systematically works its way through the PMBOK Guide to review whether

1. The appropriate stakeholders have been identified and the needs and expectations of each stakeholder have been addressed in the CPB.
2. The CPB project's integration management processes have been established to properly coordinate the various elements of the project.
3. The CPB project's scope management plan includes the processes necessary to verify that all work required to complete the project successfully is identified.
4. The CPB project's time management plan includes the processes required to expedite completion of the project.
5. The CPB project's cost management plan includes the processes required to provide confidence that the project is completed within the approved budget.
6. The project's quality management plan and the integrated safety management plan include the processes required to verify that the project will satisfy the needs of the customer.
7. The project's human resources management plans include the following processes required to make the most effective use of the people involved with the project: identifying, documenting, and assigning project roles, responsibilities, and reporting relationships; recruiting the human resources needed to be assigned to, and working on, the project; and developing individual and group skills to enhance project performance.
8. The project's communications management plan includes the processes required to verify timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information.
9. The project's risk management plans include the processes concerned with identifying, analyzing, and responding to project risk.
10. The project's procurement management plans include the processes required to acquire goods and services from outside Kaiser-Hill.

Because safety and implementation of the Integrated Safety Management concept are important elements of the performance of any DOE facility, we also included an evaluation of the safety management system in our review.

The PricewaterhouseCoopers approach provides an integrated, systematic overview approach for assessing the CPB. Our approach provides the independent validation that can best be achieved through the use of a recognized standard, such as PMBOK. A crosswalk between the PricewaterhouseCoopers approach and the details requested in the scope of work is provided in the table that follows.

Matching the PricewaterhouseCoopers Approach to the Scope of Work

Key Scope Areas for Review	Project Integration Plan	Project Scope Management Plan	Project Time Management Plan	Project Cost Management Plan	Project Quality Management Plan	Project Human Resources Plan	Project Communications Management Plan	Project Risk Management Plan	Project Procurement Management Plan
I. General Project Management									
The Project Management Organization utilizes good schedule and cost estimating practices and is effective in executing the plan.	●	●	●	●	●	●	●	●	●
Planning assumptions are valid and follow an integrated WBS.		●	●				●		
The work logic effectively delivers the desired end-state.	●	●	●						
The methodology for work scope development and planning is sound, and the resulting work scope in each of the Project Baseline Descriptions reflects the appropriate assumptions, technical bases, and understanding of current conditions and is credibly structured to achieve the project's end-state.	●	●	●					●	
The bases of schedule and cost estimates are reasonable and at the appropriate level of detail.		●	●	●		●		●	●
The total cost of the project is integrated with the schedule, the estimating methodology is sound, and the cost estimate is reasonable.	●	●	●	●	●			●	
There is an effective reporting system for monitoring schedule and cost during the project such as Earned Value Measurement System (EVMS). An EVMS monitors progress on both the schedule and cost systems on an integrated basis.	●	●	●	●			●	●	●
Uncertainty factors affecting cost and/or schedule risks have been identified and are being managed under an integrated approach to programmatic risk management.	●		●	●				●	
The current closure plan incorporates the accuracy and lessons learned from prior activities.	●	●			●		●	●	
The contract types are appropriate to provide incentive to the subcontractors to accomplish the defined project outcomes.						●	●	●	●
The total cost of the closure project is the result of an integrated scheduling approach.	●	●	●	●			●	●	●
II. Kaiser-Hill Schedule									
The PBD and WAD Life-Cycle Schedules represent a credible schedule to accomplish the work scope.	●	●	●	●	●	●	●	●	
The Critical Path Chart presents a valid representation of the critical path of activities contained in the Expanded Management Summary Schedule.	●	●	●		●	●		●	
The Expanded Management Summary Schedule is a valid representation of the information contained in the Closure Project Baseline Target Schedule.	●	●	●			●		●	
III. Kaiser-Hill Costs									
The PBD and WAD Life-Cycle Cost Profiles represent a valid cost estimate for the work scope contained in the PBD.		●		●			●	●	
The Total Cost Profile for the RFETS Closure Project represents a valid summary of all of the PBD cost profiles.	●	●		●				●	
The bases for schedule and cost estimates are reasonable and at the appropriate level of detail.		●	●	●		●		●	●

This report presents the final results of our review of the application of fundamental project management processes to the 2010 CPB. The findings of our independent validation will be presented from three different perspectives:

- First, we will discuss the PricewaterhouseCoopers validation methodology and Kaiser-Hill's compliance with accepted industrial project management standards, as represented by the PMBOK Guide and other authoritative sources.
- Second, we will discuss the effects and evidence of this performance on the SNM, deactivation and decommissioning (D&D) and waste management projects, as well as in the site support areas.
- Finally, we will discuss the major issues that cut across several projects and PMBOK Guide core processes.

4. Discussion

4.1 PricewaterhouseCoopers Validation Methodology

The methodology that PricewaterhouseCoopers employed for the Rocky Flats 2010 Closure Project Baseline Independent Validation integrates best practices from a number of different sources: the Project Management Institute (PMI) publication *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*; textbook approaches by Harold Kerzner in *Project Management: A Systems Approach to Planning, Scheduling, and Controlling* [7.4] and James P. Lewis in *The Project Manager's Desk Reference, A Comprehensive Guide To Project Planning, Scheduling, Evaluation, Control & Systems* [7.5]; as well as our own practical experiences in application of project management principles with numerous clients in a variety of industries.

The goals of our assessment methodology for this project were to

1. Accomplish a comprehensive review of the core processes necessary for successful project management,
2. Maintain consistency in review methodology at all levels of the RFETS project,
3. Perform integration and analysis of high-level and specific project reviews at the line-item level,
4. Utilize a rating scheme that would provide objectivity to the assessment results, and
5. Produce assessment results in a format that can be used as a baseline to evaluate future performance.

In order to help achieve these goals, the PricewaterhouseCoopers team tailored a project management evaluation tool that we had developed for use on similar engagements. The baseline tool comprises nine evaluation core processes structured around the PMBOK Guide model. Because of the overarching importance of safety in nuclear facilities and Kaiser-Hill's commitment to Integrated Safety Management, a tenth core process called "safety management" was added. The nine baseline PMBOK Guide core processes are as follows:

1. Project Integration Management Plan
2. Project Scope Management Plan
3. Project Time Management Plan
4. Project Cost Management Plan
5. Project Quality Management Plan
6. Project Human Resources Plan
7. Project Communications Management Plan
8. Project Risk Management Plan
9. Project Procurement Management Plan.

Within each core process, several criteria (the number varies depending on the subject) have been identified as key components of that process. In addition, each criterion comprises a number of evaluation elements, called worksteps, that constitute the criterion parameters. These worksteps are structured in a questionnaire format for use by the assessor to aid him/her in systematically evaluating the client's approach to project management for one or more projects. There are more that 200 questions across the 10 evaluation core processes for the 2010 CPB independent validation project.

Since our review of the 2010 CPB was conducted at both a site level and an individual project level, the questions within the evaluation tool were reviewed by the PricewaterhouseCoopers team to identify those that were applicable to many different projects, those that necessitated an individual response for a given project, and those that required an assessment at all levels. This effort was necessary to eliminate redundancy in the scope of the PricewaterhouseCoopers assessment of the project management practices among the 30+ projects that constitute the CPB. Although approximately 40 percent of the questions required individual project responses, the remaining 60 percent were applicable to all of the projects and could be addressed by high-level review only. There was about a 25 percent overlap in the worksteps, requiring both reviews.

In addition to the questions and a comment block for PricewaterhouseCoopers assessor input, the evaluation tool also has an area where the sources of the information can be identified. As was noted previously within this report, numerous interviews of Kaiser-Hill Team personnel were conducted, and a significant amount of documentation was reviewed during the validation process. Specific points of contact and document

nomenclature (including publication number, if known) were documented during these interviews. An interview report was prepared for each individual or group of individuals who were interviewed by the PricewaterhouseCoopers team.

Once the information relative to each workstep was obtained and reviewed by the PricewaterhouseCoopers assessor, a written response was prepared for each of the worksteps, and a judgment (Red, Yellow, Green) was made regarding the application of project management principles:

- Red (R) – The application of this workstep does not meet the standards of sound project management
- Yellow (Y) – The application of this workstep is basically sound but would benefit from several improvements
- Green (G) – The application of this workstep meets the standards of sound project management processes

In order to provide a quantitative check to ensure that the written comments and observations are placed in the proper perspective, our methodology includes a series of weighting factors that are applied to the scores for each workstep, the relative importance of each workstep within a given criterion, and the relative importance of each critirion within a given core process. Specifically, three different weighting factors were applied:

- First, numerical scores were assigned to each of these workstep ratings (i.e., Red=5, Yellow=3, and Green = 1). Thus, as the deviation from successful application of the principles of sound project management became more severe, the effect of that deviation on the overall score in a given criterion or core process became more pronounced.
- Second, because some of the worksteps within a particular criterion will have a greater impact on the overall success of the project than other worksteps within the same criterion, a weighting factor was applied to each workstep and criterion. A rating scale of 1, 2, or 3 was used in the determination of the relative importance of each workstep within a criterion and of each criterion within an core process. For example, a rating of 3 is a high rating. It means that any grades (R, Y, or G) given to that criterion or workstep will get three times as many points as the same grade given to a workstep with a weight of

one. In addition, there are no limits on the number of 1s, 2s, or 3s within a given criterion.

- Our third weighting factor recognizes that the relative importance of the individual project inputs versus the high-level project management analysis is not constant for the 25 percent overlap noted above. This factor is reflected on the evaluation tool as the project management (PM) weight; it measures the relationship between the value of the high-level review for a given workstep/criterion and the average value of the individual projects having that same workstep/criterion. Although this factor ranges from 0.5 to 3, in most cases this value is 1 and indicates equal importance.

For presentation in the figures in section 4.2 of this report, the numerical scores in each criterion were added up and normalized to provide red, yellow, and green bars on the charts that add up to a total for each criterion that is proportional to the relative importance assigned to that criterion within a given core process. The total heights of the three bars are 100 percent for criterion graded at level 3, 67 percent for level 2, and 33 percent for level 1. Thus, a red score in a criterion that is graded at level 1 (a less important criterion) would result in a bar that is only one-third as high as that for a red score in a criterion that is graded at level 3 (a more important criterion). The resulting graphical displays can then be used by Kaiser-Hill to indicate which criteria within each core process should receive priority Kaiser-Hill Team management attention in order to improve the application of project management practices and thus improve the likelihood of achieving RFCP objectives.

4.2 Comparison to Industry Standard

Kaiser-Hill has brought to the Rocky Flats Closure Project (RFCP) the elements of a sound project management capability. Kaiser-Hill has also achieved the culture change necessary to turn the Rocky Flats site from one with an operational mentality with an unlimited time horizon to a project orientation with a defined work scope and a finite end point. This culture change is evident in discussions with all levels of personnel within the site. However, as Kaiser-Hill moves toward the even more aggressive goal of site closure by the year 2006, it is clear that additional improvement will be needed to bring project management to the level of maturity necessary to meet this goal (or even the original goal of 2010).

The following comparison with the best practices model of industry standards for project management is based on the PricewaterhouseCoopers methodology discussed earlier and is the result of more than 75 interviews with approximately 150 Kaiser-Hill Team and DOE RFFO personnel.

4.2.1 Project Integration Management

Best Practices Model

The Project Integration Management Plan discussed in the *PMBOK Guide* [7.2] includes the processes required to ensure that the various elements of the project are properly coordinated. Integration as related to this core process focuses on the relationship between the overall project plan, its execution, and the accomplishment of the subprojects that constitute the overall plan. The complexity of projects such as the RFCP necessitates "cradle-to-grave" integration and project management; therefore, the key to increasing the potential success of a project lies heavily in Project Integration Management.

Effective Project Integration Management is characterized by a single management system that serves as the main coordination tool for the project and is used to identify and address critical project requirements and management activities. Project Integration Management helps the project manager and management team focus on the overall plan's continued development and revision, its execution, and its change control. It serves as a linkage between the planning, work, scheduling, and performance measurement

baselines. An effective Project Integration Management system ensures that internal and external project activities are in compliance with affected agencies and organization-mandated requirements.

Finally, effective Project Integration Management provides project managers and team members with an integrated system to enable them to analytically gather, process, measure, extrapolate, compare, disseminate, and document project information in a timely manner. Through effective Project Integration Management, critical and common performance measures/indicators can be captured, revealed, corrected, and reported so that timely decisions can be made at the appropriate management level. A project that is successful and effective at Project Integration Management would have a clearly defined plan that can be easily executed and closely monitored and that has the flexibility to withstand changes as they occur.

Rocky Flats Closure Project Performance Compared with the Standard

Figure 4.1 presents a graphical representation, developed as discussed earlier in subsection 4.1, of the PricewaterhouseCoopers assessment of the performance of the Kaiser-Hill Team on the Project Integration Management for the 2010 Rocky Flats Closure Project. As illustrated in Figure 4.1, the Project Integration Management Plan comprises three elements: Project Plan Development, Project Plan Execution, and Project Change Control.

As discussed in subsection 4.1, it should be noted here that the red, yellow, and green bars in Figures 4.1 through 4.10 serve as *indicators of compliance* with the industry standards for project management, not as absolute measures. The numerical scores given to red (5) and yellow (3) grades on the individual worksteps compiled into these charts were purposefully higher than the score given to green (1) grades in order to provide appropriate emphasis to a deficient condition that could undermine the overall effort. Thus, a large red or yellow bar on the chart indicates that additional investigation of the supporting information provided in this report is required to understand the basis for the score.

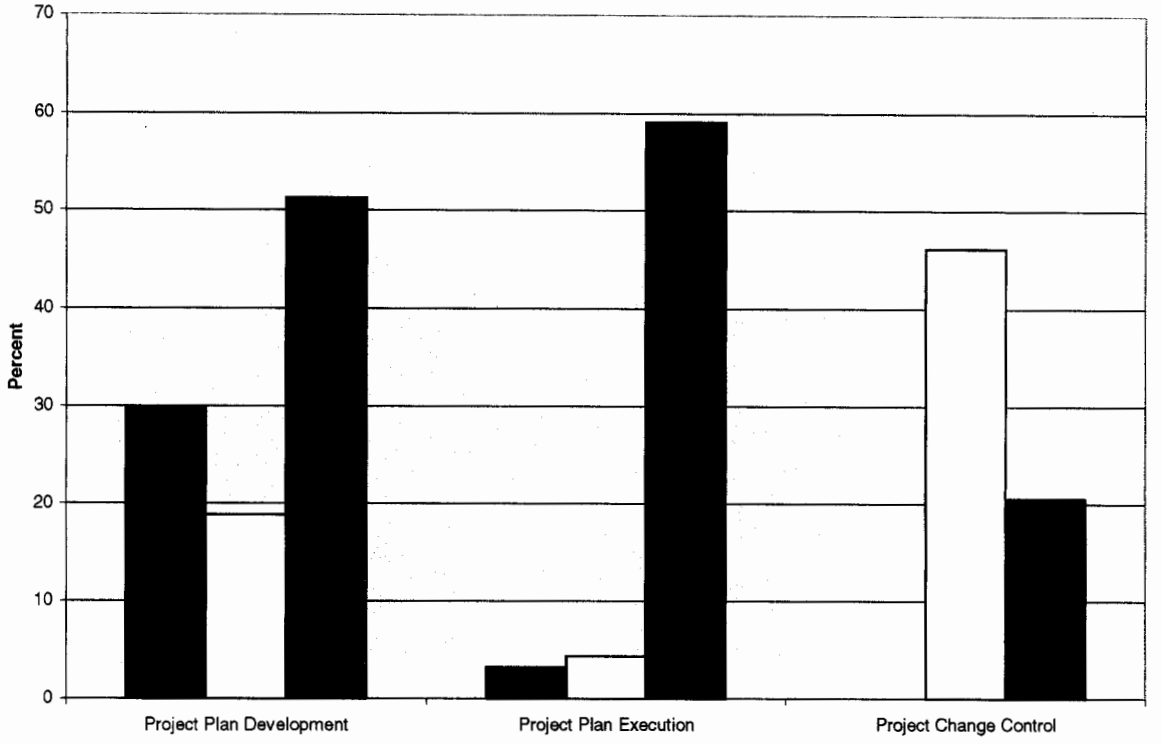


Figure 4.1 - Project Integration Management Compliance with Industry Standard

The following is a discussion of the observations that are reflected in this chart:

Project Plan Development – Kaiser-Hill has constructed the *Rocky Flats Closure Project - Project Management Plan (PMP)* [7.3], which is used to guide both execution and project control of the Closure Project and to provide a vision and framework for compliance with the *Rocky Flats Cleanup Agreement (RFCA)* [7.6]. The PMP addresses the scope, schedule, cost estimates, and management systems necessary to control the project. It is used to document planning assumptions and decisions; to facilitate communications among Kaiser-Hill staff, the subcontractors and their staff, and other stakeholders; and to document how the project will do business. Kaiser-Hill has employed best-practice methodologies such as the *PMBOK Guide* [7.2], to help build the RFCP planning foundation.

The PMP is augmented by a series of Planning and Integration (P&I) standards that define, from the standpoint of project management, the roles and responsibilities of the Kaiser-Hill Team, as it progresses toward closure. These standards are implemented through instructions that provide specific guidance for planning, estimating, scheduling,

and execution activities. (Attachment 8.2 provides a list of the P&I standards and instructions reviewed.) Additional RFCP planning is exhibited on the Expanded Management Summary Schedule (EMSS); in the closure project baseline (CPB); in the individual project schedules, and within the Basis of Estimate Software Tool (BEST), a database developed by Kaiser-Hill for the closure project activity cost estimates.

The most critical weakness in the 2010 CPB Project Plan Development is that the subprojects are not integrated into the CPB in a manner that allows schedule analysis to determine the critical path, float, and constrained resource requirements. As a result, the determination of critical path is more a matter of management judgment than of schedule analysis. This practice is not consistent with best industry practice. It is also not possible to use the computerized scheduling tools to "roll up" resource requirements in a manner that will allow resource planning on anything other that a manual basis. This is not a satisfactory process for determining resource-level requirements for a project of this magnitude. The only remaining tools for prioritization of resources are performance metrics and performance measures that are themselves developed based primarily on management judgment. Although this practice is potentially satisfactory in the short term, such a method of determining resource priorities will likely prove to be counterproductive in the long run, especially if management judgment is in error regarding one or more critical path activities.

The net result of this weakness could be the late identification that "noncritical path" activities have become "critical" before Kaiser-Hill has the opportunity to initiate corrective actions to preclude impacts that could threaten to extend the project completion date.

Project Plan Execution – Within Planning and Integration (P&I) and senior management levels of Kaiser-Hill, execution is based on progress toward completion of performance metrics. There is an intense, top-level focus on achievement of production goals at the weekly Nuclear Production meeting. Project cost and schedule performance for each Project Baseline Description (PBD) is also evaluated monthly via the Project Performance Reporting (PPR) system. Thus, in spite of the lack of a properly integrated project plan, this intense management effort has led to satisfactory execution of the

planning tools that are available. Kaiser-Hill budgets overtime for all of the projects based upon projected need, and the overtime budget is approved by RFFO.

One weakness noted in the execution of the project plan is the lack of understanding of the importance of project closure and therefore the associated failure to execute project termination planning. P&I Instruction 001 provides the guidance for project closeout. Although an understanding has been developed concerning when projects will be completed, to the knowledge of the manager of the first major PBD to be actually closed out, no "closure" strategy, as such, exists. Several other PBD managers, who had Work Authorization Documents (WADs) ready to close, also had no closure strategy. In addition, it was noted that although all of the work has been completed under a particular WAD, it is to be placed in an "inactive" status, rather than closed. There is no known Kaiser-Hill instruction that defines "inactive" status. The reason given is that it may need to be reopened should the need to reevaluate the interim storage mission resurface. Failure to close out the project results in failure to execute the formal lessons learned documentation process required by the P&I Instruction. An alternative strategy would be to transfer the reevaluation milestone to a related PBD. In this way, the lessons to be learned from closing out the WAD could be obtained.

Project Change Control – The Kaiser-Hill Team has implemented a comprehensive change control program as documented in the *Planning and Integration Change Control Guide* [7.7] and augmented by P&I Standard 001 and Instruction 004. These policies provide guidance regarding the types of change requests, the origins of change requests, and the change control review-and-approval cycle. Our analysis of this process indicates that changes are controlled; however, the following deficiencies were noted:

1. The large number of changes (~2000 initiated last year, ~1400 approved) could indicate that the baseline planning was inaccurate or that excessive control is being exerted over minor scope and funding changes; in any event, it appears that excessive effort may be expended in the change control process. In the current Work Breakdown Structure (WBS), the effort expended to execute the change control process cannot be identified because it is included as part of the project management element. In addition, since assignment of additional work to a subcontractor in a service organization, such as engineering or air monitoring, requires a contract change, managers in those organizations sometimes do not

bother to initiate contract changes; rather, they choose to absorb small project support jobs or emergent work in their level-of-effort activities.

2. The change control process does not appear to be accurately assessing the impact of project scope changes, such as superstretch changes, on the support services required. For example, scope changes to accelerate project work did not adequately consider the impact on laboratory services and laundry services; as a result, those services will likely go over budget.
3. It was noted that one major change, 1999-1274, to PBD 010, Plutonium Liquid Stabilization, defers significant work scope from FY99/00 to FYs03–05. Specifically, decontamination of rooms to be drained and draining of utility systems have been deferred so that high-priority actinide systems can be drained. This change pushes out substantial work scope with the simple statement, "There is a potential cost savings to total project cost since the work can be performed under reduced process and control requirements." There is no substantiation provided for this statement. Furthermore, there is no evaluation of the level of worker training and qualification of the system knowledge that can be expected to be present in the site at that future date. In order to be effective, the project change control system should consider the full impact of any proposed change on the life cycle of the project.

4.2.2 Project Scope Management

Best Practices Model

Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Scope Management in terms of this evaluation is concerned primarily with project scope in lieu of product scope. An effective Project Scope Management specifies the sequential order and priority of all work to be accomplished. The processes that make up the Project Scope Management are sequential by design and require that each workstep activity be addressed in order and integrated such that the work of the project will result in the delivery of a specific product. Effective Project Scope Management is characterized by a work management system that will assist the project manager with developing a well-defined scope statement, including identifying specific deliverables. A

scope of work is required for each individual project and should be unique so it does not duplicate work that may have been previously estimated or scheduled.

As with any management tool, the effectiveness of Project Scope Management is dependent on a system that can be used to accurately record and document findings. Information gathered through this process would assist the project manager and management team in conducting ongoing work assessments and in illustrating scope change characteristics that may affect the work schedule and project cost. A project that is successful at Project Scope Management will have clearly defined objectives and work structure activities that accurately reflect all required work as it refers to baseline status, detailed technical work requirements, end-state requirements, and metrics achievement. The combination of these elements serves as the basis for determining minor and major milestone events and as the managerial tool to evaluate progress to the final end state.

Another indicator of effective Project Scope Management is the utilization of a system that records, verifies, and manages the scope change process as it occurs. By accurately and continually tracking scope change, the project management team can help ensure that adjustments to project activities remain within the confines of the agreed-upon scope of work. Also, if numerous revisions or changes are incorporated into the work baseline, an integrated system is required to accurately capture and document changes in project activities, products, and scope.

If the process of Project Scope Management is to be successful and effective, considerations in the areas of scope planning, scope definition, scope verification, and scope change control should be carefully examined to ensure that the integrity of the Closure Project Baseline is not compromised.

Rocky Flats Closure Project Performance Compared With the Standard

Figure 4.2 is a graphical representation of the PricewaterhouseCoopers assessment of the performance of the Kaiser-Hill Team on the Project Scope Management for the 2010 Rocky Flats Closure Plan. As illustrated in Figure 4.2, the Project Scope Management Plan comprises four elements: Scope Planning, Scope Definition, Scope Verification, and Scope Change Control. The following is a discussion of the observations that are reflected in this chart:

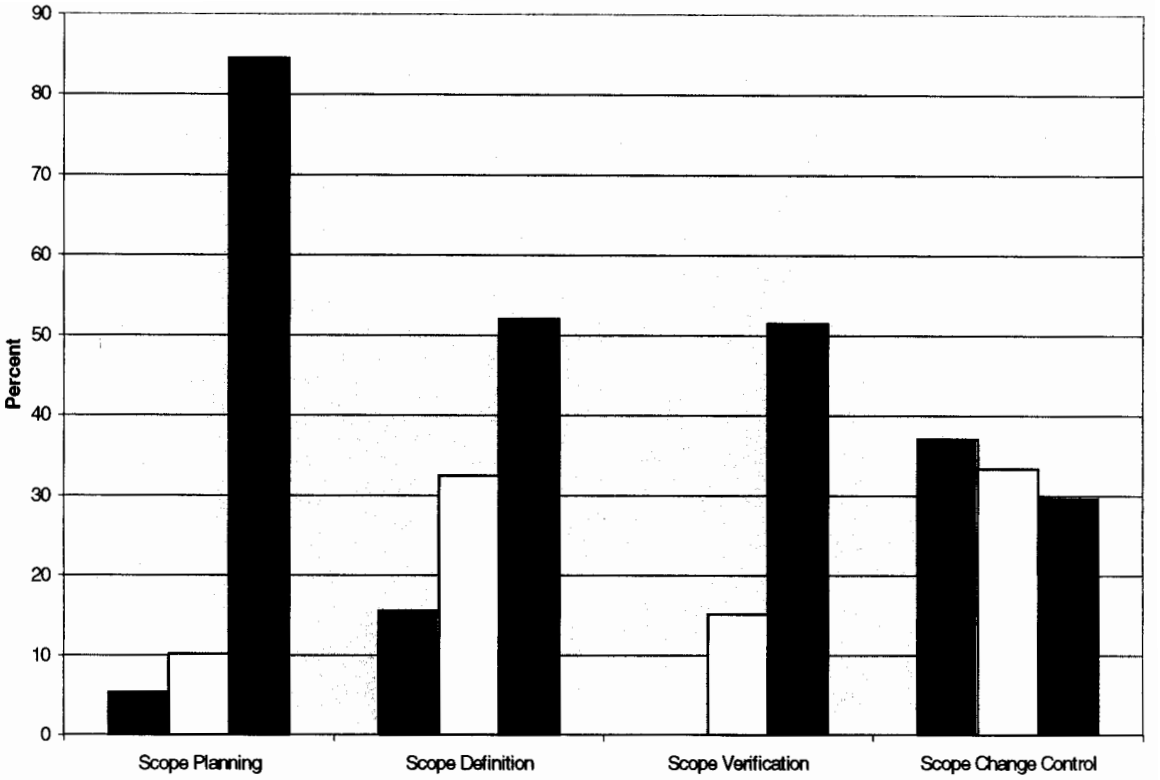


Figure 4.2 - Project Scope Management Compliance with Industry Standard

Scope Planning – The EMSS encompasses the overall RFCP scope. The WBS identifies all scope elements required to perform the work that is necessary to complete the project. Kaiser-Hill developed the WBS prior to the development of the PBDs, WADs, or WADlets. Kaiser-Hill subsequently developed the PBDs, WADs, and WADlets as logical workgroups that incorporate the WBS elements. The *Rocky Flats Closure Project Performance Metrics Baseline,* Rev. 9 [7.8], known as the "purple chart," provides high-level project metrics, and the metrics developed at the WAD level provide additional detail. The PBD descriptions discuss project end points to be achieved.

In accordance with the *Rocky Flats Closure Project FY 99/00 Work Plan Guidance Document* [7.9] issued by P&I, all assumptions and conditions used in developing the technical scope are clearly identified and justified in the PBD/WAD, and all assumptions and conditions used in developing the detail WADlet activity cost estimate are documented within BEST. Attachment 4 to the *FY 99/00 Work Plan Guidance* lists all of

the assumptions used in development of the Closure Project Baseline. Scope planning appears to be well organized; however, we noted four concerns in the individual projects:

1. In PBDs 001 and 002, there was no discussion of the impact if assumptions are invalid and no discussion of the risks involved as a basis for ranking or ordering priorities.
2. For PBD 008, some of the assumptions have been used for planning, but have yet to be proven (e.g., being able to process a given number of cans per shift).
3. For PBD 011, the major production assumption is that "uncleanable" parts will be moved to the metals and oxides PBD; however, this interface is not noted in the PBD. Also, the shipment assumptions restate a general site assumption that receiver sites (in this case, Y-12) will remain open and funded to accept material from RFETS.
4. In WAD 01, there is concern that the Colorado state fish and wildlife agency and the community of Broomfield, which are concerned about migration of actinides to nearby streams, will take action to deny Rocky Flats the ability to use the ditch system for discharges. The PBD manager is tracking progress of the external reviews and is reviewing options for surface water management with regard to National Pollution Discharge Elimination Standard (NPDES) and RFCA permits. However, considering this issue's potential serious impact on the ability to meet the schedule and milestones for this project, more proactive planning of alternatives and management of external relationships seems warranted. For example, this may be a more general "enabling assumption," therefore requiring elevation to the RFCP PMP.

Scope Definition – Since the WBS was developed before the technical sequence and work organization was identified during the development of the WADs, they do not track in the same sequence. A crosscut matrix is used to correlate the WADs to the WBS. This matrix was also used to develop an integrated discussion of scope at the PBD level. At the "overhead" site services level, the WBS is changing as organizations are restructured to reduce costs. This makes it difficult to track cost performance to authorized scope; however, the WBS has been scrutinized in detail by the Kaiser-Hill Team in order to ensure that all technical scope has been accounted for.

In PBD 011, at present, the WBS includes several categories of shapes that will not be cleaned under this PBD; management understands, and a change will be processed. In addition, the WBS description is rather coarse in the following three examples:

1. In PBD 006, there is just a single WBS for this work (neglecting the Program Management WBS); this appears to be rather coarse structure for a WAD that will be spending $3.5 million over the next two FYs. During the same time period, the detailed schedule for this WAD extends to 15 pages and more than 150 activities.
2. In PBD 004, much of the work is contracted out; this work is not covered in detail in the WBS. For example, the cooling tower replacement is a single activity "Construction Contract" for $1,442 thousand. In fact, it appears that detailed WBSs for many of these projects are not developed until the contracts for completion of the activities are awarded.
3. In PBD 009, about 30 percent of the FY99 and over 50 percent of the FY00 projected budget are ascribed to one WBS – Project Management (WAD 90, WBS 1.1.04.09.04.05). This WBS is not as well defined as the remainder of the PBD.

The milestones required to complete each major element of the closure project work scope are shown on the *Rocky Flats Closure Project Milestone Sequence Chart* [7.10], which shows the integrated path to closure. Milestones are identified for external events, key internal events, and major and minor milestones. The logical sequence of these milestones is integrated with the EMSS that serves as the managerial tool to evaluate progress to closure. As will be noted in the Time Management subsection that follows, there are several examples where milestones have been used inappropriately in development of the Primavera Project Planner (P3) schedules. This practice has contributed to the inability to perform schedule analysis to determine critical path and float.

Although risk estimates were developed for each of the activities during the scope definition process, these risk estimates have, in many cases, been given perfunctory attention by the project managers because (as will be discussed in the Risk Management subsection) it is known that these risk estimates are not used in any risk analysis. In PBDs 001 and 002, each project has defined some relative scope risk, but the definitions are not thorough or consistent. In PBD 024, significant scope risk is not being addressed

should the Safeguards and Security model adopted for one facility not be approved by DOE for the remaining facilities.

Scope Verification – P&I Instruction 131 requires monthly review of scope; Project Control Integrators (PCIs) monitor scope adherence at the project level. The Baseline Change Proposal process as documented in the *Planning and Integration Change Control Guide* [7.7] also addresses this issue. All scope is accepted by the Rocky Flats Field Office and comprises an approved WBS, EMSS, and CPB and a comprehensive change control process.

However, in PBDs 001 and 002, we did not see any evidence of these scope verification milestones; scope is reviewed along with development of the "rolling wave" schedule. Similarly, in PBDs 009, 010, and 012, we noted that scope verification appears to be conducted only as scope changes are identified. In addition, for PBD 011, because of the unknowns associated with the project, scope was undetermined for FY99; several scope changes are being processed for approval at present to address the issues.

Scope Change Control – There is a formal process for dispositioning identified scope changes that ensures that all new scope fits within the WBS technical boundaries; however, some WAD and WADlet managers appear to believe that the change control process is excessively cumbersome and are choosing to absorb the cost of some support work in their WADlets, rather than going to the trouble of initiating a change proposal. As an example, since assignment of additional work scope to a subcontractor in a service organization (such as engineering or air monitoring) requires a contract change, some managers in those organizations do not bother to charge small jobs or emergent work to the project being supported. This is not an acceptable practice if accurate accountings of project costs are to be maintained. Much of this work, even though it is emergent, can be anticipated and estimated based on history. In addition, we noted that as scope changes are made (when they are made), there is no formal method employed to capture the lessons learned so that future project estimates can benefit.

A further scope change difficulty exists in scope deferrals: in some recent cases, work scope has been deferred for up to five years. This practice has the potential to add cost,

due to escalation, and potentially extends the period during which costly access controls (e.g., radiological and security) will be required.

4.2.3 Project Time Management

Best Practices Model

Project Time Management includes the processes required to ensure timely completion of the project. The key focus of this core process is to ensure that the activities that need to be accomplished to meet the project milestones, developed during the scope definition process, have been properly identified and sequenced and their duration estimated in order to produce a realistic, attainable project schedule. In addition, effective Project Time Management is characterized by a schedule control system that will help the project manager update the baseline schedule, analyze performance to schedule, take corrective action, and revise the schedule as needed.

A typical project that has been successful at Project Time Management would have a clearly defined activities list that includes all of the tasks that need to be completed in order to accomplish the scope of work. Whereas scope decomposition produces a listing of the deliverables to meet project goals, activity decomposition results in identifying those specific work items (or activities) whose accomplishment will assist in achieving the individual milestones and deliverables. Accurate activity sequencing is an instrumental part of Project Time Management in that logical ordering of activities will assist in the development of a legitimate schedule baseline. Mandatory, discretionary, and external dependencies are important factors in the structure of the logic networks that result once project activities are sequenced.

Effective Project Time Management comprises activity duration estimates that are predicated upon a combination of historical information, industrial engineering studies, industry standards, and expert judgment inputs. An estimation of the duration for each activity is necessary to determine the total time requirement for all project events and activities, when combined in accordance with the logic network. Also included in the duration estimate is the appropriate risk factor assignment. A risk assessment should be conducted for each activity and integrated into the Project Master Schedule baseline.

The key to proper Project Time Management is determined by how efficiently and proficiently all work schedules, resource tracking, constraints identification, and critical path and slack activities are monitored, managed, and executed. The execution of the entire project rests upon having a sound time management system that ensures that all critical activities and tasks are accomplished in accordance with both the schedule and performance metric baseline.

Finally, the effectiveness of Project Time Management is determined by a schedule change and control system that is systematically monitored, tracked, managed, integrated, updated, and documented (to accurately reflect work performance) and is compatible with other project change control systems.

Rocky Flats Closure Project Performance Compared With the Standard

Figure 4.3 is a graphical representation of the PricewaterhouseCoopers assessment of the performance of the Kaiser-Hill Team on the Project Time Management for the 2010 Rocky Flats Closure Project. As illustrated in Figure 4.3, the Project Time Management Plan comprises five elements: Activity Definition, Activity Sequencing, Activity Duration Estimating, Schedule Development, and Schedule Control & Schedule Change Control. The following is a discussion of the observations that are reflected in this chart:

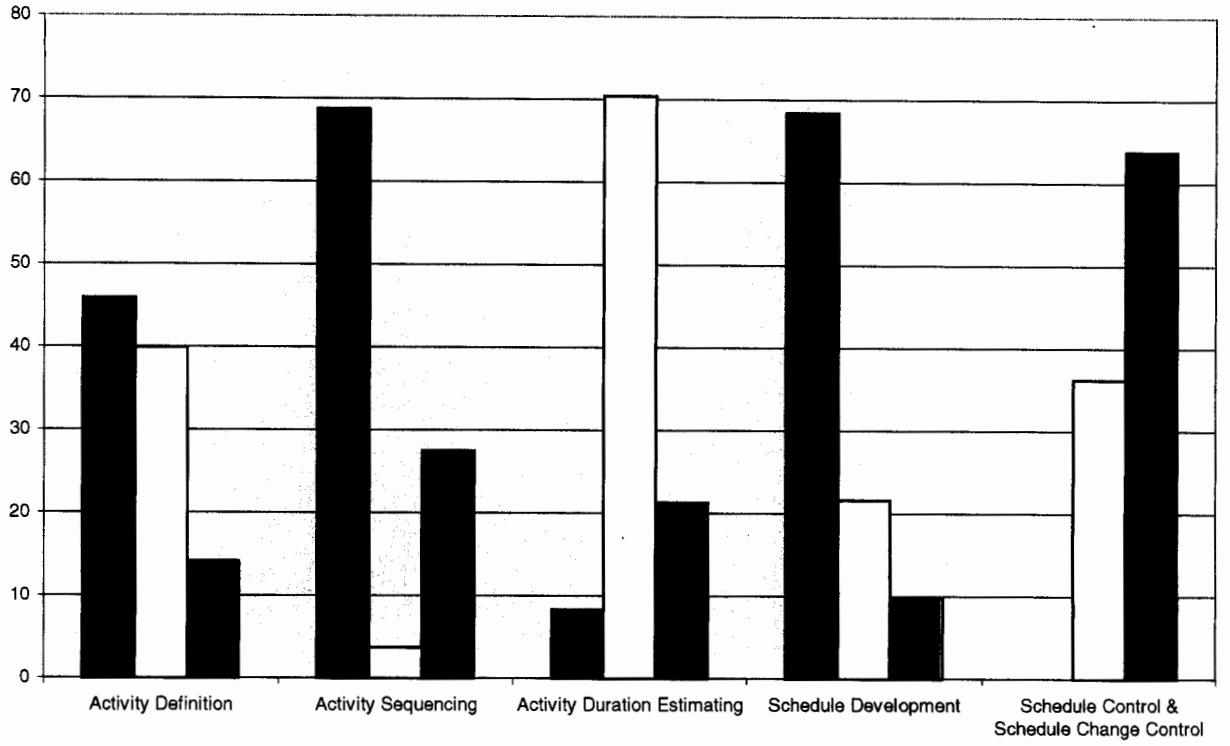
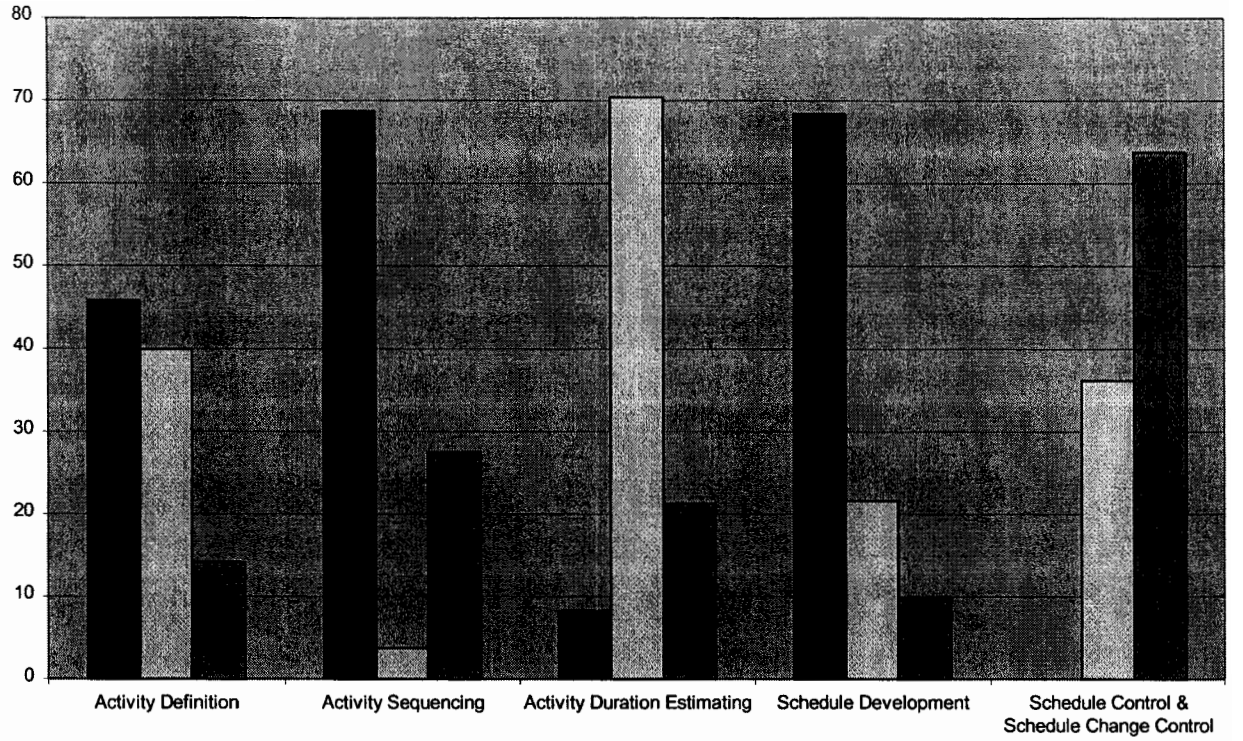


Figure 4.3 - Project Time Management Compliance with Industry Standard

Activity Definition – Much of the project support work, which is currently budgeted and charged to level-of-effort support activities, could be charged directly to the projects. Because of a combination of factors, much of this work is charged to overhead. The factors include a perceived site policy against charging some work direct; the difficulty of charging work in some PBDs to projects; and the difficulty of making contract, funding, and scope changes. This perceived policy can lead to inadequate effort to fully define activities and adversely affect activity duration and cost estimates.

The system should be able to process scope changes like any other normal function. Charging items to an overhead code because of convenience is not consistent with standard industry practice. This practice has the potential to obscure the real scope, duration, and cost of the projects and can relieve the project managers of the responsibility and accountability for identifying, defining, scoping, and budgeting for all the work necessary to execute the projects.

Ideally, the CPB should provide a level of schedule detail one or two levels down from the EMSS, and the individual project schedules developed by the PBD and WAD



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managers should expand on each activity in the CPB to provide the details of project execution. The current CPB schedule comprises approximately 9,800 defined activities. The level of detail in this schedule network is such that in many cases, the individual project schedules are identical to the CPB schedule. This provides more detail than is likely to be necessary in the CPB schedule and potentially makes it more difficult than necessary to make changes to the detailed, individual project schedules to respond to emergent conditions.

For at least one of the projects, PBD 006 – SNM Consolidation, task breakdown has occurred at the detailed schedule level, rather than at the WBS. There is just one WBS for this work (neglecting the Program Management WBS); this appears to be a rather coarse structure for a WAD that will be spending $3.5 million over the next two fiscal years. The detailed schedule for this WAD extends to 15 pages and more than 150 activities during the same time period.

Activity Sequencing – All of the networks for work accomplished by Kaiser-Hill and the four top-tier subcontractors, referred to as the "Four Tops," have been built in P3 using that tool's logic for predecessor/successor relationships, activity interface, and milestone identification. For the 2010 CPB, networks were prepared simultaneously by Kaiser-Hill and the Four Tops.

Integration of all activities into the CPB was unsatisfactory because of improper application of the P3 tools and differences in the logic relationships utilized in the individual project sequences (i.e., start-to-start, start-to-finish, and finish-to-finish) and excessive use of milestones. Since the individual projects were scheduled inconsistently, the integration of these schedules in the CPB does not result in a schedule that can be analyzed for critical path and float. The EMSS is used as the primary tool for illustrating the logic (including the critical path) required to be followed in order to get to site closure; however, there is no direct link between the P3 schedule and the EMSS. Achieving the capability to conduct true critical path and float analysis is the key to having a meaningful schedule control mechanism. The approach presently used is inconsistent with achieving integrated project controls.

It was noted that some changes to activity sequences are not fully characterized. For example, in PBD 010, one of the baseline change requests evaluated, Baseline Change Proposal 1999-1274, defers significant work scope from FY99/00 to FYs 03–05. Specifically, decontamination of rooms with systems to be drained and draining of utility systems have been deferred so that high-priority actinide systems can be drained. This change pushes out substantial work scope with the simple statement, "There is a potential cost savings to total project cost since the work can be performed under reduced process and control requirements." This statement is unsubstantiated. Furthermore, there is no assessment of the level of system knowledge that will be available at that future date. In addition, in PBD 004 – SNM Consolidation, a number of changes to the activity schedules and sequencing occurred in FY99 to accelerate this work. The WAD/PBD manager ended up concluding that it was not worth the work of putting in detailed changes to the schedule and PPR for WAD 09. Furthermore, the present plan is to make the WAD "inactive" so that information has the potential to not be covered if the WAD does not go through the closure process. Consideration should be given to some sort of interim closure documentation.

Activity Duration Estimating – Estimates for activity duration and resource loading are developed in the Basis of Estimates (BOEs) within the Basis of Estimate Software Tool (BEST) database, a database developed by Kaiser-Hill for the closure project activity cost estimates. BEST then computes the costs associated with the resource loading and durations. The sequences defined within P3 are downloaded into BEST, and the corresponding resource loading and durations are uploaded into P3 from BEST.

In some cases, the activity durations are inappropriate to the level of management for which the schedule is intended. For example, from a Kaiser-Hill management perspective, the master P3 schedule in the CPB comprises too many detailed activities to effectively manage. The Kaiser-Hill Scheduling Manager desires to reduce the number of items in the CPB from 9,800 to about 1,000. The activity durations will be longer and will be linked to the lower-level P3 schedules through the use of "hammocks," i.e., overarching activities that can be broken into more detailed tasks having the same beginning and end points. Individual PBD/WAD managers will then determine the level of decomposition required to manage their applicable P3 schedules. The *FY 99/00 Work*

Plan Guidance [7.9] provides guidelines that WAD/PBD managers should use for work task duration estimating.

A schedule risk factor was applied to each activity in the BOE estimates; however, those values have not been integrated into any P3 probabilistic schedule risk analysis. Schedule risk analysis using Monte Carlo statistical simulation has been performed, using risks and probability density functions estimated by project managers at the EMSS activity level; this analysis has produced a Pareto analysis of the top 50 schedule uncertainties. However, such a point estimate of risk does not represent the type of continuous risk management assumed by the *PMBOK Guide* [7.2].

Schedule Development – A four-tier schedule is used by the Kaiser-Hill Team to execute the CPB: (1) the Closure Project Baseline (CPB), (2) the Extended Management Summary Schedule (EMSS), (3) the Master CPB Schedule (done in P3), and (4) individual Project Schedules (also normally done in P3). The CPB schedule and the individual project schedules were developed in parallel. As discussed above, this often resulted in excessive detail in the CPB schedule.

The common identifier between the WBS and the individually scheduled activities in the Closure Project Baseline is accomplished through the activity and code fields within P3. For those activities that reside within the individual project schedules produced by the Four Tops, there is a common identifier between the code field in the detail schedules and the activity field in the CPB.

As previously noted, the way that many of the project P3 schedules have been built has resulted in the inability to accomplish critical path and float calculations. This is not consistent with industry best practice. Many of the schedules were built with activities classified as early finish and linked to artificial milestones. Since the subcontractor P3 schedules are not properly rolled up into the Master CPB schedule, the true critical path and the float in any of several alternate paths cannot be calculated. The two presently estimated parallel critical paths are based on best management judgment. Without the ability to identify the true critical path and the float in the remaining paths, management has no objective method of assigning priorities and taking management action to mitigate

potential risks. Again, this is a symptom of a lack of an integrated approach and of discipline problems in schedule development.

An excessive amount of the work is scheduled as level-of-effort. For example, in PBDs 009, 012, 018, and 022, direct project management support has been level loaded, and criticality safety has been estimated based on a potential number of reviews and then level loaded.

Schedule Control and Schedule Change Control – The EMSS is updated manually by the P&I Scheduling Department, based upon an evaluation of progress against P3 milestones. The P3 subproject schedules are updated by the project managers' Project Control Integrator (PCI) representatives to each project, based upon a review of physical progress, remaining duration, and project manager judgment. Changes to the schedule as a result of baseline change proposals (BCPs) are made in accordance with the *P&I Change Control Guide* [7.7]. However, as of January 1999, about 40 people have the ability to make changes to the schedules, which is causing problems when they make changes to other peoples' schedules or make errors. Authorized levels of schedule access have to be maintained by the program manager/system administrator to mitigate this problem.

4.2.4 Project Cost Management

Best Practices Model

Project Cost Management includes the processes required to ensure that the project is completed within the approved budget. It is primarily concerned with the cost of the resources needed to complete the project; however, it also considers the effects of decision making throughout the project life cycle on the overall cost profile. Project Cost Management is evaluated in the areas of resource planning, cost estimation, performance measurement, cost control, project performance, and contingency management. Although these areas have independent functions, the total Project Cost Management plan should ensure that there is a means established to effectively link and integrate all functions that specifically affect cost, resource, risk, performance, and contingency forecasting.

Resource planning involves the development and implementation of an accounting and continuous monitoring system to ensure that (1) proper planning is applied at a detailed level, (2) resources are identified by appropriate skill level and type, (3) labor productivity is maintained, and (4) critical resource shortages are identified. Also critical to the development of the resource plan is effective physical resource and facility planning and how it is reflected in the Work Breakdown Structure and associated activities. Without proper resource planning integrally tied to planning of physical resources and facilities, it is difficult for managers to accurately identify and determine project scope, costs, control, and end-state requirements.

A systematic approach should be used to estimate project cost requirements. A sound cost-estimating process is crucial to determining project direct and indirect costs. Once the required work and associated activity requirements have been identified, a cost is then associated with each individual activity to determine budgetary needs and to build an overall project cost profile. This "bottom-up" cost information should then be compared with the funding allotted to the project; the plan that ensues from this comparison and associated management decision making is the project cost baseline and becomes a driving factor for the project timeline and work scope execution. Also to be taken into account in this process are the application and appropriate assignment of cost risk factors, labor rates, inflation, and other cost escalation considerations as they pertain to the project work scope, individual activities, and application of project resources.

As an element of Project Cost Management, performance measurement addresses performance management, tracking, scheduling, data collection and utilization, earned value analysis, and project reviews. Since project cost is directly related to work activities and a specified budget, a system should be developed to properly identify and control cost and scheduling variances as they occur. Well-defined performance metrics should be established, and progress should be regularly updated and closely tracked to ensure success in this process. The project management team should ensure that they track project and product performance from a core set of measures in order to accurately evaluate performance at all levels for the duration of the project. Specific management concerns in this area should address project completion requirements and noticeable performance trends. These requirements include management of authorized budget at completion (BAC) and BAC change since project inception, causes for BAC change,

proper identification of baseline value, proper analysis of cost and schedule variances and indexes, and cost estimate at completion (EAC) of the project based upon up-to-date performance. Performance measure evaluations should be conducted in conjunction with cost collection events/activities. When evaluations are done, managers should ensure that an accurate collection system is in place to gather consistent and reliable performance source information. By conducting regularly scheduled performance reviews, managers can best determine proficient and deficient areas, as well as areas requiring additional emphasis.

Cost control management is also a key area that requires continuous monitoring to ensure that daily, weekly, and monthly project performance costs are being accurately captured. Cost variance thresholds for management action should be established. Assigned cost account managers should ensure that there are systems in place to properly account for cost change control, charge accounting, budget transfers, and threshold situations. In particular, considerations should be given as to how charge accounts are to be opened and closed, how response to threshold indicators are to be determined and initiated, and who has the authority to approve cost change. When changes occur, they should be accurately captured and documented in the proper format to ensure that changes in the cost baseline are assessed and can be accurately addressed in future work and cost estimates.

Finally, Project Cost Management is considered effective when cost contingency management is established throughout the life cycle of the entire project and it mirrors the requirements for the developed range of cost. Contingencies should be properly identified, monitored, and executed in regard to the areas of cost profile, cost estimating, cost risk analysis, cost overrun management, and available project funds.

Rocky Flats Closure Project Performance Compared With the Standard

Figure 4.4 is a graphical representation of the PricewaterhouseCoopers assessment of the performance of the Kaiser-Hill Team on the Project Cost Management for the 2010 Rocky Flats Closure Project. As illustrated in Figure 4.4, the Project Cost Management Plan comprises six elements: Resource Planning, Cost Estimation, Performance Measurement, Cost Control, Project Performance, and Contingency Management. The following is a discussion of the observations that are reflected in this chart:

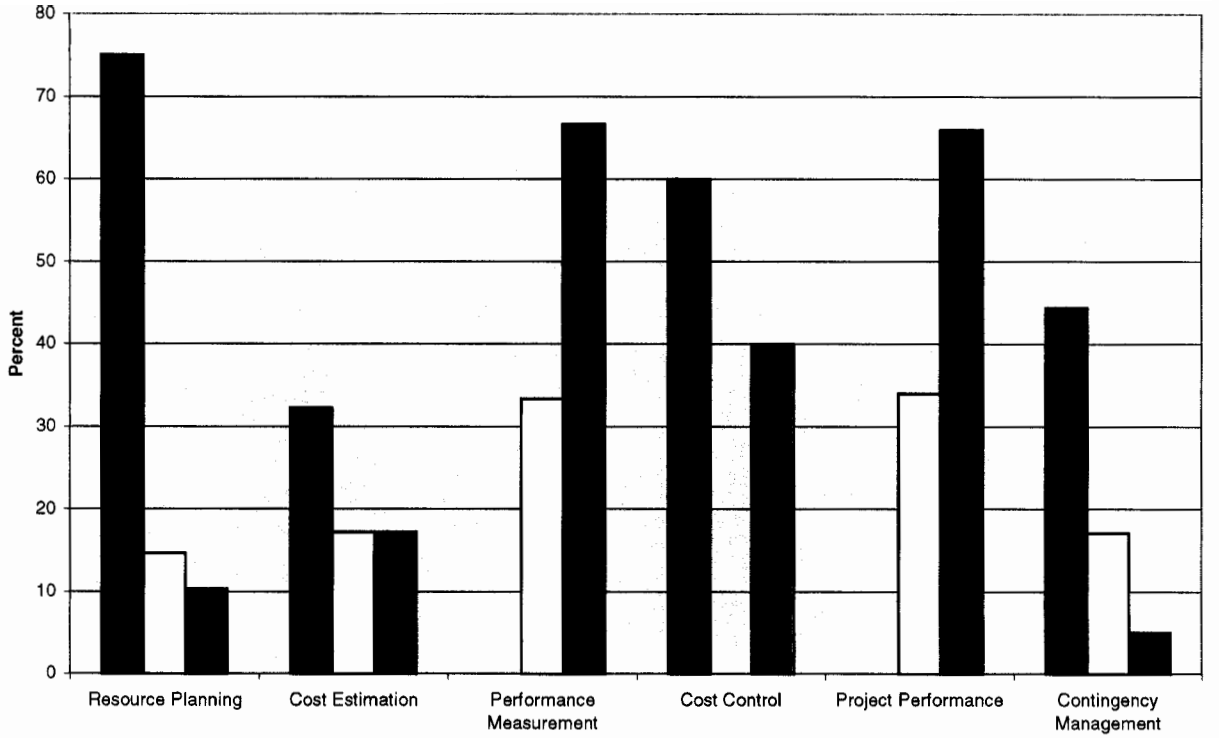


Figure 4.4 - Project Cost Management Compliance with Industry Standard

Resource Planning – Although manning estimates, primarily tracked as full-time equivalents (FTEs) for the Kaiser-Hill Team, are developed within BEST for each WBS element for current and future fiscal years, project management currently performs short-term resource planning for hourly workers during biweekly meetings of the Hourly Resource Allocation Committee (HRAC). The HRAC comprises Kaiser-Hill, Safe Sites of Colorado (SSOC), and Rocky Mountain Remediation Services (RMRS) project managers, whose focus during these meetings is to identify project manning requirements, fill open resource requirements within individual project teams, and match resource needs across multiple projects. Current resource planning activities are effective for an approximate 30-day window, although the HRAC would like to be able to forecast 90 percent of resource needs six to seven months in advance. There is significant disparity in the forecasts for key skills (D& D workers and Risk Reduction Technicians) between the FY99 P&I work plan and the actual needs of the various projects as discussed during a recent HRAC meeting. As an example, the P&I plan indicated a need for ten D&D workers during May, while actual needs requested by the projects totaled 87. In addition to discrepancies in the identification of resource needs, effective resource

planning is inhibited by the inability to quickly train and certify potentially critical skill workers.

For the long range, the HRAC, in conjunction with the Human Resources Department and the individual projects, has identified constrained resources required to meet closure schedule goals, and it is attempting to carefully track the identification, recruitment, hiring, and training of these resources. However, because of the limitations in the ability to integrate individual project schedule information within the 2010 CPB schedule, the long-range resource planning is not fully effective. Therefore, the Kaiser-Hill Team is unable to reliably forecast requirements for constrained resources that they can be onboard and properly trained, qualified, and cleared when required.

In addition, in PBD 024, we noted that a significant risk of critical skill shortages is not being addressed should the Safeguards and Security model adopted for one facility not be approved by DOE for the remaining facilities. Furthermore, resource constraints in the execution of residue processing were frequently encountered, as discussed in subsection 5.3 of this report. Finally, although they are presently being actively addressed, concerns exist regarding the transition of the present nuclear-trained workforce to D&D work. (See subsection 5.1 of this report.)

Cost Estimation – Planning and Estimating Standard 004 – Cost Estimating requires that each project " . . . have a well-documented basis of estimate (BOE) that identifies all known project data, assumptions, exclusions, and levels of risk. Known elements and exclusions must be identified, and cost estimates must be provided with appropriate documentation. All BOEs will be maintained in the Basis of Estimate Software Tool (BEST)." Costs are estimated for detailed activities for the next two years in the P3 schedules in conjunction with development of the "rolling wave" schedule for each year.

Currently, two cost estimates apply to the 2010 closure plan: (1) a plan, developed in 1997 as one of several closure scenarios, that shows closure in the 2010 CPB at a total escalated cost of $7.3 billion and (2) a second, more detailed cost estimate developed by PBD/WAD managers that shows closure by 2010 at a total escalated cost of $8.3 billion. Kaiser-Hill believes that the $8.3 billion estimate is conservative and that it has a number of errors and inconsistencies due to misunderstandings on the part of the large number of

personnel who contributed to it; however, efforts to correct the deficiencies have been placed on "hold" in order to concentrate resources on the 2006 closure plan. While it is important to assure the accuracy of the 2006 plan, a large question remains as to the accuracy of the 2010 CPB cost estimate. The differences between the two cost estimates should be pursued and resolved.

The support service codes, PBDs 030 and 034, account for those indirect activities that are not specific to a particular production PBD/WAD. Project-based focus was used to attempt to determine the types of services that would be required to execute similar work scope in past years. Those services that supported individual project activities are supposed to be charged directly to those projects. However, interviews with support service code managers indicated that many of the cost estimates were based on the assumption that the personnel required to do the job last year were the right number and, unless something changes (such as no longer needing the criticality engineers when the plutonium and uranium are gone), the same number of people will continue to be needed. In addition, personnel interviewed indicated that many of these services are, in fact, not being charged directly to the individual projects because of the cumbersome nature of the change control process or because it is perceived as a site policy not to charge direct.

The failure to drive as much of the support service costs as possible into the project estimates and budgets results in the potential for a lack of accountability for support service costs on the part of the project managers. Making the project managers fully accountable for the total cost of the support services necessary to complete the project will encourage increased responsibility and accountability for the support service expenditures and is in consonance with industry best practices.

Finally, review of the PPRs for several PBDs and associated WADs revealed extensive indications of cost-reporting anomalies that arose from a variety of causes; however, they revolved around problematic cost estimating, reporting, and accruals. Based on these observations, a summary assessment of cost-reporting issues was performed that can be found in attachment 8.6. Preliminary conclusions advanced in the attachment address concerns with a bias in cost estimation, apparent problems with cost accrual and/or reporting, and the maturity of the cost accounting system.

Performance Measurement – A set of well-defined performance metrics exist for "Product"-oriented projects, as shown on the *Rocky Flats Closure Project Performance Metrics Baseline*, Rev. 9 (the purple chart) [7.8]. These high-level closure project metrics are further broken down into individual WAD metrics. WAD and PBD managers track both metrics. Cost and schedule performance are tracked via the Performance Measurement Reporting (PMR) system as set forth by P&I Standard 008. A "rolling wave" schedule is utilized with defined project milestones and corresponding performance measures for those milestones. Milestones are evaluated weekly, and cost and schedule performance are evaluated monthly. The EMSS provides a representation of milestone progress as related to the metrics defined in the purple chart.

For cost and schedule performance measurement, Actual Cost of Work Performed (ACWP) is obtained from the PeopleSoft Financial & Accounting system; the Budgeted Cost of Work Scheduled (BCWS) is extracted from the P3 schedules; and the PBD/WAD manager obtains Budgeted Cost of Work Performed (BCWP) based on estimates of work completion using one of several predetermined metrics: Modified Milestone/Deliverable Earned Value, Percent Complete Quantitative, Percent Complete Subjective, and Level of Effort. Guidance has been issued in P&I Standard 005 for calculating the BCWP for each WBS element. The metrics listed on the purple chart are obtained from actual counts of items processed. Earned value analysis (EVA) is an integral part of all projects, and P&I Standard 005 provides the guidance for EVA. Each WBS has a predetermined method for calculating and measuring earned value. Project Performance Reports (PPRs) are tracked monthly to address earned value issues. Results for individual projects will be captured under Project Performance, discussed below.

As discussed in subsection 6.4 of this report, industry best practices show that Critical Ratio and Cost Per Percent Complete could be tracked to provide early warning of adverse trends. Industry best practices also show that use of control charts to track trends in these metrics can provide management with a valuable tool for identifying unsatisfactory trends that require management attention. Kaiser-Hill does not track Critical Ratio or Cost Per Percent Complete and does not use control charts. Furthermore, because many support activities are level loaded and some project-level schedules have broadly defined activities, the determination of physical progress or BCWP is problematic. In addition, we noted that in WAD 09, the quality of the

construction schedules used to track performance varied widely; this makes the development of consistent performance-tracking tools difficult.

Cost Control – Individual WAD managers are responsible for monitoring the performance of their WADs. The PCI assigned to a WAD assists in tracking and monitoring cost performance. Although P&I Standard 013 indicates that there are no thresholds for Project Performance Reports, a Kaiser-Hill letter (99-RF-00240) of January 19, 1999 states that the P&I threshold for the generation of a Project Performance Report (PPR) to focus management attention on cost performance is a cost variance of >$250 thousand or +/- 10 percent of BCWP.

The analysis summarized in attachment 8.6 points to two cost control issues: mischarges and cost accrual problems. Both of these issues, based on the magnitude of the funds involved, have the potential to adversely affect cost control. Resolution of the problems that underlie these issues would permit improved cost control.

Documentation and dissemination of lessons learned from changes to the cost baseline should be recorded so that future estimates for similar work can be more accurate. Kaiser-Hill employs a formal lessons-learned program for safety, radiological control, and quality issues only. The safety and radiological control lessons-learned program is on the ES&H Web page and focuses upon prevention of environmental health and safety issues from both internal and external sources. The quality program reports trend information on a quarterly basis; however, at present, no detailed analysis of trends is performed. Kaiser-Hill does not utilize a sitewide lessons-learned program that focuses on improving cost, schedule, and management issues. The PPR process provides the opportunity to capture root cause analysis in these areas; however, it is not formalized, and the data are not routinely assessed for lessons to be learned.

Project Performance – As discussed previously, close management attention is paid to reported cost and schedule variances. When cost variance issues are identified, they are reviewed, and corrective actions are developed and implemented. These corrective actions may be somewhat hampered by the level of precision of cost information (discussed above); however, based on the information available, project managers

develop logical corrective actions that have, to date, placed appropriate attention on schedule adherence.

These are areas of concern were noted relative to project cost performance:

1. A number of projects have significant cost variance and schedule variance, both positive and negative. When taken together, these variances indicate either a lack of precise cost estimating, inadequate cost control practices, inaccurate estimate of progress, or a lack of schedule adherence.
2. For deactivation and decommissioning (D&D) of Building 779, the budget at completion (BAC) is $44.8 million. It does represent a baseline value and has changed whenever the baseline has changed. The latest change occurred because of a schedule scope change, rather than a physical scope change. This $44.8 million figure includes a super stretch award fee of $14 million, which should not be included in the BCWS. This lack of understanding of the use of BCWS and the potential for misunderstanding of earned value results has been discussed with the project manager.
3. In WAD 09, the PBD manager made the conscious decision to allow schedule variance and cost variance to accumulate because of the accelerated schedule. Senior management was informed and supported the schedule acceleration. However, the PBD manager did not believe keeping that the project management information current was vital because only several months remained before task completion.

Contingency Management – Formal Cost Risk Analysis is described in the *Rocky Flats Environmental Technology Site Programmatic Risk Management Plan*, Revision 0 [7.11]. Instead of using the WBS element cost risk factors, the *Programmatic Risk Management Plan*, specifies, in section 1.5, that the project manager's estimates for optimistic, most probable, and pessimistic cost are used to develop the range of costs. The range of costs, developed from a project manager's view and not those of the estimators, are then used in the Monte Carlo simulation technique that develops the probability distribution for the project cost estimates. The cumulative probability distribution for cost is then used to derive the costs for any particular probability. These figures are used to develop the annual contingency funding (where contingency funding is defined as the funding difference between the 50 percent chance of success funding level and the expected

funding level) profile. From this profile, the project contingency fund is determined. The flaw in this method appears to be in using the project manager's estimates to develop the range of costs, instead of using probability distributions associated with the line-item risk factors developed by the estimators. It is noted that this method has been employed to conduct one *schedule* risk analysis, but has yet to be employed to conduct a *cost* risk analysis.

Cost risk estimating is normally performed at the activity line-item level during the actual estimating process. Each line-item estimate in the WBS includes a cost risk factor. The cost risk factors are identified in Appendix 9 "BOE Type Codes/Formats/Cost Risk Codes" to the *Rocky Flats Closure Project FY99/00 Work Plan Guidance Document* [7.9]. The factors represent the risk associated with the costs in the WBS estimate (where 1 = low and 5 = high). These factors are resident in the BEST system, but do not appear to have been used in the development of the actual estimate. Similarly, these data are not used in the formal Cost Risk Analysis described in the *Rocky Flats Environmental Technology Site Programmatic Risk Management Plan*, Revision 0 [7.11] As previously noted, instead of using these WBS element cost risk factors, the *Programmatic Risk Management Plan*, in section 1.5 uses the project manager's estimates for optimistic, most probable, and pessimistic cost to develop the range of costs.

Regardless of the cost risk analysis method used, a predetermined management reserve has not been budgeted. Management reserve is accumulated throughout the year as a result of the BCP/FCP process, through which efficiencies in operations or changes in the baseline identify excess funding. Cost overruns as a result of poor performance are funded from this management reserve, in lieu of internal budget transfers.

4.2.5 Project Quality Management

Best Practices Model

Project Quality Management includes the processes required to ensure that the project will satisfy the needs for which it was undertaken. It addresses both the management of the project and the product of the project. Areas of evaluation include the quality plan, the quality assurance program, and the specific characteristics of the quality control system employed on the project. Successful Project Quality Management is dependent

on how well quality policies and standards are complied with and how they are implemented and maintained throughout the life of the project.

In order to assist project and quality control managers, a total quality management system should be developed and practiced to continuously monitor quality issues and concerns. The effectiveness of Project Quality Management is measured through area-specific application and standard processes that ensure proper quality conformity and assurance. Through the use of audits, sampling, and spot checks, quality managers can assure that Project Quality Management procedures and requirements are in compliance with written policy.

The consistency and accuracy of documentation management is also a measure of effective Project Quality Management. Under Project Quality Management, a system should be developed and integrated into the overall Project Plan to support other critical areas that directly influence overall document control and management. Procedures, responsibilities, processes, and standards, as they pertain to a quality control system, should be continually monitored and documented to assist quality managers with maintaining preciseness in the areas of quality documentation tracking, reporting, and control. In particular, by accurately monitoring and documenting changes that affect quality, managers can use recorded information to assist in evaluating programs and systems. Incorporation of proper management of quality issue documentation and concerns serves as an invaluable quality management tool that can be utilized to identify and capture lessons learned through quality performance.

Rocky Flats Closure Project Performance Compared With the Standard

Figure 4.5 is a graphical representation of the PricewaterhouseCoopers assessment of the performance of the Kaiser-Hill Team on the Project Quality Management for the 2010 Rocky Flats Closure Project. As illustrated in Figure 4.5, the Project Quality Management Plan comprises three elements: Quality Plan Development, Quality Assurance, and Quality Control. The following is a discussion of the observations that are reflected in this chart:

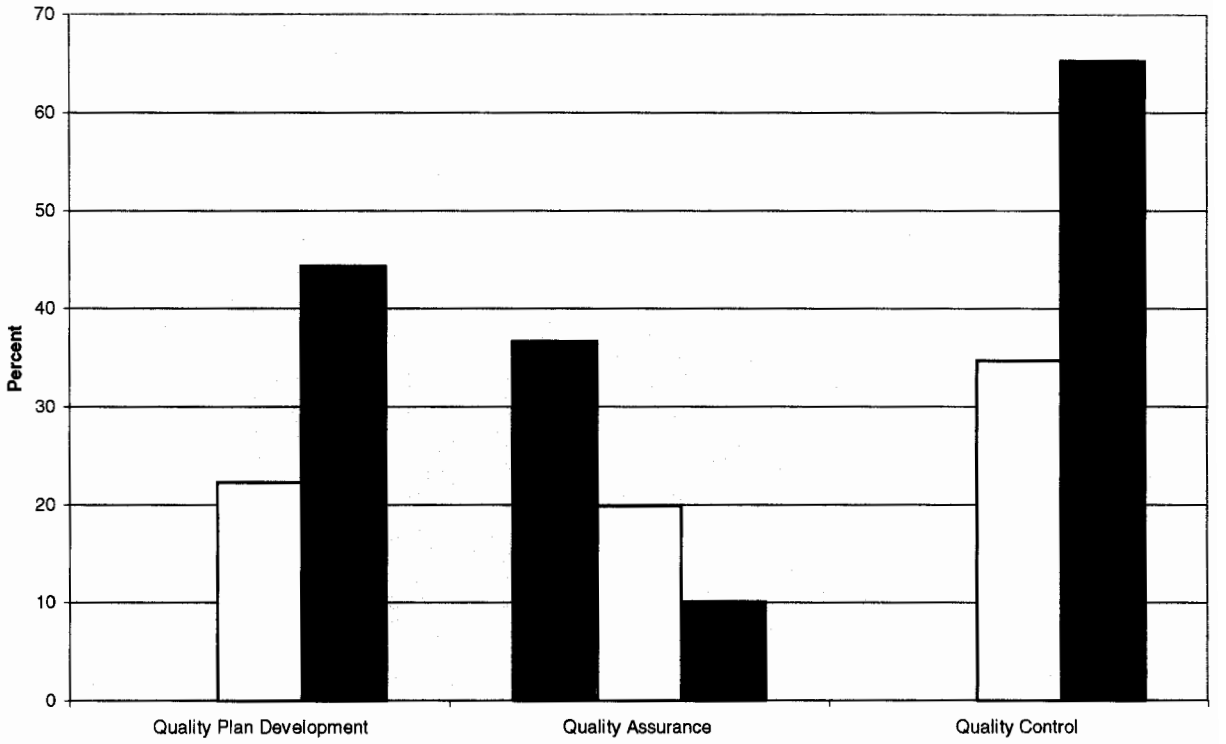


Figure 4.5 - Project Quality Management Compliance with Industry Standard

Quality Plan Development – The *Rocky Flats Environmental Technology Site, Kaiser-Hill Team Quality Assurance Program, Revision 7 (QAP)* [7.12], has been developed to meet the requirements of 10 CFR 830.120, the Quality Assurance (QA) rule for DOE sites, along with DOE Order 5700.6C, which lays out the general requirements for QA programs at DOE sites. Individual projects are required to adhere to the Kaiser-Hill QA Program, with which each of the Four Tops and the construction and architect engineering contractors all concur. The planning to achieve assurance of quality is addressed in the overall site Project Management Plan (PMP).

However, it is not clear how these PMP requirements flow through to the PBD and/or WAD managers who provide line management of the closure project. The PBD/WAD management structure is not mentioned at all in the Site QA Plan; therefore, blanket references to it would not appear to be adequate to address "line management's" responsibilities in this area.

Quality Assurance – Quality Assurance audits are established by the QA manager of the Principal Contractor. An integrated audit schedule is prepared annually by Kaiser-Hill.

In addition, DOE, the Nevada Test Site (NTS) and the Waste Isolation Pilot Project (WIPP) require some audits. The Four Tops determine the frequency of many of the audits. Comment and deficiency resolution involve the auditing organization and the organization that owns the deficiency. Comments are tracked in the Plant Action Tracking System. In order to assure that subcontractors comply with applicable quality standards, Kaiser-Hill has an Evaluated Subcontractors list for those who perform safety work. The Analytical Program Office audits suppliers who perform analytical work. Subcontractors/suppliers of other types of work are evaluated/audited by Kaiser-Hill Procurement Quality Assurance. The Contractor Technical Representative (CTR) is responsible for documenting performance and providing feedback to the procurement agent. The project manager generally provides performance information.

Project document maintenance is a concern. Once an item has been designated as a record, a formal procedure (Records Management) is supposed to be initiated to regulate the maintenance of the record. However, the standard interpretation of this requirement by WAD managers is that by and large, only BCPs, FCPs, etc. meet this criterion for PBDs and WADs; therefore, significant project-related information could be lost in the process of a long project and no longer available at project closeout.

Representatives of the quality organizations meet every two weeks (or as needed) to compare current issues in the respective companies. There is a shared data base related to open corrective actions. This group also undertakes common cause assessments. However, the limited trending analysis mentioned earlier has the potential to adversely impact this attribute.

Quality Control – Guidance on responsibility for implementing the quality control system is contained in the QAP. That responsibility resides with the subcontractor who controls the activities and tasks. All aspects of site work fall under the Site Quality Assurance Program. Certain other work types have additional stipulations with which to conform. For example, work that generates waste that will go to WIPP or NTS has additional requirements to meet. It is the responsibility of the design engineer and the project manager to determine the critical characteristics and to consult with their company QA organization to determine the level of quality required. However, the previously discussed impreciseness of assignment of responsibility for quality assurance

in the PMP and QAP leaves open the question as to where project quality requirements, other than activity-specific procedures, reside.

Three types of nonconformances are in effect. They cover (1) procurement; (2) waste; and (3) other issues such as programmatic failures, process failures, product noncompliance, etc. Each type has its own designation of who must approve final disposition. Audits are a vehicle for establishing a map and flow between requirements and QC0-related information. In addition, contractors provide quarterly reports to Kaiser-Hill for review regarding the trends present in quality-related parameters.

4.2.6 Project Human Resources Management

Best Practices Model

Project Human Resources Management includes the processes required to make the most effective use of the people involved with the project. The primary focus of this core process is on ensuring that the labor resources required to perform and manage the project are available and trained. Effective Project Human Resources Management identifies and addresses staffing issues in the areas of project organization, selection of key personnel, staff mobilization and training plans, and agency policies and labor relations. Successful Project Human Resources Management is based on the integration of project organization and functional organization as they relate to personnel issues.

Project Human Resources Management effectiveness is also determined by how well each project and functional team member understands individual and team roles and responsibilities, functions, expectations, and work requirements. A staffing management plan should be developed to identify required resources based on specified project work plan and schedules. Project and functional managers should ensure that a compatible system is developed and maintained to accurately track and manage resource activities, overages, and shortages as they occur. Therefore, as team members' status changes (transfers and terminations), the management of this system then becomes critical in ensuring that changes that affect resource availability, nonavailability, and project productivity are identified to avoid or reduce project delays.

Another factor that is key to effective Project Human Resources Management is the training program that is used to ensure that personnel are properly trained in administrative policies and procedures, safety policies, public relations, project control, and quality assurance and quality control. Managers should ensure that proper time is allocated in individual activity work plans, as well as in the overall project plan and project schedules, to support total project personnel training objectives. Once personnel are trained, training records should be documented, maintained, and updated as required for administrative and overall project requirement purposes.

The key to successful Project Human Resources Management is ensuring that administrative controls and policies are established, coordinated, enforced and maintained. A smoothly functioning administrative program and practice assures that personnel involved in the project are knowledgeable of all major aspects of project administrative policies and procedures.

Rocky Flats Closure Project Performance Compared With the Standard

Figure 4.6 is a graphical representation of the PricewaterhouseCoopers assessment of the performance of the Kaiser-Hill Team on the Project Human Resources Management for the 2010 Rocky Flats Closure Project. As illustrated in Figure 4.6, the Project Human Resources Management Plan comprises four elements: Project Organization and Key Personnel Selection, Staff Mobilization Plans, Training Plans, and Agency Policies and Labor Relations. The following is a discussion of the observations that are reflected in this chart:

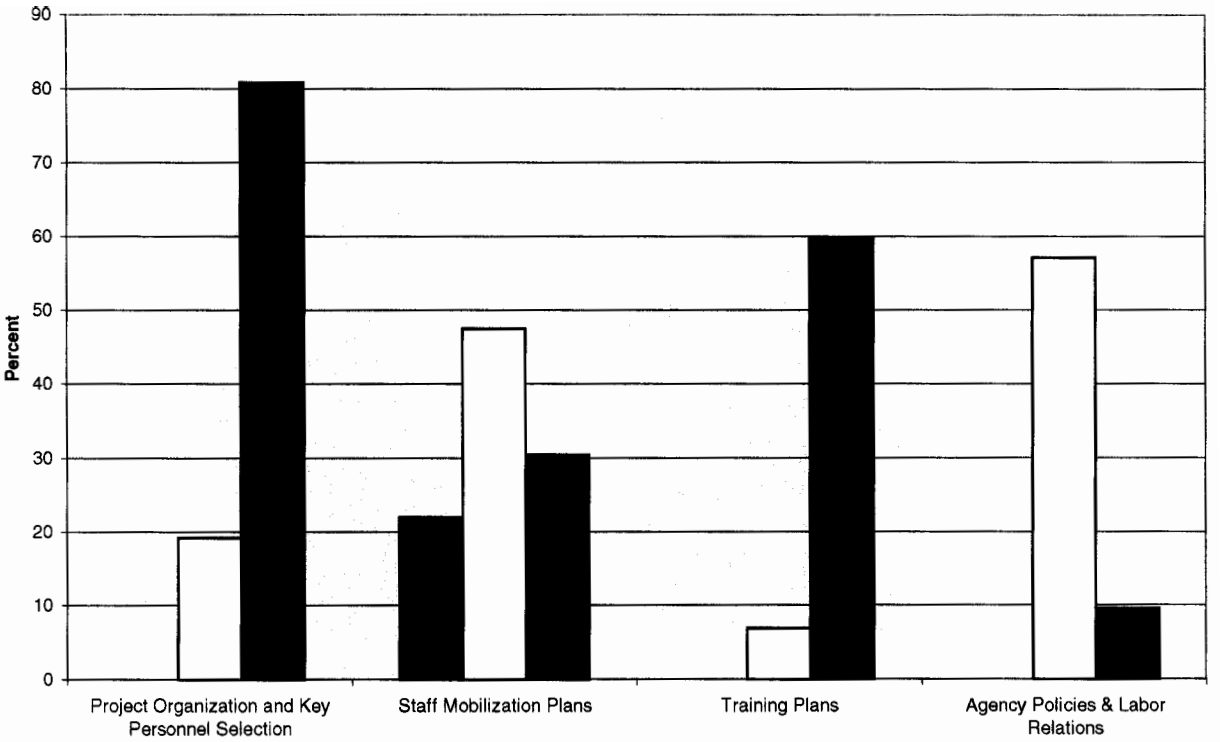


Figure 4.6 - Project Human Resources Management Compliance with Industry Standard

Project Organization and Key Personnel Selection – An RFETS matrix organization chart has not been used onsite for the last several years. Instead, the P&I organization has issued organization charts for each Kaiser-Hill Vice President's area of concern relative to PBDs/WADs under his/her control, and the *Rocky Flats Closure Project Functions and Responsibilities Document* [7.13], provides detailed assignment of responsibility for all aspects of the closure project.

For PBDs 008 and 011, the size of the teams has varied, based on the activities being performed. Some tailoring has been performed through the use of third-tier subcontractors; however, problems due to project team size appear to surface fairly frequently, even on high-priority projects such as residue processing.

Staff Mobilization Plans – A credible overall CPB resource-loaded schedule is not available. BOEs developed for each activity within the WBS identify the quantity and types of resources required to perform these activities. However, the third-tier subcontractor resources are shown only as dollar figures; therefore, there is no ability to identify the specific trade skills required to execute the activities and no way to determine

whether adequate resources will be available. We also noted that there are significant differences between the FY99 Work Plan and the expressed needs of the individual projects; no resolution of these differences could be found.

An Hourly Resource Allocation Committee (HRAC) has been convened on a biweekly basis to discuss actual manning needs. Resource shortages are identified by PBD and are discussed in detail at these biweekly meetings. Each of the Kaiser-Hill Team members submits a Requisition Report that identifies the current resources onboard, number of additional resources required, requisitions in the system, requisitions filled, clearance requirements and status, training concerns, and hiring status. However, there is no way to address long-term shortages because long-term requirements are not adequately identified in the BOEs and the Master CPB P3 Schedule cannot be used to perform effective resource-loading analysis.

For PBDs 009 and 010, the PBD managers highlighted staffing issues in the Project Performance Reviews (PPRs) for December 1998 and January 1999 and other management forums; however, resolution of staffing inadequacies remained problematic. For PBD 011, the project team worked with the HRAC to get a second shift staffed when this was determined to be required; however, it took more than three months to actually staff the shift. It would appear that if priority projects (such as the residue stabilization work mentioned above) are having difficulty staffing their work, the problem might be even more acute on activities that are removed from the critical path.

Training Plans – New employees to the Kaiser-Hill Team are put through a significant training program that combines computer-based instruction, classroom instruction, and on-the-job training. Training includes security, integrated safety management, and specific job skills. Updated training qualifications are kept for each employee. All subcontractor personnel are required to provide training records for employees that perform work at RFETS. In most cases, subcontractors are also required to take selected modules of the Kaiser-Hill computer-based training (CBT) that correspond to the type and level of work to be performed at RFETS.

For PBDs 009 and 010, we noted that training does present a long-lead-time evolution, especially for residues that required "Q" cleared personnel who are radcon-qualified.

This time is factored into the schedule to acquire personnel, but still remains a challenge in actually getting people aboard. For PBD 012, the project team worked with the Human Resources committee to get a second shift staffed when this was determined to be required; however, it still took more than three months to actually staff the shift. It should be noted that because a residual pool of recently cleared personnel existed in the Rocky Flats area, this has not presented insurmountable problems to date; however, as time goes on and this pool is depleted, personnel shortages may worsen.

Agency Policies and Labor Relations – Kaiser-Hill Human Resources has a coordinated, planned set of administrative procedures that include the required elements related to the recruitment, selection, utilization, and training of all levels of personnel.

Significant labor-related issues have been negotiated and are reflected in the most recent collective bargaining agreement signed in 1996. Where conflicts between the collective bargaining unit and project requirements arise, the provisions within the collective bargaining agreement prevail unless an alternative is negotiated through the Labor Relations Department. However, as was noted in the review of PBD 024, the imminent renegotiation of the contract with the guard force will once more provide a test of the labor-relations environment that has been improving, of late, at RFETS. These negotiations will bear close scrutiny, especially with the central role played by the guard force in the shipping of residues. In addition, the need to move work from one bargaining unit to another, as D&D moves forward, will continue to challenge Kaiser-Hill in the area of labor relations. (Note: Detailed review of labor relations was not a major focus of this review.)

4.2.7 Project Communications Management

Best Practices Model

Project Communications Management includes the processes required to ensure timely and appropriate generation, collection, dissemination, storage, and disposition of project information. The evaluation of this core process focuses upon internal and external communication practices. The critical nature of these projects necessitates special attention to public relations.

Effective Project Communications Management involves informational strategies and activities that are easily utilized to establish a comprehensive communications plan. Through clarity in informational formats, communicative support, meeting and reporting systems, and public relations management, all aspects of the project communications plan can be utilized to accomplish communication strategic goals. The success of Project Communications Management is determined by how well information is communicated, governed, shared, utilized, and implemented for both internal and external purposes. By establishing and maintaining an open public information sharing program, relationships and linkages between organizations can be forged to better promote the understanding of project objectives, goals, and requirements.

A single management system should be developed and implemented that coordinates all collected information, serves as the sole point of information filtration, and provides the informational needs of organizations associated with the project and its performance. If properly executed, an effective communications plan can be utilized to measure project performance indirectly. When diagnostic tools such as organization and public surveys are used to gather minority and majority public opinion concerning project performance, managers can better determine how, and in what manner, information should be disseminated. Only through proper communications planning, execution, management, and reporting can managers accurately evaluate the effectiveness of Project Communications Management.

Rocky Flats Closure Project Performance Compared With the Standard

Figure 4.7 is a graphical representation of the PricewaterhouseCoopers assessment of the performance of the Kaiser-Hill Team on the Project Communications Management for the 2010 Rocky Flats Closure Project. As illustrated in Figure 4.7, the Project Communications Management Plan comprises three elements: Communications Planning, Managing External Relationships, and Performance Reporting. The following is a discussion of the observations that are reflected in this chart:

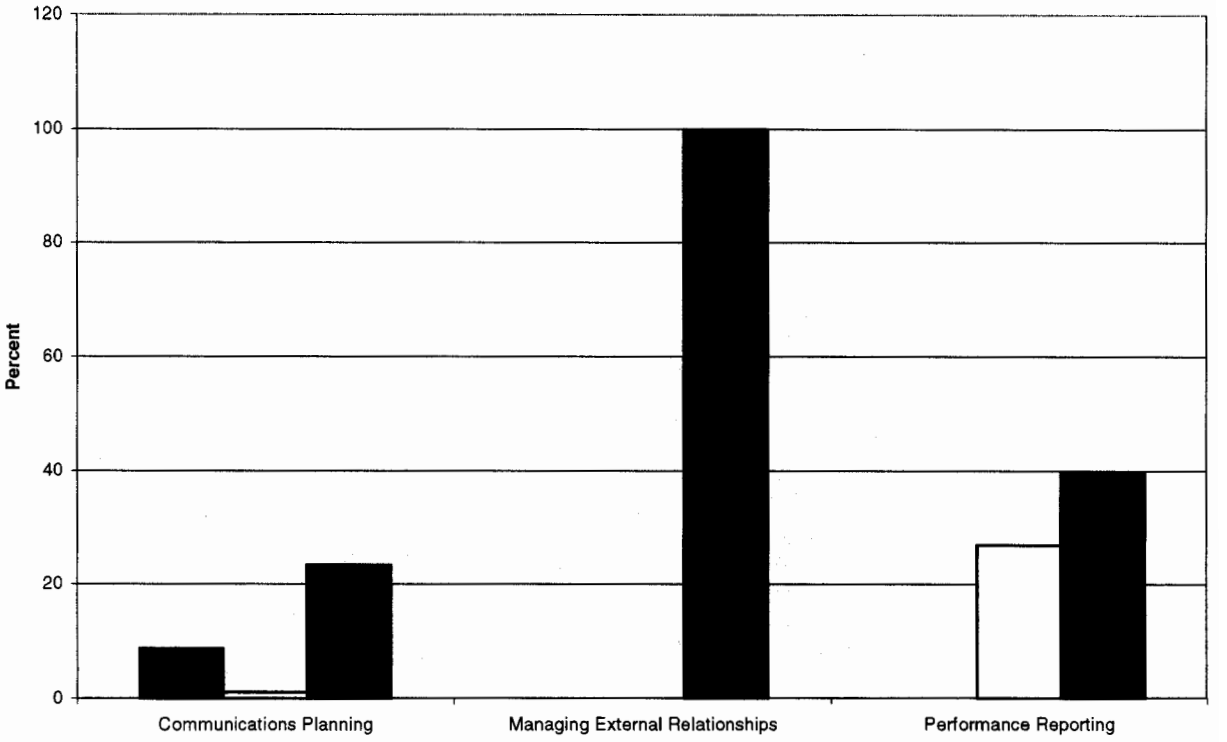


Figure 4.7 - Project Communication Management Compliance with Industry Standard

Communications Planning – Kaiser-Hill has communications plans in place that includes the following:

1. Emergency Public Information Plan
2. Employee Communications Plan
3. Media Relations Plan
4. Community Relations Plan ("Owned" by the DOE)
5. Expanded Management Summary Schedule
6. Project Management Plan, Rev. 2
7. Primavera Project Planner (P3) Schedules
8. Performance Metric Baseline Chart

The projects hold weekly meetings to coordinate the efforts of the various contractors. At these meetings, information is provided to develop reports to senior management. In addition, the PBD managers attend various nuclear production meetings, along with providing briefings at the weekly Nuclear Production meeting, to stay up to date on issues. The Daily Report, which updates the operational status of the production buildings is of particular importance and is provided via the site intranet. The other major, broad-

band communications tool is the PPR, which forms the basis for a management meeting and is also posted on the site intranet.

A major area of concern is the lack of an effective project closure plan. P&I Instruction 001 details the requirements for closing out a project. These are the same requirements that would likely be applied to closing out a PBD or WAD. Attachment 7 to P&I Instruction 001 provides a list of documentation that is anticipated to be available to close out a project. When interviewed, PBD personnel were not familiar with this instruction or with any formal requirements for project document maintenance.

Managing External Relationships – Kaiser-Hill's public relations strategy is based upon supporting the overall DOE Public Involvement Program. DOE is responsible for all aspects of the Rocky Flats Environmental Technology Site public relations strategy. Kaiser-Hill performs activities that help DOE accomplish this goal. Specific tasks performed by Kaiser-Hill include relationship building, execution of the DOE plan, providing information to the public, supporting the Citizens Advisory Board, and providing outreach to city and county governments. Kaiser-Hill is responsible for managing external relationships for the Four Tops.

DOE maintains the community relations program for the site. Elements of this program include town hall meetings, newspaper articles, and meeting with the Citizens Advisory Board (CAB). Accordingly, DOE procedures govern the release of information to the public. Kaiser-Hill, as directed by DOE, aids in the development and implementation of these procedures. Both the Kaiser-Hill communications team and the RFFO review information that is released to the public. The information is screened for accuracy, security, and clarity so that the public can easily interpret the meaning of this information. Internal release of information is accomplished in the same manner. Each of the Four Tops is responsible for releasing information to its employees. It is conveyed in site newspapers, company memos, etc., and is at a level that can be comprehended by the average person.

The PMP identifies the importance of communications among all stakeholders as a factor in the success of the Rocky Flats CPB. Although no specific milestones exist in the EMSS or the PMP for conducting stakeholder meetings, approval of the PMP requires the

concurrence of many external and internal stakeholders. In addition, Kaiser-Hill holds monthly town hall meetings with employees to discuss RFETS issues. The CAB meets semimonthly to discuss issues such as safety, water quality, air quality, quality of cleanup, end use, and disposal.

Performance Reporting – The P&I reporting system is updated monthly and produces many different reports relative to cost/schedule performance and end-user need. Although the formal release of this information is monthly, status can be obtained on a weekly basis (or sooner, if required). The "Operations and Reporting Cycle" issued on a monthly basis provides a list of reports and estimated completion dates required for a variety of site documents.

Material issues (e.g., long-lead-time material) are identified at weekly production meetings, as they occur, or during work planning. Safe Sites of Colorado (SSOC) is responsible for all of the commodity purchases for the site. Delays and stoppages are reported as they occur. The financial accounting system has charge codes available that are to be charged in the event that a project is delayed/stopped. These charge codes are very specific as to the nature (cause) of the work stoppage.

Project performance reports (PPRs) help to communicate progress, identify issues requiring resolution, and provide status at the WADlet, WAD, and PBD levels. These documents are updated monthly and are put on the intranet for all internal stakeholders to review. Scope changes applicable to negotiated work scope usually originate within the project and serve as a mechanism to communicate information within the project. The review processes mandated by the Change Control Program help to solicit and disseminate project information. P3 schedule updates also help to process project information to/from internal stakeholders.

Although resource issues are addressed at the biweekly Resource Allocation Committee meetings, there is no organized discussion taking place on-site of the long-range staffing needs and the planning for meeting those needs.

4.2.8 Project Risk Management

Best Practices Model

Project Risk Management ensures that a Risk Awareness Program has been implemented for each project. At a high level, consideration should have been given to defining objectives and priorities, defining risk tolerance and appetite for risk, defining risk reduction criteria, establishing communication of risks and risk training, and assembling risk plans. Effective Project Risk Management is dependent upon detailed development of risk estimates and assessments. Project Risk Management actively addresses risk identification, analysis, planning, implementation and tracking, and control throughout the entire span of the project.

Risk identification is evaluated on the effectiveness of the process utilized to determined how risk is identified, defined, classified, and documented. Also evaluated is the identification of unique or special features that pose a risk to the overall project. Effective Project Risk Management in this area is therefore dependent on the project manager's ability to accurately identify and address potential risk issues based on line-item activities associated with the work and schedule baselines.

Risk analysis, in regard to how Project Risk Management is evaluated, is based on how effectively risk is quantified, how risk exposure is analyzed, and how data are formatted to support analysis. Management systems in these areas should be developed and utilized by managers and estimators so that they can assure proper assignment of risk factors and values for each individual project.

Risk planning is evaluated on effectiveness and the level of detailed effort that is incorporated into the overall risk management plan, which should address measurable actions that will be used to eliminate or reduce programmatic risk. This phase of Project Risk Management should identify and assign planning management responsibilities; address development of a risk communication plan; and identify mitigation steps, selection, and allocation requirements. These are the objectives and goals of the plan. The plan should cover day-to-day operational project risks and should be closely monitored to ensure that actions are taken daily to eliminate, reduce, or avoid

unnecessary risks. If necessary, a training program can be implemented to ensure that all levels of personnel understand Project Risk Management objectives and requirements.

Risk implementation and tracking is an integral Project Risk Management process that is utilized to ensure that the areas addressed in the project plan are properly implemented, executed, monitored, analyzed, and documented. Effective Project Risk Management in this core process is dependent on adherence to standards established in the risk management plan.

Effective Project Risk Management relies heavily on the overall risk control process that is utilized. Through scheduled formal and informal reviews at all levels, management can effectively gauge project risks and take appropriate actions, if required. Identified actions resulting from reviews should be gathered and documented. Once all information is gathered, it should be analyzed to identify possible impacts on overall cost and schedule baselines. Early identification and detection of risks enable managers to make better decisions concerning risk issues and ensure a better managed risk control program. Risk control should be everyone's concern on a project.

Rocky Flats Closure Project Performance Compared With the Standard

Figure 4.8 is a graphical representation of the PricewaterhouseCoopers assessment of the performance of the Kaiser-Hill Team on the Project Risk Management for the 2010 Rocky Flats Closure Project. As can illustrated in Figure 4.8, the Project Risk Management Plan comprises five elements: Risk Identification, Risk Analysis, Risk Planning, Risk Implementation and Tracking, and Risk Control. The following is a discussion of the observations that are reflected in this chart:

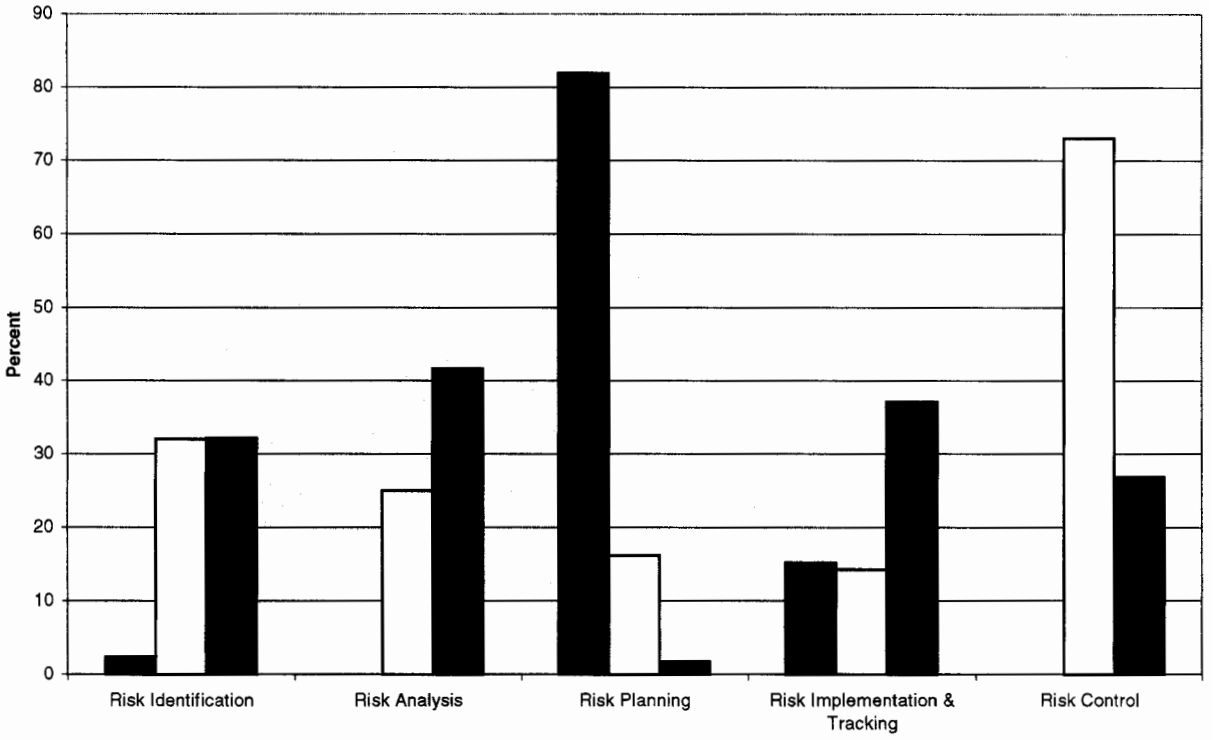


Figure 4.8 - Project Risk Management Compliance with Industry Standard

Risk Identification – Within the 2010 CPB, each PBD description includes a qualitative discussion of the risks identified for each WAD. The *Rocky Flats Environmental Technology Site Programmatic Risk Management Plan* [7.11] has identified that risks will fall into one of three categories (technological, work scope definition, or intersite dependency) and one of five levels (1 = low, 5 = high). The formal programmatic risk management process identifies uncertainty (risk) within a project's (PBD) schedule and cost estimate. However, the *Rocky Flats Closure Project FY99/00 Work Plan Guidance Document* [7.9] on page iv requests that risk data be provided at the activity line-item level for cost, schedule, and technical factors. It was noted that the recently completed Monte Carlo simulation of project risk analysis [7.14] was conducted using only project management estimates of schedule risk at the EMSS activity level.

A unique feature of the Rocky Flats Closure Project is the existence of numerous external constraints (i.e., events that are not under the control of Kaiser-Hill) that must take place for the 2010 CPB to be successful. These external constraints become enabling assumptions for the CPB and are documented in Appendix D of the PMP, "External Milestones/Constraints." [7.3] This document identifies impact dates by which mitigating

action is required if the external milestone is not satisfied and critical path dates by which the failure to satisfy the external milestone will affect the CPB critical path. By calling out critical off-site contingencies and assessing the potential impact of other entities not meeting their commitments, Kaiser-Hill has taken a step forward in risk management. The recent occurrence with WIPP is illustrative. Because the scheduled opening of WIPP slipped past the Kaiser-Hill "impact" date, DOE authorized Kaiser-Hill to start the design process for a new on-site TRU storage facility. This use of an external milestone constraint is an important risk management tool.

The project-specific risk plans, which are included in the Project Execution Plans (PEPs), are still in draft form. Cost-related risks were also considered as part of the cost model. However, routine project risks are considered in an ad hoc, reactive, corrective fashion, rather than in a formal, planned, proactive, preventive manner. In one of the projects, PBD 024, it was noted that although project risks have been identified at a high level, there has been no identification of the risk that the necessary guard force will not be retained or of the potential for the DOE to not approve continued use of the Safeguards and Security plan now being used.

In the formal *Programmatic Risk Management Plan* [7.11], risks are identified as "programmatic risk" and defined as "a measure of uncertainty within a project's schedule and cost estimate. It is the risk involved with a project's ability to (1) complete on schedule and (2) complete within the identified cost estimate." In Appendix 9, "BOE Type Codes/Formats/Cost Risk Codes," to the *Rocky Flats Closure Project FY99/00 Work Plan Guidance Document* [7.9], cost risks, schedule risks, and technical risks are characterized (1 = low, 5 = high) based on the estimator's knowledge of how the estimate was constructed. The language associated with each type and level is contained in Appendix 9 to help the estimator assign the risk value. In addition, a team of risk assessors has been trained to assist project managers in assigning risk values to each of the scheduled activities.

There are two methods of risk documentation:

1. Macro method: One formal schedule risk analysis has been conducted and formally documented. The report is entitled *Analysis of Schedule Uncertainties Within the Rocky Flats Closure Project Baseline (2010) and Their Potential Impact on the Site*

Closure Date and was issued in draft format [7.14]. No cost or scope risk analysis has been conducted.

2. Micro Method: This method, described in Appendix 9, "BOE Type Codes/Formats/Cost Risk Codes" to the *Rocky Flats Closure Project FY99/00 Work Plan Guidance Document* [7.9], has estimators indicate, at the activity line-item level, the cost risk, schedule risk, and technical risk for that line item. This bottom-up risk analysis is not used in any risk analysis scenarios at this time.

Risk Analysis – The one-time schedule risk analysis discussed above was calculated based on the type of schedule estimate that was used in coming up with the duration for the activity. Schedule estimates are based upon (1) RFETS historical performance, (2) an industrial standard, (3) the project manager's forecast, or (4) expert opinion. Each estimate type is then assigned a probability density function (PDF), and these are used to calculate a "range" of dates. The full set of activity "range dates" were then subjected to a Monte Carlo simulation of the schedule, from which a probability distribution and cumulative probability distribution are presented. Sensitivity analysis is then conducted on the schedule, and individual uncertainties (risks) are ranked in Pareto chart format. They are ranked from greatest impact to least impact.

However, two key concerns of our evaluation are (1) that there has been no analysis of cost or scope risk at the EMSS level and (2) that there has been no risk analysis using the activity-level risk estimates provided in the BOEs. As previously discussed, an analysis of schedule risk has been conducted, and a draft report issued [7.14]. This risk analysis was conducted by applying a Monte Carlo simulation to management estimates of risks and risk probability distributions at the EMSS activity level. This analysis predicted a less than 1 percent chance of completing the 2010 CPB by the end of fiscal year 2010, a 50 percent chance of completing the closure project by September 2011, and a 90 percent chance of completion by April 2012. The fact that Kaiser-Hill has completed this analysis is a large step forward; it now gives management an opportunity to identify and focus on the issues that may be standing in the way of timely completion. However, it should be recognized as only a first step. These results, albeit preliminary, point to the need for a risk analysis program using project-developed data to systematically assess all aspects of risk—cost, schedule, and work scope—on an ongoing basis.

Risk Planning–The *RFETS Programmatic Risk Management Plan* [7.11] states that "the Kaiser-Hill Director of Planning and Integration designates individuals to accomplish the risk management actions described in Table 6.1." This is supported by the *Rocky Flats Closure Project Functions and Responsibilities Document* [7.13], which lists (1) as a strategic planning activity, "conduct sensitivity and risk analyses (e.g., implementation unknowns, decision needs, and risks)," and (2) as a planning and integration activity, "analyze risks as progress is achieved." This document also designates a formal "Manager, Risk Management" on pages 11-1 and 11-2. However, the individual in this position is responsible for *insurance programs* at RFETS and is not concerned with the day-to-day management of project risks. This title would appear to be a misnomer and a potential cause for confusion.

Risk communications is mentioned in the *Rocky Flats Closure Project Functions and Responsibilities Document* [7.13], which lists on page 10-8 "provide for risk communication requirements" under the "obtain permitting and acceptance of technologies" heading. However, the only risk communications taking place is that associated with the high-level schedule risk analysis based on management estimates of risk to EMSS activities. Other than that associated with the external constraints, also noted above, there is no identifiable risk mitigation plan to communicate, and because there is no risk analysis based on the BOE-level risk estimates provided, there is no need to communicate the results or any mitigation plans.

The *RFETS Programmatic Risk Management Plan* [7.11]states that each project (PBD) or subproject (WAD) will have a programmatic risk action plan that will "develop an effective action for eliminating, avoiding, or mitigating the programmatic risks identified by the Planning and Integration Department." No formal risk mitigation plan exists for the completed schedule risk analysis discussed in detail above. In the individual projects, there are numerous examples (four are described below) where risk mitigation steps have not been identified and where the norm is after-the-fact corrective action, rather than proactive risk mitigation:

1. For PBD 004, to mitigate a problem with construction contracts and cost claims, Kaiser-Hill has made a decision to move to fixed price contracting; however, as

previously discussed, fixed-price contracting brings its own set of concerns. It will not necessarily be a panacea.

2. For PBD 024, senior leadership fully understands the risk of potential manpower shortages, and some actions are underway to provide incentives for personnel to continue working at the site; however, no specific mitigation plan appears to be in place.
3. For D&D projects, although a project-specific risk plan is included in the PEP, it is still in draft form.
4. In PBDs 001 and 002, risk management tools exist, but are not being utilized.

Because no formal risk mitigation plan associated with the completed schedule risk analysis exists, it cannot be tied to program reserves; however, formal program reserves do exist.

Risk Implementation & Tracking – Although no formal risk mitigation plan exists, the top 10 uncertainties (risks) identified in the *Analysis of Schedule Uncertainties Within the Rocky Flats Closure Project Baseline (2010) and Their Potential Impact on the Site Closure Date* [7.14]are being actively tracked. In the D&D projects, day-to-day, rolling project risks are considered in an ad hoc, reactive, corrective fashion, rather than in a formal, planned, proactive, preventive manner.

Based on management estimates of risk for the activities shown on the EMSS, computer-based risk analysis, Monte Carlo simulation, and sensitivity analysis tools were used to develop the schedule probability distribution and risk prioritization. The result is a Pareto chart listing the top 50 sources of schedule uncertainty. The same approach will be taken for cost risk, when conducted. However, a major concern of this validation is that a great deal of valuable risk data are not being utilized. The individual estimators have provided input at the activity line-item level (down to WBS level 6) relative to cost, schedule, and technical risk for each line item. These bottom-up, detailed risk data have never been used in any project risk calculations. Avoiding these data is an indicator that the project is apparently ignoring the WBS as a source of information relative to cost, schedule, and technical risk.

For the EMSS-level quantitative risk analysis that was performed, progress has been reported on the status of the analysis; however, because no true rolling risk plan has been implemented for the projects, progress is not uniformly and formally reported.

Risk Control – The *RFETS Programmatic Risk Management Plan* [7.11] states that projects (PBDs) with a programmatic risk score of 1 receive an annual cost and schedule review by the Kaiser-Hill Planning and Integration Department. No mention of any other periodicity is made in this document. It was noted that the only reevaluation of risk that takes place appears to be in conjunction with project scope or schedule changes.

As previously discussed, one schedule risk analysis has been conducted, and the data have been provided to all levels. The top 10 schedule risks are being actively monitored. However, the lack of systematic, quantitative measures of risk and associated risk planning and tracking causes risk control activities to be sporadic and ad hoc in nature and therefore difficult to assess.

4.2.9 Project Safety Management

Best Practices Model

Although Project Safety Management is not identified as a specific core process in the *PMBOK Guide* [7.2], it is an area of significant concern in the Department of Energy (DOE). This concern is particularly acute in nuclear facilities where issues such as criticality and radiological safety are added to standard industrial hazards. In addition, the prevention of accidents during execution of a major capital project should be of primary concern to all participants and the responsibility of all levels of management and supervision. Accidents cause suffering to those involved and uniformly result in project delay, loss of expertise, and additional expense to stakeholders. The evaluation of this area is focused on minimizing the incidence of these impacts.

Effective Project Safety Management is dependent upon a safety management plan that outlines policies and procedures that are in compliance with regulatory organization standards at Federal, State and local levels. All agencies and their contractors must ensure that they implement employee protection and accident prevention programs that are consistent with that of the overall project safety program. The safety program must be

developed and implemented for each phase of the project and must be integrated into the cost and schedule profile. Scheduled safety reviews must frequently be conducted to rectify any discrepancies or deficiencies found as a result of the review process.

Managers must ensure that appropriate steps and/or corrective actions are taken when a safety concern or issue surfaces. A designated safety manager should be assigned to administer and supervise the overall project safety program. A system must be established to ensure that safety standards and requirements are being practiced and enforced at all organizational levels.

The DOE *Safety Management Systems Policy*, DOE-P-450.4 [7.15], requires a formal, organized process whereby people plan, perform, assess, and improve the safe conduct of work. It is Department policy that safety management systems shall be used to systematically integrate safety into management and work practices at all levels so that missions are accomplished while protecting the public, the worker, and the environment. The DOE safety management system establishes a hierarchy of components to facilitate the orderly development and implementation of safety management throughout the DOE complex. The safety management system comprises six components: (1) the objectives, (2) guiding principles, (3) core functions, (4) mechanisms, (5) responsibilities, and (6) implementation. The objectives, guiding principles, and core functions components of safety management shall be used consistently in implementing safety management throughout the DOE complex. The mechanisms, responsibilities, and implementation components are established for all work and will vary based on the nature and hazards of the work being performed.

Rocky Flats Closure Project Performance Compared With the Standard

Figure 4.9 is a graphical representation of the PricewaterhouseCoopers assessment of the performance of the Kaiser-Hill Team on the Project Safety Management for the 2010 Rocky Flats Closure Project. Figure 4.9 reflects the fact that RFETS is considered to be at the leading edge in management of safety; RFETS is frequently mentioned as an exemplar by the Defense Nuclear Facilities Safety Board (DNFSB), a Congressionally-mandated oversight group that oversees the safety of DOE's defense nuclear facilities.

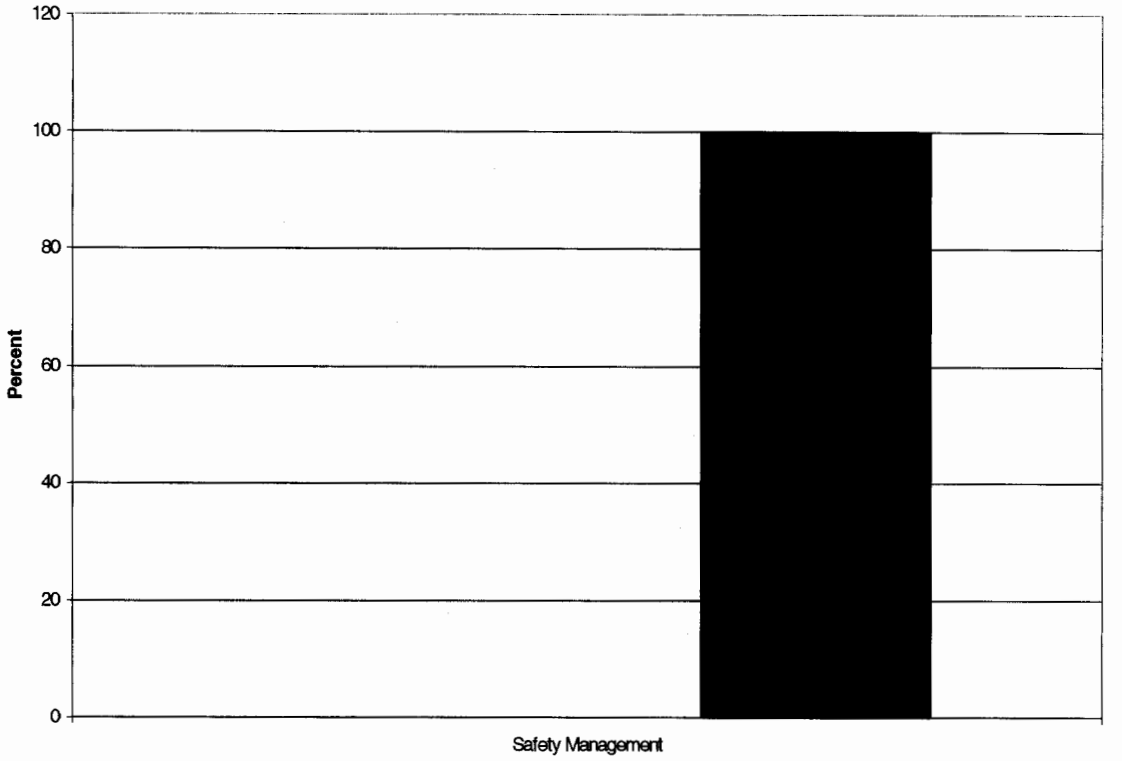


Figure 4.9 - Project Safety Management Performance

As required by Department of Energy Acquisition Regulation (DEAR) 970.5204-2, the DOE *Safety Management Systems Policy* (DOE-P-450.4) [7.15], and the DOE Implementation Plan for DNFSB Recommendation 95-2, Kaiser-Hill has developed an overarching safety management system for the closure project; it is embodied in the *Kaiser-Hill Integrated Safety Management Systems (ISMS) Manual* [7.16]. The Kaiser-Hill system has undergone the required certification review by DOE; a verification assessment was performed and documented in January 1998, and Kaiser-Hill certified that it had completed the required corrective actions on September 29, 1998 (Kaiser-Hill letter 98-RF-04864) [7.17]. DOE reviewed the Kaiser-Hill assertion and approved it with several comments on December 28, 1998 (DOE RFFO letter, AME:SPD:PH03233) [7.18]. Kaiser-Hill certified correction of those comments on March 17, 1999 (Kaiser-Hill letter, 99-RF-01040) [7.19].

The *Kaiser-Hill ISMS Manual* [7.16] clearly describes that "line management" is responsible for safety; this is consistent with the DOE *Safety Management Systems Policy* [7.15]. The *Kaiser-Hill ISMS Manual* [7.16] defines line management as follows: "Line management includes those contractor and subcontractor employees managing or

supervising employees performing work." The *Kaiser-Hill ISMS Manual* also provides overall guidance on how to execute the phases of ISM (define the scope of work, analyze the hazards, identify controls, perform work, and provide feedback). A set of plant standards exists that detail the performance of these phases; the "owners" of each manual are also identified. Each Four Tops subcontractor has concurred with the *Kaiser-Hill ISMS Manual* and is contractually obligated to develop implementing guidance of its own. [7.16]

Screening work activities to ensure that safety-related tasks and responsibilities have been developed for each phase of the project and integrated into the project cost and schedule profile is a specific requirement of the *Kaiser-Hill ISMS Manual.* The screening procedures are implemented by the development of an Activity Control Envelope (1-D55-ADM-02.37) and the Activity Definition Process (1-R32-ADM-02.38). Detailed task planning is accomplished in accordance with the Integrated Work Control Program Manual (MAN-071-IMCP), which has been concurred in by each of the Four Tops sub-contractors [7.20].

In accordance with flowed-down contractual requirements, subcontractors are monitored as part of the "Comprehensive Performance" performance measure (PM). Item 3 of this PM tracks performance in the areas of occupational, radiological, criticality and fire safety. In addition, Kaiser-Hill has a systematic audit program. The *Kaiser-Hill Site Integrated Oversight Manual* (1-MAN-013-SIOM) [7.21] provides direction for the execution of safety and quality oversight. It provides for a tiered audit program that includes independent assessments, management assessments, performance oversight, and program oversight. Deficiencies identified are entered into a corrective action tracking system in accordance with the *Kaiser-Hill Site Corrective Action Requirements Manual* (1-MAN-012-SCARM) [7.22].

4.2.10 Project Procurement Management

Best Practices Model

Project Procurement Management includes the processes required to acquire goods and services from outside the performing organization. The evaluation of this area is focused on the buyer's perspective and includes those activities associated with preparing,

selecting, and administering the contract. The Project Procurement Management process includes identifying how project needs are best addressed through procurement services. It takes into account the project scope of work, source selection, mission and objectives, change control management, and legal requirements. Consideration is also given to contract administration management, product and services cost, and claims management processes.

In order to ensure that Project Procurement Management is being properly conducted, a control system should be developed and implemented to monitor, manage, and resolve contractual issues as they occur. In effect, the system will be used to accurately track cost, schedule, and technical performance to ensure that they remain in-line with project and contractual objectives and agreements. Effective Project Procurement Management will therefore ensure that a process is in place to expedite, review, and disposition contractual changes. This process will address the establishment of the types of contracts required and the appropriateness of contract selection based on the level of acceptable risk.

Before contracts can be administered, a formal methodology must be established to identify the statement(s) of work used in describing procurement items, activities and processes. Project Managers must then assume responsibility for ensuring that contract requirements are integrated into the overall project scope. By ensuring that assignment of appropriate responsibility and authorization level have been instituted, the contract management team can then effectively focus on contract preparation, negotiating, execution, and monitoring.

Effective Project Procurement Management is also defined by how well contract disputes, discrepancies, and claims are addressed and resolved. Therefore, a system should be developed to accurately record, track, document, and resolve these types of issues in a timely manner. Early resolution allows for a more timely contractual end state and achievement of required project deliverables. Success in this area is determined by how, and at what frequency, project managers monitor contractor cost, schedule, and technical performance.

Overall, Project Procurement Management is successful when contract control and management systems are implemented and consistently executed to resolve any contractual issues or changes that may, directly or indirectly, affect the project baseline and its required outcome.

Rocky Flats Closure Project Performance Compared With the Standard

Figure 4.10 is a graphical representation of the PricewaterhouseCoopers assessment of the performance of the Kaiser-Hill Team on the Project Procurement Management for the 2010 Rocky Flats Closure Project. As illustrated in Figure 4.10, the Project Procurement Management Plan comprises three elements: Procurement Plan, Source Selection & Contract Administration, and Contract Change Control. The following is a discussion of the observations that are reflected in this chart:

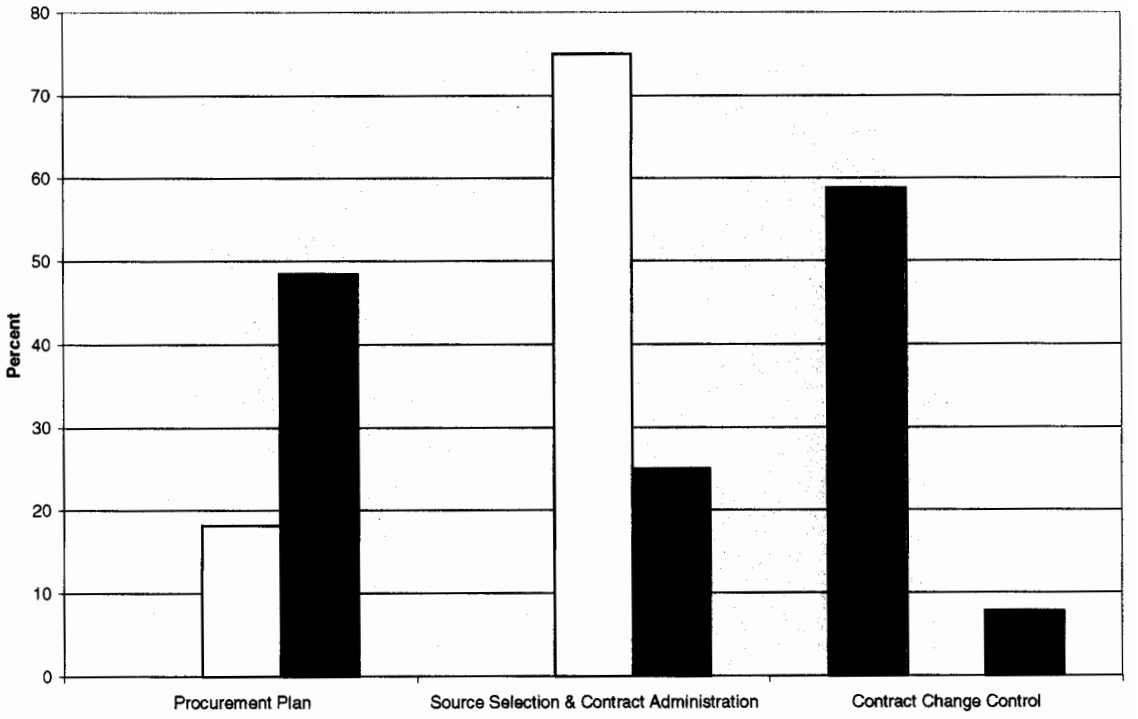


Figure 4.10 - Project Procurement Management Compliance with Industry Standard

Procurement Plan – The *Kaiser-Hill Procurement Plan* [7.24] provides the requirements for preparing, negotiating, executing, and monitoring all procurements initiated by Kaiser-Hill and the Four Tops. Needs for procurement of products and services are reviewed regularly, and whenever practical (in light of radiological, security, and union considerations), work is contracted out or procured from subtier vendors.

The cognizant technical authority develops all statements of work. The *Kaiser-Hill Procurement Plan* [7.24] provides the format and "boiler plate" contractual information for Requests for Proposal (RFPs) issued by the Kaiser-Hill Team. Specific details, especially for procured services, are put into the statement of work (SOW) by the requesting technical authority. RFPs contain a description of the criteria to be evaluated during the source selection process. The Kaiser-Hill Team utilizes two primary types of contracts: Master Task Agreements and Labor/Technical Support contracts. This year, approximately $20 million–$25 million has been let in Master Task Agreements, which are usually of the "fixed unit rates" or "firm fixed-price" types, wherein the service provider absorbs most of the risk. The other primary type of contract administered by the Contracts & Procurement Department is a Labor/Technical Support contract, which is most often let for obtaining level-of-effort (LOE) resources that function in a support role to the individual projects and/or support organizations. The risk for this type of contract is carried by the contracting activity.

A challenge for Kaiser-Hill has developed over the past year regarding the proper vehicle for construction-type contracts. Problems experienced during FY98 have led Kaiser-Hill to a conclusion that increased use of fixed-price contracting is warranted; however, this type of contract is not a panacea. It has proven to be problematic in the DOE complex in the past and brings its own set of contract management issues. In a July 1997 report entitled *Department of Energy's Project to Clean Up Pit 9 at Idaho Falls Is Experiencing Problems* [7.25], the General Accounting Office observed that the " . . . Federal Acquisition Regulation (FAR) suggests that a firm fixed-price contract . . . should be used when the risk involved is minimal or can be predicted with an acceptable degree of certainty." The GAO report goes on to note that a 1993 study of a representative sample of the DOE's Environmental Restoration projects found that cost growth on fixed-price contracts was almost 75 percent. Given the uncertainties of characterization of the RFETS facilities, fixed-price contracts for deconstruction of these facilities should be awarded with full attention to the risks involved and should be monitored closely to ensure their continued efficacy.

Source Selection & Contract Administration – Source selection is dependent upon several parameters, including best value provided by the contractor. Best value is

calculated based upon the weighted average of the Technical/Cost/Past Performance/Resumes components of the proposal. The *Kaiser-Hill Procurement Plan* [7.24] also allows for decisions for contract award to be based upon other factors such as security clearance or special skill requirements. All legal aspects of the contracting process are dispositioned as stipulated within the *Kaiser-Hill Procurement Plan*. In the event that policy and procedures within this plan are unclear, the Kaiser-Hill Legal Office is responsible for resolving contractual issues. If the issue requires RFFO participation, the Kaiser-Hill Contracts and Procurement Office and the Kaiser-Hill Legal Office will ensure that this action takes place.

Contractual oversight is the responsibility of the project manager, the contractor technical representative (CTR), and the service provider. All contractors must report their cost and schedule performance on a monthly basis or as stipulated within the Contract Data Requirement Lists of the contract. Many times, the CTR is the project manager and is able to make a daily assessment of the contractor's performance. The determination that contractual objectives have been achieved is made based upon a review of the contracted SOW by the project manager/CTR. System testing, validation of WAD-level metrics, visual acceptance, or a review of specified contract deliverables can be used as justification that contractual objectives have been met.

Kaiser-Hill has identified a need for training CTRs because of ineffective oversight caused by a lack of knowledge and experience in addressing contract-specific issues, as opposed to the technical work scope. In many cases, there was no connection between the CTRs and the WADlet managers, and the CTRs were at too low level in the organization to make effective business decisions. Deficiencies in CTR training are being overcome by training current and prospective CTRs on issues such as contract closeout procedures, invoice management, and earned value analysis. A combination of computer-based training (CBT) and on-the-job-training is helping CTRs focus on achieving a project management mentality.

Contract Change Control – Kaiser-Hill does not have an effective Contract Change Control system in place today. As a result, the Director of Procurement and Contracts has identified six contracts in which changes must be reconstructed in order to resolve

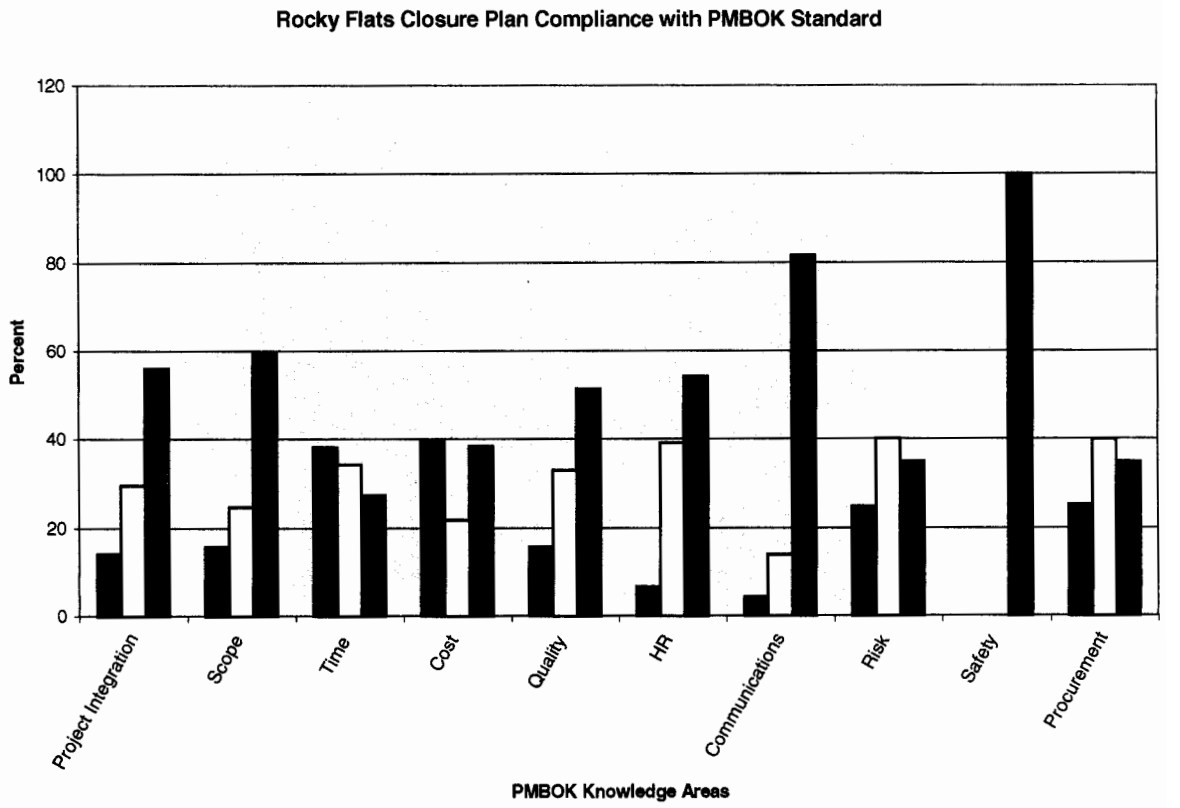
outstanding claims. He is currently pursuing the implementation of improvements in the system.

The Kaiser-Hill General Counsel arbitrates contract disputes between Kaiser-Hill, the Four Tops and architect engineering and construction firms. The RFFO handles contract discrepancies between Kaiser-Hill and DOE.

Contract closeout is determined based upon an evaluation by the Kaiser-Hill CTR. When the CTR concurrence has been obtained, the Finance & Accounting Department resolves payment obligations. P&I Instruction 001 provides specific guidance on final project and accounting closeout procedures and responsibilities.

4.3 Summary of Findings

The following chart represents a summary of the scores assigned by PricewaterhouseCoopers evaluators in comparing each of the project management areas of the 2010 CPB with the industry standard for best practices in project management:



The overall predominance of green on the above chart is indicative of the strong progress that the Kaiser-Hill Team has made in bringing project management capabilities to the Rocky Flats Environmental Technology Site and in changing the culture of the site from a production mentality to a project mindset that recognizes that the Rocky Flats Closure Project has a finite scope and a definite end point. On the other hand, this chart presents indications that the project management capability of the Kaiser-Hill Team has yet to fully mature to realize the potential that can be attained from these capabilities. The following is a discussion of the strengths and weaknesses identified in our review:

4.3.1 Project Integration Management

Strength: *Project Plan Execution* – The Kaiser-Hill project managers exhibit intense focus on the achievement of closure project goals. The series of meetings used to manage the RFCP, which include weekly project meetings, an over-arching meeting to discuss nuclear production issues, and the high-level monthly meetings held to discuss the PPRs and overall project progress, ensure that a consistent focus is applied to the achievement of project progress. **This is a particular area of Kaiser-Hill project management strength.**

Weaknesses: *Project Plan Development* – The lack of proper integration of the P3 schedules and the other management systems seriously undermines the effectiveness of the project management capabilities of the Kaiser-Hill Team by precluding the capability to perform effective resource planning and allocation, critical path analysis, float analysis, or quantitative risk analysis.

Project Change Control – A significant number of changes are processed annually, but the cost of this extensive change process is not captured or analyzed. Furthermore, the assessment performed of the impact of initiating many changes is not always comprehensive; for example, the impact of critical path decisions on support services has been frequently unanalyzed, and scope deferrals do not appear to be fully assessed for life-cycle cost impact.

4.3.2 Project Scope Management

Strength: *Scope Planning* – The RFCP, attendant EMSS, and the performance measures that make up the purple chart provide a comprehensive, top-level understanding of the scope of work involved in closing RFETS. In addition, the work plan guidance issued for use in developing detailed schedules and budgets documents the important assumptions to be used for planning purposes.

Weakness: *Scope Change Control* – In addition to the problems noted above regarding project change control, a number of WAD and WADlet managers perceive the change control process as overly cumbersome. As a result, they are often willing to "absorb" the cost/scope change involved in a particular problem area, rather than process a change request. **If this practice is widespread and if it is combined with change control measures discussed elsewhere, this is a particularly problematic finding, because it can call into question progress reporting and can undermine the ability of project managers to control the true cost of their projects.**

4.3.3 Project Time Management

Strength: *Schedule Control and Schedule Change Control* – With the single exception of what appeared to be a high number of personnel authorized to make schedule changes, Kaiser-Hill exhibits strong control of both the EMSS and P3 schedules and changes thereto.

Weaknesses: *Schedule Development* and *Activity Sequencing* – Problems with the development of the 2010 CPB schedule, which include differences in level of detail and logic relationships used in individual project schedules; an excessive use of milestones; and the lack of an automated interface between the EMSS, which is used for management decision making, and the P3 CPB lead to a project schedule that cannot be analyzed for critical path and available float. Thus management judgment, rather than schedule analysis, must be relied upon for problem resolution; this approach is not consistent with industry best practices and is **one of the principal weaknesses noted in the Kaiser-Hill project management system.**

4.3.4 Project Cost Management

Strengths: *Project Performance* and *Performance Measurement* – Consistent with observations discussed in subsection 4.3.1, close attention to detail on the part of top-level Kaiser-Hill management and Kaiser-Hill project managers has resulted in the ability to closely monitor project costs and their relationship to individual project performance.

Weaknesses: Overall, Project Cost Management is an area of particular challenge for Kaiser-Hill as its project management system matures; **the combined difficulties in the four areas discussed below present a threat to the continued successful management of the RFCP.**

Resource Planning – Because of the limitations in the schedule, discussed in subsection 4.3.3, there exists an inability to integrate individual project information; therefore, long-range resource forecasting and planning, especially at the resource skill level, must be done manually. Kaiser-Hill has put in place a high-level management team that addresses project staffing issues on a biweekly basis; however, the team's efforts are focused on the near term, often ending up being reactive in nature, and are not consistent with P&I or HR resource plans. This has the potential to adversely affect project cost because of inefficiencies in responding to variable resource requirements that are necessary to meet project schedule and milestone commitments.

Cost Estimation and *Cost Control* – Several problems with cost estimation have already been mentioned; for example, the tendency to absorb costs in one account that are, in fact, attributable to another account. Further difficulties include cost estimates based on level loading of support services from year to year and an apparent, consistent bias toward overestimating cost (see Attachment 8.6). The analysis, provided in attachment 8.6, further shows that cost attribution problems, most notably mischarges and accrual issues, are responsible for substantial cost-reporting difficulties; these have the potential to substantially skew the costs reported on a project-by-project basis.

Contingency Management – Although the detailed BOEs have estimates of cost risk, this information is not used for the contingency analysis and management that would be consistent with industry practice. Instead, project managers provide expert-based estimates of risk that are used to estimate the contingency in the cost estimates. Also, more detailed risk analyses performed to date have been based on management estimates of risk for EMSS-level activities and have estimated only schedule risk, not cost risk. Finally, regardless of the risk assessment methodology, a management reserve is not used to mitigate cost risk; the management reserve is accumulated throughout the year by the net accumulation of project cost underruns. This method of developing a management reserve is ad hoc in nature and inconsistent with industry best practices, which would call for a planned reserve based upon cost risk analysis.

4.3.5 Project Quality Management

Strength: *Quality Plan Development* – Kaiser-Hill has developed a clear quality assurance plan that meets the requirements of 10 CFR 830.120 (the DOE QA Rule). The principal subcontractors have all concurred in the Kaiser-Hill QA Plan and have developed derivative plans of their own that are tailored to their particular work scopes.

Weakness: *Quality Assurance* – Quality assurance is threatened by two problems. First, insufficient guidance exists on the maintenance of project documentation; this can lead to problems with continuous improvement, because of insufficient project information upon which to develop lessons learned. Also, the limited trending that is done of quality-related attributes does not presently provide comprehensive information upon which to plan quality improvements.

4.3.6 Project Human Resources Management

Strengths: *Project Organization & Key Personnel Selection, Training Plans,* and *Agency Policies & Labor Relations* – Given the complexities inherent in the Management and Integration organization imposed on the site by the customer, Kaiser-Hill has developed a clear organizational structure and detailed

assignments of functions and responsibilities within the organization. As would be expected in a facility with the complexities of RFETS, the training and qualification requirements are clear, and accurate records are maintained to assure that properly trained personnel perform site work. Although difficult labor relations issues loom on the horizon as the Kaiser-Hill Team workforce begins to downsize, labor relations appear to be stable.

Weakness: *Staff Mobilization Plans* – As has been discussed previously, the inability of the Kaiser-Hill Team to project long-term constrained skill resource requirements presents **a major threat to the ability to predict with confidence that the site closure objectives can be met.**

4.3.7 Project Communications Management

Strengths: **This is an area of particular Kaiser-Hill project management strength and, because of the large number of external contingencies in the RFCP, it is of exceptional importance to the ongoing success of the closure process.** Kaiser-Hill is particularly attentive to input from external stakeholders and actively manages its interface with its customer, DOE. Kaiser-Hill performs extensive communications planning, and as mentioned frequently above, has in place clear, relevant performance measures, which significantly ease the communication of progress to various stakeholder groups.

4.3.8 Project Risk Management

Strength: *Risk Identification* – A number of methods have been used by Kaiser-Hill to identify and highlight risks to the RFCP: the PBD-by-PBD discussion of risks in the PMP; the description of top-level enabling assumptions in the RFCP, for which summary risk-mitigation strategies were developed; the detailed activity-level risk estimates provided in the BOEs; and the recent risk analysis of the EMSS that has identified a prioritized list of risk areas. Through these various means, a substantial number of important project risks have been identified.

Weaknesses: *Risk Planning* and *Risk Implementation & Tracking* – Because of the lack of integration of WBS-level risk estimates, systematic risk planning is not possible with the 2010 schedule; therefore, formal, analytic risk planning cannot be achieved. This problem flows through to an inability to identify risk, other than by either management judgment or ad hoc analyses; to track risk, except at a very high level; or to conduct any effective rolling reassessment and control of risk.

4.3.9 Project Safety Management

Strength: **The integration of safety planning with overall project planning is a recognized strength of Kaiser-Hill,** which was one of the first sites to develop and implement an Integrated Safety Management System that was approved by DOE. Kaiser-Hill remains at the forefront of safety management.

4.3.10 Project Procurement Management

Strength: *Procurement Planning* – Kaiser-Hill provides clear requirements and guidance for all facets of procurement planning, both by itself and by its principal subcontractors.

Weakness: *Contract Change Control* – The conclusion from numerous interviews with project managers is that an effective change control process does not presently exist, as evidenced by the cost control problems mentioned in subsection 4.3.4.

5. Project Management Application to Individual Projects

5.1 Decontamination and Decommissioning (D&D)

Methodology

The Decontamination and Decommissioning (D&D) process at RFETS is addressed through nine Project Baseline Descriptions (PBDs) numbered 014 through 022. In general, each PBD corresponds to a major cluster of buildings at RFETS. For example, PBD 022 addresses D&D in Building 779, PBD 018 corresponds to Buildings 771/774, and PBD 016 concerns Building 371.

The scope of D&D efforts at RFETS is enormous, both in space (since virtually every facility on-site will undergo D&D) and time (because D&D efforts began several years ago and will continue until the site is closed). Consequently, the PricewaterhouseCoopers review team used a sampling approach in conducting the D&D review. The sample comprised four PBDs reviewed in great detail and two others addressed in less detail. The four PBDs reviewed in detail were PBDs 016 (Building 371), 018 (Buildings 771/774), 019 (Buildings 776/777), and 022 (Building 779).

PBDs reviewed in less detail were PBDs 015 (Building 559) and 017 (Buildings 707/750), which are in the very early stages of planning for D&D. Planning is proceeding in accordance with the *RFETS Facility Disposition Program Manual*, which establishes a rigorous project planning and execution approach to D&D, including development and promulgation of Project Execution Plans (PEPs).

All four PBDs selected for detailed review address Type III facilities, which are radiologically contaminated and relatively difficult to put through the D&D process. It is assumed that review of these PBDs would reveal problems in project management (including scope, cost, and schedule) that may not be evident in less challenging buildings. Moreover, the four PBDs selected for detailed review concern facilities at various stages of the D&D process, with Building 779 nearing completion, Buildings 771/774 having passed through much of the planning process and now starting D&D of major systems, and Building 371 just entering the planning phase. The status of work in Buildings 776/777, including "sets" of D&D tasks, is very similar to that in Buildings

771/774. Thus the four PBDs selected for detailed review are representative of the entire D&D process from beginning to end. Finally, no other major D&D efforts on-site have progressed as far as the four selected for detailed review; indeed, work has barely begun on PBDs 015, 017, 020, and 021. In some cases (such as PBD 015), D&D does not begin until 2005 or later. Thus the four PBDs selected for detailed review represent the best opportunities available for reviewing bona fide progress toward D&D at RFETS.

In addition to interviewing managers with responsibility for D&D-related PBDs and WADS, PricewaterhouseCoopers team members also interviewed managers having cross-cutting responsibilities for D&D matters, including those responsible for Closure Projects Engineering and Integration and D&D Advance Planning. We also reviewed the *RFETS Facility Disposition Cost Model*, which applies to buildings and facilities presently undergoing D&D. The model is continually updated to reflect learning curve efficiencies and actual cost and schedule data. Thus our review addressed both vertical project management (i.e., within individual PBDs and building clusters) and horizontal project management (i.e., across multiple PBDs and building clusters).

Results

The project planning process, as reflected in the P&I standards and instructions, appears to be implemented in the D&D arena, as evidenced in the earned value analysis (EVA) reports and other data provided by Kaiser-Hill. Estimates are provided, as required by the standards. A method for determining progress of each activity was identified in advance, and an appropriate work breakdown structure has been established.

Regarding project managers' use of scheduling and project management tools, our review yielded mixed results. One PBD/WAD manager and his associated P&I analysts are definitely using the tools to manage their projects, whereas several others make only moderate use of the tools. One other manager does not appear to be using them actively. Overall, however, available project management tools provide D&D project managers with the information they need to manage their projects satisfactorily. Project managers are well aware of the project management tools and the informational goals for which they are intended. Internal project metrics reflect the overall schedule and site cleanup strategy. Project managers also remain cognizant of external constraints and milestones.

Although good metrics have been established for most projects and the projects reviewed thus far are meeting the metrics, earned value reporting is not being consistently applied in some areas. Some D&D activities are managed using a level-of-effort approach, with progress measured by manpower loading and subjective percentage complete.

Although resource-loaded schedules are being used for many individual D&D efforts, they are not used in a fully integrated fashion, particularly on a cross-project or sitewide basis. This could cause significant problems in the future related to critical skill requirements, especially radiological control technicians (RCTs) and D&D workers.

Because the WBS for landlord activities largely reflects a level-of-effort approach, rather than an activity-based analysis, and because resource-loaded schedules are in many cases inadequate, D&D projects sometimes carry excess landlord and maintenance and operations (M&O) personnel. This issue could be addressed, in part, through improved WBS planning by activity and through resource-loaded schedules. Also, the landlord and M&O cost situation could be improved through the aggressive closure of Type I buildings on-site, consolidation of workers into fewer facilities, and possible redeployment of existing human resources toward D&D efforts.

The change control process appears to provide managers with the proper degree of control over the system; however, regarding upper-level review (above the level of the PBD manager), we were informed of a process that is referred to as the "murder board." This process is intended to retract some part of the individual WAD budget back to management reserve. Even though there were no clear examples of this being a problem, the process does seem to take away from the control exercised by project managers.

D&D project schedule risks have been identified at a high level, and a Monte Carlo simulation has been performed to identify sitewide schedule risks. A project-specific risk plan is included in building-level PEPs, which are still in draft form. Cost-related risks are also considered as part of the *RFTS Facility Disposition Cost Model.* However, for both Buildings 371 and 779, day-to-day, rolling project risks are considered in an ad hoc, reactive, corrective fashion, rather than in a formal, planned, proactive, preventive

manner. D&D project risk management could be improved through greater formality and more detailed planning.

Sources of Uncertainty

As with any validation of complex project management, including scope, cost, and schedule elements, the results of our review of the RFCP are contingent on a variety of factors. To the degree that there is variability or subjectivity in any of the data selected for review and analysis, there is intrinsic uncertainty in the conclusions reached.

In the D&D arena, we identified the following specific sources of uncertainty:

- RFETS has not progressed very far in the D&D process (e.g., less than 3 percent of the total building square footage has completed the D&D process, and substantially less of the more complex, radiologically contaminated facilities have been completed). To date, only relatively easy buildings and facilities have undergone D&D. Even with these facilities, substantial surprises have occurred, resulting in both increased cost and significantly increased waste generation. D&D efforts are scheduled to progress on a building-by-building basis until FY01/02, at which time D&D activities will begin to be conducted more in parallel (i.e., on several buildings at any one time). However, the ability to conduct complex D&D operations in parallel has yet to be demonstrated. To the degree that future D&D activities may be more extensive or complex than those undertaken to date, significant project management problems may be encountered at that time that have not been observed to date.

- Because D&D efforts have not progressed very far, human resource issues (such as a potential shortage of critical RCT and other D&D worker skills) that have not yet occurred may be encountered in thefuture. Such human resource issues may be exacerbated by three factors: the relative immaturity of D&D worker training and qualification programs at RFETS; the absence of an overall, sitewide, resource-loaded schedule; and the overall trend toward lower productivity as closure approaches while some landlord functions continue. "People issues" are among the most critical to site

closure in general and to D&D in particular, yet there are among the most difficult to assess and the most prone to unanticipated change.

5.2 Waste Management

Methodology

Environmental remediation and related waste management activities at RFETS are addressed in many PBDs, but they are the focus of at least four: PBDs 001, 002, 003 and 013 respectively. All these PBDs and the WADs within them are focused on waste disposal and site remediation actions at Rocky Flats. Of these, PBD 001, Buffer Zone Closure Project, and PBD 002, Waste Management Project, reflect active and extensive project situations, while PBD 003, Remediation Waste and Contingency Storage Project, and PBD 013, Closure Caps Project, have not yet begun to assume budgetary, resource, or scheduling significance.

The clear focus of remedial and waste management activities at RFETS is PBD 002, Waste Management Project, with a total budget of slightly more than $800 million. PBD 001, Buffer Zone Closure Project, has a budget of $180 million. The budget of PBDs 003 and 013 have allocated less than $100,000 each for the current and next fiscal years; nevertheless, an overview of activities for these two PBDs is provided below. However, much of the remaining discussion focuses on PBDs 001 and 002 and the WADs contained therein.

Results

The project planning process, as reflected in the P&I standards and instructions, is generally well represented in, and being implemented in, the environmental remediation (ER) and waste management project areas, as evidenced in the earned value analysis (EVA) reports and other data provided by Kaiser-Hill. A method for estimating and tracking the progress of each activity was determined in advance, and an appropriate work breakdown structure has been established to reflect this. In the case of some WAD-level activity within PBDs 001 and 002, however, these estimates were not consistently tied to actual field events and progress.

Regarding project managers' use of scheduling and project management tools, we have reviewed each PBD/WAD with their respective managers, as well as with the lead P&I manager for each PBD. Selected Rocky Mountain Remediation Services (RMRS) managers were interviewed to gain further insight. The results of these interviews give a mixed review on the overall use of the basic project management tools. One PBD/WAD manager and his associated P&I analysts were definitely using the tools to manage their projects, whereas others were somewhere in the middle, and one didn't seem to be using them at all. They did, however, seem well aware of these tools and the informational "goals" for which they were intended. The P&I analysts acknowledged our observations and indicated that in the ER/waste management arena, the WAD managers were using the tools more often and that the PBD managers were able to explain what this information showed and clearly understood how it was being used. For the most part, these comments supported our observations.

The project management tools, coupled with the internal project metrics that are linked to the project schedule and overall site cleanup business strategy, provide the project managers with the information they need to manage their projects satisfactorily. The project expectations of the waste management PBDs are linked through other PBDs/WADs to the point that they can react to internal changes. The managers are also trying to manage resources while watching and reacting to the off-site or external milestones as best they can.

In some areas, earned value reporting is not, in some areas, being consistently applied. Some ER/waste activities are managed using a level-of-effort approach, with progress measured by manpower loading and WAD manager estimate of percentage complete. Although resource-loaded schedules are being used for many individual WADs, they are not used in a fully integrated fashion, particularly on a cross-project or sitewide basis. This could cause significant problems in the future related to waste processing, movement of stored material off-site, and critical skill requirements that may be needed to support handling and disposal of special waste types, particularly if volumes accumulate and then need to be moved in (currently) unanticipated quantities at one time.

These issues are germane to a series of related issues and milestones that cut across PBDs 001 and 002 (via the WADs within each) that deal with on-site treatment and off-site

disposal of certain materials (sites being treated under PBD 001 generate the materials of concern under PBD 002), particularly the TRU/TRUM wastes (PBD 002, WADs 04 and 05), liquid wastes (PBD 002, WAD 48), and non-TRU wastes (PBD 002, WAD 06). Current and pending storage of wastes during the next two to three years (particularly PBD 002, WADs 07, 08, 50, and 62) represents the area of the most considerable budgetary, scheduling, and resource management fluctuation, much of which, while figuring in the thinking and planning of PBD and WAD managers, has not been factored into the project management planning and forecasting in a concrete way. It should be noted that some of the constraints herein are political; for example, the project team demonstrated an understanding of the disruptions to planning that could be encountered if budgeting for additional on-site storage facilities were incorporated into project planning before absolutely necessary.

When additions or changes have been required or are anticipated, the change control process appears to provide managers with the proper degree of control over the system. However, regarding upper-level review (above the level of the PBD manager), we were informed of a process that is referred to as the "murder board." This process is intended to retract some part of the individual WAD budget back to management reserve. Even though there were no clear examples of this being a problem, the process does seem to take away from the control exercised by project managers.

PBDs 003 and 013 are both considered to be support PBDs to the larger Waste Management Project (PBD 002). The manager of this PBD also manages several WADs under PBD 002. In PBD 003, the Corrective Action Management Unit (CAMU) has been set up to provide for ad hoc on-site storage of various waste types "in lieu of other options." As such, PBD 003 is designed and intended to provide options and relief for slowdowns encountered under PBD 002, particularly in anticipation of pending difficulties in direct shipment of wastes from RFETS to off-site facilities. Problems to date include waste characterization, regulatory approval for waste treatment and removal, and the availability of off-site locations that can accept chemical and LLMW from Rocky Flats.

Nevertheless, to date, virtually all the activity on this PBD remains in the "anticipated" category, likely to include some building demolition and new on-site storage preparation by the years 2001–2002.

PBD 013 is the Closure Caps project and refers to management and disposition of the 300 Area and 700 Area caps. To date, work has comprised occasional regulatory review to check external parameters and to ensure consistency with RCRA (because these are RCRA caps). A modicum of R&D time has been put into consideration of alternative cap types, in terms of both technical efficacy and potential for regulatory flexibility. Total budget for this PBD for FY99 is only $30,000.

Sources of Uncertainty

As with any validation of complex project management, including scope, cost and schedule elements, the results of our review of the RFCP are contingent on a variety of factors. To the degree that there is variability or subjectivity in any of the data selected for review and analysis, there is intrinsic uncertainty in the conclusions reached.

In the ER/waste management areas, specific sources of uncertainty include these four issues:

1. RFETS has made a good start in the ER/waste management area, but most of the milestones will not be reached for two to five years. One very positive outcome of this is that the majority of WAD managers whom we interviewed on this group of PBDs demonstrated awareness of problems to be anticipated and were also able to discuss planned response strategies to various contingencies. Conversely, there remained a basic wait-and-see attitude about the majority of such contingencies, so little was being done by way of formal planning to prepare for these circumstances.
2. Progressing of task completions is not consistent across all WADs. For PBD 001 and for some WADs in PBD 002, definitions and agreements are reached in the planning phase as to what it takes to satisfy progress. However, other WADs in PBD 002 wait until the execution phase to determine, which places some uncertainty on the monthly reliability of some EVA parameters.
3. The delay of shipments of TRU waste to WIPP continues to be problematic. Even though WIPP has formally opened, the relatively simple initial shipments

from the Los Alamos National Laboratory required new/additional controls to be implemented. This could indicate that the requirements for shipments from RFETS, whenever they are allowed to commence, have yet to be finalized.

4. Because waste management efforts have not yet reached critical stages regarding schedule or related regulatory pressures, certain human resource issues (such as a potential shortage of critical worker skills) that have not yet occurred may be encountered in future. Such human resource issues may be exacerbated by factors such as worker training and qualification programs at RFETS; the absence of an overall, sitewide, resource-loaded schedule; and the overall trend toward lower productivity as closure approaches. As mentioned above, this issue could be most problematic in the ER area if and when key off-site disposal milestones suddenly change or emerge. These could potentially require a sudden ramp-up in trained staff to move significant amounts of hazardous and radioactive waste under strict regulatory guidelines and public and media scrutiny. If such a requirement were to occur coincident with the need to perform residue-related shipments, conflict in the area of a key shared resource, shipping-experienced personnel, would occur. This type of situation will undoubtedly be the emblematic "litmus test" for this series of PBDs.

5.3 Special Nuclear Material

Methodology

Projects associated with special nuclear material (SNM) storage, treatment and shipment are contained in eight PBDs: 004, 006, 008, 009, 010, 011, 012, and 024. These PBDs cover a variety of tasks, including construction (004 and 008), safeguards and security (024), residue processing (008, 009, 010, and 011), and SNM movement/shipment (006, 012). These projects rest squarely on the critical path for site closure and are therefore the subject of a substantial number of performance measures and contractual incentives. As such, they represent project management at RFETS at its most intensive.

Several of the PBDs are at or near completion (004, 010, and 011); therefore, somewhat less effort was spent reviewing the status on these projects in detail. In fact, the work for two of these projects was largely complete before the completion of this review. For the

remainder, detailed review of the status of completion was performed. In addition, an understanding was developed of the basis for the reported progress.

The projects reviewed in detail constitute some of the most hazardous work remaining at RFETS; therefore, the detailed daily planning of the work was reviewed, including attending detailed planning meetings, reviewing production-related documentation, assessment of work planning, and walk-downs of the work areas. In addition, extensive reviews were completed of detailed schedules for work performance and the relationship of such detailed schedules to the overall planning at the site. Finally, a series of approximately a dozen interviews were performed to answer questions that had arisen and to probe details regarding production status, change control, and performance measures (to name just a few of the subjects covered).

Over and above the project-related assessment (discussed above), several lines of inquiry were pursued with senior Kaiser-Hill management. The weekly nuclear production meeting was attended frequently to evaluate its use as a high-level interface meeting. Senior production managers were interviewed to determine the methods used to set priorities with regard to competing production issues. Finally, overarching schedules were reviewed to determine their impact on day-to-day operations.

Results

The residue processing projects have an extensive set of meetings in place to assure that required integration actions are discussed, agreed to and executed. These meetings include, but are not limited to, production plan-of-the-day meetings, which provide the detailed, nuts-and-bolts integration required to perform nuclear work; weekly planning meetings, both on the project level to prioritize work and at the building level to integrate the work of various projects with required safety-related systems work; a higher-level nuclear production meeting that not only addresses production status, but takes on high-level integration issues; and a biweekly senior management meeting to discuss staffing issues. This series of meetings is capped off by an internal Kaiser-Hill review of PPRs and a joint meeting with DOE-RFFO to discuss sitewide priorities and issues. It is largely through this series of meetings that interface issues that affect nuclear operations are addressed and resolved.

The technical scope of the projects associated with residue processing has been the subject of substantial planning and technical analysis. This is in response to a number of drivers, including recommendations made by the Defense Nuclear Facilities Safety Board (DNFSB), most notably 94-1, which specifically addressed plutonium residues, and 94-3, which encouraged DOE to take a systems engineering approach to planning for the interim storage mission at RFETS; the fact that the work resides on the present critical path to site closure; and the need to perform detailed planning for nuclear and radiological work, in general. This has led to using a substantial number of performance measures (both project-level and site-level, i.e., purple chart) to track progress in this area, clear documentation of assumptions necessary for successful completion of work, and the close involvement of internal and external stakeholders by Kaiser-Hill in their planning for this work. In addition, work progress is closely followed, and potential changes to scope are evaluated frequently to determine their potential for accelerating or meeting schedule commitments. However, the planning of scope is not without its weaknesses; for example, the uneven work breakdown structure, yielding a number of very large WBSs and activities that would benefit from finer structure; a number of project-level assumptions that require the action of outside entities that are not being effectively followed in the RFCP; and the carrying of known changes to scope as "open items" without documentation as to a closure path.

Because these projects make up the presently identified critical path, consistent and senior management attention has been paid to schedule progress. Because this work has been planned out to a very detailed level, opportunities are rapidly identified to use slack resources; however, other limitations such as the number of nuclear-qualified personnel and security force coverage issues can make this difficult (as discussed further below). Projects such as PBDs 004 and 008, where design and construction activities are still ongoing, have developed a number of positive practices for progressing this type of work that should be reviewed for applicability to the large amount of D&D work that is upcoming. At least three challenges remain, however:

1. Accurate changes to schedule and cost need to be processed. For example, some PBD managers have chosen to "eat" cost problems at the WADlet level (when the overall WAD was within cost variance boundaries), rather than run through the change control process to recognize the cost control issue. Another manager decided that it was "not worth it" to process a baseline change that was known to

be required, because of the relative proximity of the project to completing all work (but not to formal closure).

2. A significant amount of work seems to reside in PBD/WAD-level "project management" accounts that are level-of-effort and are not amenable to schedule and cost analysis.
3. Construction projects often appear to exist as simple cost line items until the construction contracts are issued; therefore, little schedule information exists for these activities until the contract is awarded.

From the standpoint of monitoring costs, those residue projects with a well-developed set of performance measures (and there are many) have distinct advantages over many other projects at site. This, coupled with the fact that they are on the critical path, has permitted Kaiser-Hill and DOE-RFFO management to provide additional assets when they are required to maintain schedule progress. In addition, accumulated experience in residue processing and residue shipping, coupled with detailed engineering analysis, has led to schedules that have a lower degree of uncertainty. Even with the high-priority awarded residue processing and related projects, cost and schedule problems have developed because of difficulties with scheduling and/or integrating important shared resources at the site. In the past, significant problems existed because of limited through-put capability in the area of nondestructive assay (NDA) equipment; the site has made a substantial investment in additional NDA capacity, projectized the management of this asset, and appears well on the way to solving this specific shared resource issue. However, others exist or are looming. Available, qualified staffing is one that has already been mentioned and will be discussed further below. Another is the availability of the security force to staff the numerous evolutions that require their support. Finally, one that is more applicable to the D&D field is analytical laboratory support. A consistent approach to the handling of shared resources needs to be developed; a possible starting point is the integrated transportation planning that is ongoing under PBD 012.

Quality assurance in the field of residue processing is very tightly controlled by both standard nuclear industry shipping protocols and by additional stringent standards (for example, DOE Standard 3013) developed for the shipment of plutonium residues. Significant reliance is placed on completing work in accordance with detailed, verbatim compliance procedures, which are developed in accordance with the site Integrated Work

Control Program and provide a comprehensive set of precautions and requirements to ensure that work performed with residues is safe and of consistent quality. Feedback and improvement on safety-related issues are comprehensive; in addition, site contractors have requirements to provide quarterly reports on quality indicators (although trending of this work is not presently funded). However, with respect to the scheduling, planning, and estimating function, the feedback process is less well developed. Some information could be developed from the project closure process, but few WADs have been closed and the knowledge of the value and content of this process is inadequate. Also, without an instruction on the maintenance of project-related documents (before they enter the records control realm), significant amounts of project "best-practice" information could be lost before personnel get around to closing out projects.

The coordination of human resources, specifically nuclear-qualified workers, was a problem raised by several PBD managers. Review of the PPRs for residue processing indicates that even though these projects are judged to be critical path, progress was frequently stymied or curtailed because of the lack of qualified workers. This is not simply a human resource issue; as discussed elsewhere, the maturity of the 2010 schedule did not allow for summing of resource requirements across PBDs (or within PBDs, for that matter). Since the training of a nuclear worker can take up to six months (with obtaining a DOE "Q" clearance being a controlling path item), substantial attention needs to be paid to addressing this issue, which has been somewhat muted to date because personnel with previous clearances have applied for recent openings; however, this trend will not necessarily continue. Also, the fact that frequent stoppages or slowdowns were encountered on priority projects can cause one to question the potential impact on lower-priority work. Some personnel interviewed expressed concern that the next potential human resource/training issue was the guard force.

Communications was found to be a particular strength among the residue processing and related projects. The interlocking meetings, capped by the weekly nuclear production meeting and enhanced by the daily report system, appear to permit project-related information to be well disseminated. A singular exception, which has already been mentioned, is information regarding the practice of, and the need for, project-closure efforts and reports as an important part of the feedback and improvement process for scheduling, planning, and estimating.

Sources of Uncertainty

The ability for RFETS to ship residues depends upon a complex network of agreements with both external stakeholders and other DOE entities. A number of the most important of these relationships are noted in the RFCP "Enabling Assumptions." Active management of this network of agreements will be necessary for Kaiser-Hill to execute its present 2010 schedule. In this vein, the site is presently working on an integrated transportation plan, which is an important evolution. If properly implemented, this initiative should permit Kaiser-Hill to identify key shared resources and potential bottlenecks in the shipment of both SNM and the various waste forms that must be shipped off-site. In this vein, the weekly telephone conferences held under PBD 012 are cited as an excellent example of communications and management of stakeholder expectations.

Significant scope changes have been negotiated in some PBDs/WADs to facilitate schedule issues. These changes have deferred work that would have been performed this year to next year (and in some cases for as long as six years). This work will now be completed at costs that are likely to be escalated from today's; although added experience and potentially reduced levels of control (due to lower levels of overall risk) may offset this cost differential (as asserted in several change proposals), such efficiencies have yet to be demonstrated. Furthermore, the situation may not be that simple; as the site workforce ages and/or undergoes attrition, the capability to perform some categories of work may be reduced. This type of "life cycle" thinking was not clearly displayed in change proposals that significantly delayed the accomplishment of work scope.

During FY98, significant problems were encountered in the area of construction contracts; a number of these impacted residue-processing work. Negotiations are still ongoing to determine the final costs for a number of construction jobs. One particular corrective action mentioned by personnel interviewed was expanding the use of fixed-price contracts and decreasing the use of cost-type contracts. Important construction-related work remains under PBD 008 for residue processing. Over and above this work "deconstruction" or D&D contracts are in the offing for any number of projects. It will be an important part of ongoing improvement efforts to show that the site has solved its construction management issues.

The site is presently undergoing a review of the closure project schedule to attempt to accelerate site closure to 2006. The lack of a disciplined, active feedback and improvement process for scheduling, planning, and estimating, as noted frequently in the review of residue-processing work, can adversely impact the ability to meet such an accelerated schedule even more drastically than it impacts the 2010 schedule. Focus should be applied to learning lessons not only from problems experienced in these high-priority projects but also from the good practices developed, while they can still be applied to remaining residue work and potentially impact downstream nuclear and construction work.

5.4 Support Projects

The Rocky Flats Closure Project Baseline contains a number of projects that do not produce contract deliverables, but provide required support to the production projects. It also contains several projects that are either inactive or operating at such a low level of activity as to be insignificant to this validation. Those projects are discussed below.

5.4.1 Project and Site Management

Methodology

This area encompasses the overall management of the Rocky Flats site and the Rocky Flats Closure Project by the Kaiser-Hill Team and includes PBD 030, K-H Project Management and PBD 034, Management Project. These PBDs are broken down as follows:

PBD 030/WAD 24

- Environmental Compliance

PBD 030/WAD 45

- Program Direction for the Environmental Restoration/Waste Management, Nuclear Operations, and D&D Programs
- Planning and Integration
- Records Management and Document Control
- Management and Oversight of the Architect Engineer/Construction/Construction Management Subcontracts

PBD 030/WAD 46

- Health and Safety Services
- Quality Assurance
- Independent Safety Oversight
- Events Analysis and Regulatory Integration
- Nuclear Engineering and Radiation Protection Programs and Support Services
- Site Engineering Standards, Procedures and Support Systems

PBD 030/WAD 63

- Cost Reduction Proposal
- Incentive Fees

PBD 030/WAD 84

- Occupational Health Support

PBD 030/WAD 85

- Work Force Restructuring

PBD 034/WAD 44

- K-H General Management and Subcontractor Overhead
- Provide General and Administrative Management Support

These WADs include most of the basic project management processes necessary to execute the Rocky Flats Closure Project; the management and support processes necessary to operate the Rocky Flats site; and many of the support activities necessary to execute the individual SNM, D&D, and waste management projects on the site. Our review focused on the systematic evaluation of the project management capabilities that Kaiser-Hill has in place to support the 2010 CPB, as discussed in section 4.1. To that end, we conducted interviews with a broad spectrum of the Kaiser-Hill Team members responsible for development and implementation of the project management methodologies in place at Rocky Flats. In addition, in order to assess the contribution of the support functions on the site to the 2010 CPB, we conducted numerous interviews with a sampling of the WAD and WADlet managers responsible for providing support services. The focus of those interviews was to determine the types of support provided; to identify the methods used to estimate the scope, cost, and schedule for this work; and to assess whether that support activity should be an overhead or a direct charge to the projects.

Results

The results of our assessment of the Kaiser-Hill Team project management capabilities are stated in our comparison with the industry standard for project management in section 4.2 of this report. Fundamentally, we found that Kaiser-Hill has brought to the Rocky Flats Closure Project the elements of a sound project management capability. Kaiser-Hill has also achieved the culture change necessary to turn the Rocky Flats site from one with an operational mentality with an unlimited time horizon to a project orientation with a defined work scope and a finite end point. This culture change is evident in discussions with all levels of personnel within the site. However, as Kaiser-Hill moves toward the even more aggressive goal of site closure by the year 2006, it is clear that additional improvement will be needed to bring project management to the level of maturity necessary to meet this goal, or even the original goal of 2010.

Our interviews of a broad sampling of the managers responsible for support services on the site identified a number of instances in which improvement is needed to develop a mature project management capability on the site. Most of these are identified in the discussion in section 4.2. Examples of these issues and other observations made during these interviews are as follows:

- Several WADlet managers stated that a significant portion of the work being performed under their WADlets could be charged directly to the projects, but is being charged to the "overhead" support project because it is too cumbersome to get scope and funding changes through the change control process. Examples include:
  - PBD 030/WAD 46/ WADlet 1.1.08.04.07.05 – Analytical Laboratories
  - PBD 030/WAD 24/WADlet 1.1.08.04.01.01 – Effluent Air Monitoring
  - PBD 030/WAD 46/WADlets 1.1.08.04.04.06 and 1.1.08.04.04.08 – Site Engineering Integration and Engineering Support Services, respectively
  - PBD 034/WAD 44/WADlet 1.1.08.02.01.27.01.03 – Customer Support Services & IT Projects
  - PBD 034/WAD 44/WADlet 1.1.08.02.01.11.03 – Training Programs
- Scope changes to accelerate site closure activities do not always address all the impacts of those changes on the site support services required. Examples include PBD 030/WAD 46/WADlet 1.1.08.04.07.05 – Analytical Laboratories and PBD 030/WAD 24/WADlet 1.1.08.04.01.01 – Effluent Air Monitoring.

- Since project managers are not responsible for the budget expenditures of site support activities funded under PBD 030 and 034, they often do not consider the effect of their activities on the support activities. One comment from a support activity manager was that most of the information that he obtains relative to the need for services comes from attending planning meetings, rather than from the schedule.
- Although the perception on the part of many WAD and WADlet managers is that the change control process is unnecessarily cumbersome and time-consuming, none of them tracked the man-hours expended on the process, so hard data is not available. It is clear, however, that the process is an inhibitor to initiation of changes to recognize changes in work scope.
- It is also clear that because many of the support services are level-of-effort and have no clear project identification, they are the legitimate target of much of the management cost-cutting measures on-site. These measures include provision of budgets that are substantially below projected "need," the use of "murder boards" to identify efficiencies and cost savings to be used to "mine" money out of the budget for fund management reserves, and direction not to fill any vacancies that arise because of retirement or resignation of Kaiser-Hill Team personnel.
- Much of the work that is currently level-of-effort could be time-phased with some effort and coordination with the projects. This would avoid much of the current cost and schedule variance that now simply adds confusion to the PPR.

Sources of Uncertainty

These two PBDs (030 and 034), together with PBD 036, Indirects, account for about $3,110 million of the $7,259 million (about 43 percent) in the 2010 CPB budget. Since most of the activities in these PBDs are level-of-effort, it is extremely difficult to justify the budgets. The fact that Kaiser-Hill has been successful in "mining" funds out of these PBDs is a good indication that there is still substantial excess capacity in these areas.

5.4.2 Infrastructure and Utilities

Methodology

The infrastructure and utilities projects at RFETS are addressed in two PBDs:

- PBD 025, which is made up of WADs 51 through 55. Each of these WADs covers a specific project associated with an upgrade or improvement to the existing infrastructure:
  - WAD 51: Representative Effluent Sampler
  - WAD 52: Infrastructure Replacement
  - WAD 53: Air Monitoring Improvement
  - WAD 54: Plant Fire Security System
  - WAD 55: Criticality Alarms
- PBD 023, which is made up of WADs 39 and 40. Each WAD covers the continuation and maintenance of existing infrastructure:
  - WAD 39: Utilities (water, nitrogen, steam, gas, and electric)
  - WAD 40: Infrastructure Services (food services, metrology laboratories, emergency preparedness, logistics, fire operations, laundry, air filter testing, and alarm systems)

The scope of these infrastructure and utilities projects is very similar in that they all provide sitewide services.

In addition to interviewing managers with responsibility for utility- and infrastructure-related PBDs and WADs, our team members reviewed documentation associated with the WADs and interviewed managers affected by the infrastructure projects.

Results

The project planning process, as reflected in the P&I standards and instructions, appears to be implemented in the utility and infrastructure area, as evidenced in the earned value analysis reports and other data provided by Kaiser-Hill. Estimates are provided, as required by the standards. A method for determining progress of each activity was determined in advance, and an appropriate work breakdown structure has been established.

Regarding project managers' use of scheduling and project management tools, our review yielded mixed results. One PBD/WAD manager and his associated P&I analysts are definitely using the tools to manage their projects, whereas several others make only

moderate use of the tools. Project managers are well aware of the project management tools and the informational goals for which they are intended.

Earned value reporting is not being consistently applied in some areas. Some infrastructure activities are managed using a level-of-effort approach, with progress measured by manpower loading and subjective estimate of percentage complete. While on the surface this may seem alarming, further analysis shows that many of the infrastructure and utilities tasks (such as those in WADs 51, 53, 54 and 55) are level-of-effort and are not associated with completion of a specific project. Because the work breakdown structure (WBS) for utilities and infrastructure services largely reflects a level-of-effort approach, rather than activity-based analysis, and because resource-loaded schedules are in many cases inadequate, the other sitewide projects sometimes carry excess landlord and maintenance and operations (M&O) personnel. This issue could be addressed through development of a more detailed WBS by activity and through development of resource-loaded schedules. In addition, the landlord and M&O cost situation could be improved through the aggressive closure of Type I buildings on-site, consolidation of workers into fewer facilities, and redeployment of existing human resources toward other efforts.

The change control process appears to provide managers with the proper degree of control over the system. However, regarding upper-level review (above the level of the PBD manager), PwC was informed of a process that is referred to as the "murder board." This process is intended to retract some part of the individual WAD budget back to management reserve. Even though there were no clear examples of this being a problem, the process does seem to take away from the control exercised by project managers.

No project schedule risks have been identified other than those included in the high-level Monte Carlo simulation that has been performed for sitewide schedule risks.

Sources of Uncertainty

As with any validation of complex project management, including scope, cost and schedule elements, the results of our review of the RFCP are contingent on a variety of

factors. To the degree that variability or subjectivity exists in any of the data selected for review and analysis, there is intrinsic uncertainty in the conclusions reached.

In the utilities and infrastructure area, specific sources of uncertainty are as follow:

- RFETS has not progressed very far in the D&D process. To date, only relatively easy buildings and facilities have undergone D&D. D&D efforts are scheduled to progress on a building-by-building basis until FY01/02 at which time, D&D activities will begin to be conducted more in parallel (i.e., on multiple buildings at any one time). The estimates for utilities and infrastructure support have been developed based on achieving the D&D schedules and eliminating buildings and their support requirements. Failure to achieve these closures will directly impact costs.
- There have been some attempts to move responsibility to mission-specific projects for some services that used to be provided as part of infrastructure. Examples include laundry services, nondestructive radiographic testing (part of metrology), and property management within the boundaries of project-specific facilities. For example, the WAD manager is now responsible for decontaminating property for disposition and getting it to the loading dock. WAD managers may be able to improve efficiency considerably if they focus on identifying recoverable property and getting it out early, which can reduce mortgage costs. An area for inquiry is how well the WAD managers understand this. Though this is no longer technically an area of uncertainty for WAD 40, it does become an area of uncertainty for mission-specific projects and therefore the RFCP as a whole.

5.4.3 Indirect Charges

Methodology

PBD 036 includes indirect charges such as employee benefits, paid absences, and payroll tax programs. This PBD covers the pools for these three programs; it does not include the cost of administering and managing these programs, which is covered in PBD 034.

1. Employee benefits include the following for all eligible *active and inactive* employees of Kaiser-Hill and the Four Tops:
    - Medical, dental and life insurance programs

- WS&A
- Short term and long term disability
- Pension
- Thrift plan
- Savings plan
- COBRA
- Benefit services

After site closure, both the cost and administration of employee benefits for inactive employees become the responsibility of DOE.

2. Paid absences includes the following for all eligible *active* employees of Kaiser-Hill and the Four Tops:

   - Holidays
   - Time off with pay (TOWP)
   - Sick leave
   - Funeral leave
   - Jury duty
   - Snow days

3. Payroll taxes provide funding for the employer's share of Federal, State, and local payroll taxes for active employees of Kaiser-Hill and the Four Tops.

PricewaterhouseCoopers interviewed the managers and human resources professionals responsible for these benefits.

Results

The scope for this PBD is well planned and well defined in the site WBS. Management recognizes the need for professional and prudent control of fringe benefit functions. The assumptions relative to the scope of the project are well documented (these assumptions are not to be confused with the assumptions on which the estimates of future fringe benefit costs rest). Insurance companies run the plans, and even the self-insured health

benefits program is administered by an insurance company. Internal controls are therefore established and followed.

The life-cycle costs of this PBD rest on the headcount assumptions to which various fringe benefit types apply and the expected unit costs of each fringe benefit type. In general, these are monitored at a detailed level. Furthermore, many of the key assumptions, such as headcount assumptions for future years, are, in effect, critical performance measures for the site and are watched and managed very closely. Cost estimates are based on the number of hourly and salaried (active and retired) employees. Each of these labor categories is further broken down by the enrollment distribution across the plans available to each labor category.

Cost estimates depend on headcount assumptions and unit costs for each fringe benefit type. A headcount table, subject to formal change control, is used. Unit costs are readily determined because the cost of each fringe benefit type is generally known, as specified by contract.

Monthly cost performance is regularly monitored. Should a pattern of negative monthly cost variances occur, a mechanism exists to establish a team to understand the reasons and recommend corrective action. Cost variances are measured monthly. For the past fiscal year, there was a small positive cost variance due to prudent management of fringe benefits. This gets distributed back to the programs via a financial change proposal (FCP).

The process by which fringe benefit costs are estimated appears sound. Internal controls are in place to ensure that costs remain within scope and that cost variances are addressed. The only area of concern noted above is the treatment of inflation for fringe benefit estimates, since inflation costs for health insurance are likely to significantly exceed general site-wide inflation assumptions.

One important issue is recommended for management attention. The current practice is to burden back to the programs both the fringe benefits for active employees and the fringe benefits for retired employees. Clearly, active employees are the drivers for their own fringe benefits. However from a project management cost control standpoint, there

is no logic to burdening the projects with fringe benefit costs for retirees, particularly in a facility where there is a decreasing workforce that is expected to go to zero by the end of the project. Fringe benefit (FB) costs for retirees are projected to exceed those for active employees by 2004 in the 2010 CPB. In the extreme, under current projections, the 47 remaining employees in 2010 would carry a burden of roughly $29 million in FB costs for retirees, or a burden of $616,000 per employee. This skewing of the cost of Kaiser-Hill Team employees creates a situation in which make/buy decisions cannot reasonably be made and makes project cost control nearly impossible.

Sources of Uncertainty

Factors contributing to uncertainty include expiration of the current health insurance contract in 2003, assumptions about the rate of exodus from the Kaiser-Hill workforce, and the unit cost of meeting retiree health insurance requirements.

- Health Insurance – With respect to unit costs, there is no inflation built into the cost estimates for the 2010 plan, other than an assumed 33 percent increase in health insurance costs under one plan in 2003 (based on analysis by Kaiser-Hill's actuary, Mercer). Though it is sitewide policy not to include inflation assumptions in future cost projections, it is also true that the inflation rate for health insurance costs is likely to exceed inflation for other costs at the site. The assumed 33 percent increase in FY03 mitigates this problem somewhat, as do conservative assumptions regarding how participants are distributed over available plans. Current distributions among health plans are assumed to remain constant, even though relative costs of the plans will change over time. Because Kaiser-Hill has initiated actions to encourage employees to use health maintenance organizations (HMOs) it is expected that fewer participants will remain in the more expensive self-insured plans.
- Headcount – Since Kaiser-Hill closely manages to the headcount table, there appears to be little exposure to cost risk due to inaccurate headcount assumptions. Furthermore, even if actual headcounts deviate from the plan, benefits for actual employees will offset benefits for retired employees to some extent.
- Retiree Health Benefits – This is a major area of uncertainty. There are actuarial estimates of health benefit requirements and a reasonably good estimate of the number of retirees over time. However, the self-insured health insurance program provides virtually unlimited benefits, and costs could escalate dramatically as the

retired population ages and increasingly expensive health care options become available.

5.4.4 Analytical Services

Methodology

Analytical Services are addressed under WAD 41 within PBD 027; they are organized into the following five areas of work scope:

1. Laboratory Management and Integration
2. On-Site Commercial Laboratories
3. On-Site Radiological Laboratories
4. Off-Site Commercial Laboratories
5. Sample Team Operations

Specifically excluded are the following activities, which are all now within the scope of individual projects/programs:

- Analytical data verification services
- Analyses performed by on-site commercial laboratory
- Analyses performed by on-site radiological laboratory beyond single shift operating capacity
- Sample packaging and shipping and analyses performed by off-site commercial laboratories
- Sampling services

Analytical services under PBD 027 are provided for the following 31 WADs in FY99:

WAD 01	Buffer Zone Closure Project
WAD 02	Sanitary Waste and LLW/LLMW Project
WAD 04	TRU/TRUM Storage Project
WAD 06	Waste Disposal Project
WAD 07	Waste Treatment Project
WAD 13	Pu Processing and Packaging Project
WAD 17	Uranium Decontamination Project
WADs 19-22	SNM

WAD 24	Environmental Compliance Project
WAD 25	Industrial Zone Closure Project
WADs 27-36	Various Cluster Closure Projects
WADs 39-41	Utilities, Infrastructure, and Analytical Services
WAD 46	Technical Support Project
WAD 60	Safeguards and Security Project
WAD 62	LLW/LLMW Storage Project
WAD 64	124/441 444/690T Cluster Project
WAD 83	Buffer Zone Environmental Remediation

The scope for PBD 027 is essentially to provide the Analytical Services laboratory management and integration so that various programs and projects can plan and budget for their Analytical Services needs. A change in scope has recently taken place to transition Analytical Services from a site infrastructure service that is free to the programs to a management and integration service that provides support for Analytical Services that are planned and budgeted by the individual projects. PBD 027 makes laboratory capacity and sampling capacity available through unit price contracts. In addition, hot laboratory services to the site are still funded out of this PBD, although there are plans also to privatize this in the future.

Results

The Analytical Services management and integration effort is reasonably well planned internally, based on the best available information about expected demand for Analytical Services; however, there is a concern about how well the other programs and projects in the RCFP are now planning for their own Analytical Services needs. For the 2010 CPB, there does not seem to be a corporately mandated process that programs and projects should follow to ensure that they are properly planning for and budgeting their Analytical Services needs. As was also noted in our review of WAD 46 – Analytical Laboratories, the projects have not consistently assessed the impact on laboratory services of project scope changes, such as those to address "superstretch" goals.

Because this is a site service provided uniformly throughout the life of the RFCP, scheduling issues do not apply to this PBD; however, scheduling issues do potentially come into play for programs and projects that have Analytical Services needs if they do

not adequately plan for their Analytical Services. The turnaround for many Analytical Services can often not be accelerated, and not planning adequately can affect schedules for other programs and projects.

The key schedule item is the planned privatization of the hot laboratory. Current plans are to establish fixed unit prices for hot laboratory services by March 31, 1999, and to complete privatization of hot/mixed laboratory operations by March 31, 2000.

There are only two WBS elements in PBD 027:

1.1.07.02.13.02 (Laboratory Management and Integration) ($2.6 million in FY99)

1.1.07.02.13.06 (On-Site Radiological Laboratory) ($4.5 million in FY99)

This is one more example of an area where additional breakdown of the WBS would yield additional opportunities for cost definition and control. There are approximately 34 employees in Laboratory Management and Integration and 65 employees in the hot laboratory, down from 160 employees in the past. Many of the workers in the hot laboratory can be better put to use elsewhere on the site because of their Q clearances, and privatization of the laboratories is being pursued to help free up these resources. Contracts are now in place with on-site and off-site commercial laboratories and sample team operations. In addition, within Laboratory Management and Integration, they also use third-tier subcontractors for functions like programming support for the Analytical Services Tracking (AST) database.

Quality assurance is a core value in the Analytical Services world; therefore, it is taken very seriously: it is called out as a specific activity in both WADlets that remain in this PBD. For example, 7 blind samples are sent to each of 10 off-site laboratories per year. Electronic data validation is performed on 25 percent of the data packages coming back from laboratories.

Overall, Analytical Services is an area of concern for the site. With the transition taking place from treating Analytical Services as a site infrastructure service to treating it as a fee-for-service activity, the projects now need to plan and budget for their Analytical Services needs. Not all of the 29 WADs that need Analytical Services in order to fulfill

their mission have been working with PBD 027 in planning for their Analytical Services needs. If Analytical Services are not properly planned for and budgeted, there could be significant effects (especially regarding schedule) for many of the programs. Many Analytical Services tests are governed by physical and chemical laws and cannot be speeded up (e.g., low-level plutonium sampling and analysis takes two weeks).

Sources of Uncertainty

Two major uncertainties can affect the performance of this PBD:

- The major concern is how well the programs will be able to adequately plan for their own Analytical Services needs, which affects PBD 027's ability to plan for needed laboratory capacity.
- Laboratory capacity for doing the type of analysis needed to execute this work is shrinking nationwide, thereby making planning more difficult.

6. Summary

The Kaiser-Hill Team has made strong progress in bringing project management capabilities to the Rocky Flats Environmental Technology Site and in changing the culture of the site from a production mentality to a project mindset that recognizes that the Rocky Flats Closure Project has a finite scope and a definite end point. As discussed in section 4 of this report, the Kaiser-Hill Team has the following notable strengths:

- A well-defined high-level definition of the scope of work and the performance measures used to drive work priorities
- A strong management commitment to project execution to meet the performance measures
- Strong control over project scope and schedule
- Excellent relationships and communications with the customer and the stakeholders
- A good identification of project risks, both internal and external, and well-defined mitigation plans for the external risks
- An integrated safety management capability that is at the forefront of the DOE sites

On the other hand, there are also strong indications that the Kaiser-Hill Team has yet to realize the full potential that can be attained from the project management capabilities that are in place. This section will discuss the underlying deficiencies that cut across several of the project management core processes discussed in section 4 of this report and are major drivers in the lack of maturity of the overall Kaiser-Hill project management effort.

6.1 Management Systems Integration

Subsections 4.2.1 and 4.3.1 of this report discuss the lack of proper integration of the P3 schedules and the other management systems. This deficiency cuts across almost all of the project management core processes discussed in this assessment. Lack of systems integration prevents Kaiser-Hill from developing a true critical path schedule and analyzing the float in the alternate paths, from developing a resource-loaded schedule and doing comprehensive resource planning, and from conducting a living risk analysis

capability. This deficiency, in turn, drives many of the scores assigned and the comments provided in the Time Management, Cost Management, Human Resources Management, and Risk Management sections of this report.

6.2 Integration of Risk Management, Resource Planning, and Duration Estimating

These three activities are currently being done independently. Resource planning and duration estimating need to be integrated so that resource availability can be used to bring duration estimates into line with the reality of resource limitations. Similarly, quantitative expressions of risk associated with duration and cost estimates should be applied at the line-item or activity level. Through application of techniques such as Monte Carlo simulation, this analysis could yield a more complete picture of high-risk areas in the project plan; schedule paths requiring additional analysis, planning, and management; and activities in which scarce resources should be applied on a high-priority basis.

Once the integration of resource planning and duration estimating is achieved, resource-loaded schedules can be developed. Workload forecasting at the skill level can then be accomplished, which will permit more accurate workforce planning. Along with the application of quantitative risk planning, this forecasting will give management the tools to accurately adjust the workforce to the changing priorities of the closure project.

6.3 Programmatic Risk Management Plan

As a special project, Kaiser-Hill has applied global risk assessment values ranging from 1–5 to cost and duration estimates for each activity in the EMSS and performed a Monte Carlo simulation based on the schedule risk estimates to evaluate the likely controlling path and project end date. This is a good procedure, as far as it goes. This high-level risk assessment (already accomplished) could form the basis for segmenting the project plan according to the risk assessments already performed at the WADlet or summary-activity level. This segmentation could be used as a "first cut" global assignment of duration and resource confidence levels (percent offsets + or -) for the underlying activities or line items in the P3 schedule. Once this is accomplished, management would then have the option of singling out individual activities for more in-depth risk analysis.

6.4 Metrics

Additional metrics might be tracked to provide management with information valuable in tracking the performance of projects:

6.4.1 Performance Indices

Once actions are taken to correct problems with the cost-estimating and -tracking systems, increased reliance can be placed on the tracking of several performance indices that can be used to identify adverse trends. These include the Cost Performance Index (CPI) and the Schedule Performance Index (SPI), which are both currently being monitored by Kaiser-Hill, and Critical Ratio (CR), which is not now being used:

CPI = BCWP/ACWP

SPI = BCWP/BCWS

CR = CPI * SPI

Experience has shown that these indices, when used in a control chart, can be an important indicator of overall project performance.

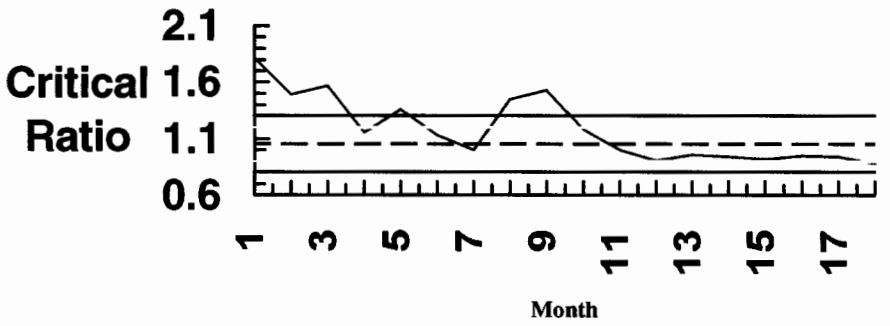
6.4.2 Control Charts

A control chart approach can be a useful tool for monitoring percent change in indices such as CPI, SPI, or CR. For each of these, the natural process limits can be established from historical data. Using statistical process control techniques, control charts can be used to (1) understand the "capabilities" of the processes for controlling growth (both within and out of scope), cost, and schedule; (2) understand that some process changes will have to be put in place to change the process capability; or (3) detect when changes in the process have occurred. In the example of the Critical Ratio chart shown below, upper and lower control limits have been established for the CR and are typically used to highlight the level of management attention required to address the out-of-control limit.

As an example, a project manager's response to a range of CR values might be as follows:

CR is between 0.9 and 1.2	Project is satisfactory
CR is between 0.8 and 0.9 or 1.2 and 1.3	Project manager check/review
CR is above 1.3 or below 0.8	Red flag – action required
CR is above 1.6 or below 0.6	Inform management

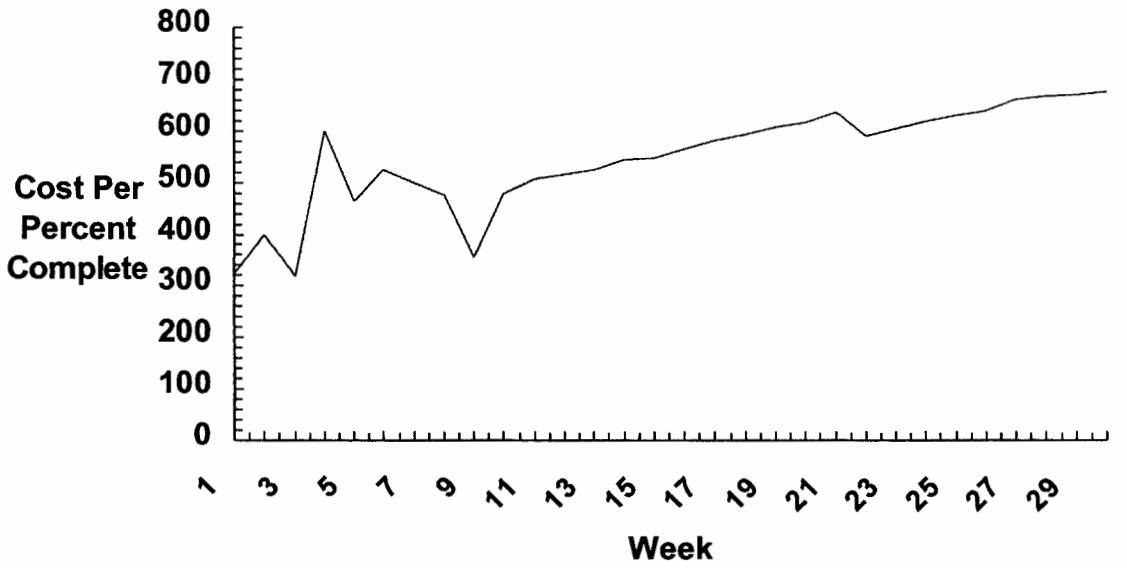
It should be noted that in some industrial environments, CPI = ACWP/BCWP and SPI = BCWS/BCWP. When the critical ratio is used as a performance index, the formulas employed for the calculation of CPI and SPI do not impact the degree of management attention that should be given to the project. An example of a chart that reflects the CR over a project's life cycle is as follows:



6.4.3 Cost Per Percent Complete

In addition to the indices discussed in the previous subsection, a valuable indicator of overall project performance relative to estimated cost is Cost Per Percent Complete. This metric can be used to observe the impact of corrective actions and other changes and as an "early warning" of unfavorable trends. An example shown below illustrates a project in which the cost of each incremental percent of completion is increasing as time goes along. This could be an indication of excessive reporting of work completion early in the project, of uncontrolled growth in scope, or of failure to reduce staffing as the project

nears completion. In any event, a cost per percent complete that is not level or decreasing provides early indication that management attention is needed.



6.5 Conclusions

The Rocky Flats Closure Project currently has a Closure Project Baseline that shows closure of the site occurring in 2010 at a total cost of about $7.3 billion. A number of positive factors are essential elements in any plans to close the Rocky Flats Environmental Technology Site by the end of fiscal year 2010:

- The fundamental elements of sound project management have been brought to the site by Kaiser-Hill and have resulted in a project management capability that is as good as any we have seen in the DOE weapons complex. This capability is absolutely essential to the successful completion of the 2010 CPB.
- Kaiser-Hill has developed a management team that has succeeded in turning the culture of RFETS from a "production" focus to one that understands that the closure project has a finite scope and a definite end point. This culture change is essential to successful completion of the project.
- The RFCP and the RFCA have been successfully used as tools to develop customer and stakeholder buy-in for Kaiser-Hill's closure plan. A vital element of this planning has been the highlighting of key events and decisions that must occur off-site to support the plan—these are termed "enabling assumptions."

Having developed this type of focused attention on the part of such a broad spectrum of organizations is a signal accomplishment.

- The *Rocky Flats Closure Project Performance Metrics Baseline*, the purple chart, provides clear and understandable metrics that give focus to the project and provide clear measures of progress. This chart, together with the contractual incentives provided to Kaiser-Hill by DOE, provides a positive incentive for the Kaiser-Hill Team to meet or exceed these performance requirements. Thus it establishes the potential for a "win-win" situation for Kaiser-Hill and the DOE.
- Kaiser-Hill management is using a series of high-level meetings to place appropriate focus on production, resource allocation, and individual project performance metrics.

However, the deficiencies outlined in this report, along with the early stage of schedule execution, make it difficult to determine whether Kaiser-Hill will, in fact, be able to complete the 2010 CPB on schedule and within budget. Major potential problems include:

- Because of the inability to compute critical path and float, the Kaiser-Hill Team cannot accurately determine the true critical path, cannot forecast the impact of delays in noncritical paths, and cannot determine the impact on noncritical path work of shifts of resources to support critical path efforts.
- Kaiser-Hill cannot accurately forecast requirements for skilled and cleared resources and cannot assure the availability of other important shared resources (e.g., guard force, Analytical Services); therefore, Kaiser-Hill cannot predict with confidence the ability to execute the workload over the long term.
- Since Kaiser-Hill is unable to perform risk analysis on the 2010 CPB, it is not able to obtain a perspective on the areas that most need management focus to achieve the cost and schedule goals.
- Cost-estimating, -charging, and -accrual issues, along with the present limited use of life-cycle impact analysis, can undermine the ability of the Kaiser-Hill Team to properly manage and control costs over the long term on this project.

Accordingly, PricewaterhouseCoopers concludes that the probabilities of success in the execution of the 2010 CPB are as follows:

Schedule – Moderate Probability of Success. With the positive steps that it has taken to provide a viable on-site project management capability and adequate funding, Kaiser-Hill has a moderate probability of succeeding in closing the Rocky Flats site in fiscal year 2010. Given the positive movement that we observed toward correction of the deficiencies identified in this report, the Kaiser-Hill Team has the prospect for improvement on this probability of success.

Cost – Lower Probability of Success. The scope and magnitude of the cost-estimating and -control issues identified in this report, along with the lack of any coordinated feedback and improvement process for planning, estimating, and scheduling, do not lead to a high confidence that Kaiser-Hill can close the Rocky Flats site at the currently projected cost. Furthermore, decontamination, decommissioning, and deconstruction of buildings at the site are at a very early stage; there exist substantial unknowns regarding how difficult it will be to bring closure to this process on complex buildings such as Buildings 771, 707, and 371. In addition, the number of enabling assumptions that must come to fruition, along with the nature and complexity of these issues, provides additional cost risk.

7. References

7.1 Kaiser-Hill Company L.L.C. Subcontract No. KH900231ME with PricewaterhouseCoopers L.L.P., December 30, 1999

7.2 Project Management Institute, *Guide to the Project Managers Body of Knowledge*, 1966

7.3 *Rocky Flats Closure Project (RFCP) - Project Management Plan*, Revision 02, December 10, 1998

7.4 Kerzner, Harold, *Project Management: A Systems Approach to Planning, Scheduling, and Controlling* (3rd ed.), New York: Van Nostrand Reinhold, 1989

7.5 Lewis, James P., *The Project Manager's Desk Reference, A Comprehensive Guide To Project Planning, Scheduling, Evaluation, Control & Systems,* New York: IRWIN Professional Publishing, 1993

7.6 *Rocky Flats Cleanup Agreement,* July 20, 1998

7.7 *Planning and Integration Change Control Guide*, January 18, 1999

7.8 *Rocky Flats Closure Project Performance Metrics Baseline,* Revision 9, January 5, 1999

7.9 *Rocky Flats Closure Project FY99/00 Work Plan Guidance Document,* April 1998

7.10 *Rocky Flats Closure Project Milestone Sequence* (Draft), Revision 2.2, December 16, 1998

7.11 *Rocky Flats Environmental Technology Site Programmatic Risk Management Plan*, Revision 0, July 16, 1998

7.12 *Rocky Flats Environmental Technology Site, Kaiser-Hill Team Quality Assurance Program*, Revision 7, August 5, 1998

7.13 *Rocky Flats Closure Project Functions and Responsibilities Document,* February 10, 1999

7.14 *Analysis of Schedule Uncertainties Within the Rocky Flats Closure Project Baseline (2010) and Their Potential Impact on the Site Closure Date* (Draft), January 25, 1999

7.15 DOE *Safety Management Systems Policy*, DOE-P-450.4

7.16 *Kaiser-Hill Integrated Safety Management Systems Manual* (1-MAN-016-ISM)

7.17 Kaiser-Hill letter (98-RF-04864), September 29, 1998

7.18 DOE RFFO letter (AME:SPD:PH03233), December 28, 1998

7.19 Kaiser-Hill letter (99-RF-01040), March 17, 1999

7.20 *Kaiser-Hill Integrated Work Control Program Manual* (1-MAN-071-IWCPM)

7.21 *Kaiser-Hill Site Integrated Oversight Manual* (1-MAN-013-SIOM)

7.22 *Kaiser-Hill Site Corrective Action Requirements Manual* (1-MAN-012-SCARM)

7.23 *DEPARTMENT OF ENERGY: Accelerated Closure of Rocky Flats, Status and Obstacles* (GAO/RCED-99-100), April 1999

7.24 *Kaiser-Hill Procurement Plan*

7.25 *Department of Energy's Project to Clean Up Pit 9 at Idaho Falls Is Experiencing Problems* (GAO/RCED-97-180), July 1997

8. Attachments

8.1 PricewaterhouseCoopers Statement of Work from Kaiser-Hill Subcontract KH900231ME

8.2 Planning and Integration Standards and Instructions Reviewed

8.3 Acronyms and Abbreviations

8.4 RFETS Personnel Interviewed

8.5 Documents Reviewed

8.6 Cost Estimating and Collection Assessment

8.7 RFETS Evaluation Sheet Comment Summary

PricewaterhouseCoopers Statement of Work from Kaiser-Hill Subcontract No. KH900231ME

Attachment 8.1

PricewaterhouseCoopers Statement of Work from Kaiser-Hill Subcontract No. KH900231ME

Interim Report:

The interim report will provide an assessment and confidence level concerning the following topics:

- Are the fundamental planning processes in place and functioning?
- Are scheduling and project management tools in place and adequate to manage the project?
- Is a change control process in place and adequate to control the project?
- Is an adequate cost collection system set up and functioning?

Final Report:

The final report will address each of the requirements in the following Scope statement:

The subcontractor will be required to conduct an independent validation of the Project Management Plan, Schedule, and cost proposed in the Kaiser-Hill CPB to evaluate the following:

1. General Project Management:
   a. The Project Management Organization utilizes good schedule and cost estimating practices and is effective in executing he plan.
   b. Planning assumptions are valid and follow an integrated WBS.
   c. The work logic effectively delivers the desired end-state.
   d. The methodology for work scope development and planning is sound, such that
      i. The resulting work scope is each of the Project Baseline Descriptions reflects the appropriate assumptions, technical bases, and understanding of current conditions, and
      ii. The work scope is credibly structured to achieve the project's end state.
   e. The bases of schedule and cost estimates are reasonable and at the appropriate level of detail.
   f. The total cost of the project is integrated with the schedule, the estimating methodology is sound, and the cost estimate is reasonable.
   g. There is an effective reporting system for monitoring Schedule and Cost during the project, such as an Earned Value Measurement System (EVMS). An EVMS monitors progress on both the Schedule and Cost systems on an integrated basis.
   h. Uncertainty factors affecting cost and/or schedule risks have been identified and are being managed under an integrated approach to programmatic risk management.
   i. The current closure plan incorporates the accuracy and lessons learned from prior activities.
   j. The contract types are appropriate to provide incentive to the subcontractors to accomplish the defined project outcomes.
   k. The total cost of the closure project is the result of an integrated scheduling approach.

2. Kaiser-Hill Schedule:
   a. The PBD and WAD Lifecycle schedules represent a credible schedule to accomplish the work scope.
   b. The Critical Path Chart presents a valid representation of the critical path of activities contained in the Expanded Management Summary Schedule.
   c. The Expanded Management Summary Schedule is a valid representation of the information contained in the Closure Project Baseline Target Schedule.

3. Kaiser-Hill Costs:
   a. The PBD and WAD Lifecycle Cost Profiles represent a valid cost estimate for the work scope contained in the CPB.
   b. The Total Cost Profile for the RFETS Closure Project represents a valid summary of all of the PBD cost profiles.
   c. The bases for schedule and cost estimates are reasonable and at the appropriate level of detail. [7.1]

Planning and Integration Standards and Instructions Reviewed

Planning and Integration Standards and Instructions Reviewed

Standards

1. BASELINE CHANGE CONTROL
2. BASELINE PLANNING
3. COST COLLECTION
4. COST ESTIMATING
5. EARNED VALUE REPORTING
6. ESTIMATE AT COMPLETION
7. FUNDING DETERMINATION FOR COMMODITIES AND SERVICES - CAPITAL VS. EXPENSE DETERMINATIONS
8. MANAGEMENT/ORGANIZATIONAL REPORTING
9. PROGRESS TRACKING SYSTEM
10. SCHEDULING
11. UTILIZING BENCHMARK DATA
12. VALIDATION
13. PROJECT PERFORMANCE REPORTING
14. WORK AUTHORIZATION/WORK SUSPENSION/FUNDS MONITORING
15. WORK BREAKDOWN STRUCTURE MANAGEMENT
16. PROJECT MANAGEMENT PLANS
17. SCHEDULE INTEGRATION

Instructions

1. - FINAL PROJECT AND ACCOUNTING CLOSE-OUT
2. - COST ESTIMATE PREPARATION
3. - WORK PLAN VALIDATION
4. - BASELINE CHANGE CONTROL/BASELINE MODIFICATION
5. - WORK SUSPENSION/TERMINATION INSTRUCTION
6. - PROGRESS TRACKING SYSTEM
7. - WBS/CHARGE NUMBER MODIFICATION
9. - UPDATING PRIORITIZED UNFUNDED LIST

118 - LINE ITEM VALIDATION & PROJECT DATA SHEET (PDS) DEVELOPMENT

119 - WORK AUTHORIZATION

121 - FISCAL YEAR WORK PLAN DEVELOPMENT

122 - PROJECT PERFORMANCE REPORTING

123 - EARNED VALUE REPORTING

124 - POSTING ACCRUALS

125 - COST TRANSFER

126 - YEAR-END CLOSING

127 - ESTIMATE AT COMPLETION

128 - CLEARING KICKOUTS INSTRUCTION

129 - OUTYEAR BUDGET PREPARATION INSTRUCTION

130 - S&S CROSSCUT BUDGET SUBMISSION

131 - PROJECT MANAGEMENT PLANS

132 - SCHEDULE PREPARATION AND INTEGRATION

133 - RISK MANAGEMENT

135 - PROCEDURE FOR DEVELOPMENT AND MAINTENANCE

136 - CLOSURE PROJECT BASELINE (CPB)

Acronyms and Abbreviations

Acronyms and Abbreviations

1. **ACWP** – Actual Cost of Work Performed
2. **ACWS** – Actual Cost of Work Scheduled
3. **BAC** – Budget at Completion
4. **BCP** – Baseline Change Proposal
5. **BCWP** – Budgeted Cost of Work Performed
6. **BCWS** – Budgeted Cost of Work Scheduled
7. **BEST** – Basis of Estimate Software Tool
8. **BOE** – Basis of Estimate
9. **CAB** – Citizen's Advisory Board
10. **CBT** – Computer-Based Training
11. **CPB** – Closure Project Baseline
12. **CTR** – Contractor Technical Representative
13. **CV** – Cost Variance
14. **D&D** – Deactivation and Decommissioning
15. **DNFSB** – Defense Nuclear Facilities Safety Board
16. **DOE** – Department of Energy
17. **EAC** – Estimate at Completion
18. **EMSS** – Expanded Management Summary Schedule
19. **ES&H** – Environment, Safety and Health
20. **EVA** – Earned Value Analysis
21. **EVMS** – Earned Value Management System
22. **Four Tops** – the top-tier subcontractors to Kaiser-Hill, i.e., Safe Sites of Colorado (SSOC), Rocky Mountain Remediation Services (RMRS), Wackenhut Security International (WSI), and Closure Site Services (CSS)
23. **HRAC** – Hourly Resource Allocation Committee
24. **JOSHUA** – the Kaiser-Hill cost collections and reporting system
25. **Kaiser Hill** – Kaiser-Hill Company L.L.C.
26. **LOE** – Level of Effort
27. **M&I** – Management and Integrating Contractor

28. **M*PM** – Microframe Project Manager
29. **NPDES** – National Pollutant Discharge Elimination Standard
30. **NTS** – Nevada Test Site
31. **P3** – Primavera Project Planner
32. **P&I** – Planning and Integration (organizational unit of Kaiser-Hill)
33. **PBD** – Project Baseline Description
34. **PCI** – Project Control Integrator
35. **PEP** – Project Execution Plans
36. **PMBOK** – Project Management Body of Knowledge
37. **PMI** – Project Management Institute
38. **PMP** – Project Management Plan
39. **PMR** – Project Measurement and Reporting
40. **POD** – Plan of the Day
41. **PPR** – Project Performance Report
42. **RFCA** – Rocky Flats Cleanup Agreement
43. **RFCP** – Rocky Flats Closure Project
44. **RFETS** – Rocky Flats Environmental Technology Site
45. **RFFO** – Rocky Flats Field Office (site DOE organization)
46. **RFP** – Request for Proposal
47. **RMRS** – Rocky Mountain Remediation Services LLC
48. **SNM** – Special Nuclear Material
49. **SOW** – Statement of Work
50. **SSOC** – Safe Sites of Colorado LLC
51. **SV** – Schedule Variance
52. **WAD** – Work Authorization Directive
53. **WADlet** – subdivision of a WAD
54. **WIPP** – Waste Isolation Pilot Plant
55. **WBS** – work breakdown structure

RFETS Personnel Interviewed

Attachment 8.4

RFETS Personnel Interviewed

Robert Card (K-H), President and CEO

Nancy Tour (K-H), Vice President and Director, Closure Project Development

Larry Burdge (K-H), Vice President, Planning and Integration

Jeff Stevens - Manager, K-H, D&D Advanced Planning

Vic Pizzuto - Project Manager, K-H, Bldgs. 771/774

James Floerke- Project Manager, K-H, Bldg. 371

Kelly Trice - VP, RMRS, Decontamination and Decommissioning

Bob Warther - Training Manager, K-H

Pete Swenson - Planning and Integration Manager, K-H

John Whiting - Project Manager, K-H

David Nickless - DOE Rocky Flats Field Office

Ken Brusegaard - K-H Analyst

Randall Walker - Project Manager, K-H, Bldgs. 776/777

T. J. Wirth - Project Manager, Misc. Production Zone Closure and Bldg. 707

J. R. Marschall - Project Manager, K-H, Industrial Zone Closure Project

Ron Carlson - Project Manager, K-H, Bldg. 881 Cluster Closure Project

Steve Crowe - Division Manager, K-H, Closure Projects Engineering and Integration

Mike Hill - PCI Lead Analyst

Paul White - K-H Analyst

Frank Sheppard - DOE EM-64

Bill Gomer – PBD 25 Manager, K-H

Kurt Kehler – WAD 51 and 53 Project Manager, K-H

Jerry Cable -- WAD 039 Manager, K-H

Bob Kopplin, PBD 23 and WAD 40 Manager, K-H

Tom Lukow -- Asset Management Division Director, RFFO, DoE

Gary Voorheis, Vice President, Nuclear Production (K-H)

John Fulton, Vice President, Nuclear Production (K-H)

PBD 006/011 Team: Lew Richey, Manager (K-H), Court Tuck (SSOC), Steve Hiatt (PCA/K-H), Michael Hinman (LATA/SSOC), Steve Browdy (LATA/SSOC), Kevin Globe (PCA/K-H)

PBD 008 Team: Kurt Kehler, Manager (K-H), Tina Meins (K-H), Gary Scott (K-H), Kevin Globe (PCA/K-H)

PBD 009 Team: Ken Ferrara, Manager (K-H), John Lehew (Tenera/K-H), Mike Kennedy (Informatics/SSOC), Steve Scott (SSOC), Greg Interline (K-H), Tom Gilmartin (K-H), Sheldon Anderson (K-H), Jim Floerke (K-H), Mike Rivera (K-H), Wally Boyd (K-H)

PBD 010 Team: Mike Singh (K-H), Mary Nixon (PCA/K-H), Jeff Pennell (LATA/SSOC)

PBD 012 Team: Robert Leonard (K-H), Steve Hiatt (PCA/K-H)

PBD 004: Joe Majestik, Manager (K-H)

PBD 024: Karen Rose, Manager (K-H)

George Setlock (K-H), Manager, PBD 01

Patrice Jacobs (K-H), P&I Analyst, PBD 01

Alan Rodgers (K-H), Manager, PBD 02

J. Lane Butler (K-H), Manager, PBDs 03 and 13, WADs 07, 08, 48, and 83

Doug Schaefer, (K-H), P&I Analyst, WAD 83

Colburn Kennedy, Manager, WADs 06 and 62

Steve Hahn (K-H), Manager, WADs 02 and 05

Scott Anderson, Manager WAD 04

Mike Jennings, Manager, WADs 07 and 48

Russ Lahoud

Beth Telesmanich

Virgene Ideker (K-H), Manager, Analytical Services

Dick Stagner (K-H), Manager, PBD 27 and WAD 41

Frank Humber, PCA, Inc.

James Payne (PAC), P&I Scheduling Manager

Sam Gianti, (K-H), P&I Performance Measures Manager

Bob Williamson (K-H) Cost Estimating Manager

Jill McLaughlin (K-H) P&I Scheduling

Joe Nolter (PA&E, Inc.) P&I Risk Analyst

Mike Bolles (EnergX) P&I Analyst

R.C. (Rob) Easdon (K-H), Director Labor Relations

Robin Piers (K-H), Manager Labor Relations/Central Employment Program

Lonnie Casias (K-H), Human Resources Manager, Hourly Employees

Bob Nininger (K-H), Air Monitoring Manager

John Gilmour (K-H), Manager, Engineering Programs

Gary Rappenecker (K-H), Manager, Engineering Support

Mike Carpenter (K-H)

Steve Swanson (SSOC)

Debby Chlebana (RMRS)

Kim Reber (PMI)

Tom Villani (K-H)

Karen Burzynski (DynCorp)

Robert Wagner

Bonita Patterson (K-H), Manager, Training and Development

Steve Esterline (K-H)

Erin Bognar (K-H), Manager, Project Support

Len Martinez (K-H), Vice President, Finance and Administration and CFO

Gregg Crockett (K-H), Deputy CFO

Linda Pace (K-H), Manager, Project Controls

William Harroun (K-H), Deputy Director, Planning & Integration

Mark Lewis (K-H), Director, Contracts and Procurement

Robert Allen (K-H), Vice President, Human Resource Programs and Services

Ben Plummer (PPC)

Chris Schoenbauer (K-H), Manager, Project Systems

Frazer Lockhart (DOE-RFFO), Division Director, Planning & Integration

Bill Kitchen (K-H), Cost Reduction Program Manager

Steve Baker (RMRS), Manager

GeorgeMiller, K-H, Manager, Independent Safety Oversight

Bob Plappert, K-H

Pam Norman, K-H

Linda Smith, K-H, Manager, Quality Programs

Jack Hoopes (K-H), Manager, Communications

Wynn Harding (K-H), Vice President, Safety Systems and Engineering

Mark Spears (K-H), Deputy, Safety Systems and Engineering

Documents Reviewed

Documents Reviewed

1. PBD Descriptions from the RFCP Project Management Plan for all PBDs
2. PPRs for December, January and February for PBDs and associated WADs
3. Detailed Schedule for PuSPS Installation (3/17/99)
4. Building 707 (Complex) Plan of the Week (2/3/99)
5. Building 707 (Complex) Plan of the Day (3/17/99)
6. Nuclear Activity Technical Description Sheet for Building 371 Wet/Combustible Repackaging
7. Detailed Schedule—Wet Combustibles (3/17/99)
8. Production Plans for Salt, Ash, Total Dry Residues, Wet/Combustibles, Sand, Slag & Crucible (1/24/99)
9. Detailed Schedule for Gas Generation Testing (1/24/99)
10. DOE Memo, Approval of Variance Request, Safeguards Termination Authorization for All Attractiveness Level D Waste Derived from Plutonium Bearing Residues (8/20/98)
11. DOE Recommendation 94-1 Implementation Plan (Revision 1)
12. Change Proposal 1999-1305, Accelerate Dry Residues Repackaging for Superstretch A & B (2/1/99, Draft)
13. Change Proposal 1999-1271, Establish Building 371 Cal/Gamma Lab and Conduct LANL TGS Testing (1/15/99)
14. Change Proposal 1999-1264, Establish Salt Preoperational Activities in Building 371 (12/30/98)
15. Change Proposal 1999-1098, Start Salt Direct Repack Operations in Building 371 (1/20/99)
16. Change Proposal 1999-1274, Building 371 Liquids Project Scope, Schedule and Cost Re-baselining (1/20/99)
17. Production Chart – Building 371 Actinide/Mixed Residue Liquids Draining
18. Detailed Schedule, SNM Liquid Stabilization (FY99)
19. Daily Operations Report, Building 371/374 (2/1/99)
20. Change Proposal 1999-8045, Return eU Decontamination Funding to Management Reserve (1/20/99)
21. Production Chart – eU Decontamination, Weekly Performance (3/17/99)

22. Change Proposal 1999-1304, Accelerate Shipment of SNM Metals & Oxides from FY00 to FY99 (1/18/99)
23. Change Proposal 1999-1391, Accelerate Completion of Scrub Alloy (2/18/99, Draft)
24. Production Chart, eU Hemishell Shipments (1/99)
25. Memorandum of Agreement for Shipments between RFETS and Savannah River Site (Revision 1, 10/8/98)
26. Unclassified Detailed Schedule – SNM Shipment (2/99)
27. Enriched Uranium Component Disposition Study
28. Rocky Flats Cleanup Agreement
29. Facility Disposition Cost Model and supporting documentation
30. All WADs associated with the RFCP PBDs
31. Project Execution Plan for Bldg. 779 Cluster Decommissioning Project
32. Decommissioning Operations Plan for Bldg. 779
33. Facility Disposition Program Manual (MAN-076-FDPM)
34. Completion Metrics Performance Reports
35. Bldg. 779 Cluster Closure Project - Health and Safety Plan
36. Army Corps of Engineers Project EM Task Force Phase 2 Report dated 30 Jan. 1998
37. Manpower Summary Reports
38. Schedules for all listed PBDs and WADs
39. Cost estimates for all listed PBDs and WADs
40. Planning & Integration Standards and Instructions
41. Headcount Table Rev 1/20/98
42. Factor Table Rev 1/20/98
43. FY 99/00 Work Plan Guidance Document (April 1998)
44. Kaiser-Hill Integrated Safety Management Systems Manual (1-MAN-016-ISM)
45. Kaiser-Hill Integrated Work Control Program Manual (MAN-071-IMCP)
46. Kaiser-Hill Site Integrated Oversight Manual (1-MAN-013-SIOM)
47. Kaiser-Hill Site Corrective Action Requirements Manual (1-MAN-012-SCARM)

Cost Estimating and Collection Assessment

Attachment 8.6

Cost Estimating and Collection Assessment

Background: During the review of individual Project Performance Reports (PPRs), several PwC reviewers noted a number of cost anomalies. Terms such as "mischarge" and cost "overrun" and "underrun" were frequently encountered in reviewing the text. This was often the case even when the PBD, overall, did not show a cost or schedule variance that exceeded the levels specified in the applicable P&I instructions. This situation argued for a closer look at whether cost control problems had the potential to adversely effect the "actual" cost numbers used in analyzing scheduled and actual progress.

Discussion:

Initial Assessment - Initially a cursory analysis was performed. This assessed whether a cost estimation problem predominated or whether charging problems were more important when it came to those PBDs that reported cost variances. The results of this analysis are summarized in enclosure (1). The results indicated that the predominant reasons quoted for cost variances were misestimation (costs initially estimated to be too high or too low) and mischarges (which during this analysis covered a broad range of problems, including inaccurate charges and accrual problems). Since these two categories accounted for significantly greater than 80 percent of the total instances of charging problems, both from the standpoint of numbers of occurrences and absolute value of problematic charges, it was decided to analyze the occurrence of these problems further. (Note: the category "blank PPR" was not included in the above analysis, it simply reflected an indicated cost variance for which no explanation was proffered).

Follow-on Analysis – In this evaluation, definitions of problem areas were refined and four types of charging difficulties (overrun/underrun, mischarge, FY98 accrual issue and other accrual problems) were defined, along with a catch-all "other" category. In addition, a more detailed analysis of the text of the available PPRs was performed. The results of this analysis are summarized in enclosure (2); the detailed analysis is provided in enclosure (3). The intent of this phase of the review was to more finely describe the problems being encountered, especially those that were occurring in the portion of the cost variance that was not due to estimation issues.

Limitations of Assessment: There are a number of important limitations to this summary assessment. Probably the most important of these are the following:

Limited Data – The assessment is based on two months worth of data, the potential exists that December 1998 and January 1999 are not representative of normal months.
Timing – These months are fairly early in the fiscal year (months 4 and 5, respectively); therefore, beginning of the year startup problems may be over-represented.
Data Source – Detailed accounting information (such as general ledger accounts) was not used for this review, the source of data was that reported by the project managers in the PPRs. This presents two difficulties: First, not all cost variances are required to be reported or accounted for in the PPR; and, second, our analysis showed that, for those PBD where information was presented, the PPRs captured about approximately 80 percent of the reported cost variance.

However, even with the above limitations noted, it is believed that the ensuing analysis provides significant, albeit preliminary, information regarding cost accumulation problems that have the potential to impact K-H project management success.

Preliminary Observations:
Substantial Funds are Involved – When compared to the total estimated value of the individual PBDs (as is done in enclosure (3)), the amounts involved may about 5 percent of the estimated cost of the PBD; however, another perspective may be more valuable. At a budget of approximately $650 million/year, the RFCP spends, based on straight-line average, $54 million/month. The figures provided in enclosure (3) indicate that approximately 13% of that money is wrapped up in problematic charges (net). If the absolute (as opposed to net) value of the problematic charges is used, an amount equal to more than 40 percent of the monthly budget is either being redistributed or in dispute.

Estimation Bias – There appears to be a consistent bias towards estimating more funds than are required to complete scheduled work. This was shown in both

enclosure (1) and (2) by a consistent, net positive balance in the "misestimate" or "cost overrun/underrun" category. This estimation error was the single largest source of cost variance, at approximately 40 percent of the total (as estimated in enclosure (2)).

Divergence Between Project and Project Management PBDs – The predominance of cost estimation bias as a source of cost variance was consistent for both Project-related PBDs (e.g., 1, 9, 12) and Project Management PBDs (30 and 34). Thereafter, the causes of cost problems diverge.

Accrual Issues – Overall, this category (when FY98 and other accrual problems are combined) makes up about 28 percent of the cost variance issue for both types of PBDs. However, FY98 holdover problems predominate in the Project Management PBDs, while the "other" category is more important for Project-related PBDs.

Mischarges – This category plays a significant role in Project-related PBDs but only a minor role in the Project Management PBDs.

Project Management "Other" – This category probably needs to be further refined; the potential exists that another substantial category of problems could be buried in this agglomeration.

Preliminary Conclusions: It is always dangerous to base conclusions on a small amount of data with known limitations. However, the following thoughts are advanced for consideration:

Cost Estimation – The above information, coupled with observations elsewhere in this report regarding the lack of lessons learned in the planning, scheduling and estimating realm, would argue for development of an active feedback and improvement program for these activities. Better cost and schedule estimates, early on in the planning cycle, will permit more systematic assessment of priorities and help to encourage the analysis of the full spectrum of uses for the available funding.

Cost Accrual Issues – These issues have the potential to adversely impact project management measurements in use, such as those presented in the PPR. Further assessment of the causes of these accrual problems and, potentially process improvements, could materially improve the precision of the project management performance measures and potentially reduce the amount of cost incurred in managing, reporting and resolving cost accrual issues.

Mischarges – Mischarges play a significant role in the cost variances investigated for Project-related PBDs. The potential exists that this is merely a reflection of the maturity of the cost accounting system and the manner in which it is implemented in the field; however, process-related problems could exist in how project personnel are processing cost information.

Project Management "Other" - These costs make up a substantial portion (more than one third) of cost variances analyzed for Project Management PBDs. It is likely that further review of this cost variance category would provide useful information for reducing cost variances.

ENCLOSURES:

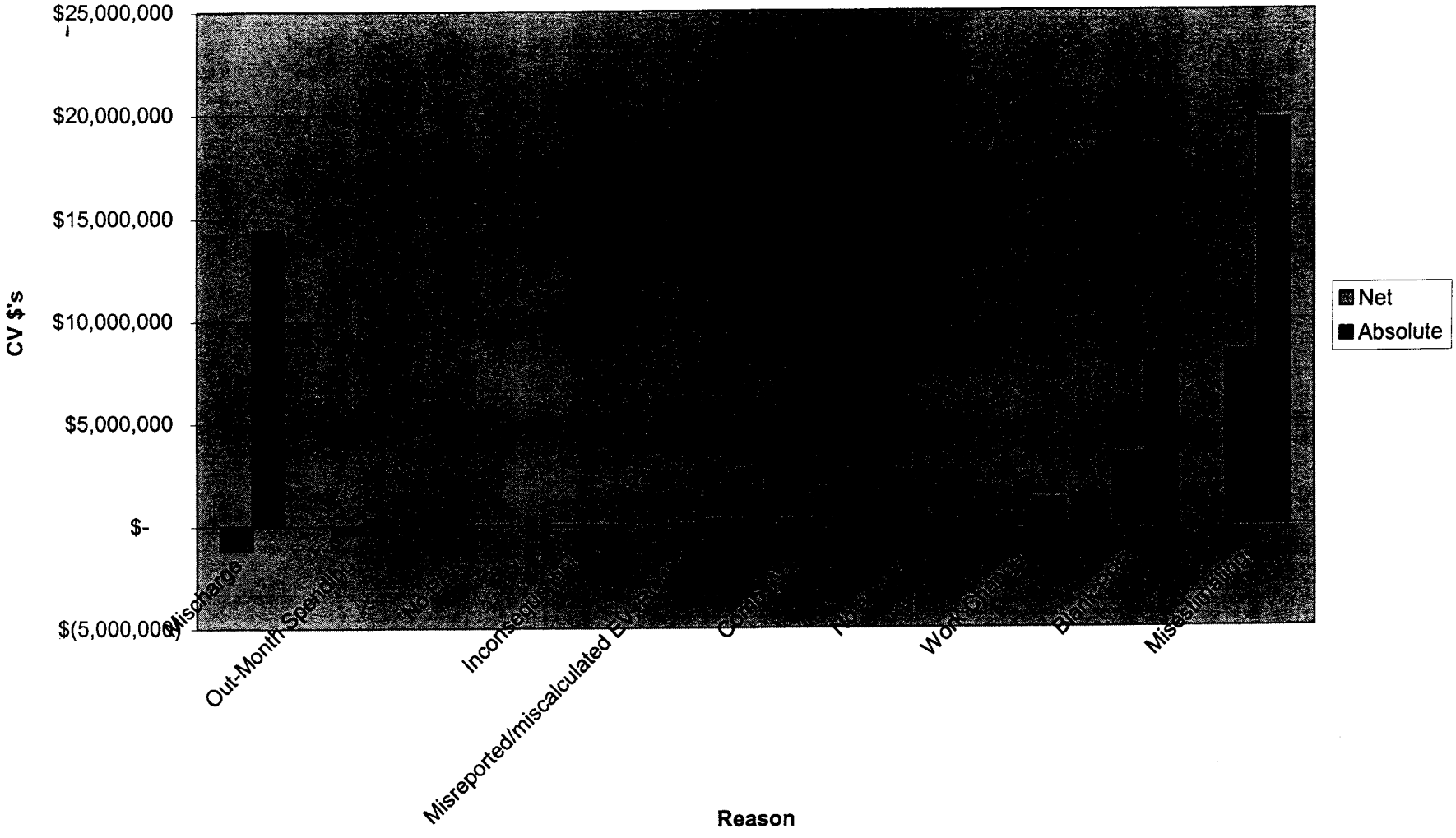
(1). Initial Cost Variance Analysis

(2). WADlet Level Analysis of Cost Variance

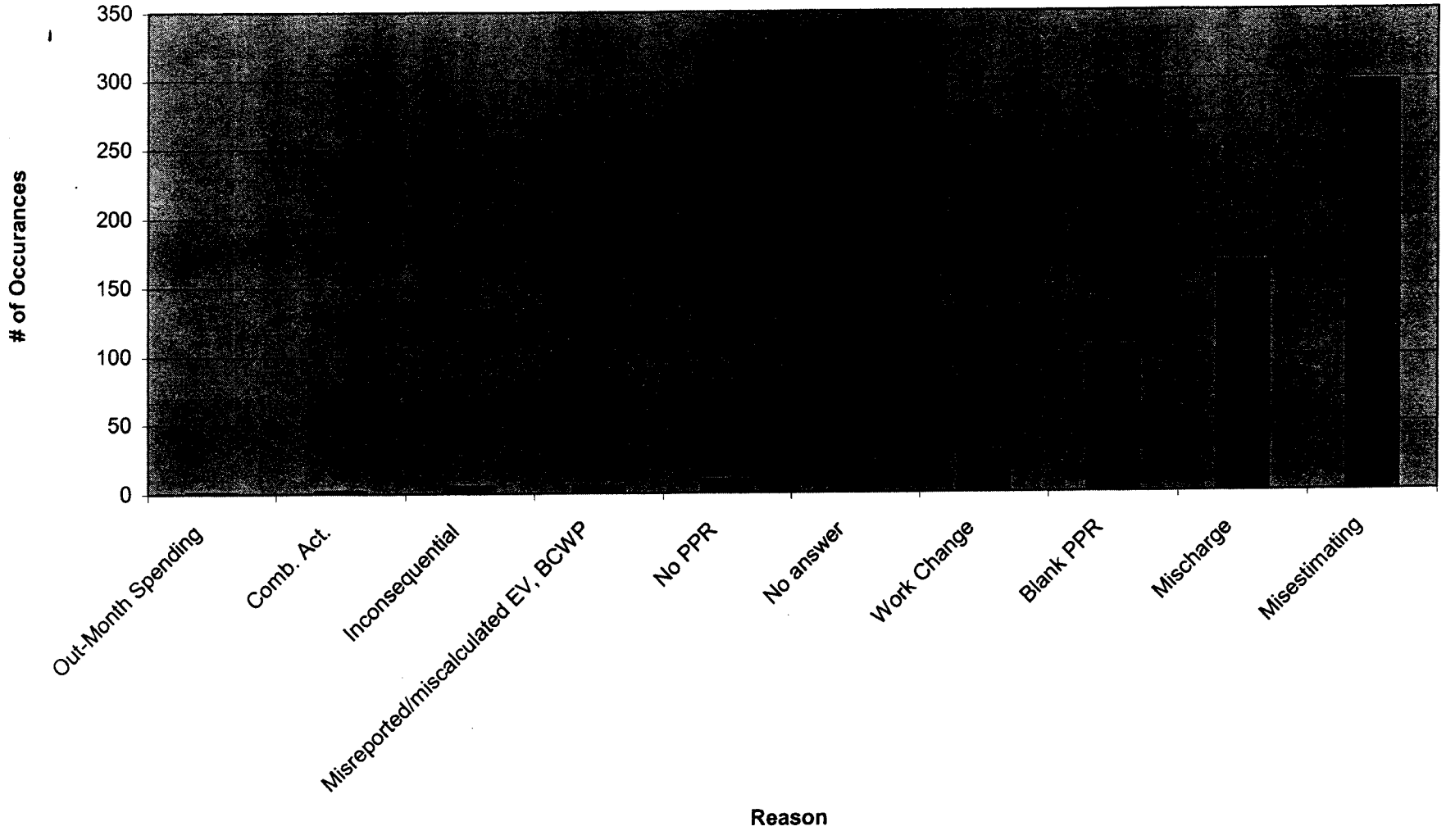
(3). Cost Variance Summary Table

Initial Cost Variance Analysis

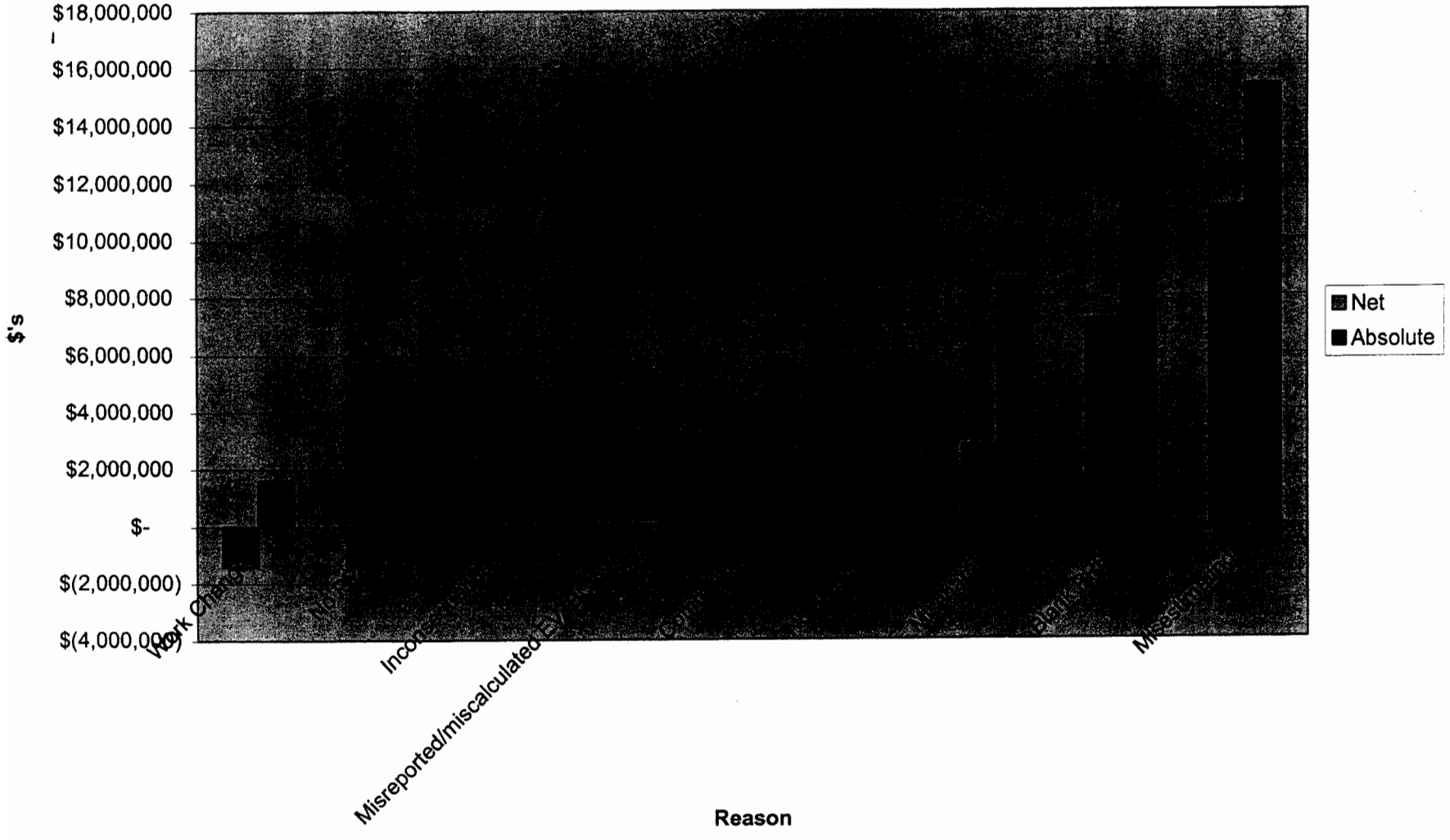
CV $'s by Reason: Net vs. Absolute
December 1998



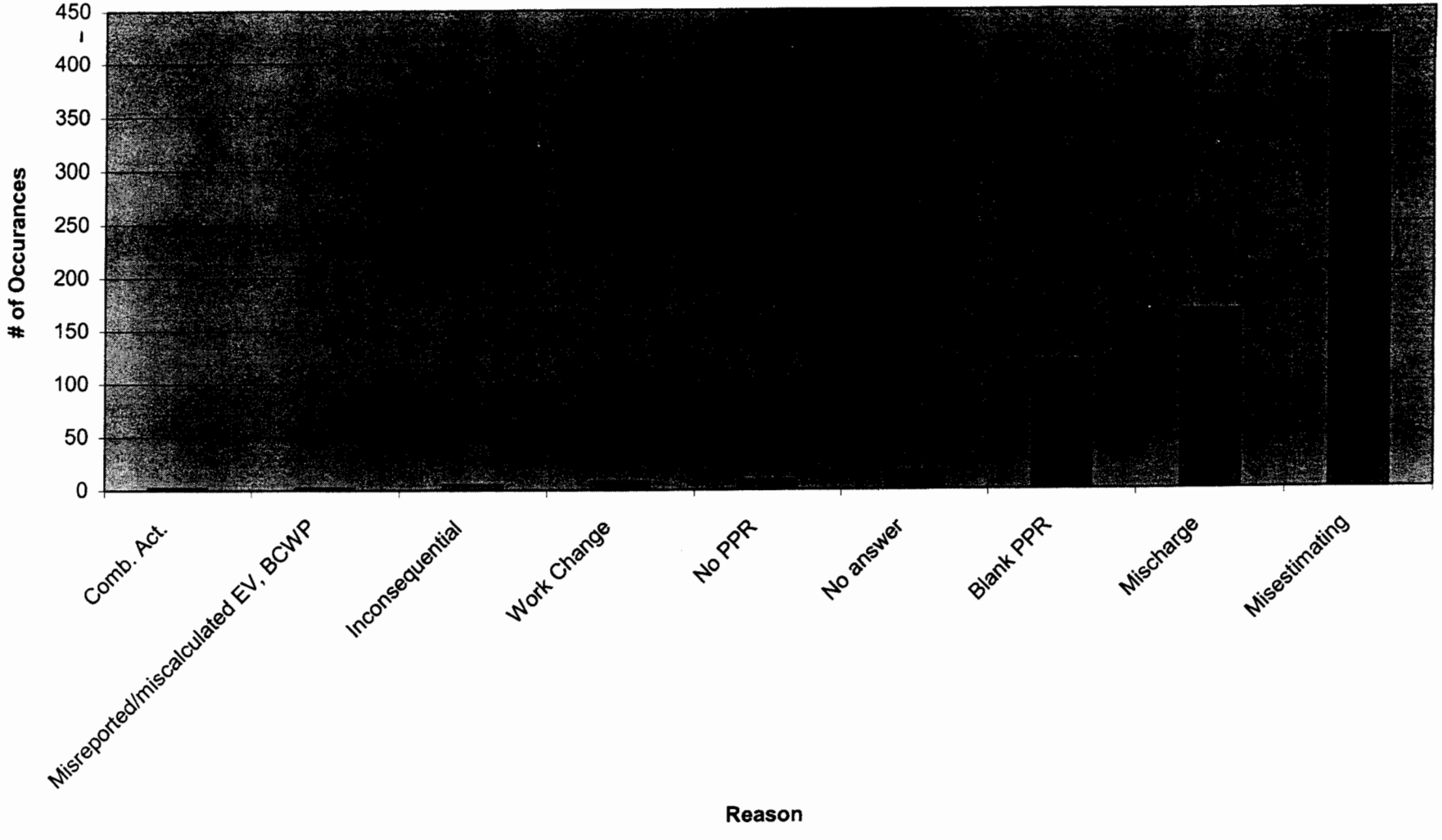
CV Occurances by Reason
December 1998



CV $'s by Reason: Net vs. Absolute
January 1999



CV Occurances by Reason
January 1999



WADlet Level Analysis of Cost Variance

Analysis at the WADlet level--December 1998

Selected WADlets were examined and the descriptions of root-cause for cost variances were categorized. Five categories were used, described below:

- **Overrun or underrun:** A variance was assigned to this category if actual spending did not equal budgeted costs. Examples include more overtime required, delays due to weather, anticipated costs not required, cost overruns or underruns when costs occur in peaks and the budget is straight-lined (ie budget loading), and increase in scope to a WADlet.

*Examples of the wording used in the WADlets to characterize these **overruns and underruns**:*

PBD 1, WAD 1, WADlet 101: "Adding the corrected $44 K cost estimate to the apparent $55 K Analytical Services underrun (...there were fewer samples collected and submitted for analysis than originally scheduled due to a dry first quarter) results in a $69 K correction for actuals"

PBD 6, WAD 10, WADlet 202: "Approx. $144.5 K in efficiencies have been realized in B707 and B776 by combining multiple transfers, and not having any items require special handling"

PBD 9, WAD 15, WADlet 401: "Unanticipated charge to KH Dept Code"

PBD 9, WAD 89, WADlet 702: "Variance in the amount of $29 D is due to work performed by the project lead who charged to and is budgeted in Project Management." And The remaining $60K of variance is due to the budget allocation of design between two quarters. It is expected that the work packages planned for the second quarter will require more resources than for the first. However, the first quarter is budgeted with greater resources."

PBD 9, WAD 90, WADlet 405: "POC pricing differential in what is budgeted versus actuals (new pricing)."

PBD 30, WAD 45, WADlet 208: "Costs due to transfer of 1 person out of department code."

PBD 30, WAD 24, WADlet 101: "These costs where level loaded for the year. However, the first quarter has been slower than anticipated. Based on prior years trends, these activities will experience irregular peaks throughout the year based on site-wide activities."

- **Mischarge**: A variance was designated as a mischarge if the explanation indicated a WADlet was inappropriately charged for work, whether it was the recipient of the mischarge or the account that should have been charged. Also, charges made against a new charge number that was not opened were counted as mischarges. A mischarge was assumed if the explanation indicated that a charge was made to a closed charge number, UNLESS the explanation specifically stated that the charge was from FY98. In those cases, the variance was assigned to FY98 Accrual or Reversal.

*Examples of the wording used in the WADlets to characterize these **mischarges**:*

PBD 6, WAD 10, WADlet 202: "$45K in Secure and Receive costs being mischarged to WBS 1.1.06.02.02" and "Approx. $80 K will need to be transferred to this WBS from B707 Baseline (Oxide transfer mischarge."

PBD 9, WAD 15, WADlet 401: "Charges against closed charge number EM2234"

PBD 9, WAD 89, WADlet 402: "Operators erroneously charged fluorides administrative work to this account."

- **FY98 Accrual or Reversal**: A variance was assigned to this category if the explanation indicated it was the result of a charge to a FY98 charge number or a subsequent reversal.

*Examples of the wording used in the WADlets to characterize these **FY98 Accruals or Reversals**:*

PBD 1, WAD 83, WADlet 201: "Purchase order number 708096B, "Farler" experienced an $8 K reversal of an FY98 accrual for this FY."

PBD 9, WAD 20, WADlet 705: "The cost variance of $34 K or 128.5% is due to FY98 charges that were accrued in September 98, which reversed out in FY 99. Cash payments are being made against these accruals, resulting in the CV being reduced until there is no CV."

PBD 9, WAD 88, WADlet 309: "$24,624 incurred in FY 98 against charge numbers that have been closed to FY 99 charges and have no FY99 funding."

PBD 9, WAD 89, WADlet 408: " No budget associated with this activity in FY 99. Variance due to adjustments from September charging. Charge numbers have been closed to new activities; however, open purchase req's associated with this charge number will continue to have costs booked against it The practice of booking open purchase req costs to closed numbers is a procurement policy."

PBD 30, WAD 46, WADlet 711: "The causes are a $45K over-accrual in E2 (made in September 1998) and a reversal in Tenera for services that were not rendered to support the SARAH."

- **Other accrual:** A variance was assigned in this category for any type of accrual error or discrepancy that did not specifically indicate it was from FY98. For example, positive cost variances that resulted from work that was completed but where costs had not yet been incurred were included. Variances that were explained as "accrual error" were also counted in this category.

*Examples of the wording used in the WADlets to characterize these **other accruals**:*

PBD 9, WAD 8, WADlet 309: "No incurred costs were accrued for software upgrades for work performed in December 98.":

PBD 9, WAD 90, WADlet 405: "Costs not yet posted for POC's delivered from vendor."

- **Other**: This category accounts for variances were not explanation was given, were considered insignificant, or otherwise explained. Variances that were the result of BCWP being misstated, or where EV was not taken or taken incorrectly, were categorized here.

*Examples of the wording used in the WADlets to characterize **other**:*

PBD 1, WAD 83, WADlet 201: "The remaining cost variance of $13K is due to earned value taken in error with regard to road repairs not being done due to weather, this is a schedule variance."

PBD 1, WAD 83, WADlet 602: "The negative 57 K cost variance reported is excessive and does not accurately reflect the status of the project. It is the result of using the initially proposed earned value methodology for the 903 Pad Remediation Project."

PBD 12, WAD 22, WADlet 011: "The cost variance of $59K is the result of an incorrectly calculated BCWP."

PBD 30, WAD 45, WADlet 204: "L/L costs due to contractual commitment to the Community College of Denver" and "management change from LATA to SSOC."

NOTE: For certain WADlets that were not available, cost variance data was taken from the WAD. Since not all WADlets or WADs were examined for all PBDs, although the net effect of the CV is captured at the PBD level, there can potentially be large CVs that cancel out.

- **PBD 1**

In PBD 1, the WADs and WADlets examined account for most of the CV of the PBD ($281,000 of $299,000 total). However, the EAC of the WADlets examined only account for $5,697,000 of the $15, 353,000 EAC of the PBD. This could indicate that the WADlets that were not examined that make up the remaining EAC contained CVs that cancelled out. The $299,000 CV represents 2% of the EAC for this PBD.

The breakout indicates that $134,000 of the $281,000 CV (48%) occurred due to FY 98 charges or reversals. The absolute value of the CV attributable to this is $142,000: most of the 7 line items in this category were credits. Another 37% ($147,000) of the CV is due to over- or under-runs.

- **PBD 6**

WAD 10 accounts for most of the EAC and most of the CV for PBD 6. The $339,000 CV represents 14% of the $2,402,000 EAC. A majority of the CV is due to mischarges in this PBD ($190,500 of the total $339,000 CV, or 56%). The remaining CV is due to efficiencies realized. All of the cost variances in this WADlet are positive.

- **PBD 9**

In PBD 9, the WADlets examined account for 95.5% of the CV of the PBD (-$96,500 of -$101,000 total). The WADlets account for $42,361,000 of the $51,579,000 total EAC of the PBD (82%). The net effect of the CVs in each of the WADlets masks the true extent and magnitude of the cost variances throughout the PBD. The net CV for PBD 9 is only -$101,000, a small fraction of the total EAC (0.2% of the $15,579,000).

The category of overruns and underruns has the most significant net effect. While the total CV for these items is $212,200, the absolute value of the individual misestimates totals $2,645,400, representing a significant portion of the EAC. Twenty-seven instances of over- or under-runs occurred. Mischarges account of a large portion of the positive CV: a disproportionate amount of the mischarges is due to one line item, a $1,181,000 mischarge in WADlet 310. A total of 17 instances of mischarges were detailed. Another single line item that has a substantial effect of the CV is an accrual error of -$1,911,000 in the same WADlet, categorized in the Other Accruals category. The two large line items, one positive and one negative, work to reduce the total CV for the WADlet, and subsequently the WAD and the PBD.

- **PBD 11**

In PBD 11, WADlet 102 of WAD 17 account for all of the EAC, but only 34% of the CV is accounted for ($66,000 of the total $192,000 CV) for the PBD. Although WAD 18 shows a CV of $56,000, no explanations are provided as the WAD indicates that it is within threshold. Since the total EAC for the PBD is small ($1,014,000), the discrepancies have more of an effect: the CV is 19% of the EAC for PBD 11.

For the CV that is accounted of, overrun and underruns cancel out all but $10,000. One item, an underrun in FY98 subcontract, account for $56,000 of the $66,000 CV for this WADlet.

- **PBD 12**

Analysis of WAD 22 accounts for 100% of the CV for this PBD. The total -$263,000 CV represents 4.6% of the $5,672,000 EAC. A FY98 accrual error of -$322,000 and net overruns of -$43,000 account for a large portion of the total -$263,000 CV. Positive CV from mischarges ($48,000) and other accrual errors ($58,000) mitigates the magnitude of the total CV.

- **PBD 15**

While the total CV for PBD 15 is -$93,000, the CV of the WADlets examined is -$233,000. Futhermore, the EAC of the WADlets examined is only $4,738,000, where the total EAC of the PBD is $11,502,000 (41%). The positive CV to offset the total CV must be contained in a WADlet that was not examined.

Most of the line items (9), and most of the CV, is from the overrun and underrun category. These misestimates account for 84% of the negative CV of the WADlets examined (-$196,000 of the -$233,000). Although there were only 4 line items of mischarges with a net effect of -$44,000, two mischarges of -$194,000 and $108,000 mitigate each other out.

- **PBD 30**

Only $1,139,000 of the total $3,995,000 CV is accounted for in the WADlets examined (29%). The WADlets also only account for $30,857,000 of the $123,028,000 EAC for the PBD (25%). Approximately $1,260,000 of the remaining CV is from WADlets that were not examined in WADs 45 and 46. The CV for the PBD represents 3.2% of the EAC.

While instances of overruns or underruns accounted for the most line items (23 counts), the net effect is only -$305,400 and the magnitude is only $642,000. Two single items account for most of the $1,139,000 CV: this is a $1,967,000 incentive fee accumulation in WAD 63 (categorized as Other), and $1,003,000 of FY98 reversals from severance fees. These two items account for $2,970,000 of the CV total.

- **PBD 34**

In PBD 34, the CV of the WADlets examined is -$308,710, where the total CV of the PBD is -$2,048,000, representing only 15%. The WADlets examined account for $23,923,000 of the total EAC of the PBD of $92,717,000, or 25%. A large part of the gap is from WAD 96, which has a -$1,576,000 CV that is not itemized or explained on a WAD or WADlet.

Again, overruns and underruns account for the most line items (13 counts), but the net effect to the CV is only -$75,700. The absolute value of $849,700 gives the magnitude of these misestimates. Mischarges make up the greatest percentage (53%) of the CV, representing -$162,300 of the $-308,710. FY98 accruals make up 46% (-$141,000 of -$308,000) of the CV. All of the line items in Mischarges and FY98 accruals or reversals are negative, so there is not net effect to reduce these two categories.

OVERALL ANALYSIS

The net effects of CVs in the WADlets obscure to some extent the magnitude of underruns, overruns, mischarges, and FY98 accruals and reversals. This canceling out of positive and negative CVs also happens on the WAD level. The net effect masks both the total CV attributable to each category of discrepancy (ie mischarges or overrun and underrun) and the total CV for the WADlet.

With respect to the occurrence of each category of the CV, there were the most line items in Overrun and Underrun (86 counts). There were 46 counts of FY98 accruals or reversals, and 42 counts of misestimates. There were 11 counts of Other Accruals and 22 counts of Other.

In certain cases, single line items/charges accounted for a major portion of the total CV (for example, PBDs 9 and 30).

There was not direct correlation between the net amount of the CV and the EAC of the PBD, although it can be said that PBDs with low EAC (approximately $1,000,000) were more impacted by the CVs (ie CV was a greater % of EAC).

PBD	Dec-98	EAC Mil	WADlet	CV (K)			Overrun or Underrun	Mis-Charge	FY98 Accural or Reversal	Other Accrual	Other
1	Buffer Zone Closure	15.353		299.00		Explanation from WADLET					
WAD	WADlet Name										
1	Surface Water Mon.	1.717	101	127.00							
					25.00	Flume not installed due to envirnmental concerns	25.00				
					69.00	Underrun costs due to weather	69.00				
					14.00	Missing accruals				14.00	
1	Pollutant Source Con.	1.060	104	86.00							
					(23.00)	no signifiant variance					(23.00)
					(18.00)	Charges posted to new charge # before resources assigned		(18.00)			
					17.00	Improper accural reversal			17.00		
					(10.00)	Mischarge		(10.00)			
					8.00	design savings	8.00				
					7.00	wrong completion date (resource loading)					7.00
					23.00	Mischarge-new charge #		23.00			
					18.00	Mischarge-new charge #		18.00			
					22.00	Mischarge-new charge #		22.00			
					69.00	Mistake in June98 entry			69.00		
1		0.035	106	17.00							
					14.00	Reversed accrual			14.00		
					3.00	incorrect EV in October					3.00
1	Clean Water Program	0.248	604	22.00							
					13.00	labor underrun-changed priority	13.00				
					9.00	incorrect accrual reversal			9.00		
1		0.019	202	22.00							
					21.00	prior FY subcontract closeout			21.00		
1		1.405	401	41.00							
					41.00	costs not accrued				41.00	
83		0.184	201	21.00							
					8.00	Dec 98 accrual reversal			8.00		
					13.00	EV taken in errov					13.00
83		0.015	301	(1.00)							
					(1.00)	Incorrect charge		(1.00)			
83		0.168	302	(4.00)							
					(4.00)	reversal of FY98 overcredit			(4.00)		
83		0.846	602	(57.00)							
					(46.00)	incorrect ev metholology					(46.00)
					31.50	underrun	31.50				
					(42.30)	overrun	(42.30)				
		5.697		274.00	281.20	Total	104.20	34.00	134.00	55.00	(46.00)
						Absolute Value	257.80	147.00	142.00		
						Count	6.00	6.00	7.00	2.00	5.00

WAD	WAD EAC	PBD CV	WAD CV	WADlet CV	
1	6.924	346.00	346.00	322.00	OK
83	8.429	(47.00)	(47.00)	(40.80)	OK
	15.35		299.00	281.20	

PBD	Dec-98	EAC Mil	WADlet	CV (K)		Explanation from WADLET	Overrun or Underrun	Mis-Charge	FY98 Accural or Reversal	Other Accrual	Other
6	SNM Consolidation	2.402		339.00							
WAD	WADlet Name										
	SNM Consolidation	2.369	202	335.00	45.00	mischarges		45.00			
					5.50	mischarges		5.50			
					60.00	underspent (suspect mischarge)		60.00			
					80.00	mischarges		80.00			
					144.50	efficiencies	144.50				
				335.00	335.00	Total	144.50	190.50	0.00	0.00	0.00
						Absolute	144.50	190.50	0.00	0	0
						Count	1.00	4.00	0.00	0.00	0.00

WAD	WAD EAC	PBD CV	WAD CV	WADlet CV	
10	2.402	339.00	339.00	335.00	OK
93					
94					
95					
	2.40		339.00	0.00	

PBD	Dec-98	EAC Mil	WADlet	CV (K)								
9	Pu Solid Residue Stabilization	51.579		(101.00)		Explanation from WADLET	Overrun or	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
WAD											
15		6.796	401	(906.00)							
					(232.00)	Mischarge		(232.00)			
					(69.00)	LANL IWO for Mobile TGS testing	(69.00)				
					(80.00)	Charged against closed chrg no.		(80.00)			
					(65.00)	Unanticipated expenditures	(65.00)				
					(75.00)	Unidentified charges		(75.00)			
					(384.00)	higher costs	(384.00)				
20		1.237	409	94.00							
					94.00	Charges going to wrong chrg no.		94.00			
20		0.027	705	34.00							
					34.00	FY98 acruals being reversed out			34.00		
20											
	From WAD		407	79.00	79.00	Efficiencies	79.00				
			704	(11.00)	(11.00)	One time charge					(11.00)
88		0.305	309	(7.00)							
					(24.60)	Incurred against FY98 chrg no.			(24.60)		
					(26.50)	Incurred PM charges	(26.50)				
					43.80	Cost not accrued for work comp				43.80	
88	From WAD	5.486	403	(470.00)							
	From WAD				(330.00)	Rework required	(330.00)				
	From WAD				(71.00)	Extra maintenance	(71.00)				
	From WAD				(57.00)	No FY99 funds			(57.00)		
	From WAD				(26.00)	Extra PM costs	(26.00)				
	From WAD				43.00	Cost not accrued for work comp				43.00	
89		2.718	702	338.00							
					128.00	mischarges		128.00			
					40.00	Savings on training	40.00				
					29.00	Work budgeted in PM	29.00				
					(19.00)	ev not taken on partial work					(19.00)
					92.00	savings	92.00				
					81.00	no maintenance requires	81.00				
					35.00	Charges to closed chrg no.		35.00			
					60.00	budget variance	60.00				
					(18.00)	experimental operator					(18.00)
					(16.00)	exceeded costs	(16.00)				
					(59.00)	Incurred against FY98 chrg no.			(59.00)		
					(15.00)	mischarges		(15.00)			
					17.00	maintenance	17.00				
					(20.00)	mischarges		(20.00)			
89		1.447	310	(1303.00)							
					8.00	work not begun	8.00				
					11.00	work not begun	11.00				
					(79.00)	overtime	(79.00)				
					1181.00	mischarge		1181.00			
					(4.00)	over accrual				(4.00)	
					(201.00)	mischarge		(201.00)			
					(257.00)	over accrual				(257.00)	
					(1911.00)	accrual error				(1911.00)	
					(27.00)	No reason given					(27.00)
					(25.00)	overtime	(25.00)				
89		5.983	402	(215.00)							
					13.00	Partial budget not needed	13.00				
					(128.00)	mischarges		(128.00)			
					(82.00)	No ev					(82.00)
					59.00	Charged against closed chrg no.		59.00			
					36.00	mischarges		36.00			
					(112.00)	Management overtime	(112.00)				
89		3.471	408	127.00							
					(3.70)	FY 98 charge number			(3.70)		
					(5.20)	Mischarge		(5.20)			
					49.80	dispensation not resolved					49.80
					(8.10)	Charged against FY98 chrg no.			(8.10)		
					38.80	credit for maintenance	38.80				
					(13.10)	higher costs	(13.10)				
					68.30	funded by WAD 41		68.30			
90		1.111									
	From WAD		304	(16.00)	(16.00)	FY98 reversal			(16.00)		
	From WAD		305	250.00	250.00	FY98 reversal			250.00		
	From WAD			86.00	86.00	FY98 reversal			86.00		
	From WAD		404	(100.00)	(100.00)	FY98 accrual			(100.00)		
90		13.527	405	1820.00							
					179.00	credit from fy98 reversed			179.00		
					30.00	credit from fy98 reversed			30.00		
					97.00	miscoding of labor rates		97.00			
					106.00	underspent	106.00				
					40.00	underspent	40.00				
					56.00	underspent	56.00				
					758.00	new pricing	758.00				
					567.00	Work performed cost not posted				567.00	
90		0.253	412	64.00							
					64.00	Charge number not opened		64.00			
		42.361		(136.00)	(96.50)	Total	212.20	1006.10	310.60	(1518.20)	(107.20)
						Absolute	2645.40	2518.50	847.40	2825.80	206.80
						Count	27.00	17.00	12.00	6.00	6.00

WAD	WAD EAC	PBD CV	WAD CV	WADlet CV	
15	10.621	(101.00)	(893.00)	(906.00)	OK
20	6.657		196.00	196.00	OK
88	5.791		(470.00)	(448.30)	OK
89	13.619		(1053.00)	(1053.00)	OK
90	14.891		2118.00	2117.00	OK

PBD	Dec-99 EAC Mil	WADlet	CV (K)							
11	Uranium Disposition	1.014	WADlet	192.00		Explanation from WADLET	Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
WAD											
17		1.014	102	136.00							
					18.00	Under run in overtime	18.00				
					17.00	Under run in misc	17.00				
					56.00	Under run in subcontract from FY98			56.00		
					(25.00)	Over run supplies and subcontract	(25.00)				
				136.00	66.00	Total	10.00	0.00	56.00	0.00	0.00
						Absolute	60.00	0	56.00		
						Count	3.00	0	1.00	0.00	0.00

WAD	WAD EAC	PBD CV	WAD CV	WADlet CV	
17	1.014	192	136.00	66.00	No further explanation on WAD or PBD
18			56.00		No explanation on WAD or PBD
	1.01		192.00		

PBD	Dec-99 EAC Mil	WADlet	CV (K)							
12	SNM Shipping 5.672		(263.00)		Explanation from WADlet	Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
WAD	SNM Shipping									
22	0.03	6	(3.00)							
				(3.00)	Mischarges		(3.00)			
	1.326	7	(332.00)							
				(332.00)	FY 98 accrual error			(332.00)		
	0.349	13	56.00							
				56.00	Mischarges		56.00			
	From WAD	4	(26.00)	(26.00)	Not explained					(26.00)
		10	15.00	15.00	Accrual Error				15.00	
		11	33.00	33.00	BWCP in error					33.00
			26.00	26.00	Underspent	26.00				
		12	19.00	19.00	Under spent	19.00				
		16.01	(5.00)	(5.00)	Mischarges		(5.00)			
		16.02	(89.00)	(89.00)	Overrun	(89.00)				
		19.01	43.00	43.00	Costs not posted				43.00	
		10.2	1.00	1.00	Underspent	1.00				
	1.71		(262.00)	(262.00)	Total	(43.00)	48.00	(332.00)	58.00	7.00
					Absolute	135.00	64.00	332.00	58.00	59.00
					Count	4.00	3.00	1.00	2.00	2.00

WAD	WAD EAC	PBD CV	WAD CV	WADlet CV	
22	5.672	WADlets			OK
		6	(3.00)		
		7	(332.00)		
		13	56.00		
		4	(26.00)		
		10	15.00		
		11	59.00		
		12	19.00		
		16.01	(5.00)		
		16.02	(89.00)		
		19.01	43.00		
		10.2	1.00		
	5.67		(262.00)	0.00	

Cost Variance Summary Table

($1000s)

PBD Category	Over/Under Run	Mischarge	FY98 Accrual	Other Accrual	Other
Project-related PBDs					
Net	$1,497	$553	-$9	$343	-$783
Absolute	$5,796	$2,419	$1,221	$2,599	$1,430
% of Total	43	18	9	19	11
Project Management PBDs					
Net	$957	-$177	$1,435	$41	$3,210
Absolute	$3,442	$268	$2,310	$546	$3,440
% of Total	34	3	23	5	34

PBD	Dec-	EAC Mil	WADlet	CV (K)		Explanation from WADLET	Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accuals	Other
15	Miscellaneous Production Zone Closure	11.502		(93.00)							
WAD											
27		1.17	103	(27.00)							
					(19.00)	xfer of scope from ssoc	(19.00)				
					(8.00)	misc overuns	(8.00)				
27	From WAD		101	(23.00)							
					(16.00)	Annual surveys	(16.00)				
					(2.00)	misc overuns	(2.00)				
27	From WAD		102	(118.00)							
					(70.00)	Overwork and Overtime	(70.00)				
					(35.00)	More supplies needed	(35.00)				
27	From WAD		104	19.00							
					19.00	Underrun	19.00				
29		0.162	103	13.00							
					13.00	incorrect charging		13.00			
29		0.72	104	(194.00)							
					(194.00)	incorrect charging		(194.00)			
29		1.58	403	108.00							
					108.00	incorrect charging		108.00			
29		0.268	101	(10.00)							
					(10.00)	accrual of FY98 charge			(10.00)		
70	569 Cluster Project	0.547		7.00	7.00	FY98 accrual reversal			7.00		
71	910/PWSTN	0.101		(9.00)							
					(9.00)	Additional labor	(9.00)				
77	Cluster Landlord Function	0.19	101	(37.00)							
					(56.00)	debris removal	(56.00)				
					29.00	mischarges		29.00			
					10.00	carryover from fy 98			10.00		
		4.738		(271.00)	(233.00)	Total	(196.00)	(44.00)	7.00		
						Absolute	234.00	344.00	27.00		
						Count	9.00	4.00	3.00	0.00	0.00

WAD	WAD EAC	PBD CV	WAD CV	WADlet CV	
27	5.044	-93	(127.00)	(131.00)	OK
29	2.905		(77.00)	(83.00)	
77	3.315		137.00	(17.00)	Unable to determine other $154
70	0.547		7.00	7.00	OK
71	0.101		(9.00)	(9.00)	OK
72			(6.00)		No explanation
38	0.159		(19.00)		Mischarge and greater costs
	12.07		(94.00)		

PBD	Dec-98	EAC Mil	WADlet	CV (K)							
30	K-H Project Mgmt	123.028	WADlet	3995.00		Explanation from WADLET	Overrun or Underrun	Mis-charge	FY98 Accrual or Reversal	Other accual	Other
WAD											
85	WFR Severance a	8.535	901	409.00							
					409.00	FY 98 reversals (severance)			409.00		
85	WFR Severance a	3.155	902	594.00							
					594.00	FY 98 reversals (severance)			594.00		
24	Effluent Air Monitor	0.536	101	28.00							
					11.00	FY 98 work performed			11.00		
					15.00	slow first quarter	15.00				
24	Tech Support		106	18.00							
					17.00	delay in funding					17.00
					10.00	Software charges didn't occur	10.00				
					(9.50)	fy98 underaccrued			(9.50)		
24	Chemical Life-Cycl	0.33	109	36.00							
					20.00	work not performed	20.00				
					12.00	error in EV					12.00
					7.00	mischarge		7.00			
24	Compliance and P	1.311	123	18.00							
					15.60	bugeted vs actual labor hrs	15.60				
					4.60	FY 98 estimated costs			4.60		
45	SSOC PM	0.836	208	(44.00)							
					(20.00)	cost overruns	(20.00)				
					(28.00)	FY98 accruals			(28.00)		
					(12.00)	FY98 accruals			(12.00)		
					10.00	xfer of personnel	10.00				
45	ESQ&H	1.876	203	(29.00)							
					(15.00)	mischarging (est)		(15.00)			
					(14.00)	overrun (est)	(14.00)				
45		0.119	603	3.00							
					2.60	Costs not yet incurred				2.60	
45	D&D	0.98	514	361.00							
					352.00	FY98 reversal			352.00		
					9.00	under run	9.00				
45	Nuclear Facility Op	1.493	204	(59.00)							
					(34.00)	Contractual commitment					(34.00)
					(65.00)	costs not budgeted	(65.00)				
					28.00	management change					28.00
					18.00	Savings on supply purchases	18.00				
45	SSOC Constructio	0.306	209	41.00							
					4.00	mischarges		4.00			
					6.00	direct scope					6.00
					19.00	Position not filled	19.00				
					5.00	computers not costed				5.00	
					6.00	training costs not incurred	6.00				
45	Document Support	1.389	308	(69.00)							
					(44.00)	FY98 accruals			(44.00)		
					(15.00)	accrual for cancelled task			(15.00)		
					(10.00)	Computer cost	(10.00)				
45	Records Support	1.909	307	(82.00)							
					(75.00)	FY98 accruals			(75.00)		
					(7.00)	accelerated spending	(7.00)				
45	Closure Project Int	3.964	310	(157.00)							
					(37.00)	cost overruns	(37.00)				
					(124.00)	cost overruns	(124.00)				
					(35.00)	incorrect charging		(35.00)			
					28.00	FY98 credit			28.00		
					11.00	cost savings	11.00				
45	Decomissioning	1.761	312	(113.00)							
					(34.00)	fy 98 accrual			(34.00)		
					(12.00)	fy 98 accraul			(12.00)		
					(14.00)	unanticipated costs	(14.00)				
					(12.00)	extra accrual on FY98 contrct			(12.00)		
					(41.00)	mischarges		(41.00)			
46	Health Physics		703	73.00							
					87.00	Posting of void check					87.00
46	Analytic Lab	1.247	705	36.00							
					36.00	Work performed not billed				36.00	
46	Nuclear Engineeri	1.11	711	70.00							
					45.00	over accrual and reversal			45.00		
					15.00	BCWP incorrect					15.00
84	From WAD	2.602		(111.00)							
					(116.00)	No budget	(116.00)				
					(25.00)	FY98 accruals			(25.00)		
					35.00	Labor underrun	35.00				
					(3.00)	Subcontract cost	(3.00)				
63	From WAD	50.341		1675.00							
					1967.00	Incentive Fee-not finalized					1967.00
					(46.00)	FY98 incentive fee			(46.00)		
					(56.00)	Fee not in baseline	(56.00)				
					(8.00)	Higher fees	(8.00)				
		30.857		1134.00	1139.30		(305.40)	(80.00)	1131.10	43.60	2098.00
						Absolute	642.00	102.00	1756.00	49.60	2166.00
						Count	23.00	5.00	18.00	3.00	8.00

WAD	WAD EAC	PBD CV	WAD CV	WADlet CV	
85	6.655		1003.00	1003.00	OK
24	7.594		159.00	102.70	
25					
45	34.936		546.00	(149.40)	Unknown
46	20.848		743.00	183.00	**
84	2.602		(111.00)	(111.00)	OK
63	50.341		1675.00	1857.00	
	122.98		3995.00		

PBD	Dec-98	EAC Mil	WADLET	CV (K)			Overrun or Underrun	Mis-charge	FY98 Accrual or Reversal	Other accual	Other
34	Management	92.717		(2048.00)		Explanation from WADLET					
D											
44	Legal Support	1.488	102	41.00							
					41.00	pending resolution of bills					41.00
44	Integration Ov	0.537	110	(38.00)							
					(43.00)	FY98 accrual			(43.00)		
					5.00	Costs less than budgeted	5.00				
44	Sub Leased L	3.031	903	(181.00)							
					(118.00)	mischarge of breaks		(118.00)			
					(18.00)	cost overrun	(18.00)				
					(45.00)	payments front loaded	(45.00)				
44	G&A	6.122	201	(347.00)							
					(249.84)	Increase in G&A allocation	(250.00)				
					(72.87)	Interim rate billing	(73.00)				
					(24.00)	Scope transfer	(24.00)				
44	Convenience	1.138	202	(15.00)							
					(32.00)	FY98 accrual			(32.00)		
					17.00	Underruns	17.00				
44	Printing Servic	0.365	204	(30.00)							
					(40.00)	FY98 accrual			(40.00)		
					10.00	Underruns	10.00				
44	G&A	2.398	301	(53.00)							
					(50.00)	budget spread out	(50.00)				
					(22.00)	billing proceess days				(22.00)	
					19.00	Underruns	19.00				
44	IRM	2.308	101	(31.00)							
					(31.00)	Error in manual accrual				(31.00)	
44	JCUSC	0.53	128	6.00							
					6.00	accrued vs expended	6.00			6.00	
4	Training	5.693	103	412.00							
					330.00	No charges to date	330.00				
					82.00	expenditures not yet taken				82.00	
44	Photography	0.313	203	(73.00)							
					(26.00)	FY98 accrual			(26.00)		
					(36.50)	mischarge		(36.50)			
					(7.80)	mischarge		(7.80)			
					(2.70)	overruns	(2.70)				
		23.923		(309.00)	(308.71)	Total	(75.70)	(162.30)	(141.00)	35.00	41.00
						Absolute	849.70	162.30	141.00	141.00	41.00
						Count	13.00	3.00	4.00	4.00	1.00

WAD	WAD EAC	PBD CV	WAD CV	WADlet CV	
44	92.717		(472.00)	(309.00)	
96			(1576.00)		Not Explained
	92.72		(2048.00)		

Analysis at the WADlet level--January 1999

Selected WADlets were examined and the descriptions of root-cause for cost variances were categorized. Five categories were used, described below:

- **Overrun or underrun**: A variance was assigned to this category if actual spending did not equal budgeted costs. Examples include more overtime required, delays due to weather, anticipated costs not required, cost overruns or underruns when costs occur in peaks and the budget is straight-lined (ie budget loading), and increase in scope to a WADlet.

*Examples of the wording used in the WADlets to characterize these **overruns and underruns**:*

PBD 1, WAD 1, WADlet 604: "The cost variance of $9K results form a labor and A5H dollars underrun due to changes in work priority."

PBD 2, WAD 7, WADlet 201: "Unanticipated area contamination increased labor cost by $58K, subcontractor support by $63K, associated personnel protective equipment by 8K, and training/miscellaneous by 6K."

PBD 9, WAD 15, WADlet 401: "Higher than expected cost per KG produced."

PBD 12, WAD 22, WADlet 007: "Efficiencies realized in packing and shipping eU hemishells."

- **Mischarge**: A variance was designated as a mischarge if the explanation indicated a WADlet was inappropriately charged for work, whether it was the recipient of the mischarge or the account that should have been charged. Also, charges made against a new charge number that was not opened were counted as mischarges. A mischarge was assumed if the explanation indicated that a charge was made to a closed charge number, UNLESS the explanation specifically stated that the charge was from FY98. In those cases, the variance was assigned to FY98 Accrual or Reversal.

*Examples of the wording used in the WADlets to characterize these **Mischarges**:*

PBD 2, WAD 62, WADlet 401: "The 77K underrun in labor costs is because container moves associated with RTR and NDA were erroneously charged to the low-level container moves charge number."

PBD 9, WAD 89, WADlet 702: "Cost variance is primary due to lack of charges form Building 371 operator who charged the operations account. Charges in the amount of $130K will be transferred from the operations charge number." And "Charges in the amount of $35 K will be transferred form RW23DD, TB23GM, and TB23HA, closed charge numbers that inappropriately received charges for this work."

PBD 9, WAD 89, WADlet 402: "Operators erroneously charged fluorides administrative work to this account."

- **FY98 Accrual or Reversal**: A variance was assigned to this category if the explanation indicated it was the result of a charge to a FY98 charge number or a subsequent reversal.

*Examples of the wording used in the WADlets to characterize these **FY98 Accruals and Reversals**:*

PBD 1, WAD 1, WADlet 104: "Subcontract 708075 was assigned an incorrect accrual of $72,568 in June 98. That should have been $7,053. Subsequent corrections were made, including a journal entry made in September 1998 of $34,450. This entry should have been -$34,450 to correctly reflect the accruals for this contract."

PBD 9, WAD 15, WADlet 401: Effect of fact that the Salt Project has yet to fully recover 512 kg of carryover scope from FY98" and "Carryover costs from FY98 captured under charge number EM2234."

PBD 9, WAD 20, WADlet 705: "The cost variance of $34 K or 128.5% is due to FY98 charges that were accrued in September 98, which reversed out in FY 99. Cash payments are being made against these accruals, resulting in the CV being reduced until there is no CV."

- **Other accrual**: A variance was assigned in this category for any type of accrual error or discrepancy that did not specifically indicate it was from FY98. For example, positive cost variances that resulted from work that was completed but where costs had not yet been incurred were included. Variances that were explained as "accrual error" were also counted in this category.

*Examples of the wording used in the WADlets to characterize these **Other Accruals**:*

PBD 1, WAD 1, WADlet 104: "Due to missed accruals for LANL, Wright Water Engineers and Destiny Resources."

PBD 1, WAD 1, WADlet 401: "The cost variance is due to missing la accruals for the first quarter of FY99."

PBD 2, WAD 7, WADlet 201: "An accrual made for the month of January for $77K on the Freeze Protection Project should not have been made."

PBD 9, WAD 90, WADlet 405: "Costs not yet posted for POC's received from vendor. Accruals not submitted for these costs."

- **Other**: This category accounts for variances were not explanation was given, were considered insignificant, or otherwise explained. Variances that were the result of BCWP being misstated, or where EV was not taken or taken incorrectly, were categorized here.

*Examples of the wording used in the WADlets to characterize **Other**:*

PBD 1, WAD 1, WADlet 104: "Weed and Vegetation Management: Earned value over-reported. Work on the Environmental Assessment has been delayed due to permit issues."

PBD 9, WAD 89, WADlet 310: "ACWP should be $1,177K. Accrual reduction is $241K."

PBD 9, WAD 89, WADlet 402: " Due to stopping operations in October and November, charging from operators and RCTs having no corresponding earned value resulted in a cost variance of -$82K. In addition, there was no earned value for the month of January, resulting in a cost variance of -$57K."

PBD 12, WAD 22, WADlet 012: "The CV of $29K is within threshold."

NOTE: For certain WADlets that were not available, cost variance data was taken from the WAD. Since not all WADlets or WADs were examined for all PBDs, although the net effect of the CV is captured at the PBD level, there can potentially be large CVs that cancel out.

- **PBD 1**

In PBD 1, the WADs and WADlets examined account for $570,500 of the total $605,000 CV (94%). The WADlets examined account for $9,480,000 of the total $15,502,000 EAC for the PBD (61%). The remaining EAC lies in WADlets in both WAD 1 and WAD 83 that were not examined, and could contain additional CVs that cancel each other out. The total CV for the PBD comprises 4% of the total EAD.

Overruns and Underruns account for $206,500 of the total $605,000 CV (34%). Other accruals account for $142,000 of the CV and Other discrepancies account for $156,000 of the CV (23% and 26% respectively). Net effects do not impact this PBD significantly, as most discrepancies are positive variances.

Comparison between Dec 98 and Jan 99:

A mischarge of -10,000 was made both in December and January in WADlet 104, both charges that should have been paid by Solid Material Management.

In WADlet 104, a wrong completion date loaded in BEST was not corrected in December, carrying the $7,000 variance into January.

In WADlet 106, a positive January CV is attributed to actions to correct a negative CV in December caused by a reversed accrual for FY98.

In WADlet 201, a reversed accounting accrual of $8,000 was recorded both in January and December.

In WADlet 302, a reversal of a FY 98 over credit affects both December and January's CV.

- **PBD 2**

The WADs and WADlets examined account for $1,605,900 of the total $1,821,000 CV, representing 88%. The WADlets account for $61,710,000 of the total $65,742,000 EAC for the PBD (94%). The value of the total CV represents 2.8% of the total EAC for the PBD.

Most discrepancies in this PBD come from Underruns and Overruns, having the most occurrences (34), and the largest net ($1,628,000) and absolute value ($3,484,000). Since the other categories of discrepancies almost cancel each other out, the Underruns and Overruns accounts for most of the total CV for the PBD. The difference in the net effect ($1,628,000) and the absolute value ($3,484,000) indicates that both underruns and overruns are canceling each other out in the category.

- **PBD 9**

The WADs and WADlets examined account for 59% of the total CV for the PBD ($660,980 out of $1,122,000). The EAC of the WADlets examined account for 87% of the total EAC for the PBD ($46,141,000 of $52,868,000). The total CV represents 2% of the total EAC for the PBD.

In this PBD, several large line items have a significant effect of the net CV. Positive and negative variances cancel each other out, both in the total for the categories and among the WADlets.

Overruns and Underruns accounted for the most occurrences of discrepancies (36 counts), but the net effect is only $828,450. The absolute value of $3,520,250 in this category indicates the extent of the cancellation effects.

The same situation is true for the category of mischarges, though not to the extent of the Overrun category. With a net value of $153,160 from 17 occurrences, the mischarges seem less significant to the overall CV in the PBD, but the magnitude of $1,03,160 indicates that these discrepancies could have a significant effect on the individual WADlets or WADs.

Other accruals and the Other category have very large values, but work to cancel each other out to mask the significant effect on the overall CV. A positive CV of $1,784,900 in Other Accruals in mainly from one line item charge of costs not being posted in WAD 90. This is mitigated by a negative CV of $1,913,970 in Other, mainly from two line items of wrong ACWP in WAD 89.

Comparison between Dec 98 and Jan 99:

In WADlet 401, charges were made against a closed FY98 charge number EM2234 in both December (-$80,000) and January (-$51,000).

In WADlet 409, charges are missing for Gas Generation, which were being mischarged, In December ($94,000) and January $50,000.

In WADlet 705, the $34,000 for December and January is due to a FY98 charge. WADlets note that "cash payments are to be make against these accruals which will result in the CV being reduced until there is no CV."

In WADlet 309, both December and January record over -$20,000 of CV incurred in FY98 against closed charge numbers. Although both December and January reports indicate costs were not accrued for work performed, the work was performed with that month.

In WADlet 702, both December and January show charges directed to the wrong charge number ($128,000 in December and $130,000 in January). A $35,000 CV in both months is due to charges against a closed charge number in the same WADlet (the mischarge is cancelled out by the -$35,000 mischarge also recorded in both months). A separate mischarge of -$59,000 is also recorded in December and January. Both months account for a negative cost variance because partial EV cannot be taken.

In WADlet 402, both months show mischarges being to Fluorides (-$128,000 and $-130,000). Both months record a -$82,000 CV due to no EV. And December and January show a $59,000 CV due to charges being made against a closed account.

In WADlet 408, a mischarge of -$3,700 to a FY98 charge number appears in both months (and a not in December's report indicates the mischarge existed in November.) A mischarge in December of -$5,200 was reduced to $355 by corrective action. Another charge to a FY98 closed charge number occurred in December and January. The December WADlets note that "Charge numbers have been closed to new activities; however, open purchase req's associated with this charge number will continue to have costs booked against it. The practice of booking open purchase req costs to closed numbers is a Procurement policy."

In WADlet 405, both December and January have posted $209,000 in CV due to FY98 over accruals. Both months show large positive CVs due to costs not being posted for POC's received from a vendor ($567,000 in December and $1,520,000 in January.)

- **PBD 12**

The analysis of the WADlets in WAD 22 accounts for the total CV of the PBD of $405,000 and the total EAC of $5,672,000. The CV represents 7% of the total EAC for PBD 12.

Three quarters of the total CV comes from the 6 instances of overruns or underruns ($306,000 out of $405,000). Positive and negative variances in this category reduce the net effect from the overall magnitude ($576,000). No discrepancies were categorized in FY98 accruals or reversals, and only one mischarge of -$5,000 is recorded.

Comparison between Dec 98 and Jan 99:

WADlet 10.10 shows a $15,000 CV due to accrual error in both December and January. Both months also show a mischarge in WADlet 601 of $5,000.

- **PBD 15**

The analysis of the WADlets and WADs in PBD 12 account for $392,000 of the total CV of $256,000; there is a positive CV in WAD 77 that is not accounted for with a WADlet. The CV represents 2% of the PBD EAC.

In this PBD, the most line item discrepancies occur in the Overrun or Underrun category (7 counts) and the Mischarge category (6). These two each account for slightly over half of the total CV for the PBD (53% and 51% respectively. The absolute value of each category indicates that there are no significant effects from positive CVs and negative CVs canceling each other out.

Comparison between Dec 98 and Jan 99:

In WADlet 104 of WAD 20, incorrect charging in December creates a -$194,000 CV at the WAD level. In January, a -$172,000 CV is posted, but the WADlet records that the charging practices have been corrected.

In WADlet 101 of WAD 77, mischarges of $29,000 occur in both December and January.

- **PBD 30**

The WADs and WADlets examined account for $6,854,450 of the overall $7,982,000 CV for the PBD (82%) and $98,500,000 of the total EAC (82%). The CV represents 7% of the EAC.

Analysis of Jan 99 PBD 30 is similar to Dec 98. Although Underruns and overruns have the most occurrences (36 counts), they account for only $692,550 of the total CV. Two single items account for most of the $6,854,450 CV: this is a $4,123,000 incentive fee accumulation in WAD 63 (categorized as Other), and $1,805,000 of FY98 reversals from severance fees. These two items account for $5,928,000 of the CV total.

Comparison between Dec 98 and Jan 99:

In WADlets 901 and 902, large overaccruals of severance funding in December and January account for substantial positive CVs (total $$1,013,000 in December and $1,805,000 in January). Both months also have a -$10,000 CV due to FY98 underaccrued costs for a subcontract of technical writer.

In WADlet 208, both months have FY98 accruals (-$28,000 and -$30,000) due to work performed in September but not accrued until October on the Project Control Manual.

WADlet 209 in December shows a mischarge of $4,000 for which a cost transfer was submitted on November 18,1998 but not yet loaded into the system. In this WADlet, both months show positive CVs for computer equipment not yet costed.

WADlet 310 shows negative CVs for December (-$35,000) and January (-$23,000) for mischarges to the same charge. These negative CVs are offset (in both months by a positive CV of $28,000 and $22,000 for FY 98 accrual credit for project control and Scheduling.

WADlet 312 shows missed FY98 accruals of $34,000 and $12,000 for both months.

WAD 63 shows a positive CV for December ($1,967,000) and January ($4,123,000) for under spending for incentive fees because they were not finalized.

- **PBD 34**

The WAD examined, WAD 44, accounts for $1,497,000 of the $1,215,000 total CV (123%) for PBD 34. The remaining CV, from WAD 96, is not itemized as the WAD indicates it is within threshold. The CV represents 1.3% of the EAC for this PBD.

A majority of the CV is attributable to Overruns and Underruns, which total $1,602,000 among 16 counts. The magnitude of this category is $3,730,000, indicating a significant portion of the positive and negative variances are cancelled out. The total of the other categories also cancel out each other.

- **PBD 36**

The WAD examined, WAD 87, accounts for $4,150,000 of the total $4,296,000 CV (97%) for PBD 36. The CV represents 5.7% of the total EAC ($74,952,000) of this PBD.

The significant portion of the CV is due to several overruns in the Employee Benefits WADlet, totaling $5,820,000. This amount is offset by a negative CV in Other Accruals, a -$2,002,00 charge for earnings being transferred from payroll to accounting. Insignificant mischarges occurred in this PBD.

OVERALL ANALYSIS

The overall analysis is similar to December 98 results. Net effects of CVs in the WADlets obscure the magnitude of underruns, overruns, mischarges, and FY98 accruals and reversals, in each category, in the WADlets, and the overall PBD.

With respect to the occurrence of each category of the CV, there were the most line items in Overrun and Underrun (160 counts). There were 37 counts of FY98 accruals or reversals, and 45 counts of misestimates. There were 39 counts of Other Accruals and 30 counts of Other.

In certain cases, single line items/charges accounted for a major portion of the total CV (again in PBDs 9 and 30, and 36).

Over $7,000,000 of the CV in January 99 is a repeat or a carryover of a CV from December 98 in the mischarge, FY98 Accruals, Other Accruals, and Other categories. While the totals are influenced by a few single large line items, canceling does occur (absolute value of total CV carried over is $9,146,560). Since this is a positive CV, any negative CV due to overruns, schedule delays, scope increase, etc can be masked in the PBDs, WADs, or WADlets.

PBD	Jan-99	EAC Mil	WADlet	CV (K)			Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
2	Waste Management	65.742		1821.00		Explanation from WADLET					
WAD											
2	219 Cluster	0.066	105	14.00							
					6.00	Mischarges		6.00			
					8.00	Undercost	8.00				
4	WAD Analysis	13.164		187.00							
					241.00	Less labor required	241.00				
					37.00	Redirected resources					37.00
					37.00	Under spent	37.00				
					(91.00)	Overestimation of status	(91.00)				
5	WAD Analysis	4.604		178.00							
					60.00	FY98 credit			60.00		
					118.00	Under spent	118.00				
6	WAD Analysis	27.684		1745.00							
					104.00	Reduced costs	104.00				
					831.00	Lower costs	831.00				
					200.00	Under spent	200.00				
					53.00	Lower costs	53.00				
					838.00	Efficiencies	838.00				
					(162.00)	Over run	(162.00)				
					(121.00)	FY98 carryover			(121.00)		
7	Interceptor Trench Op	0.406	201	(100.00)							
					(23.00)	Over run	(23.00)				
					(77.00)	Accrual mistake				(77.00)	
7	From WAD	4.912	101	(114.00)							
					(45.00)	Additional Maintenance	(45.00)				
					(17.00)	FY98 accruals			(17.00)		
					41.00	Efficiencies	41.00				
7	LLMW Treatment	0.613	503	7.00							
					6.20	Accrual reversal				6.20	
					0.70	Accrual reversal				0.70	
62	Op and Maintain LLW	7.28	101	(293.00)							
					(36.00)	Over spent labor	(36.00)				
					(21.00)	Over spent	(21.00)				
					(16.00)	Over spent	(16.00)				
					21.00	Under spent	21.00				
					(95.00)	Increased scope	(95.00)				
					(186.00)	Over spent labor	(186.00)				
					(23.00)	Over spent supplies	(23.00)				
					(6.00)	Over spent	(6.00)				
					(28.00)	Over spent	(28.00)				
					(146.00)	Mischarges		(146.00)			
					(58.00)	Over spent labor	(58.00)				
					(63.00)	Over spent contract suppt	(63.00)				
					(8.00)	Over spent	(8.00)				
					(6.00)	Over spent	(6.00)				
					140.00	Unknown					140.00
					77.00	Unknown					77.00
					14.00	Unknown					14.00
					3.00	Unknown					3.00
62	ER ops	0.147	108	(27.00)							
					(13.00)	Accrual correction				(13.00)	
					(14.00)	Over spent	(14.00)				
62	TSCA/Asbestos	0.249	502	(34.00)							
					24.00	Scope transfer	24.00				
					(41.00)	Accrual mistake				(41.00)	
					(17.00)	Over spent labor	(17.00)				
62	Haz Waste Ops	0.337	503	12.00							
					17.00	Under spent	17.00				
					(5.00)	Accrual mistake				(5.00)	
62	Pollution Prevention	0.49	301	(10.00)							
					(7.00)	FY98 accrual reversal			(7.00)		
					(16.00)	FY98 accrual			(16.00)		
					13.00	Contract not issues	13.00				
62	Assay LLW	1.758	401	57.00							
					77.00	Mischarges		77.00			
					10.00	Under spent supplies	10.00				
					(30.00)	Costs not budgeted	(30.00)				
		61.71		1622.00	1605.90	Total	1628.00	(63.00)	(101.00)	(129.10)	271.00
						Absolute	3484.00	229.00	221.00	142.90	271.00
						Count	34.00	3.00	5.00	6.00	5.00

WAD	EAC	CV		
2	2.537	223.00	14.00	Descrepancies not itemized
7	4.913	(114.00)	(114.10)	OK
62	12.692	(397.00)	(439.00)	OK
50				Within threshold
4	13.164	187.00	224.00	OK
5	4.604	178.00	178.00	OK
6	27.684	1745.00	1743.00	OK
8				
47		(2.00)		
48	0.148	1.00		Within threshold
49				
	65.74	1821.00	1605.90	

PBD	Jan-99	EAC Mil	WADlet	CV (K)							
9	Pu Solid Residue Stabilization	52.868		1122.00	Explanation from WADLET	Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
WAD	Pu Solid Residue Stabilization									
15		6.589	401	(829.00)						
				(328.00)	Cost Over runs	(328.00)				
				(284.00)	FY98 accrual			(284.00)		
				(64.00)	Additional staff reqd	(64.00)				
				(53.00)	Higher than anticipated costs	(53.00)				
				(51.00)	Carryover costs from FY 98			(51.00)		
				(49.00)	Increased scope	(49.00)				
15		3.706	411	113.00						
				(5.60)	EV can't be taken					(5.60)
				(6.70)	EV can't be taken					(6.70)
				(105.00)	BCWP not approved					(105.00)
				79.00	Mischarges		79.00			
				12.00	Mischarges		12.00			
				6.00	Costs not yet incurred				6.00	
				68.00	EV credit incorrectly taken					68.00
				(31.00)	EV can't be taken					(31.00)
				13.00	Mischarges		13.00			
				84.00	Costs not yet incurred				84.00	
20		1.237	409	50.00						
				50.00	Mischarges		50.00			
20		0.027	705	34.00						
				34.00	Reversing of FY 98 accruals			34.00		
88		0.303	309	16.00						
				(27.00)	Reversing of FY 98 accruals			(27.00)		
				20.30	Under run	20.30				
				20.70	Incurred costs not accrued				20.70	
				2.00	Slow start up	2.00				
88		5.382	403	(351.00)						
				(352.40)	Over run	(352.40)				
				(72.50)	Closed charge numbers		(72.50)			
				(43.50)	Over run	(43.50)				
				11.20	Decreased scope	11.20				
				9.70	Under run	9.70				
				63.20	Costs not yet incurred				63.20	
				42.30	Mischarges		42.30			
89		2.782	702	335.00						
				130.00	Mischarges		130.00			
				75.00	training not required	75.00				
				34.00	Work charged in other budget	34.00				
				(18.00)	EV can't be taken					(18.00)
				(37.00)	Unplanned maintenance	(37.00)				
				(10.00)	EV can't be taken					(10.00)
				92.00	Under run	92.00				
				81.00	No maintenance required	81.00				
				35.00	Mischarges		35.00			
				76.00	Budget loading	76.00				
				(18.00)	Experimental operator					(18.00)
				(25.00)	Over run	(25.00)				
				(59.00)	Charge to FY98			(59.00)		
				(15.00)	Mischarges		(15.00)			
				(20.00)	Over run	(20.00)				
				28.00	Costs not yet accrued on work				28.00	
				(20.00)	mischarge		(20.00)			
89		1.465	310	(1986.00)						
				8.00	Work not begun	8.00				
				11.00	Work not begun	11.00				
				(78.00)	Over run	(78.00)				
				(1024.00)	wrong ACWP					(1024.00)
				(9.00)	over accrual				(9.00)	
				(204.00)	Mischarge		(204.00)			
				(469.00)	wrong ACWP					(469.00)
				(29.00)	Over run	(29.00)				
				(42.00)	PM not funded	(42.00)				
				(154.00)	wrong ACWP					(154.00)
89	Residue Stabaliza	5.656	402	(415.00)						
				5.00	Under run	5.00				
				(130.00)	mischarge		(130.00)			
				(82.00)	No EV					(82.00)

				59.00	Closed charge numbers		59.00			
				(27.00)	over run	(27.00)				
				(35.00)	over run	(35.00)				
				17.00	mischarge		17.00			
				(163.00)	over run	(163.00)				
89										
				(3.70)	Mischarge from FY98			(3.70)		
				0.36	Mischarge		0.36			
				43.80	Change in scope	43.80				
				(9.86)	Charge to closed FY98 no.			(9.86)		
				31.17	over run	31.17				
				(1.67)	Insignificant					(1.67)
				93.18	Not enough operators	93.18				
90										
				179.00	Reversing of FY 98 accruals			179.00		
				30.00	Reversing of FY 98 accruals			30.00		
				55.00	Misestimate of labor rates	55.00				
				92.00	Under run	92.00				
				1263.00	Misestimate of rates	1263.00				
				72.00					72.00	
				1520.00	Costs not posted				1520.00	
				53.00	Misestimate of labor rates	53.00				
				59.00	Under run	59.00				
				139.00	Mischarge		139.00			
90										
				18.00	Mischarges		18.00			
				59.00	Under run	59.00				
	46.141		641.00	660.98	Total	828.45	153.16	(191.56)	1784.90	(1913.97)
					Absolute	3520.25	1036.16	677.56	1802.90	2049.97
					Count	36.00	17.00	9.00	8.00	14.00

WAD	EAC	CV		
15	10.415	(713.00)	(715.30)	OK
20	6.657	231.00	84.00	**
88	5.685	(400.00)	(326.00)	OK
89	13.374	(1912.00)	(1920.72)	OK
90	16.737	3917.00	3539.00	**
	52.87	1123.00	660.98	

PBD	Jan-99	EAC Mil	WADlet	CV (K)		Explanation from WADLET	Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
12	SNM Shipping	5.672		405.00							
WAD											
22	Enriched Uranium	1.326	7	219.00							
					166.00	Cost savings	166.00				
					53.00	Accrual credit				53.00	
22	From WAD	4.346	4	(19.00)							
					(19.00)	Overspent	(19.00)				
			6	9.00							
					9.00	BCWP incorrect					9.00
			10	15.00							
					15.00	Accrual error				15.00	
			11	194.00							
					194.00	Work not requires	194.00				
			12	29.00							
					29.00	Within threshold					29.00
			13	81.00							
					81.00	Efficiencies	81.00				
			601	(5.00)							
					(5.00)	Mischarges		(5.00)			
			602	(110.00)							
					(110.00)	Overspent	(110.00)				
			901	(2.00)							
					(2.00)	Within threshold					(2.00)
			20	(6.00)							
					(6.00)	Slower start	(6.00)				
		5.672		405.00	405.00	Total	306.00	(5.00)	0.00	68.00	36.00
						Absolute	576.00	5.00	0.00	68.00	40.00
						Count	6.00	1.00	0.00	2.00	3.00

WAD	EAC	WADlet	CV	
22	5.672	7	219.00	219.00
		4	(19.00)	(19.00)
		5	9.00	9.00
		10	15.00	15.00
		11	194.00	194.00
		12	29.00	29.00
		13	81.00	81.00
		16.01	(5.00)	(5.00)
		16.02	(110.00)	(110.00)
		19.01	(2.00)	(2.00)
		10.2	(6.00)	(6.00)
			405.00	

PBD	Jan-99	EAC Mil	WADlet	CV (K)		Explanation from WADLET	Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
15	Miscellaneous Production Zone Closure	11.917		(256.00)							
WAD											
27	Ops Tech Support	1.244	103	(98.00)							
					(68.00)	Over accrual				(68.00)	
					(45.00)	Over spent	(45.00)				
					15.00	Under runs	15.00				
	B559 Authorization Basis	0.13	105	34.00							
					34.00	Accruals not posted				34.00	
	NOTE: Analysis from WAD		101	(53.00)							
					(61.00)	Overspent	(61.00)				
					8.00	Under runs	8.00				
	NOTE: Analysis from WAD		102	(125.00)							
					(90.00)	Overspent	(90.00)				
					(41.00)	Overspent	(41.00)				
					6.00	Under runs	6.00				
29		0.698	104	(172.00)							
					(172.00)	Mischarge		(172.00)			
77	Cluster Landlord Function	0.19	101	(15.00)							
					7.00	Mischarge		7.00			
					7.00	Mischarge		7.00			
					(31.00)	Mischarge (from Dec)		(31.00)			
					31.00	EV not entered					31.00
					(39.00)	Mischarge (from Dec)		(39.00)			
					27.00	Mischarge (from Dec)		27.00			
					20.00	Credit from FY 98			20.00		
		2.262		(429.00)	(392.00)	Total	(208.00)	(201.00)	20.00	(34.00)	31.00
						Absolute	266.00	283.00	20.00	102.00	31.00
						Count	7.00	6.00	1.00	2.00	1.00

WAD	EAC	WADlet	CV		
27	4.89		(256.00)	(242.00)	OK
29	2.905		(154.00)	(172.00)	OK
77	3.315		177.00	(15.00)	WAD indicates within threshold
70	0.547		6.00		
71	0.101		(10.00)		
72			(8.00)		
38	0.159		(12.00)		
	11.92		(257.00)		

PBD	Jan-99	EAC Mil	WADlet	CV (K)							
30	K-H Project Mgmt	120.032		7982.00		Explanation from WADLET	Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
WAD											
85	WFR Severance a	8.535	901	573.00							
					573.00	FY98 reversal			573.00		
85	WFR Severance a	2.905	902	1232.00							
					1232.00	FY98 reversal			1232.00		
24	Effluent Air Monito	0.458	101	72.00							
					40.00	Over accrued				40.00	
					35.00	Costs level loaded	35.00				
24	Tech Support	0.615	106	(5.00)							
					4.00	EV underreported					4.00
					4.00	Change of contract					
					8.00	Underspent	8.00				
					(11.00)	Overspent	(11.00)				
					(10.00)	FY98 under accrued			(10.00)		
24	Ecology Support	0.972	108	(28.00)							
					(9.00)	Overspent	(9.00)				
					(20.00)	FY98 accruals			(20.00)		
24	Drinking Water	0.23	112	31.00							
					17.00	Costs not accrued				17.00	
					5.00	Mischarge		5.00			
					7.00	EV overstated					7.00
24	Environmental Pro	0.425	116	50.00							
					10.00	Mischarge		10.00			
					16.00	EV incorrectly reported					16.00
					23.00	Under run	23.00				
24	Compliance and P	1.311	123	45.00							
					(19.00)	Labor rate variance	(19.00)				
					15.00	Underspent	15.00				
					(4.00)	Overspent	(4.00)				
					25.00	Accrual from FY98			25.00		
					15.00	Accrual from FY98			15.00		
					10.00	Mischarge		10.00			
45	Nuclear Operation	2.743	101	(85.00)							
					(88.75)	Wrong BCWS loaded					(88.75)
					3.00	Insignificant					3.00
45	SSOC PM	0.836	208	(51.00)							
					(18.00)	Mischarge		(18.00)			
					(36.00)	Cost overrun	(36.00)				
					(30.00)	FY98 accruals			(30.00)		
					18.00	Cost underrun	18.00				
45	SSOC Constructio	0.303	209	71.00							
					12.00	Mischarge		12.00			
					25.00	Underspent	25.00				
					8.00	Hardware rcvd not costed				8.00	
					9.00	Training costs not incurred	9.00				
					16.00	Under accrued				16.00	
45	Records Support	1.834	307	224.00							
					123.00	Under spent	123.00				
					25.00	Under accrued				25.00	
					50.00	Under spent	50.00				
					15.00	Under spent	15.00				
					(10.00)	Over spent	(10.00)				
					21.00	Timing of invoices				21.00	
45	Document Support	1.345	308	(94.00)							
					(4.00)	Mischarge		(4.00)			
					(52.00)	FY98 accruals			(52.00)		
					(14.00)	Over spent	(14.00)				
					(14.00)	Over spent	(14.00)				
					(9.00)	Budget loading	(9.00)				
					(1.00)	Unplanned expense	(1.00)				
45	Closure Project Int	4.048	310	(134.00)							
					(161.00)	Over spent	(161.00)				
					(23.00)	Mischarge		(23.00)			
					22.00	FY98 credit			22.00		
					17.00	Underspent	17.00				
					13.00	Underspent	13.00				
45	Decomissioning	1.761	312	(146.00)							
					(34.00)	Missing FY98 accruals			(34.00)		

					(12.00)	Missing FY98 accruals			(12.00)			
					(100.00)	Mischarges		(100.00)				
45	D&D	0.98	514	396.00								
					396.00	FY98 reversal			396.00			
45	AECCM Site Cons	1.059	601	(78.00)								
					(30.00)	FY98 work not accrued			(30.00)			
					(20.00)	excessive accrual				(20.00)		
					(40.00)	Overpayment				(40.00)		
					13.00	Mischarges		13.00				
45	From WAD	19.515	102	258.00								
					258.00	Under spent	258.00					
			202	169.00								
					169.00	Labor underrun	169.00					
46	Medical Records	0.044	412	(7.00)								
					(7.00)	Accruals misstated				(7.00)		
46	Safety and Industr	2.397	601	86.00								
					64.00	Cost savings	64.00					
					14.00	Work not billed				14.00		
					8.00	Hardware not billed				8.00		
46	Plant Action Track	0.405	603	12.00								
					3.31	Wrong ACWP					3.31	
46	Radiological Healt	2.452	701	158.00								
					54.05	Labor Underrun	54.05					
					(24.66)	Mischarge		(24.66)				
					(25.66)	FY98 costs not accrued			(25.66)			
					(6.74)	Costs not budgeted	(6.74)					
					128.12	Purchases on hold	128.12					
					29.38	Mischarge		29.38				
					3.60	Classes canceled	3.60					
46	Health Physics	0.098	703	171.00								
					(21.97)	Mischarge		(21.97)				
					181.60	Accrual not zeroed out				181.60		
					13.15	Supplies not needed	13.15					
46	Radiological Engin	1.808	704	149.00								
					131.02	Under run on labor	131.02					
					(73.34)	Transferred scope	(73.34)					
					121.46	Reversal				121.46		
					(24.81)	Accruals not budgeted				(24.81)		
					4.70	Over runs	4.70					
63	From WAD	41.366		3847.00								
					4123.00	Incentive fee undrrun					4,123.00	
					(160.00)	FY98 incentive fee			(160.00)			
					(107.00)	Fee not in baseline	(107.00)					
					(9.00)	Higher fees	(9.00)					
84	From WAD	0.055		(47.00)								
					(47.00)	FY98 close out			(47.00)			
		98.5		6869	6854.45	Total	692.553	(112.25)	1842.343	360.25	4067.56	
						Absolute	1660.70	271.00	2683.66	543.87	4,245.06	
						Count	36.00	12.00	16.00	14.00	7.00	

WAD	EAC	WADlet	CV	
85	11.44	1806.00	1805.00	OK
24	7.594	242.00	161.00	OK
25				
45	34.424	925.00	516.25	**
46	25.153	1210.00	572.21	**
84	0.055	(47.00)		OK
63	41.366	3847.00	3847.00	OK
	120.03	7983.00	6901.46	

PBD	Jan-99	EAC Mil	WADLET	CV (K)			Explanation from WADLET	Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
34	Management	90.368	WADLET	1215.00								
WAD	Management											
44	WAD Analysis	90.368										
	KH Overhead			269.00								
					231.00		Services less than planned	231.00				
					38.00		FY97 accrual			38.00		
	Subcontractor Overhead			536.00								
					495.00		Savings	495.00				
					117.00		Less labor	117.00				
					(77.00)		Unplanned payments	(77.00)				
	Leased labor Overhead			497.00								
					320.00		Charged to activity					320.00
					103.00		Less anticipated charges	103.00				
	Site G&A			395.00								
					576.00		Budget straight lined	576.00				
					95.00		Less labor	95.00				
					322.00		Delays in work	322.00				
					106.00		Delays in work	106.00				
					89.00		Timing of work	89.00				
					(442.00)		Higher costs	(442.00)				
					(356.00)		Error posting actuals				(356.00)	
					(88.00)		Unplanned payments	(88.00)				
					(61.00)		Unplanned payments	(61.00)				
	Subcontract G&A			(15.00)								
					(179.00)		Higher costs	(179.00)				
					(217.00)		Higher costs	(217.00)				
					532.00		Credits	532.00				
	Overhead and G&A			(107.00)								
					(107.00)		Allocation of funds					(107.00)
				1575.00	1497.00		Total	1602.00	0.00	38.00	(356.00)	213.00
							Absolute	3730.00	0.00	38.00	356.00	427.00
							Count	16.00	0.00	1.00	1.00	2.00

WAD	EAC	WADlet	CV		
44	90.368		1575.00	1497.00	OK
96			(360.00)		Within Threshold
	90.37		1215.00		

PBD	Jan-99	EAC Mil	WADLET	CV (K)			Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
36	Indirects	74.952		4296.00		Explanation from WADLET					
WAD				*							
87	Employee Ben	38.26	401	5200.00							
					107.00	Under spent	107.00				
					591.00	Under spent	591.00				
					1053.00	Under spent	1053.00				
					955.00	Under spent	955.00				
					200.00	Under spent	200.00				
					379.00	Under spent	379.00				
					374.00	Bills not posted				374.00	
					318.00	Refunds	318.00				
					318.00	Refunds	318.00				
					318.00	Refunds	318.00				
					318.00	Refunds	318.00				
					225.00	Settlement	225.00				
					50.00	Refunds	50.00				
87	Paid Absence	22.384	402	(1056.00)							
						Earnings xferred from payroll					
					(2002.00)	to accounting				(2002.00)	
					704.00	Unused snowday	704.00				
					400.00	Unused holiday	400.00				
					(116.00)	Overspent jury duty/funeral	(116.00)				
					(30.00)	Mischarges		(30.00)			
					(12.00)	Mischarges		(12.00)			
		60.644	0	4144.00	4150.00	Total	5820.00	(42.00)	0.00	(1628.00)	0.00
						Absolute	6052.00	42.00	0.00	2376.00	0.00
						Count	15.00	2.00	0.00	2.00	0.00

WAD	PBD EAC	WADlet	CV		
87	74.952		4296.00	4150.00	OK
			4296.00		

PBD	WAD/WADlet	CV (K)	Explanation from WADLET	Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accrual	Other
1	1/104	(10.00)	Mischarges		(10.00)			
1	1/104	7.00	Wrong completion date					7.00
1	1/106	(8.00)	Reversed accruals from FY 98			(8.00)		
1	1/106	2.00	Misappropriated EV					2.00
1	1/202	22.00	FY 98 closeout accrual			22.00		
1	83/201	8.00	Reversed accruals from FY 98			8.00		
1	83/302	4.00	Credit of previous charges				4.00	
9	15/401	(51.00)	Carryover costs from FY 98			(51.00)		
9	20/409	50.00	Mischarges		50.00			
9	20/705	34.00	Reversing of FY 98 accruals			34.00		
9	88/309	(27.00)	Reversing of FY 98 accruals			(27.00)		
9	89/702	130.00	Mischarges		130.00			
9	89/702	35.00	Mischarges		35.00			
9	89/702	(59.00)	Charge to FY98			(59.00)		
9	89/702	(15.00)	Mischarges		(15.00)			
9	89/702	(20.00)	mischarge		(20.00)			
9	89/402	(130.00)	mischarge		(130.00)			
9	89/402	(82.00)	No EV					(82.00)
9	89/402	(57.00)	No EV					(57.00)
9	89/402	59.00	Closed charge numbers		59.00			
9	89/408	(3.70)	Mischarge from FY98			(3.70)		
9	89/408	(9.86)	Charge to closed FY98 no.			(9.86)		
9	90/405	179.00	Reversing of FY 98 accruals			179.00		
9	90/405	30.00	Reversing of FY 98 accruals			30.00		
9	90/405	1520.00	Costs not posted				1,520.00	
12	22/10	15.00	Accrual error				15.00	
12	22/601	(5.00)	Mischarges		(5.00)			
15	29/104	(172.00)	Mischarge		(172.00)			
15	77/101	7.00	Mischarge		7.00			
15	77/101	7.00	Mischarge		7.00			
15	77/101	(31.00)	Mischarge (from Dec)		(31.00)			
15	77/101	(39.00)	Mischarge (from Dec)		(39.00)			
15	77/101	27.00	Mischarge (from Dec)		27.00			
30	85/901	573.00	FY98 reversal			573.00		
30	85/902	1232.00	FY98 reversal			1,232.00		
30	24/106	(10.00)	FY98 under accrued			(10.00)		
30	45/208	(30.00)	FY98 accruals			(30.00)		
30	45/209	12.00	Mischarge		12.00			
30	45/209	8.00	Hardware rcvd not costed				8.00	
30	45/308	(52.00)	FY98 accruals			(52.00)		
30	45/310	(23.00)	Mischarge		(23.00)			
30	45/310	22.00	FY98 credit			22.00		
30	45/312	(34.00)	Missing FY98 accruals			(34.00)		
30	45/312	(12.00)	Missing FY98 accruals			(12.00)		
30	63	4123.00	Incentive fee undrrun					4,123.00
30	63	(160.00)	FY98 incentive fee			(160.00)		
		7065.44	Total	0.00	(118.00)	1,643.44	1,547.00	3,993.00
		9146.56	Absolute	0.00	772.00	2,556.56	1,547.00	4,271.00
				0.00	17.00	20.00	4.00	5.00

PBD	Jan-99	EAD Mil	WADlet	CV (K)		Explanation from WADLET	Overrun or Underrun	Mis-charges	FY98 Accrual or Reversal	Other accual	Other
1	Buffer Zone Closure	15.502		605.00							
WAD											
1	Surface Water Mon.	1.717	101	151.00							
					32.00	Cost savings	32.00				
					79.50	Under runs (dry weather)	79.50				
					3.50	Mischarges		3.50			
					36.00	Under runs (dry weather)	36.00				
1	Pollutant Source Co	1.129	104	137.00							
					56.00	Missed accruals				56.00	
					25.00	EV over reported-work delayed					25.00
					(31.00)	Underfunded	(31.00)				
					(10.00)	Mischarges		(10.00)			
					8.00	Cost savings	8.00				
					7.00	Wrong completion date					7.00
					69.00	Overaccrual from FY 98			69.00		
					15.00	Change of Scope	15.00				
					(3.50)	Mischarges		(3.50)			
1		0.035	106	(6.00)							
					(8.00)	Reversed accruals from FY 98			(8.00)		
					2.00	Misappropriated EV					2.00
1	Clean Water Progra	0.248	604	9.00							
					9.00	Underrun-change in scope	9.00				
1		0.019	202	22.00							
					22.00	FY 98 closeout accrual			22.00		
1		1.405	401	28.00							
					28.00	Late accruals				28.00	
83		0.184	201	20.00							
					8.00	Reversed accruals from FY 98			8.00		
					12.00	Programatic support not reqd	12.00				
83	Buffer Zone Plume	3.700	301	154.00							
					54.00	Accrual Reversal				54.00	
					100.00	Costs not loaded to match					100.00
83		0.168	302	4.00							
					4.00	Credit of previous charges				4.00	
					16.00	Cost under run	16.00				
					(12.00)	Reversed accrual from FY 98			(12.00)		
					(3.00)	Other mischarges		(3.00)			
83		0.875	602	52.00							
					22.00	Taking EV on work not reqd					22.00
					30.00	Under accrual	30.00				
		9.480		571.00	570.50	Total	206.50	(13.00)	79.00	142.00	156.00
						Absolute Value	268.50	20.00	119.00	142.00	156.00
						Count	10.00	4.00	5.00	4.00	5.00

WAD	EAC	CV	
1	6.924	411.00	339.50
83	8.578	194.00	231.00
	15.50	605.00	570.50

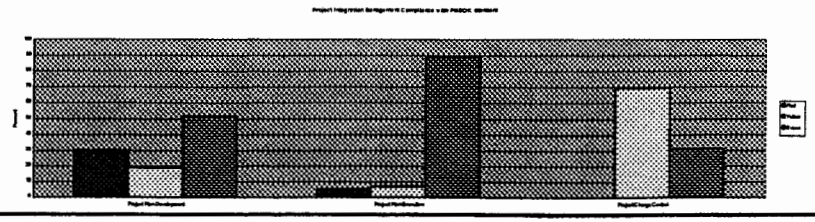
Cost Variance Summary Table

RFETS Evaluation Sheet Comment Summary

Attachment 8.7

Evaluation Area: **PROJECT INTEGRATION MANAGEMENT PLAN**

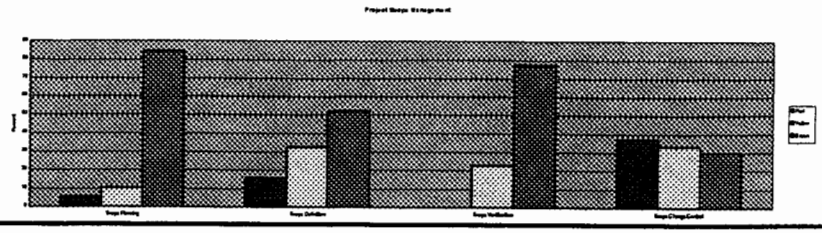
Eval. Approach: The Project Integration Management Plan includes the processes required to ensure that the various elements of the project are properly coordinated. Integration as related to this evaluation area focuses on the relationship between the overall project plan, its' execution, and the accomplishment of the sub-projects that comprise the overall plan. The complexity of these projects necessitates cradle-to-grave integration and project management.



Evaluation Elements		Scorecard R	Y	G	Comment Summary
Criterion 1.	**Project Plan Development**				
	h. Are centralized schedules available that integrate all of the projects? Does this centralized schedule serve as the performance schedule subject to change control?		1		Yes, the EMSS and the Closure Project Baseline provide the high level integration. Each of the individual projects are included in the P3 Schedules. Milestones and performance metrics are clearly defined. However, the projects are not fully integrated in that the individual schedules developed by the subcontractor are not rolled up into the master schedule in such a manner that K-H can analytically determine the controlling path or the amount of float in the schedule. Thus, the determination of controlling path is more a matter of management judgement than of schedule analysis. It is also not possible to use the computerized scheduling tools to "roll up" resource requirements in a manner that permits resource planning on anything other that a manual basis. The remaining tool for prioritization of resources is performance metrics and performance measures that are developed based on management judgment.
	j. Is there a prioritization plan in place for scheduled work scope? Is the prioritization plan realistic?		1		The EMSS and the P3 schedules provide this prioritization. The Change Control process governs integration of new or reduced scope into the plan. Prioritization of the project work is based on the performance metrics rather than on any objective understanding of the real controlling path.
Criterion 2.	**Project Plan Execution**				
	Worksteps				
	h. Has a project termination procedure been developed for the overall RFETS project? For the individual projects?			1	P&I Instruction #1 provides the guidance for project closeout. Although an understanding has been developed concerning when projects will be completed, to the knowledge of one PBD Manager, his project will be the first major PBD that actually gets closed out.no "closure" strategy, as such, exists. Several PBD managers had no closure strategy.Although all of the work has been completed under WAD 009, it is to be placed in an inactive status, vice closed; the reason is that it may need to be re-opened if the need to re-evaluate the interim storage mission resurfaces. However, another strategy would be to keep the re-evaluation milestone in a related PBD (e.g., 371 Cluster CLosure) and open a new PBD if warranted. In this way the lessons to be learned from closing out the WAD could be obtained.
Criterion 3.	**Project Change Control**				
	Worksteps				
	c. What configuration management system is implemented that will help to ensure the projects end products meet stakeholder requirements?		1		P&I Standard #1, P&I Instruction 004, and the P&I Change Control Guide (CCG) provide the methodology for changes to project scope, cost & schedule. The large number of changes (~2000 initiated last year, ~1400 approved) indicates the baseline planning may be inaccurate, that excessive control is being exerted over minor scope and funding changes, and/or that excessive effort may be expended in the change control process. The current WBS does not allow recording of the effort expended to execute the change control process.

Evaluation Area: **PROJECT SCOPE MANAGEMENT PLAN**

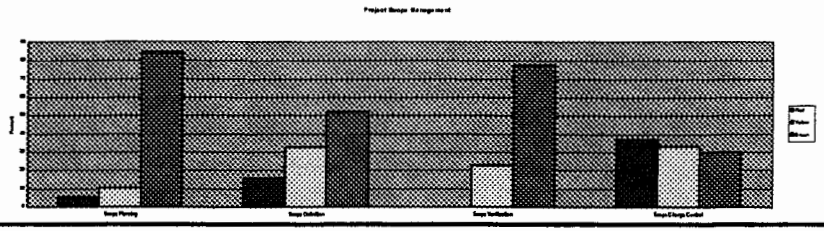
Eval. Approach: Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Scope management in terms of this evaluation is concerned primarily with project scope in lieu of product scope.



Evaluation Elements		Comment Summary
Criterion 1.	**Scope Planning** Worksteps	
	d. Have alternative approaches been considered in planning for accomplishment of the project?	In WAD 001, options for progress and milestones being considered in light of state fish and wildlife involvement with community of Bloomfield on wastewater ditch issue (pertains to actinide migration wadlet); external committee evaluating risks; PBD mgr tracking; also reviewing surface water mgmt with regard to NPDES and RFCA permits. Despite these considerations, serious hurdles exist, and some optimization of sequence of actions has not been attended to.
	f. Are the assumptions relative to the scope of the project well documented and substantiated by an accompanied level of risk? What are these assumptions? What is the impact if the assumptions are invalid?	Per the FY 99/00 Work Plan Guidance Document issued by P&I, all assumptions and conditions used in developing the technical scope are clearly identified and justified in the PBD/WAD, and all assumptions and conditions used indeveloping the detail Wadlet activity cost estimate are documented within BEST. Attachment 4 to the FY 99/00 Work Plan Guidance lists all of the assumptions used in development of the Closure Project Baseline. In PBDs 001 and 002, no overt or tangible risk parameters were presented to us as a basis for ranking or ordering priorities. For PBD 008, some of the assumptions have been used for planning, but have yet to be proven (e.g., being able to process a given number of cans per shift). For PBD 011, the major production assumption is that "uncleanable" parts will be moved to the metals and oxides PBD, however this interface is not noted in the PBD. The shipment assumptions restate an general site assumption that receiver sites (in this case Y-12) will remain open and funded to accept material from RFETS.
Criterion 2.	**Scope Definition** Worksteps	
	a. Has a Work Breakdown Structure (WBS) been developed for the project?	For the closure project, the WBS identifies all the required work elements, which in turn have been mapped to the PBDs/WADs. The WBS was developed before the WADs were officially released. Thus, they do not track in the same sequence. A crosscut matrix is used to correlate the WADs to the WBS. At the 'overhead' site services level, the WBS is changing as organizations are restructured to reduce costs. This makes it difficult to track cost performance.
	b. Does the WBS accurately reflect the negotiated scope of work?	The WBS has been scrutinized in detail by the K-H team in order ensure that all technical scope has been accounted for. In addition, the comprehensive scope change control process ensures that all new scope fits within the WBS technical boundaries. Work scope that does not meet this criteria is not approved for inclusion into the Closure Project Baseline. In PBD 011, at present, the WBS includes several categories of shapes that will not be cleaned under this PBD; management understands and a change will be processed, For PBD 006, there is just a single WBS for this work (neglecting the Program Management WBS); this appears to be rather course structure for a WAD that will be spending $3.5M over the next two FYs. The detailed schedule for this WAD goes to 15 pages, over 150 activities, during the same time period. For PBD 004, much of the work is contracted out; this work is covered in less detail. For example, the cooling toware replacement is a single activity "Construction Contract" for $1,442K.
	c. Does the WBS provide comprehensive detail throughout the approved technical scope?	There are approximately 700 WBS elements that comprise the technical scope of the Closure Project Baseline. The PBDs/WADs/WADlets that are part of this WBS structure clearly provide the detail that identifies the technical scope. For PBD 006, see above.

Evaluation Area: **PROJECT SCOPE MANAGEMENT PLAN**

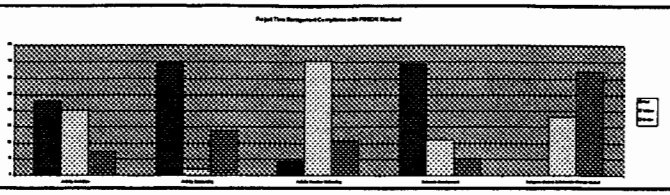
Eval. Approach: Project Scope Management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Scope management in terms of this evaluation is concerned primarily with project scope in lieu of product scope.



	Evaluation Elements	Comment Summary
	d. Are the WBS classifications structured around the endpoint product in lieu of organization or function?	The WBS heirarchy is structured around the endpoint product and consists of six levels as follows: LEVEL 1 - Project; LEVEL 2 - Project Baseline Description; LEVEL3 - Work Authorization Description (WAD); LEVEL 4 - Sub-WAD breakdown (WADlet); LEVEL 5 - Activity; LEVEL 6 - Line Items. For PBD 006 there is no product structure, simply "Operate & Maintain Existing Pu Storage Facility.
	e. Are the major milestones defined in terms of how the project will be managed (i.e. project life cycle phases, key events, etc.)?	The Rocky Flats Closure Project Milestone Sequence Chart clearly shows the integrated path to closure. Milestones are identified for external events, key internal events and major and minor milestones. The logical sequence of these milestones is integrated with the EMSS which serves as the managerial tool to evaluate progress to closure. In PBD 009, about 30% of the FY99 and over 50% of the FY00 projected budget is ascribed to one WBS--Project Management (WAD 90, WBS 1.1.0409.04.05). This WBS is not as well defined as the remainder of the PBD. For PBD 006, key events have been developed with respect to amounts of SNM consolidated/buildings closed.
	f. Has an appropriate scope risk factor been assigned?	In PBD 001 and 002, each project has defined some relative scope risk, but the definitions are not thorough or consistent. In PBDs 008, 009, 010, and 012, risk factors are not applied at the PBD/WAD level for the 2010 schedule; risk factors used for lower-level WBS estimates do not scale/multiply to a higher level risk factor. In PBD 024, there is significant scope risk that is not being addressed if the Safeguards and Security model adopted for one facility is not approved by DOE for the remaining facilities.
Criterion 3.	**Scope Verification** Worksteps	
	b. Do the various project schedules identify clear scope verification milestones?	In PBDs 001 and 002, we did not see any evidence of this scope verification milestones; scope is reviewed along with rolling schedule. Similarly, in PBDs 009, 010, and 012, scope verification is conducted as scope changes are identified.
	c. How are deviations from scope handled by the project team?	For PBD 011, due to the unknowns associated with the project, scope was undetermined for FY99; several scope changes are being processed for approval at present to addess the issues.
Criterion 4.	**Scope Change Control** Worksteps	
	a. Has a scope change control system been implemented? Are procedures and personnel responsibilities documented?	P&I Standard #1, P&I Instruction 004, and the P&I Change Control Guide (CCG) provide the methodology for changes to project scope, cost & schedule. The process appears to be well controlled; however, the difficulty of making changes has led to some support service activities electing to charge project work to overhead rather direct. Conversely, some projects are charging overhead work to direct.
	e. Is a lessons learned database available/utilized that addresses scope change control issues?	The change control process has undergone several revisions with positive changes at each revision. SMEs track subject matter for trends and inconsistencies. However, as changes are made, there is no database to capture the lessons learned.

Evaluation Area: **PROJECT TIME MANAGEMENT PLAN**

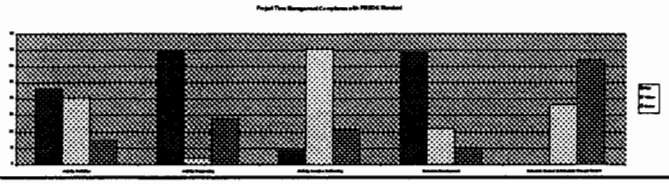
Eval. Approach: Project Time Management includes the processes required to ensure timely completion of the project. The key focus of this evaluation area is to ensure that the activities that need to be accomplished to meet the WBS milestones have been properly identified, sequenced and estimated in order to produce a realistic attainable project schedule.



	Evaluation Elements	Comment Summary
Criterion 1.	**Activity Definition**	
	Worksteps	
	a. Has sufficient decomposition of the scope of work taken place such that individual work task activities can be identified, quantified, and managed?	No. Much of the support work in PBDs 30 and 34 could be charged directly to the projects. Due to a combination of factors, including a perceived site policy against charging some work direct, the difficulty of charging work in these PBDs to the projects and the difficulty of making contract, funding and scope changes, much of this work is charged to overhead. For PBD 006, task breakdown has occurred at the detailed schedule level, WBS discussion is somewhat course-grained, as discussed under scope management.
	b. Does the WBS include all of the activities identified either directly or as a roll-up of a group of activities?	The WBS (about 700 elements) is decomposed into the current K-H Closure Project Baseline (CPB) which consists of approximately 9800 defined activities. Individual networks have been developed by the 4-tops for work under their cognizance. As an example, SSOC's networks consist of approximately 17,000 defined activities. Each of these activities is then linked to K-H's activities on the CPB via an Activity Code. There should be a 1:Many relationship between the activities in the CPB and the 4-Tops networks. In many cases there is a 1:1 relationship. K-H's Master Scheduler has recognized that the CPB schedule activities have been defined in too great of detail and is currently redefining these activities. For PBD 006, the WBS is a roll up of a group of activities.
Criterion 2.	**Activity Sequencing**	
	Worksteps	
	a. Has a logical predecessor/successor task relationship been utilized to sequence activities as modeled in the WBS?	All of the networks for work accomplished by K-H and the 4-Tops have been built into P3 using that tools logic for predecessor/successor relationships, activity interface, and milestone identification. For the 2010 closure plan, networks were prepared simultaneously by K-H and the 4-Tops. Integration of all activities into the CPB was difficult due to differences in the logic relationships utilized in the individual project sequences (i.e. start-to-start, start-to-finish, finish-to-finish, inconsistent use of milestones etc.). The EMSS is used as the primary tool for illustrating the logic (including the critical path) required to be followed in order to get to closure.
	c. Does the WBS accurately reflect any changes to major milestones or deliverables as a result of activity sequencing changes?	The WBS is changed to reflect changes in work scope. Since the WBS is already out of synch with the PBDs, it may not be changed to show changes in sequence. The element are just moved to the new location in the PBD. For PBD 010, the change evaluated, 1999-1274, defers significant work scope from FY 99/00 to FY 03 - 05; specifically decon of rooms to be drained and draining of utility systems has been deferred so that high priority actinide systems can be drained. This pushes out substantial work scope with the simple statement "There is a potential cost savings to total project cost since the work can be performed under reduced process and control requirements," this is unsubstantiated. Further, what will be the level of system knowledge at that future date? For PBD 004, a number of changes to the activity schedules and sequencing occurred in FY99 to accelerate this work. The WAD/PBD manager ended up concluding that it was not worth the work of putting in detailed changes to the schedule and PPR for WAD 009. In addition, the WAD has just been made "inactive" so the information has the potential to not be covered if the WAD does not go through the closure process--consideration should be given to some sort of interim closure documentation.
Criterion 3.	**Activity Duration Estimating**	
	Worksteps	
	a. Have work tasks been estimated at a level that can be easily managed?	From a K-H perspective, the CPB consists of too many activites to effectively manage. It is the desire of the K-H Master Scheduler to reduce the number of items in the CPB from 9800 to 1000. The activity durations will be longer, but be linked to the lower level P3 schedules through the use of hammocks. Individual PBD/WAD managers will then determine the level of decomposition required to manage their applicable P3 schedules. The FY 99/00 Work Plan Guidance provides guidelines that WAD/PBD managers should use for work task duration estimating. For PBD 006, the WBS is problematic; however, the activity schedule goes to over 150 items. For construction projects, tasks appear to be estimated after contract award.
	b. What level of confidence has been factored into the activity duration estimates? Has an appropriate risk factor been used?	A schedule risk factor was applied to each activity in the BOE estimates, however, those values have not been integrated into any P3 probabilistic schedule analysis. Schedule risk analysis has been accomplished at the EMSS level through the use of probability density functions, Monte Carlo statistical simulation and Pareto analysis of the top 50 schedule uncertainties.

Evaluation Area: **PROJECT TIME MANAGEMENT PLAN**

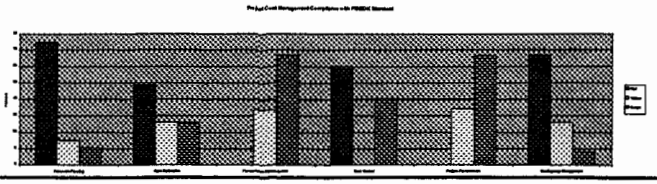
Eval. Approach: Project Time Management includes the processes required to ensure timely completion of the project. The key focus of this evaluation area is to ensure that the activities that need to be accomplished to meet the WBS milestones have been properly identified, sequenced and estimated in order to produce a realistic attainable project schedule.



Evaluation Elements		Comment Summary
Criterion 4.	**Schedule Development Worksteps**	
	a. Are all elements of the schedule traceable to the WBS?	The link between the WBS and the individually scheduled activities in the Closure Project Baseline is accomplished through the activity field code within P3. For those activities that reside within the individual project schedules (i.e. SSOC and RMRS detail schedules), there is a link between the Code Field in the detail schedules and the Activity Field in the CPB. A WBS sort within P3 will provide a roll-up of all activities that reside within a particular level of the WBS. In PBD 009 and 010, it was noted that detailed project schedules are easily related to WAD and PBS, although this relationship is not always shown on the schedules, relationship to the WBS would be less obvious.
	b. Are heirarchical levels of schedules in use?	Yes, a four tier schedule is used 1)Closure Project Baseline, 2) Extended Management Summary Schedule, 3) a Master P3 Project Schedule, and 4) individual P3 Project Schedules. However, the level of detail shown on the P3 schedules is inconsistent.
	c. Have level-of-effort (LOE) activities been incorporated into project schedule networks?	Yes, many LOE activities have been rolled into PBD 30 and PBD 34. These LOE activities have been scheduled, primarily in a linear fashion and in parallel with closure project work. In PBDs 009, 012, 018, and 022, direct management support has been level loaded and criticality safety has been estimated based on a potential number of reviews and then level loaded.
	e. Have all constraints been identified and documented when the Project Master Schedule baseline is developed?	The P3 schedule has the capability to query and show constraints identified within the CPB for any given WBS element. The WADs/PBDs provide a detailed listing and discussion of constraints and assumptions that pertain to the work scope being scheduled. However, some of the subprojects have inappropriately used milestones to define the beginning and end of activities. This makes it impossible to determine real controlling path and float.
	f. How have slack activities been managed in the project schedule?	The way that many of the P3 schedules have been built has resulted in the inability to accomplish float calculations. Many of the schedules were built with activities classified as early finish and linked to artificial milestones. The K-H Master Scheduler indicated that this will not be an issue for the 2006 Baseline.
	g. Is the critical path method for scheduling being applied?	No. Since the subcontractor P3 schedules are not properly rolled up into the K-H schedule, the true critical path and the float in the alternate paths cannot be calculated. The two estimated parellel critical paths are based on best judgement. The EMSS identifies a critical path, but it is not integrated into P3.
	h. How does the project team avoid the existence of multiple critical paths? If unavoidable, how are these paths managed?	They have not avoided multiple critical paths as noted above. The management of the dual critical paths is done during high-level meetings to discuss the EMSS and the progress towards meeting the performance metric baseline.
Criterion 5.	**Schedule Control & Schedule Change Control Worksteps**	
	a. How are schedule updates accomplished and by whom?	The EMSS is updated manually by the P&I Scheduling Department based upon an evaluation of progress against P3 milestones. The P3 sub-project schedules are updated by the PM's PCI reps to each project based upon a review of physical progress and remaining duration. Changes to the schedule as a result of BCPs are made IAW the P&I Change Control Guide. Currently, about 40 people have the ability to make changes to the schedules. This is causing problems when they make changes to other peoples' schedules or make errors.

Evaluation Area: **PROJECT COST MANAGEMENT PLAN**

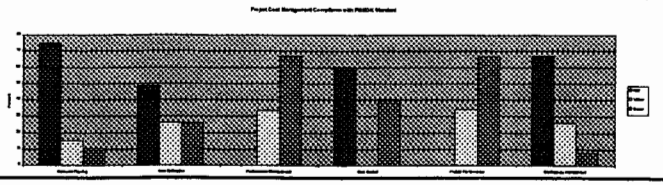
Eval. Approach: Project Cost Management includes the processes required to ensure that the project is completed within the approved budget. It is primarily concerned with the cost of the resources needed to complete the project, however, it also considers the effects of decision making throughout the project life-cycle on the overall cost profile.



	Evaluation Elements	Comment Summary
Criterion 1.	**Resource Planning** Worksteps	
	a. How has the resource labor pool been analyzed by the project team in order to determine the type and number of resources required to execute the activities? (i.e. Skill level, availability, capacity,etc.)	In the project support service codes, most of the cost estimates were based on the assumption that the personnel required to do the job last year were the right number and, unless something changes, such as no longer needing the criticality engineers when the Plutonium and Uranium are gone, the same people will continue to be needed. The bi-weekly Hourly Resource Allocation Committee meetings function to discuss specific project manpower needs in quantities and skillsets. The Hourly Resource Allocation Committee in conjunction with the Human Resources Department and the individual projects has identified critical resources required to meet closure schedule goals and is attempting to carefully track the identification, recruitment, hiring and training of these resources. However, due to the limitations in the ability to integrate individual project schedule information with the CPB schedule, the long range resource planning is ineffective. Therefore, the K-H team is unable to forcast requirements for critical resources such that they can be onboard and value-added when required.
	b. Is resource planning being applied at the lowest level of the schedule?	Resources are identified at the line item level of the WADlet during the estimating process within BEST. This is at the lowest level manageable. This information is then uploaded into P3s , however, the resource loading feature of P3 is not being utilized to its fullest extent. For PBD 001 and 002, there is no indication of resource planning at the lowest levels of the schedule.
	d. Has a critical physical resource and facility plan been developed based upon the WBS and associated activities?	During execution of multiple safety upgrade projects in PBD 004, conflicting needs for access to work site became a problem.
	e. Have critical skill shortages been identified as project risks? How has the project team accounted for them?	Critical skill shortages are identified in the short term (this year); however there is no systemmatic means of identifying critical skill requirements or projected shortages in out years. Staffing remains a concern for several WADs, even though these WADs have been clearly identified as critical path and they support "Purple Chart" milestones. In PBD 024, there is significant risk of critical skill shortages that is not being addressed if the Safeguards and Security model adopted for one facility is not approved by DOE for the remaining facilities.
Criterion 2.	**Cost Estimation** Worksteps	
	c. How have the indirect costs of the project been estimated?	The support service codes, PBD's 30 & 34, account for many of the indirect activities that are not specific to a particular PBD/WAD. An ABC-type approach to cost estimating was utilized to determine the types of services that would be required in order to execute work scope. Those services that supported individual line items are charged directly to those items. However, several interviews indicated many of these services are not being charged directly to the individual projects because of the cumbersome nature of the change control process or because it is perceived a site policy not to charge direct..
	f. Have appropriate cost risk factors been assigned?	Cost risk factors are assigned at the activity line-item level during the actual estimating process. Each line-item estimate in the WBS includes a cost risk factor. The cost risk factors are identified in Appendix 9 "BOE Type Codes/Formats/Cost Risk Codes" to the "Rocky Flats Closure Project FY99/00 Work Plan Guidance Document of April 1998." The factors represent the risk associated with the costs in the WBS estimate where 1 = low and 5 = high. These factors are resident in the BEST system but are not used in the development of the actual estimate. In a number of cases in WAD 009, cost risk factors of '5' were assigned even though there were firm construction estimates from the 3rd tier subcontractor and the most that could be reasonably be justified was a '2' or '3'.
Criterion 3.	**Performance Measurement** Worksteps	
	a. Does the Project Team have a core set of performance measures that they are tracking?	There are a set of well defined performance metrics for "Product" oriented projects as shown on the "Rocky Flats Closure Project Performance Metrics Baseline, Rev. 9" (the "purple chart"). Individual WAD Metrics that roll-up to the baseline are also tracked. Cost and Schedule performance are tracked via the Performance Measurement Reporting system as set forth by P&I Std. 8. However, there are several performance indices that should be tracked to provide early warning of adverse trends. These include the Cost Performance Index (CPI), Schedule Performance Index (SPI), Critical Ratio, and Cost-per-percent complete. In WAD 009, the quality of the constructions schedules used to track performance varied widely.
Criterion 4.	**Cost Control** Worksteps	
	f. Are lessons learned captured that result from changes to the cost baseline such that future estimates for similar work can be more accurate?	K-H employs a formal lessons learned program for incident related issues only. This program is on the EH&S web page and focuses upon prevention of environmental health and safety issues from both internal and external sources. K-H does not utilize a site wide lessons learned program that focuses on improving cost, schedule, management issues. The PPR process provides the opportunity to capture root cause analysis in these areas, however, it is not formalized.

Evaluation Area: **PROJECT COST MANAGEMENT PLAN**

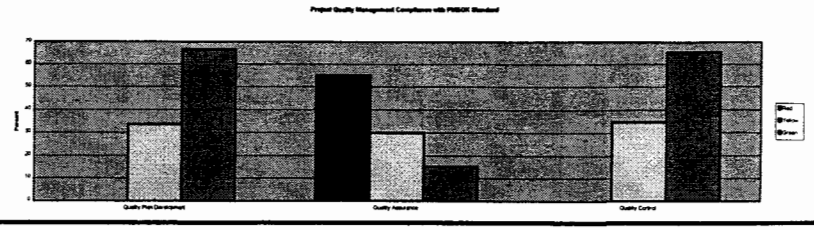
Eval. Approach: Project Cost Management includes the processes required to ensure that the project is completed within the approved budget. It is primarily concerned with the cost of the resources needed to complete the project, however, it also considers the effects of decision making throughout the project life-cycle on the overall cost profile.



Evaluation Elements		Comment Summary
Criterion 5.	**Project Performance** Worksteps	
	a. What is the currently authorized budget at completion (BAC) for this project? Is this the baseline value? How often has the BAC changed since inception? What caused this change?	For the Bldg 779 D&D the BAC is $44.8 million. It does represent a baseline value and has changed whenever the baseline has changed. The latest change occurred due to a schedule scope change rather than a physical scope change. This $44.8 million figure includes a "Super Stretch" award fee of $14 million, which should not be included in the BCWS. This lack of understanding of the use of BCWS and the potential for misunderstanding of earned value results has been discussed with the project manager.
	b. What are the current project cost and schedule variances?	A number of projects have significant Cost Variance and Schedule Variance, both positive and negative. Together, the variances indicate poor cost estimating and cost control practices and poor schedule adherance.
	e. Are clear, logical actions being taken to address CV & SV that exceed allowable levels?	In WAD 009, the PBD manager made the conscious decision to allow SV and CV to accumulate due to the accelerated schedule. Senior management had been brought on board and supported the schedule acceleration...the PBD manager did not believe keeping the project management information upto speed was vital due to the fact that only several months remained.
	f. What is the estimate at completion (EAC) for this project based upon the performance to date? (EAC = ACWP + (BAC-BCWP/CPI))	In WAD 009, the EAC is unclear at present, there are several negotiations ongoing with construction contractors that could materially effect the finalcost for this year. These negotiations are well known to management and the work for PBD 004 is just a part of the overall issue.
Criterion 6.	**Contingency Management** Worksteps	
	a. Has a cost contingency profile been established for the lifecycle of the project? Does it correspond to the expected decrease in uncertainties as the project progresses towards completion?	Formal Cost Risk Analysis is described in the "*Rocky Flats Environmental Technology Site Programmatic Risk Management Plan, Revision 0 of July 16, 1998*." Instead of using these WBS element cost risk factors developed in step 2.f above, the "Programmatic Risk Management Plan," specifies, in section 1.5, that the Project Manager's estimates for optimistic, most probable and pessimistic cost to develop the range of costs. The range of costs, developed from a Project Managers view and not those of an estimators in step 2.f, are then used in the Monte Carlo simulation technique that develops the probability distribution for the project cost estimates. The cumulative probability distribution for cost is then used to derive the costs for any particular probability. These figures are then used to develop the annual contingency funding (where contingency funding is defined as the funding difference between the 50% chance of success funding level and the expected funding level) profile. From this profile the project contingency fund is determined. The flaw in this method appears to be in using the "Project Manager's" estimates to develop the range of costs instead of using probability distributions associated with the line-item risk factors developed by the estimators.
	c. What cost risk analysis tools were employed to help determine the anticipated project costs and the degree of contingency funding required?	True cost risk analysis is performed at the activity line-item level during the actual estimating process. Each line-item estimate in the WBS includes a cost risk factor. The cost risk factors are identified in Appendix 9 "BOE Type Codes/Formats/Cost Risk Codes" to the "*Rocky Flats Closure Project FY99/00 Work Plan Guidance Document of April 1998.*" The factors represent the risk associated with the costs in the WBS estimate where 1 = low and 5 = high. These factors are resident in the BEST system but do not appear to be used in the development of the actual estimate. Similarly, this data is not used in the formal Cost Risk Analysis described in the "*Rocky Flats Environmental Technology Site Programmatic Risk Management Plan, Revision 0 of July 16, 1998.*" Instead of using these WBS element cost risk factors, the "Programmatic Risk Management Plan," in section 1.5 uses the Project Manager's estimates for optimistic, most probable and pessimistic cost to develop the range of costs. The range of costs, developed from a Project Managers view and not those of an estimator, are then used in the Monte Carlo simulation technique that develops the probability distribution for the project cost estimates.
	d. Are cost overruns on specific line items being funded from management reserve in lieu of internal line item budget transfers?	A predetermined management reserve has not been budgeted. Management reserve is accumulated throughout the year as a result of the BCP/FCP process, through which efficiencies in operations or changes in the baseline identify excess funding. Cost overruns as a result of poor performance are funded from this management reserve, in lieu of internal budget transfers.

Evaluation Area: **PROJECT QUALITY MANAGEMENT PLAN**

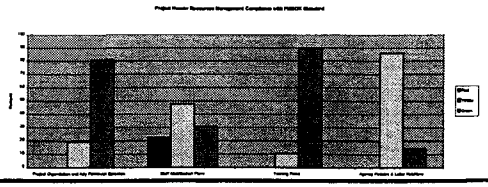
Eval. Approach: Project Quality Management includes the processes required to ensure that the project will satisfy the needs for which it was undertaken. It addresses both the management of the project and the product of the project. Areas of evaluation include the quality plan, the quality assurance program, and the specific characteristics of the quality control system employed on the project.



	Evaluation Elements	Comment Summary
Criterion 1.	**Quality Plan Development**	
	Worksteps	
	c. Has a management representative been designated who shall have defined authority and responsibility for ensuring that the quality policy is implemented and maintained throughout the project?	The planning to achieve assurance of quality, is addressed in the overall site project management plan. However, it is not clear that flow through to the PBD and/or WAD managers (who provide line management of the effort) is clear. The PBD/WAD management structure is not mentioned at all in the Site QA Plan--so that blanket references to it would not appear to be an adequate addressing of "line management's" responsibilities in this area.
Criterion 2.	**Quality Assurance**	
	Worksteps	
	c. Are project records maintained in accordance with document control procedures?	Once an item has been designated as a record, a formal procedure (Records Management) kicks in to regulate the maintenance of the record. However, the standard interpretation of this by WAD managers is that only changes to the contract meet this criteria for PBDs and WAD's; therefore, significant project-related information could be lost in the process of a long project and no longer available at project closeout.
	d. Is a program in place that identifies and acts upon lessons learned for improved performance?	Reps of the quality orgs meet nominally everyt two weeks or as needed to compare current issues in the respective companies.There is a common shared data base related to open corrective actions.This group also undertakes common cause assessments. However, the limitation mentioned above (item 2.c) has the potential to adversely impact this attribute.
Criterion 3.	**Quality Control**	
	Worksteps	
	c. What techniques are employed to measure specific process quality characteristics?	It is the responsibility of the design engineer and the project manager to determine the critical characteristics and to consult with the their company QA organization to determine the level of quality required. However, the impreciseness in the overall PMP leaves open a questions as to where, other than activity-specific procedures, project quality requirements reside.

Evaluation Area: **PROJECT HUMAN RESOURCES MGMT PLAN**

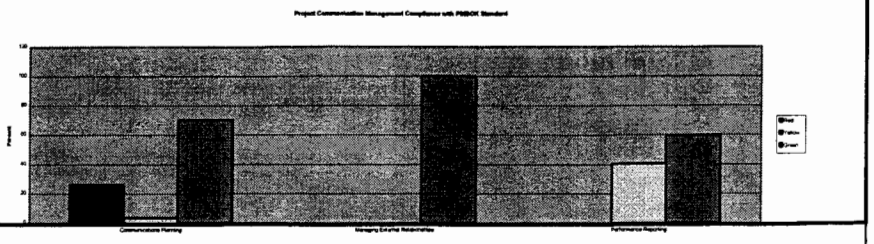
Eval. Approach: Project Human Resource Management includes the processes required to make the most effective use of the people involved with the project. The primary focus of this evaluation area is on ensuring that the necessary labor resources required to perform and manage the project are available and trained.



	Evaluation Elements	Comment Summary
Criterion 1.	**Project Organization and Key Personnel Selection**	
	Worksteps	
	b. How was the size of the project team determined?	For PBD 008 and 011, the size of the team has varied, based on the activities being performed. Some tailoring has been perfomred through the use of third-tier subcontractors. Problems due to project team size appear to surface farly readily. That is, as the need arises to increase production to meet performance measures, Kaiser-Hill is unable to respond quickly to place a second shift in operation. In addition, it was noted that, in PBDs 009 and 010, although the project managers continue to highlight staffing requirements in the PPR and other management forums, resolution of staffing inadequacies remains problematic.
Criterion 2.	**Staff Mobilization Plans**	
	Worksteps	
	a. Has a master staffing management plan been prepared that identifies required resources by WBS?	A credible overall CPB resource loaded schedule is not available. BOEs developed for each activity within the WBS identify the quantity and types of resources required to perform these activities. However, the third tier subcontractor resources are shown only as a dollar figure; therefore, there is no ability to identify tthe specific trade skills required to execute the activities and no way to determine if adequate resources will be availble. There are significant differences between the FY'99 WorkPlan and the expressed needs of the individual projects. An Hourly Resource Allocation Committee has been convened on a bi-weekly basis to discuss actual manning needs.
	e. How has the project team addressed shortages in available resources?	Shortages are identified by PBD and are discussed in detail at the bi-weekly hourly resource allocation meetings. The 4-tops submit a Requisition Report which identifies the current resources on-board, # of additional resources required, requisitions in the system, requisitions filled, clearance requirements & status, training concerns and hiring status. However, there is no way to address long term shortages since long term requirements are not adequately identified in the BOEs. For PBDs 009 and 010, the PBD manager continues to highlight staffing requirements in the PPR and other management forums; however,resolution of staffing inadequacies remains problematic. for PBD 011, the project team worked with the HR comittee to get a second shift staffed when this was determined to be required; it took more than three months to actually staff the shift.
Criterion 3.	**Training Plans**	
	Worksteps	
	c. Has adequate training time been allocated into the overall project plan and project schedules to support team personnel needs?	For PBD 009 and 010, it was noted that training does present a long-lead time evolution, especially for residues which required "Q" cleared personnel who are radcon qualified. This time is factored into the schedule to acquire personnel but still remains a challenge in actually getting people aboard. For PBD 012, the project team worked with the HR comittee to get a second shift staffed when this was determined to be required, as discussed previously it took more than three months to actually staff the shift.
Criterion 4.	**Agency Policies & Labor Relations**	
	Worksteps	
	b. With regard to prevailing labor practices and conditions, has policy been established and responsibility assigned pertaining to the use of locally negotiated labor agreements or project agreements?	All labor related issues have been negotiated, and are reflected in the most recent collective bargaining act signed in 1996. Where conflicts between the collective bargaining act and project requirements arise, the agreements within the collective bargaining act prevail unless an alternative is negotiated through the Labor Relations Department. Although there are notional plans on the part of several Kaiser-Hill managers to roll the steelworkers over into the building trades as identified steelworker work assignments decrease and fixed price D&D efforts build up, we were unable to identify any specific plans for preserving this skilled workforce.

Evaluation Area: **PROJECT COMMUNICATIONS MGMT PLAN**

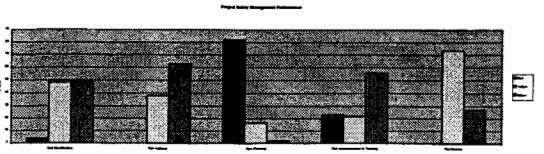
Eval. Approach: Project Communications Management includes the processes required to ensure timely and appropriate generation, collection, dissemination, storage, and disposition of project information. The evaluation of this are focuses upon internal and external communication practices. The critical nature of these projects necessitates special attention on public relations.



Evaluation Elements		Comment Summary
Criterion 1.	**Communications Planning** Worksteps	
	d. Is the project utilizing a formalized administrative closure process to collect project records, evaluate their effectiveness and retain for future use?	P&I Instruction 001 details the requirements for closing out a project. These are the same requirements that would likely be applied to closing out a PBD. Attachment 7 to this instruction provides a list of documentation that is anticipated to be available to closeout a project. When interviewed PBD personnel were not familiar with this instruction, nor with any formal requirements for project document maintenance.
Criterion 2.	**Managing External Relationships** No significant comments	
Criterion 3.	**Performance Reporting**	
Worksteps	Worksteps	
	d. Are manning plans being evaluated and deficiencies reported?	Resource issues are addressed at the Bi-Weekly Resource Allocation Meetings. Manning deficiencies are addressed jointly by this committee, labor relations and human resourses. However, there is no organized discussion taking place on the site of the long range manning needs and the planning for meeting those needs.

Evaluation Area: **PROJECT RISK MANAGEMENT PLAN**

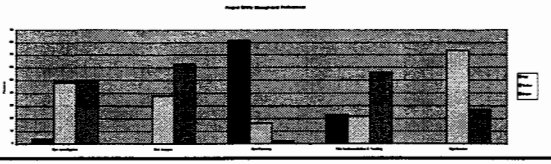
Eval. Approach: Ensure that a Risk Awareness Program has been implemented for each Project. At a high level, consideration should have been given to Defining Objectives and Priorities, Defining Risk Tolerance & Appetite for Risk, Defining Risk Reduction Criteria, Establishing Communication of Risks & Risk Training, and Assembling Risk Plans.



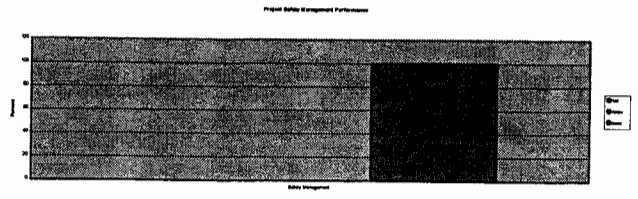
Evaluation Elements		Comment Summary
Criterion 1.	**Risk Identification**	
	Worksteps	
	b. How are the project risks identified?	The formal programmatic risk management process identifies uncertainty (risk) within a project's (PBD) schedule and cost estimate. However, the "Rocky Flats Closure Project FY99/00 Work Plan Guidance Document April 1998" on page iv requests that risk data be provided at the activity line-item level for cost, schedule and technical factors. For the D&D projects, it was noted that project risks were identified at a high level during the Monte Carlo analysis of site-wide schedule risks. The project-specific Risk Plan, which is included in the PEP, is still in draft form. Cost-related risks were also considered as part of the cost model. However, day-to-day, rolling project risks are considered in an ad hoc, reactive, corrective fashion rather than in a formal, planned, proactive, preventive manner. In PBD 024, although project risks have been itdentified at a high level, the risk of inability to retain the guard force or failure of DOE to approve the Safeguards an Security plan now being used could significantly increase project risk.
	e. How are the risks documented?	There are two methods. Macro method: One formal risk analysis, on schedule, has been conducted and formally documented. The report i entitled "Analysis of Schedule Uncertainties Within the Rocky Flats Closure Project Baseline (2010) and Their Potential Impact on the Site Closure Date" and was issued in Draft format on January 25, 1999. No cost risk has been conducted. Micro Method: This method, described in Appendix 9 "BOE Type Codes/Formats/Cost Risk Codes" to the "Rocky Flats Closure Project FY99/00 Work Plan Guidance Document April 1998" has estimators indicate, at the activity line-item level, the cost risk, schedule risk and technical risk for that line-item. The risks have five levels (1=low, 5=high) and are characterized for each situation (i.e. cost, schedule and technical) in the Appendix. This bottom-up risk analysis is not used at all in any risk scenarios at this time.
Criterion 2.	**Risk Analysis**	
	Worksteps	
	b. Has the exposure to the risk been analyzed?	Sensitivity analysis is conducted on the schedule and individual uncertainties (risks) are ranked in Pareto chart format. They are ranked from greatest impact to least impact. However, there has been no analysis of cost or scope risk at the EMSS level and there has been no risk analysis using the activity level risk estimates provided in the BOEs.
Criterion 3.	**Risk Planning**	
	Worksteps	
	a. Who is responsible for risk planning management?	The Rocky Flats Environmental Technology Site (RFETS) Programmatic Risk Management Plan, Revision 0 of July 16, 1998 states that "the Kaiser-Hill Director of Planning and Integration designates individuals to accomplish the risk management actions described in Table 6.1." This is supported by the "Rocky Flats Closure Project Functions and Responsibilities Document, Revision 1 of February 8, 1999" where it lists: (1) as a strategic planning activity, "conduct sensitivity and risk analyses (e.g., implementation unknowns, decision needs, and risks); and (2) as a planning and integration activity, "analyze risks as progress is achieved." This document also designates a formal "Manager, Risk Management" on pages 11-1 and 11-2. However, this individual is responsible for insurance programs at the RFETS and does not concern himself with the day-to-day management of project risks. This title would appear to be a misnomer and a potential cause for confusion.
	b. Has a risk communication plan been developed?	Risk communications is mentioned in the "Rocky Flats Closure Project Functions and Responsibilities Document, Revision 1 of February 8, 1999" where, on page 10-8 it states "provide for risk communication requirements" under the obtain permitting and acceptance of technologies heading. However, the only risk communication which is taking place is that associated with the high level schedule risk analysis that was based on management estimates of risk to EMSS activities. There is no identifiable risk mitigation plan to communicate and, since there is no risk analysis based on the BOE-level risk estimates provided, there is no need to communicate the results or any mitigation plans.
	c. Have risk mitigation steps been identified? At what level of detail are these steps identified?	Each Project (PBD) or sub-project (WAD) will have a programmatic risk action plan which will "develop an effective action for eliminating, avoiding, or mitigating the programmatic risks identified by the Planning and Integration Department." No formal risk mitigation plan, associated with the completed schedule risk analysis, exists. In the individual projects, there are numerous examples where risk mitigation steps have not been identified and where the norm is corrective action rather that proactive risk mitigation. For PBD 004, to mitigate the problem with construction contracts and cost claims, they have made a decision to move to fixed price contracting; however, FP contracting brings with it its own set of concerns. It will not necessarily be a panacea. For PBD 024, senior leadership fully understand the risk of potential manpower shortages and some actions are underway to provide incentives for personnel to stay at the site, however, there does no appear to be a specific mitigation plan in place.
	d. Has a risk mitigation action plan been selected?	No formal risk mitigation plan, associated with the completed schedule risk analysis, exists. For D&D projects, a project-specific Risk Plan is included in the PEP, which is still in draft form. In PBDs 001 and 002, risk management tools exist but are not being utilized.
	e. Have program reserves (cost/scedule) been allocated in accordance with the mitigation plan?	No formal risk mitigation plan, associated with the completed schedule risk analysis, exists so it can not be tied to program reserves. However, formal program reserves do exist.

Evaluation Area: **PROJECT RISK MANAGEMENT PLAN**

Eval. Approach: Ensure that a Risk Awareness Program has been implemented for each Project. At a high level, consideration should have been given to Defining Objectives and Priorities, Defining Risk Tolerance & Appetite for Risk, Defining Risk Reduction Criteria, Establishing Communication of Risks & Risk Training, and Assembling Risk Plans.



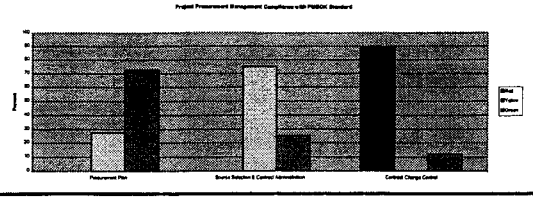
Evaluation Elements		Comment Summary
Criterion 4.	**Risk Implementation & Tracking**	
	Worksteps	
	a. Has a risk mitigation plan been implemented?	The top ten uncertainties (risks) identified in the "Analysis of Schedule Uncertainties Within the Rocky Flats Closure Project Baseline (2010) and Their Potential Impact on the Site Closure Date" are being actively managed. In the D&D projects, day-to-day, rolling project risks are considered in an ad hoc, reactive, corrective fashion rather than in a formal, planned, proactive, preventive manner.
	b. Has/Is the risk data been/being captured and analyzed? What analytical tools are used for this analysis?	The pareto chart listing the top 50 souces of schedule uncertainty serves as the principal source of schedule risk data. Computer based risk, Monte Carlo simulation and sensitivity analysis tools were used to develop the schedule probability distribution and risk prioritization. The same approach will be taken for cost risk, when conducted. However, a great deal of very valuable risk data is being routinely ignored. The individual estimators have provided input, at the activity line-item level (WBS level 6!), relative to cost, schedule and technical risk for each line-item. This bottom-up, detailed risk data is never used in any project risk calculations! Avoiding this data is another indicator that the project is ignoring the WBS as a source of information relative to schedule, schedule risk and technical risk.
	c. Has progress been reported on the status of this analysis?	For the EMMS level risk analysis that was performed, progress has been reported on the status of the analysis. Hovever, because no true rolling risk plan has been implemented for the projects, progress is not uniformly and formally reported.
Criterion 5.	**Risk Control**	
	Worksteps	
	a. At what frequency are risk reviews conducted? What is the basis for this frequency?	The Rocky Flats Environmental Technology Site (RFETS) Programmatic Risk Management Plan, Revision 0 of July 16, 1998 states that Project's (PBD's) with a programmatic risk score of 1 receive an annual cost and schedule review by the Kaiser-Hill Planning and Integration Department. No mention of any other periodicity is made in this document.
	c. How are impacts to project cost and schedule addressed?	They are addressed at the Expaned Management Schedule Summary (EMSS) level where all Project and sub-Project (PBD's/WAD's) roll up for cost and schedule analysis (i.e. ACWP and BCWS against BCWP). However, the lack of systematic, quantitative measures of risk, and associated risk planning and tracking, cause risk control activities to be sporadic and ad hoc in nature

Evaluation Area:	**PROJECT SAFETY MANAGEMENT PLAN**	
Eval. Approach:	The prevention of accidents during execution of a major capital project should be of primary concern of all participants and the responsibility of all levels of management and supervision. Accidents cause suffering to those involved, and result in project delay and additional expense to stakeholders. The evaluation of this area is focused on minimizing the incidences of these impacts.	

Evaluation Elements	Comment Summary
Criterion 1. General Provisions **No significant comments**	

Evaluation Area: **PROJECT PROCUREMENT MGMT PLAN**

Eval. Approach: Project Procurement Management includes the processes required to acquire goods and services from outside the performing organization. The evaluation of this area is focused on the buyer's (K-H) perspective, and includes those activities associated with preparing, selecting, and administering the contract.



Evaluation Elements		Comment Summary
Criterion 1.	**Procurement Plan**	
Worksteps	Worksteps	
	e. Has a contract type been selected that is appropriate for the level of risk accepted by the contractor in performance of the scope of work?	There are two primary types of contracts that the K-H Team utilizes; the Master Task Agreements, and Labor/ Technical Support contracts. Master Task Agreements are usually of the "fixed unit rates" or "firm fixed price" wherein the service provider absorbs most of the risk. Labor/Technical Support contracts are let for obtaining LOE resources that function in a support role to the individual projects and/or support organizations. Risk for this type of contract is carried by the contracting activity. A challenge for Kaiser-Hill has developed over the past year with the proper vehicle for construction-type contracts, Problems experienced during FY98 have led Kaiser-Hill to coclude that icreased use of fixed price contracting is warranted. However, this type of contrating is not a panacea, has proven to be problematic in the DOE complex in the past, and brings its own set of contract management issues. Since construction-type contracts will play an increaseing role on-site as D&D progresses, this decision willl need to be constantly monitored for its efficacy.
Criterion 2.	**Source Selection & Contract Administration**	
Worksteps	Worksteps	
	c. How, and at what frequency, does the project manager (or his/her representative) monitor contractor cost, schedule, and technical performance?	Contractual oversight is the responsibility of the project manager, the contractor technical representative (CTR), and the service provider. All contractors must report their cost and schedule performance on a monthly basis or as stipulated within the CDRLs of the contract. Many times, the CTR is the project manager and is able to make a daily assessment of the contractor's performance. K-H has identified a need for training CTRs due to ineffective oversight caused by a lack of knowledge and experience in addressing the contract specific issues as opposed to the technical work scope. In many cases, there was no connection between the CTRs and the WADlet managers, and the CTRs were at too low of level in the organization to make effective business decisions.
	d. How does the project manager make a determination that contractual objectives have been achieved?	This determination is made based upon a review of the contracted SOW by the project manager/CTR. System testing, validation of WAD level metrics, visual acceptance, or a review of specified contract deliverables can be used as justification that contractual objectives have been met. Deficiencies in CTR training as noted above are being overcome by training current and prospective CTRs on issues such as contract closeout procedures, invoice management and earned value analysis. A combination of computer-based training (CBT) and OJT is helping CTRs focus on achieving a project management mentality.
Criterion 3.	**Contract Change Control**	
	Worksteps	
	a. Has a contract change control system been implemented?	K-H does not have a Contract Change Control System in place today. The Director of Procurement and Contracts is currently pursing the implementation of a system. He has identified six contracts where changes must be re-constructed in order to resolve outstanding claims.
	b. What process is in place to expedite, review, and disposition a contractor's change request?	No formal process is currently in place.