Track: Reengineering
Control #: 96199
PMI '96 Boston
Conference Theme: Revolutions, Evolutions, Project Solutions
October 4-10, 1996

Role of Performance Measures in Reengineering U. S. Department of Energy's Management of Environmental Management Programs

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Performance Measures are the vital few actions designed to attain Site performance objectives. The outcome of each performance measure must be precisely defined to ensure its contribution and relationship to the Site's goals and objectives. The impending reengineering of the Site closure strategy connotes a paradigm shift in the Site's mission, life, and cost to the nation.

Introduction

The Rocky Flats Environmental Technology Site (Rocky Flats) contributed to America's defense up to the end of the Cold War. It is one of several large U. S. Department of Energy (DOE) nuclear industrial facilities, currently undergoing cleanup and closure. The Site was constructed in a sparsely populated area along the Rocky Mountain Foothills, near Denver, in 1952. In the 45 years since, Denver has grown to a major metropolitan area. Over 2 million people live within the Site's 50-mile radius. The Site is directly upstream of water supplies that serve over 300,000 people. As a result, *accelerated cleanup, consolidation, reuse, and closure of the Site are the current essentials*. The Site has had three management and operating (M&O) contractors since inception. In keeping with the shift in the Site's paradigm from one of *weapon-parts production* ***program*** to *cleanup and closure* ***project***, DOE changed its contracting philosophy for the Site from the M&O type of contract to a Performance-based Incentive Fee Integrating Management contract (PBIF IMC). DOE selected the Site's fourth contractor as an IMC contractor in July 1995. Kaiser-Hill Company L.L.C. was awarded the contract and assumed IMC responsibility for the Site on July 1, 1995. Integral to this contract is the establishment and implementation of a performance measures system. Performance measures are the bases for incentives that motivate the IMC and the subcontractors working at Rocky Flats.

This paper provides an overview of Performance Measures system practiced at Rocky Flats from July 1995 to December 1995. Also described are the developments in reengineering during the July 1995-March 1996 interval.

Reengineering and Performance Measures

DOE is reengineering and evolving its contract management process at its environmental restoration Sites. Several of these Sites were engaged in nuclear weapons production for national defense until about 1990. The focus of reengineering efforts is: **do things faster, cheaper, and better** at all DOE Sites. One of the steps toward reengineering is DOE's move away from the cost-plus-award fee (CPAF) type M&O contracts to PBIF IMC contracts. DOE has already implemented the PBIF IMC at Rocky Flats.

Performance Measures are a key element of the reengineering efforts at the Rocky Flats Environmental Technology Site. The Site has a new mission: "Make It Safe and Clean It Up." Performance measures act as essential and clearly visible milestones along the Site's expedition towards mission completion. Also, performance measures eliminate the use of unnecessary labor resources and oversight by neutralizing CPAF contract's tendency to award fees on the basis of work volume or labor use. Performance measures provide stakeholders a meaningful mechanism of understanding the Site's future course of action. By defining the end product clearly and precisely, performance measures eliminate confusion among the DOE, contractors, and stakeholders on end-product expectations.

Reengineering and integrated strategic planning have taken on unusual urgency and importance at Rocky Flats. The search for optimal methods of reengineering and integrated planning is continuous. Furthermore, the search methods and the results must suit the needs of the times and of the customer, and must incorporate the insight and wisdom of the Site's stakeholders. The Kaiser-Hill Team and DOE are engaged in such a search at Rocky Flats. In this paper, we share the interim processes and some of the introspection entailed in the search. We also discuss the development and administration of processes to formulate and implement a performance measurement system. We point out the aspects of communication, effective interface, and integration of the many contractors and stakeholders at the Site.

DISCLAIMER

The Site As a Project

The distinction between "Program" and "Project" (as defined in the Project Management Body of Knowledge [PMBOK] developed and published by the Project Management Institute, for example) plays an important role in planning at the Site. By definition, *the Site as a project is a limited duration activity, with a clearly defined scope and end point, and a finite budget.* This contrasts with the Site's pre-1990 status during its weapons production mission, with numerous projects, and with no clearly articulated end point in time or budget. The Site is one large "project," not a program, according to the current view. Projectizing the Site is the key to applying project management tools to everyday Site activities. The stated current Site mission of *safely shutting the Site down,* through DOE's use of a performance based contract and an integrated management contractor, offers an appealing challenge to the Kaiser-Hill team. The team can meet this challenge only by consciously applying disciplined project management principles. The move to projectize the Site is consistent with the new mission of the Site to "Make it Safe and Clean it Up" by 2015, so that DOE can maintain the Site safely thereafter until necessary, at a greatly reduced budget. The Site's many stakeholders are participating in this cooperative effort of formulating a reasonable and meaningful Interim and Final Site Condition (end state).

In August 1995, Kaiser-Hill, together with DOE, began a serious examination of the then accepted Site paradigm of gradual cleanup over a 75 year period (reported in the *1995 Baseline Environmental Management Report* [1] sent to the U. S. Congress by DOE). This so called "BEMR I" document provides an older life-of-Site planning baseline for the Site.

The logical question that persisted in the mind of Kaiser-Hill, DOE, and stakeholders was*: Is the prevailing strategy for the Site consonant with the stated new mission of safe closure as soon as possible*? The quest for an answer to this question produced an intensive effort that concluded in envisioning a new Site paradigm named "**Accelerated Site Action Project.**" The acronym "ASAP" is appropriate in that it offers a technical and strategic planning vehicle to close down the Site *as soon as possible.*

ASAP is the Site integrated life-cycle plan (work scope) and its associated schedule and cost estimate. ASAP includes all work necessary to take the Site to closure.

The Interim and Final Site Condition alternatives analyzed in ASAP range from *mothballing the Site buildings and facilities* to *unrestricted access that allows residential development* if desired. Included within this range are varying levels of decommissioning the facilities, and placing the waste generated in different retrievable and monitored storage and disposal configurations.

The Site and its stakeholders crafted a *Draft Rocky Flats Vision,* and issued it for public comments in March 1996. Signatories to the draft vision are senior officials from DOE, the Environmental Protection Agency and the State of Colorado. The vision is:

- to achieve accelerated cleanup and closure of the Site in a safe, environmentally protective manner;
- to ensure that Rocky Flats poses no unacceptable risk to the citizens of Colorado or to the Site workers from Site-related hazards; and
- to work toward the removal of contamination, wastes, buildings, facilities and infrastructure from Rocky Flats consistent with community preferences and national goals.

The Site also issued a *Draft Rocky Flats Cleanup Agreement* (RFCA) for public comments in March 1996. The Agreement:

- describes the process that will be followed to accomplish the vision and achieve cleanup and closure of the Site;
- defines the legal relationships between the agencies which regulate the Site;
- underscores DOE's obligations to the people of Colorado for Site cleanup; and
- sets milestones that ensure timely action within the budget constraints.

The execution aspects of ASAP alternatives incorporate both the Vision and RFCA. The single most important lesson learned from the careful formulation and analyses of the ASAP alternatives is: *Time is the single most-critical factor in keeping both the costs and risks at the lowest possible level. The longer it takes to clean up and close the Site, the more the cost and greater the life-cycle risk.*

ASAP is now in the process of selecting an alternative in accord with the decisionmaking process described in the next section. The selected alternative will become the approved life-of-Site baseline and project, beginning in FY 1997. The selected alternative will help further solidify the Site as a "project."

Decisionmaking Process and Tools

Choosing a preferred alternative is a complex process. In making the choice, the decisionmakers must consider both the individual and cumulative environmental impacts of the selected alternative, in addition to its technological feasibility and relative life-cycle costs.

The National Environmental Policy Act (NEPA)[2] is an umbrella statute that is simple and effective. For major actions, the Environmental Impact Statement (EIS), a NEPA document, encompasses and captures all other environmental and safety statutes and requirements. The EIS is driven by NEPA. The Site is currently preparing an EIS that reflects the current Site vision, mission and alternatives. A Record of Decision (ROD) is expected to be published in the Federal Register, in December 1996.

The *Implementing DOE Procedures and Regulations* codified in 10 CFR 1021 in April 1992, provide detailed rules for preparing an EIS at DOE facilities. The NEPA process offers an effective vehicle for formulating and documenting compliance with applicable environmental and regulatory requirements for the ASAP alternatives. Also, the EIS process is an efficient medium for obtaining formal review and comments from all stakeholders. The process of public comments and public participation used by DOE NEPA professionals since 1970 has been one of the best means for sharing decisionmaking information with the public as well as obtaining public participation.

The EIS will (1) describe the Site closure alternatives, (2) define the impacts of those alternatives, and (3) rigorously compare the alternatives in terms of their potential health, safety, and environmental impacts, status of technology, timeliness of meeting the need, extent of natural resources used, dollar costs of implementing the alternatives, cost versus benefit, socioeconomic impacts, and tradeoffs among these. The anticipated publication of ROD at the end of the NEPA process would officially systematize and document the decision on a Site closure alternative. Specific performance measures will be formulated based on the selected alternative.

Evolution of Performance Measures (PM)

Ideally, when the Site reaches a steady state planning and integration setting (i.e., a "Project-baseline" is approved), a majority of the performance measures would fall out directly from Life-of-Site Baseline (LSB) and the activity packages as depicted in Figure 1. The LSB is generated from the Site's ASAP Work Breakdown Structure (WBS). As shown in Figure 1, the Site is now being viewed as a 20-year duration project, based on the Site Final Condition attained after implementing a selected ASAP alternative. Figure 2 shows Level 1 and Level 2 of the Life-of-Site WBS. The Site's emphases on vision, goals, objectives, and the Final Site Condition are reflected in Figure 2.

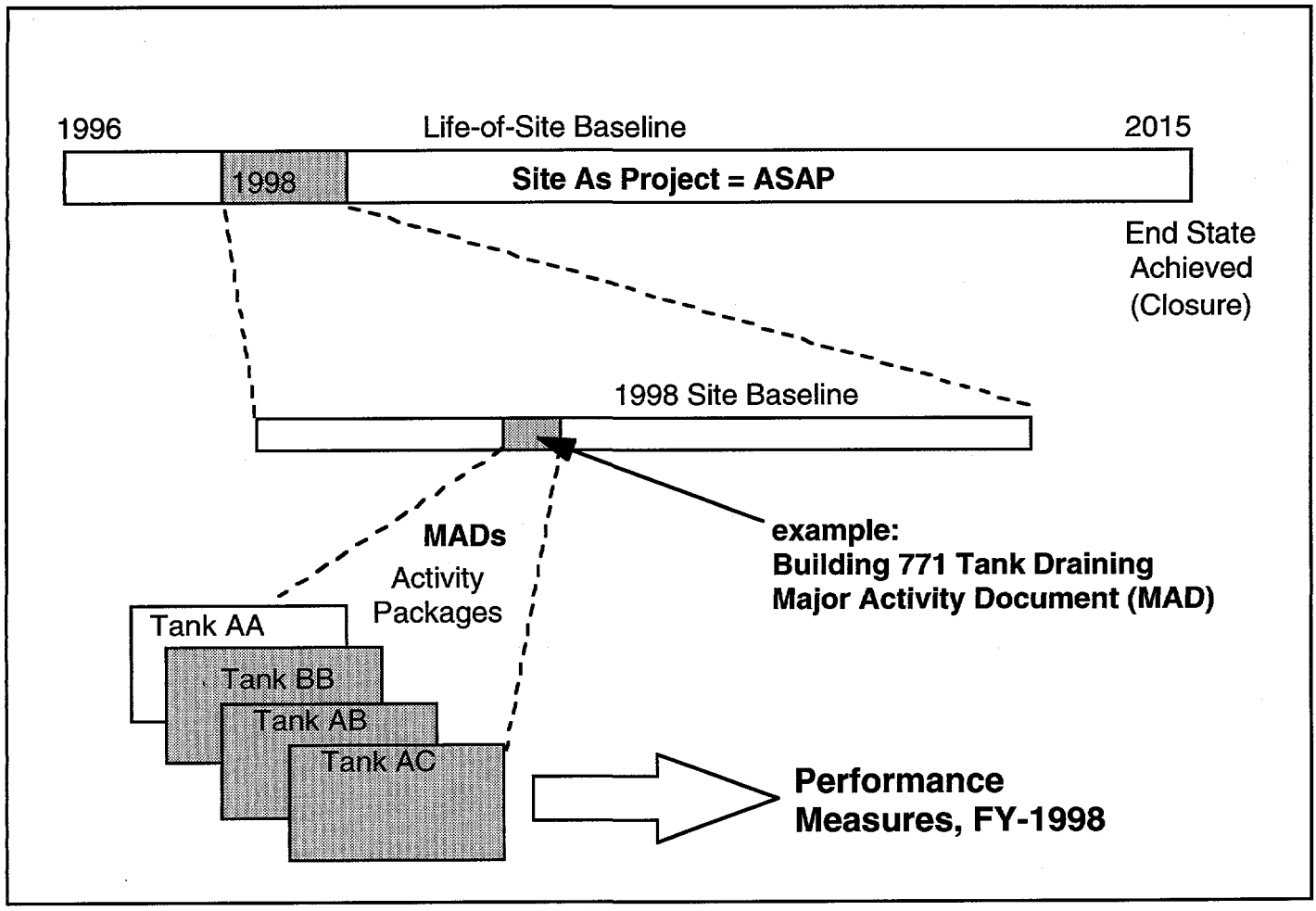

Figure 1. Evolution of Performance Measures From Site Baselines

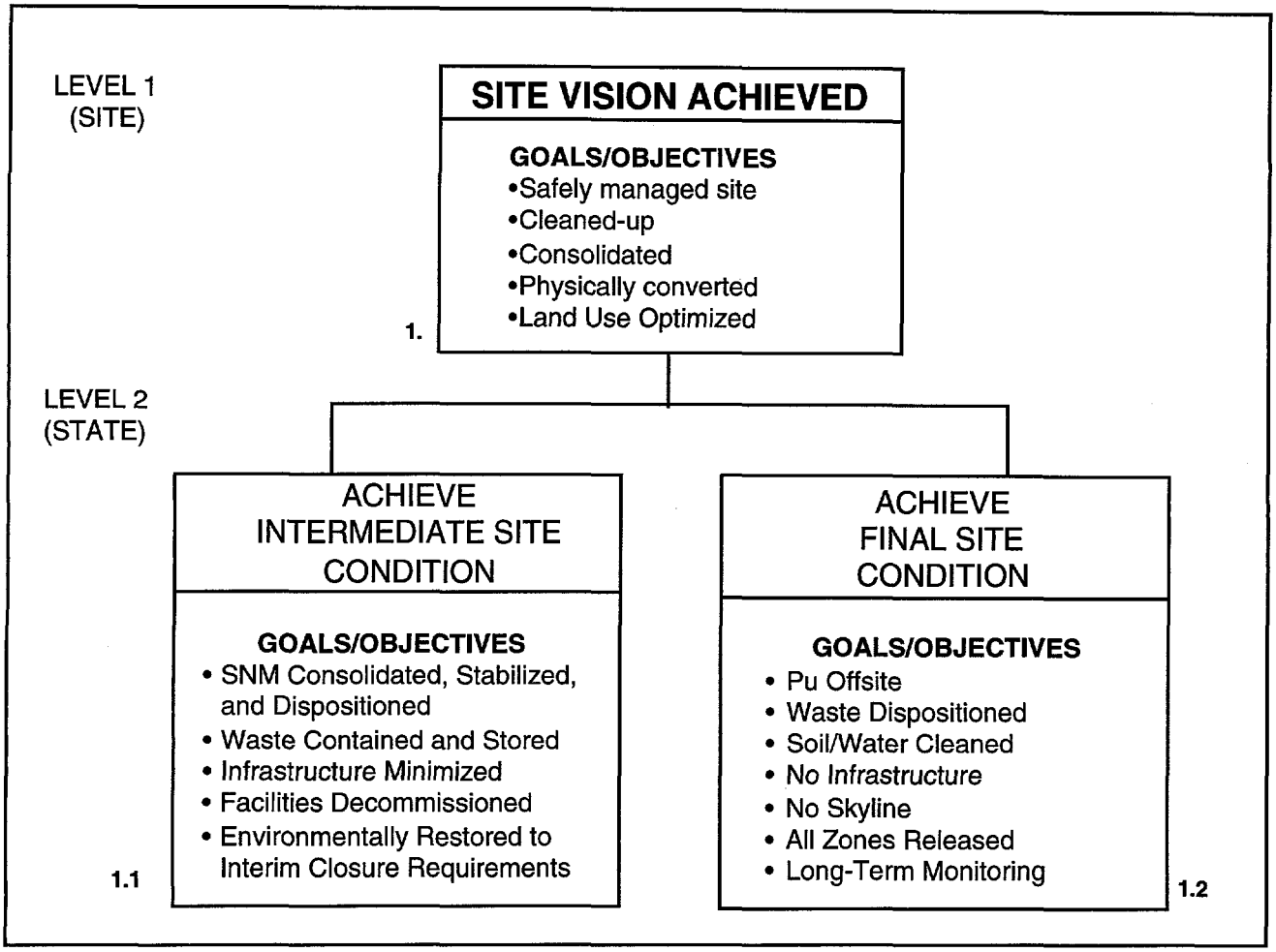

Figure 2. Illustration of Life-of Site Work Breakdown Structure

When Kaiser-Hill assumed the Integrating Management Contractor responsibilities at the Site, it began the transformation from the old "number-of-milestones-met" type of contract to the new "performance-based" incentive fee contract. Also, the Site began the move towards steady state planning and integration activities to achieve the goals and objectives of the Site's new mission.

During the July 1995 to March 1996 transformation period, many if not all of the performance measures were set on the basis of the goals and objectives that were indicative of the immediate safety and health compliance needs at the Site. Also, some of the performance measures were selected on the basis of the need to move the Site away from the old security/safeguards requirements to the new reduced security requirements; the resulting reductions in guns and guards expenditures could be redirected to risk reduction activities at the Site.

Concurrent with performance measures selection during the transformation period, the Site embarked on formulating and describing the Accelerated Site Action Project. The ASAP was envisioned as an effective reengineering tool by the Kaiser-Hill Company, in September 1995. This plan intends to achieve the Site mission of safe shutdown in 20 years, in contrast to over 50 years identified in the 1995 Baseline Environmental Management Report, and with less than half the previous total estimated cost. (The 1995 BEMR provides life-cycle cost estimates, tentative schedules, and projected activities necessary to complete the DOE's Environmental Management Program.)

At the time of writing this paper (April 1996), the Site and its stakeholders were in the process of selecting one alternative from among *those described in an earlier phase of the ASAP. This effort to select an alternative for Site closure was for planning and performance* measures formulation purposes, while the Site is awaiting the finalization of its *Vision* and RFCA. The Site's Baseline and Work Breakdown Structure were being redrawn to transform the Site work from operations to closure. Performance measures were generated from the baseline and its work packages.

Performance Measures (PM) and Performance Breakdown Structure (PBS)

The basis and the need for Performance Measures are established in the Integrating Management Contract (#DE-AC34-95RF00825) awarded to the Kaiser-Hill Company, L.L.C., by DOE Rocky Flats Field Office (RFFO). The Contract (Appendix H, Section J) states:

> *"The objective of the incentive fee provisions of the contract is to afford the Contractor an opportunity to earn performance-based incentive fee commensurate with the achievement of measurable optimum contract performance.... Contractor will utilize self-assessment program to measure progress against the standard and stretch incentive fee goals...."*

The illustrative *Performance Breakdown Structure* shown in Figure 3 portrays the hierarchical relationship among the Site's ***Objectives, Goals, and Performance Measures***. Following are some important definitions:

- *Performance Objectives* are broad areas of performance specifically identified in the Site Strategic Plan or other top-level plans (example: the Accelerated Site Action Project). Each performance objective may generate one or more Performance Goals (PG).
- *Performance Goals* are actions, described in broad terms, that advance the performance objectives within the contract performance period. A PG is an element of the Performance Criteria (PC). A PC is a collective reference to Performance Objectives, Goals, and Measures, together referred to as the Performance Breakdown Structure (PBS).
- *Performance Measures* are the vital few actions that are designed to achieve the performance objectives. Each performance objective relates to a Performance Goal (PG). Each PM must be precisely defined to ensure the outcome of these vital few actions covers a significant part of the goals and objectives of the Site.

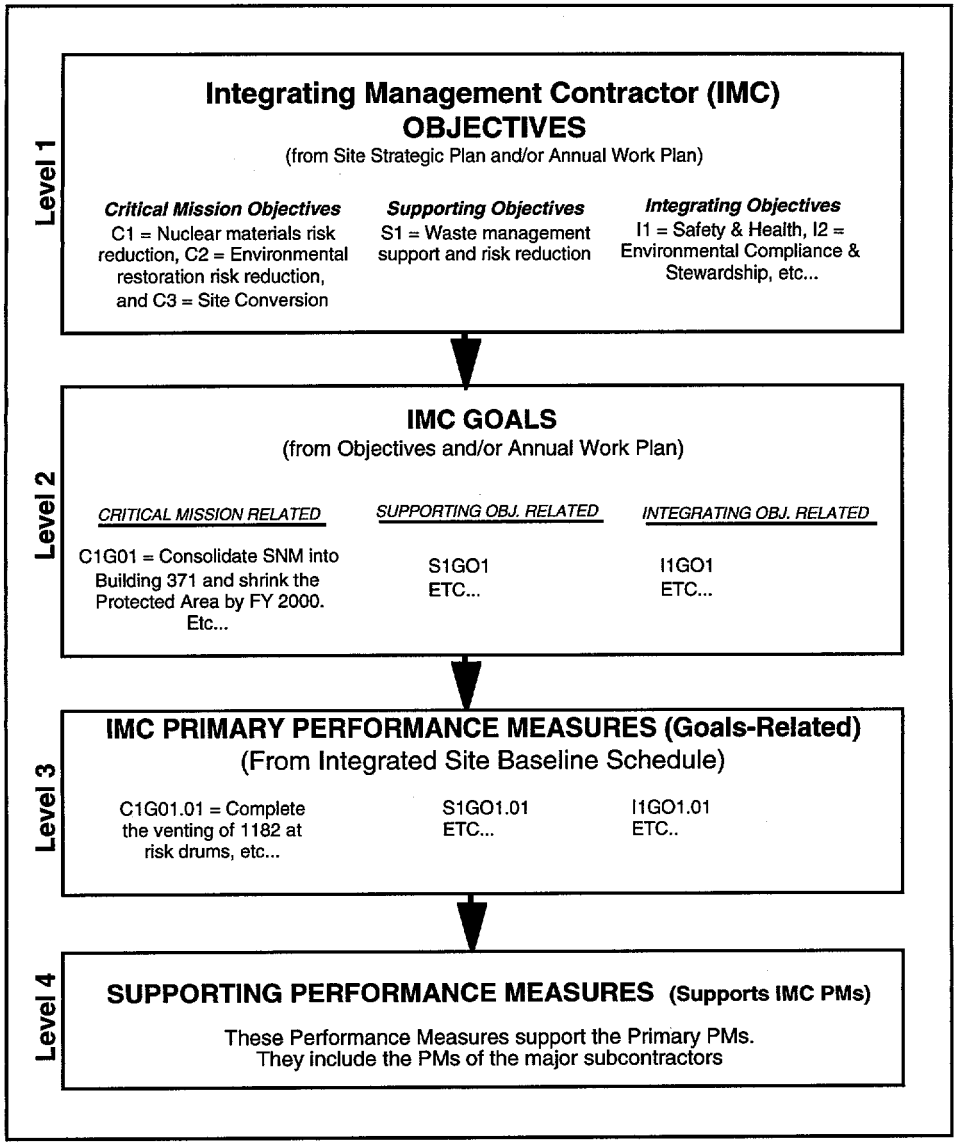

Figure 3. Example of a Performance Breakdown Structure

Kaiser-Hill L.L.C. attains its performance measures by working with the Kaiser-Hill Team in a team-management spirit. The K-H Team consists of K-H and its primary subcontractors. The primary subcontractors work with their secondary subcontractor to accomplish their portions of the measures. The primary subcontractors are DynCorp of Colorado, Inc. (DSI), Rocky Mountain Remedial Services (RMRS), Safe Sites of Colorado (SSOC), and Wackenhut Services (WSI). Each subcontractor brings to the team the unique and specific experience required to achieve the Site mission. The IMC's responsibility is to integrate the expertise of the subcontractors for each major activity.

The DOE RFFO is the direct customer for performance measures. Other customers are: regulators, stakeholders, and Kaiser-Hill's major subcontractors in that they use the K-H performance measures to design their own PMs in response to the K-H Performance Measures.

For the final quarter of FY 1995, Kaiser-Hill formulated 60 performance measures and submitted them to DOE for review and approval under the new Integrating Management Contract. The 60 performance measures were distributed under the following major activity categories:

1. Consolidating Special Nuclear Materials and shrinking the protected area	5. Environmental Compliance and Stewardship
2. Environmental Restoration Risk Reduction and Completion	6. Safety and Health
3. Site Conversion	7. Social, Administrative and Security
4. Waste Management Support and Risk Reduction	8. Cost Reduction
	9. Management and Work Force Performance

Each performance measure in each of the above categories adhered to the criteria that it must be clear and measurable. It also conformed to the Site's mission, long-range objectives and goals, as defined at the time. The process used to initiate and prepare the measures is *briefly* described in the following paragraphs.

Establishing the PM System involved substantial effort in defining, describing, designing, and implementing on a learn-as-you-go-basis. During this period, the following elements of the PM system were developed:

1. The annual Performance Breakdown Structure, Performance Based Incentive Fee Plan (PBIFP), quarterly Performance Evaluation Plans (PEP), and Incentive Fee Statement
2. A form for initiating performance measures
3. A performance Measure Rating Plan form
4. An effectively administered PM Change Control Process
5. Training for managers and planners in implementing the Performance Measures system
6. Identification of Performance Measures in all planning documents
7. Incorporation of Performance Measures into annual Kaiser-Hill contract modification
8. Monitoring of progress on each performance measure
9. Estimation of projected incentive fee earnings for each PM

Performance measures were monitored for progress on a continual basis. The monitoring results provide a logical platform for making intelligent management decisions on reallocating resources and taking corrective actions.

Because performance measures are formulated on the basis that the work done to attain them is intrinsically important to fulfill the Site's mission and vision, incentive fees are assigned to the performance measures.

Frequently nowadays, DOE Sites are required to be ever ready to reallocate limited (and continually changing, usually decreasing) resources to the most essential or high pay-back activities. Performance measures can be useful as resource reallocation indicators in such stringent situations. Normally, screening would be done to allocate limited resources to the highest priority PMs. Factors that determine the priority of a PM include:

1. Is the PM activity essential to protecting worker health and safety from Site-related hazards?
2. Is the PM activity essential to accomplishing the Site Mission?
3. Is the PM activity essential to protecting public health and safety from Site-related hazards?
4. Is the PM activity essential to protecting the environment from Site-related hazards?
5. Is the PM activity essential to the maintenance or improvement of safeguards and security of the Site?
6. Is the PM activity essential to achieving compliance with standards?
7. Does the PM help improve business efficiency?
8. Is the PM activity essential to maintaining or improving public and community relations?

If a performance measure does not meet at least one of these factors, it would normally not be a candidate for funding.

Conclusions

1. Reengineering of the Site to accomplish *safe and accelerated closure* has been essentially embraced by many at the Site and also by the stakeholders.
2. Preliminary results indicate that at Rocky Flats, reenginnering could actually save the nation tens of billions of dollars and accelerate closure by over 30 years, compared to the BEMR I baseline[1].
3. The Performance Measures system used at the Site was tailored specifically to the needs of the Site. Although designed and implemented in a very short time (90 days), it was accepted and implemented in a cooperative spirit.
4. The net result has been successful implementation of a Performance Measures system. For the first time, through the employee performance incentive fee distribution program, all employees of the IMC and the major contractors at the Site received a share of the incentive fee earned. The fee-sharing served to connect the employees with the Site mission and focus their attention on the importance of performance measures. It also helped connect the day-to-day Site activities with each employee (from management to the technical and from Site maintenance to cleaning services).
5. To ensure that each performance measure truly contributes to the Site's goals and objectives, it is necessary to formulate a Performance Breakdown Structure that establishes a clear relationship among the vision, mission, objectives, goals, and the performance measures.
6. Performance measures serve to connect the Site with stakeholders by offering a precisely defined outcome of a specific activity for the stakeholders' review.
7. The IMC is a new type of contract concept. It is being tried on a large scale at Rocky Flats, a DOE facility. Much learning as-you-go is involved in implementing this contract. The entities involved in making this contract work (DOE, Kaiser-Hill, DynCorp, SSOC, RMRS, and WSI) are diligently working the day-to-day issues and challenges in making this type of contract a success. All of them recognize that an intensive learning process is involved.
8. Changing the DOE style of day-to-day management of the contract can accelerate the efficiencies of reengineering. The essential change is that DOE will approve the performance measures and leave up to the IMC the best way to accomplish them safely, expeditiously, and within budget.

References

1. Department of Energy Office of Environmental Management, March 1995. *Estimating the Cold War Mortgage: The 1995 Baseline Environmental Management Report (DOE/EM-0232).*

2. National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*)