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Final Report

Support to LANL:

Cost Estimation

Submitted to:

Los Alamos National Laboratory

October 4, 1993

Subcontract 9-LG2-8809F-1

ICF KAISER ENGINEERS

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Final Report
Support to LANL on Cost Estimation

I. Background

This report summarizes the activities and progress by ICF Kaiser Engineers conducted on behalf of Los Alamos National Laboratories (LANL) for the U.S. Department of Energy, Office of Waste Management (EM-33) in the area of improving methods for Cost Estimation. This work was conducted between October 1, 1992 and September 30, 1993.

ICF Kaiser Engineers supported LANL in providing the Office of Waste Management with planning and document preparation services for a Cost and Schedule Estimating Guide (Guide). The intent of the Guide was to use Activity-Based Cost (ABC) estimation as a basic method in preparing cost estimates for DOE planning and budgeting documents, including Activity Data Sheets (ADSs), which form the basis for the Five Year Plan document.

Prior to the initiation of the present contract with LANL, ICF Kaiser Engineers was tasked to initiate planning efforts directed toward a Guide. This work, accomplished from June to September, 1992, included visits to eight DOE field offices and consultation with DOE Headquarters staff to determine the need for a Guide, the desired contents of a Guide, and the types of ABC estimation methods and documentation requirements that would be compatible with current or potential practices and expertise in existence at DOE field offices and their contractors.

A. Summary of Discussions

The needs analysis conducted prior to initiation of the current task serving LANL included the following components:

- Discussions with Headquarters EM-33 staff and their contractors (including LANL) regarding the status of cost and schedule estimation methods used currently, and the results of reviews of cost estimates conducted by the Office of Waste Management (EM-33), the Office of Quality Assurance and Quality Control—Engineering and Cost Evaluation Division (EM-24), and the Office of Procurement, Assistance and Program Management—Program/Project Management Division (PR-24);

- Discussions with Headquarters units involved in cost estimation, i.e., PR-24 and the Office of Chief Financial Officer, concerning status of cost and schedule estimation methods, documentation requirements, and format/content of cost estimates;

- Discussions with the representatives of DOE field offices and their contractors regarding cost and schedule estimation methods, documentation requirements. Discussions were held with the following field offices:

    - Oak Ridge
    - Savannah River
    - Kansas City
    - Idaho
    - San Francisco

- Hanford
- Rocky Flats
- Pantex

In addition, the team visited the Thiokol Utah operations to discuss industry practices on cost estimation.

The discussion summaries from each field office are included as Appendix A to this report.

Although each field office discussion covered a wide range of topics, there were several common themes emerging from the discussions. Following is a summary of the major outcomes, or lessons learned, from these discussions:

- ABC Method. Field office staff did not use ABC estimation methods in general, although some facilities encourage its use or use ABC routinely. Level of effort methods, generally applied incrementally vis a vis current operations, are more generally used. There were few conceptual obstacles to use of ABC estimation, but ABC was not seen as required or necessary in many ongoing operations.

- Resources. Field office staff perceived use of ABC estimation as requiring more resources than are currently devoted to preparation of cost estimates. ABC was seen as requiring more time and effort by technical project managers to analyze, collect data, prepare estimates, and document compared to current estimation methods. ABC was similarly regarded as requiring additional training for on-board management and budgeting staff, as well as additional staff for preparing estimates. Finally, the documentation requirements implied by use of ABC indicated the need for installation-wide cost categories (i.e., work breakdown structures, code of accounts or activity dictionaries), with data systems set up to collect costs using these cost categories. Such categories and systems were considered to require significant expenditures and years to implement.

- Duplication. Field office staff at every installation expressed concern over repeated reviews of cost estimates by several organizations. These reviews, according to field office staff, covered virtually the same ground each time, requiring extensive preparation time, and consumed additional time during each review. Economies of scale were insignificant due to variations on the information required or the objectives of each review.

- Consequences. Field office staff expressed concern over the use of estimates prepared using the ABC method. The concern was that Headquarters staff may use the estimates or the attached documentation to find fault with plans of field offices, and to cut budgets or scope.

- Documentation. Field office staff agreed that, once ABC methods were used, documentation would be a logical consequence and a necessary component of the method. Field offices were concerned, however, that many basic components of the estimate e.g., time and motion studies) had not been measured, and that such measurements would require significant resources. Concerns were also raised concerning retention of documentation, and over the extent of any documentation requirements in that additional documentation could always be requested.

- Contingency. Finally, field office staff at every installation raised the issue of uncertainty over estimates, and the method to be adopted to account for or document assumptions concerning uncertainty.

During the discussions, approaches were discussed in an effort to examine the validity and extent of each of these areas of concern. The result of these discussions was the Cost and Schedule Estimating Guide.

B. Cost and Schedule Estimating Guide Concept

As a result of the concerns raised in the needs analysis, several principles were developed to guide preparation of the Guide. Following are the guiding principles:

- Cooperative Effort. The Guide would be developed with significant cooperation by field offices, who would be given meaningful opportunity to comment on the Guide and its subsequent implementation. Training of ABC methods and the Guide's procedures would be provided to field offices, as well as technical assistance following publication of the Guide.

- Commitment to ABC. DOE is committed to use of ABC estimation methods for preparing estimates of DOE waste management program costs. ABC is legitimate, consistent with best practices of cost estimation professional worldwide, and consistent with proper program and project management practices that are or will be implemented by DOE.

- Rigor Balanced by Flexibility. The needs analysis concluded that ABC estimation requires a rigor of analysis and documentation not present across all field offices. In that some of the concerns raised relate to concerns over increased rigor, a basic principle of the Guide was that heightened rigor of analysis and documentation would be tempered in order to promote implementability of the ABC method. Analysis, estimate preparation, and documentation would be true to the ABC concept, but not carried to extremes, with significant license given to field offices in determining the degree of rigor required.

- Reasonableness. Application of ABC methods would be guided by a desire to focus effort on areas maximum results. The Guide would encourage increased rigor for programs with high dollar values or other criteria indicating strategic importance. Rigor and effort for the sake of consistency would not be sought or required.

Section 1 of the Guide summarizes the application of the above principles to the concerns raised during discussions. The relevant points may be summarized as follows:

Purpose. The purpose of the Guide is to replace the *EM-30 Interim Cost and Schedule Estimating Guidance for Waste Operations*, to improve the accuracy and credibility of cost estimates, and to provide additional detail on cost estimation methods appropriate to waste management operations. Lessons learned from cost estimate reviews and Cost Quality Management Assessment (CQMA) findings were considered in preparing the Guide.

Improved Management. The increased rigor entailed in ABC estimation provides management oversight and data that inevitably will result in improved accountability and management of waste management programs.

Appropriate Level of Detail. The Guide includes methods and examples intended to adapt ABC estimation methods to the level of maturity of a program. Extensive, detailed estimates thus are not required for programs at a conceptual or preliminary stage of planning, although more detailed estimation and documentation would be required for relatively well-established programs.

Reduced Long-Term Resources for Reviews. By standardizing and simplifying the requirements for cost estimates, reviews of these estimates will be simplified as well. By consolidating requirements and providing reviewers with access to findings by other reviewers, resources required for reviews should be decreased over time.

Exhibit 1 summarizes the results of the needs analysis translated into specific types of guidance to be included in the Guide.

C. Training Concept

It was clear from the discussions with Headquarters and field office staff that implementation of ABC estimation would require not insignificant modifications in approach and operations by implementing organizations. Training of Headquarters and field office staff was therefore a key component of the scope of work for the present task.

Following is a summary of the principles guiding the training course:

- Buy-In. The training sessions primary purpose was to foster implementation of the Guide and its underlying ABC estimation method. The sessions would therefore not be technical presentation of methods, nor clear explanation of incontrovertible dicta from Headquarters. Rather, the sessions would attempt both to persuade and inform participants.

- Two-Way Communication. In addition to communication from Headquarters to participants, the sessions would offer opportunities for comments, questions and objections to the ABC methods.

- Hands-On Participation. The training sessions would, to the extent possible, employ hands-on exercises rather than pure lecture in order to give participants the experience of employing ABC methods. Such experience would further the learning process and foster meaningful exchange of views on the implementability of ABC methods.

II. Cost Estimation Handbook: Summary

A. Summary of Final Draft (December 1992)

The Guide was prepared in September 1992. The first draft was reviewed by a workshop of knowledgeable professionals with significant experience in cost estimation for DOE waste

Exhibit 1
Requirements for Guide

REQUIREMENT
V. COST ESTIMATE BASIS
A. Activity Based: Activity based costing is used as basis for estimates. Estimates are built up from labor hours and material/services costs per activity. FTEs are not used as the fundamental labor building blocks.
B. Activity Definition: Estimate activities are defined in sufficient detail to identify components included and excluded from the estimate. The activity is defined in terms of a quantity of cost element (e.g., manhours, labor cost, materials, subcontracts, equipment usage, & overhead percentage) resulting in an output (e.g., gallons processed, drums stored, reports produced). The nature of the operation, e.g., number of shifts, has been identified and used.
C. Technical Scope: Program/project describes work to be performed, technology concept(s), size and complexity, design and research objectives, media, contaminants, capital equipment requirements, operating resources, and integration with other site programs/projects as well as the time frame of the program/project. Rationale for activity, task logic, milestones, and resource loading are explained.
D. Time-Phased: Estimates and schedules are prepared as a baseline for comparison with actual performance. The performance is indicated by actual productivity, quantified by a milestone achieved, percent complete, or output produced, and not manhours or materials expended. Depending on the size of the project, the schedule is loaded with resources and constraints for tracking actual manhours and costs.
E. Nonroutine Activities: Long-lead procurement items, required special studies, and technology development are identified and explained.
F. Logic: Programs/projects are conceived and presented via a network logic diagram depicting the identities and interrelationships of individual activities, events, products and milestones required to be completed in order to achieve a technical objective or accomplish a finite technical scope.
G. Labor Costs: Basis for labor costs are presented and detailed by relevant categories, e.g., by exempt/nonexempt, department, technical discipline, or pay grade. Usually expressed in terms of $/hour, not an annual cost or FTEs.
VI. COST ESTIMATE DOCUMENTATION
A. Assumptions: Major assumptions in the estimate have been identified. Assumptions are explicit, and are presented at the most detailed level practical and are clearly documented.

REQUIREMENT
B. Cost Estimate Presentation Format: Estimates are presented in a clear, consistent, comprehensive format that facilitates review of details and assumptions. A WBS dictionary and WBS Index are desirable.
C. Detail: Activities to be costed have sufficient detail to support the estimate methodology used.
D. Historical Basis: Estimates are based on records from ongoing activities applicable to the present activity/task/program/project or similar activities/tasks/programs/projects conducted elsewhere. Examples include timecards, activity logs, vendor quotations, past practice correlations, and unit cost studies, preferably as part of a pricing database.
E. Document Hierarchy: Estimate documents establish the order of precedence for the planning, requirements definition, scope development, management, and other related activities associated with a activity/task/program/project.
F. Regulatory Drivers: Regulatory basis for activities, tasks or programs/projects are presented.
G. Accessibility of Data: Location of historical data, assumptions, worksheets, etc. is identified and accessible upon review.
H. Estimate Backup Sheets: Clearly identifies what was examined, and where and how estimate quantities were identified. Should include all pertinent data, e.g., drawing numbers, process flow sheets depicting plant activities and production quantities.
I. Change Control Documentation: Estimate changes have been documented. An estimate development history has been kept. Estimates are updated/modified and documented on a timely basis when relevant changes occur.
J. Participants: Estimate developer(s) and reviewers have been identified. Date and identity of preparer/reviewer is indicated on all backup sheets and estimation forms.
VII. COST ESTIMATION METHODS
A. Method Documentation: The estimating methodology used has been described.
B. Contingency: Estimates for contingency are presented at a low level of detail if feasible, using a consistent method, indicating probability of occurrence and range of potential cost impact, with assumptions documented.

REQUIREMENT
C. Escalation: Escalation factors are specific to cost elements (e.g., labor, travel, materials) and activities (e.g., construction versus ongoing operations), are consistent among all estimates presented, with basis for escalation factors documented. Escalation factors are applied according to guidance.
D. Indirects and Overheads: Indirect, overhead, or other costs shared among activities/tasks/programs/projects are identified and reasonable. Direct costs are identified separately.
E. Schedule: Scheduling is presented by use of logic diagrams with durations of activities identified. Underlying schedule presents logically connected activities ,i.e., Activity D cannot start until activity B is completed. Acceptable presentation formats include Gantt Chart (Bar Chart) or time scaled logic diagrams.
VIII. MANAGEMENT A. Estimation Staff: Technical project/program operations managers are assisted in preparation of the estimate by qualified cost estimation specialists.
B. Independent Review: Estimates are validated by independent, qualified reviewers.
C. Automated Systems: Estimates roll up to an automated, validated Management Control System used for budgeting and tracking expenditures.
D. Guidance: Estimates are prepared consistent with site-specific guidance on cost estimation or DOE Headquarters guidance documents as applicable.
E. Consistency: Assumptions on waste volumes, quantities for activities, and unit costs are consistent among estimates/activities/Activity Data Sheets as well as estimate backup documentation.

management projects on October 20-22, 1992. The resulting comments were extremely useful in producing the final draft, submitted in December 1992. At DOE's request, the final draft was called "Working Draft".

The December 1992 draft contained the following sections:

Executive Summary of the Guide, including background and summary of Guide contents.

I. Introduction, including the purpose and benefits of the Guide, background information on DOE cost estimation preparation and review procedures, a summary of the intended audience for the Guide, and a clarification of terms used as part of DOE's Work Breakdown Structure.

II. Introduction to Activity-Based Costing, reviewing the key features of ABC estimating and the basics of ABC use in DOE waste management operations.

III. Planning and Scoping Methods and Formats, summarizing methods and presentation of planning and scoping and resource identification.

IV. Cost Estimate Documentation, summarizing what a well-documented cost estimate should look like and the supporting materials it should contain.

V. Summary of Capital Cost Estimation Procedures reviewed well-established ABC estimation methods. This section provided a foundation for the application of ABC methods to waste management operations in subsequent sections.

VI. Estimating Methods, Performance Goals, and Deliverables described methods and approaches for estimating costs of ongoing waste management operations. It included discussion of the estimate criteria document, work breakdown structure, activity dictionary, development of quantities and time and cost assumptions, significant findings, estimate factors, and assembly of the "estimate package".

VII. Scheduling Methods, Performance Goals, and Deliverables described methods and approaches to scheduling ongoing DOE waste management operations for use in the estimate. The section covered the basics of Critical Path Method (CPM) scheduling and its application to waste management operations.

VIII. Example of Annotated Cost Estimate presented an example, with narrative explanation, of a cost estimate for a drum storage facility.

Each section contained Assessment Criteria, i.e., a set of questions or issues to be considered in preparing a cost estimate. These criteria were summarized in Section IX and listed in Appendix F.

The December 1992 draft contained the following Appendixes:

A. **Glossary** of terms used;
B. **Activity Dictionary**, presenting a set of broad top-level categories of costs for use in designing work breakdown structures;
C. **DOE Work Breakdown Structure**, presenting the 1992 DOE-EM Programmatic WBS and the WBS for each DOE field office;

D. **Program Controls**, a capsule summary of program control system concept as a natural outgrowth of the cost estimation planning process;
E. **Value Engineering**, with DOE Order 4010.1A (May 15, 1992) and Office of Management and Budget circular A-131 (January 26, 1988); and
F. **Assessment Criteria**, summarizing the criteria found in each section of the Guide.

B. Summary of Review Comments (Spring 1993)

Comments were solicited from a large number of organizations and individuals. The comments were requested by March 1992, although some were received subsequently. In addition to comments by DOE EM-33 and LANL staff, comments were received from 17 sources, as indicated in Exhibit 2.

Exhibit 2

Commenters on Cost Guide

Source No.	Source Name	Contact
1	EM-36	Jim Antizzo
2	EM-323	Patty Bubar
3	Richland	J.J. Keating
4	Argonne	Bob Repetti
5	University of Texas, Austin	Paul Cooper
6	Pinellas	Gary Schmidtke
7	Oak Ridge	Larry Radcliffe
8	EM-20	Vince Fayne
9	Chicago	Jeff Roberts
10	U.S. Army Corps of Engineers	Michael Fellows
11	Attendees at Oak Ridge training	Bob Repetti (summary)
12	Albuquerque	Marilyn Bange
13	Kansas City	Margaret Stockdale
14	EM-341	Ram Lahoti
15	PR-24	Muriel Scarborough
16	EM-331	Lee Stevens
17	Idaho	Walter Sato

Over 700 comments were received. A summary of all comments (prepared by DOE, LANL and Project Performance Corp.) is presented in Appendix B of this report. Following is a summary of the most significant comments follows.

- The comment resulting in the most significant edits to the Guide was the observation that programs mature over time from a relatively conceptual stage to a highly defined stage. This observation necessitates adapting estimation and documentation methods to the "maturity" of a program.

- Among numerous comments containing editorial suggestions and terminology clarifications, several useful comments were received with suggestions on reducing duplication and otherwise shortening the Guide.

- Several comments resulted in addition of exhibits and examples to increase clarity, e.g., overviews of planning process, examples of Resource Plan/Resource Dictionary.

In addition to the above comments resulting in changes to the guide, DOE received comments with more general concerns regarding the Guide. Examples included the following:

- Concerns over the ability of field offices to properly develop the tools, structure and databases to implement ABC estimation;

- Concerns over the resources required to perform ABC estimation consistent with the Guide.

- Requests to standardize the cost estimation process, including standardized software, and complex-wide work breakdown structure, modified review procedures, and provision of standard costs.

- Suggestions to address explicitly the issue of contingency;

- Suggestions to consolidate cost estimation methods for all ERWM programs, including those overseen by EM-20, 40 and 50.

- Expansion of the Guide to address other key program management procedures such as contracting, cost analysis, baselines, project controls and budget preparation.

C. Summary of Revision 0 (September 1993)

Revision 0 was produced following compilation of the above comments and a thorough incorporation of those comments deemed appropriate by DOE. Following are the major changes made resulting in Revision 0.

- Addition of the concept of "estimate development stages" reflecting program maturity;

- Consistent with the estimate development stages concept, addition of further examples within section 8 to reflect programs at a conceptual and intermediate stage (magnitude and preliminary estimates). These additions resulted in additional exhibits specifically

illustrating the differences in estimating methods and formats among magnitude, preliminary and performance estimates;

- Addition of several exhibits in other sections, including Exhibit III-1 (Summary of Planning Process), Exhibit III-2 (Example Resource Plan), Exhibit III-3 (Example Resource Dictionary), Exhibit VI-1 (Operations Cost Estimating Process), Exhibit VI-2 (Characteristics of Estimate Development Stages), Exhibit VI-3 (Estimate Accuracy).

- Addition of a Bibliography (section IX);

- Refinement of the Activity Dictionary (Appendix B);

- Addition of Appendix G (Cost and Schedule Guide Comparisons), which compares the Guide to EM policies on cost and schedule estimation and analysis, and with the Cost Quality Management Assessment Handbook;

- Relocating section IX (Assessment Criteria) to become Appendix F;

- Renaming section VI "Operations Cost Estimating Methods" in place of "Estimating Methods, Performance Goals and Deliverables";

- Adding or clarifying many terms in the Glossary;

III. Training

A. Summary of Training Course

Over 650 people attended the training on Activity-Based Cost estimation. Training sessions were conducted at eight DOE field offices plus Headquarters. The schedule completed is as follows:

Kansas City Plant	December 10-11, 1992
Idaho National Engineering Laboratory	January 4-5, 1993
Richland Field Office	January 6-7, 1993
Headquarters	January 11, 1993
Savannah River Plant	January 14-15, 1993
San Francisco Field Office	January 21-22, 1993
(with Nevada Field Office staff attending)	
Oak Ridge National Laboratory	January 25-26, 1993
Rocky Flats Plant	January 28-29, 1993
Albuquerque Field Office	February 2-3, 1993
Chicago Field Office	February 9-10, 1993

The training consisted of three sessions at each field office. The first session, called the Senior Management Briefing, was a briefing for senior managers with oversight responsibility for the preparation of Waste Management cost estimates. The second session, called the "All Hands" session, provided an overview of ABC estimation, and included a brief hands-on exercise in activity definition. The third session, called "Workshop", was a full day of hands-on exercises in activity definition, estimating methods, and documentation.

The Senior Management Briefing was held on the morning of Day 1 of each training. The purpose of the briefing was to further the "Buy-In" and "Two-Way Communication" principles described in section I.C above. The typical audience consisted of 15 managers from the DOE field office and the M&O contractor, although at one session (Idaho) approximately 70 managers attended. The session began with Joel Kristal of DOE EM-333 conveying the importance of improved cost estimation practices, and requesting cooperation and communication with the field office, particularly with regard to improvements in the Guide.

The All Hands session was held in the afternoon of Day 1 of each training. The target audience was all staff involved in preparing or reviewing cost estimates, and drew up to 100 staff at the larger facilities. The purpose of the session was to provide an overview of the ABC methods described in the Guide, and to persuade participants of the importance and feasibility of these methods. The session consisted primarily of lecture, with a stimulating exercise on activity definition included.

The Workshop was held on Day 2 of each training. The purpose of the Workshop was to train staff in more detailed methods of ABC estimate preparation. The target audience was staff primarily responsible for preparing cost estimates, thus, a subset of those attending the All-Hands session. The Workshop included three exercises plus lecture providing additional detail on cost estimation methods, documentation, program controls, and scheduling.

B. Training Evaluation Summary

Evaluation forms were completed by participants at the All-Hands and Workshop sessions. Appendix C of this report contains the results of the evaluations. Following are the highlights of that summary:

- Approximately 80 percent of the participants rated this course and its instructors as "good" or "excellent".

- Over 70 percent of participants felt they now understood the basics of ABC estimating.

- Participants were satisfied with the many logistical arrangements, including comfort of meeting rooms, audio-visual equipment, ability to hear and see adequately, quality of materials, and so forth.

A question of key importance is whether the training succeeded in obtaining "buy-in" from the participants. 77 percent of respondents agreed with the statement "Activity-Based Cost Estim ıg techniques will improve the accuracy and quality of cost estimates over time", and 80 perce, reed that "Activity-Based Cost Estimation will help to produce defensible, credible cost estimates." However, respondents had doubts on the ability to implement ABC estimation:

- 45 percent agreed with the statement "The use of Activity-Based Cost Estimating techniques will increase the likelihood of budget approvals in the future."

- 27 percent agreed with the statement "Activity-Based Cost Estimating techniques can be implemented at my facility without too much difficulty."

- 55 percent agreed with the statement "It is feasible to implement Activity-Based Cost Estimating at my facility."

In conclusion, the training program was successful in communicating the basics of ABC estimation methods, but additional measures will be needed to ensure implementation nationwide.

IV. Future Considerations

A. Implementation of ABC

Field office staff expressed substantial reservations concerning implementation of Activity-Based Cost estimation during the needs analysis, training and the comments on the Guide. These concerns include the following:

- ABC will require documentation that does not exist or is difficult to obtain;
- Implementation of ABC would be eased by modification of accounting and data management systems to collect cost by activity rather than organizational unit, but such modifications will be expensive, and would not be completed soon enough to be used for the next round(s) of ADSs.
- ABC estimates will give reviewers a clear picture of program operations, but may fail to prevent cuts in programs. Reviewers unfamiliar with programs may make arbitrary cuts based on this more complete information.
- Field offices lack the resources to prepare ABC estimates. Requiring ABC estimates will divert resources from other key management and programmatic functions.

Implementation of ABC techniques will be accomplished after field offices have the opportunity to use ABC techniques over a period of time. As field offices become more familiar with ABC use on their respective programs, it is likely that the necessary techniques will be learned and applied, and the documentation and back-up will be created. Similarly, because implementation of the Guide will only begin in the coming months, it is likely that Headquarters will learn of several applications or implementation issues that were not anticipated during development of the Guide. Additional methods or approaches may need to be developed to aid field offices in implementation, and existing approaches in the Guide may be revised to resolve these issues.

B. Program/Project Management

Improved cost estimation, including use of ABC techniques, are directed toward the ultimate objective of improved program and project management. A central selling point of the Guide is that ABC techniques enable managers to view programs in a useful, analytical context. For example, managers have the tools to anticipate the effects of changes in demand by altering the units, improve the efficiency of the activity in order to lower the unit cost,

Significant areas for improved program/project management remain to be exploited by building on ABC. These include:

- Implementation of program/project control systems tracking progress in accomplishing the units estimated;

- Cost estimation databases compiling unit costs and efficiency factors based on historical experience;

- Improved reporting and oversight using the Progress Tracking System or other management information system;

- Improved opportunities for modifying training, compensation and promotion systems to reflect management accomplishments.

A key question for DOE Headquarters managers exits as to the role Headquarters will/should play in making these improvements. With increased emphasis on decentralizing management responsibilities to field offices and "reinventing government" by empowering managers, it seems likely that these improvements will be the primary responsibility of field offices. Whether inspired or performed by Headquarters or field offices, the above areas are ripe for improvement and can be initiated in the near term.

Some specific starting points might include the following:

- Demonstration of ABC estimation at each DOE field office using teams of Headquarters and field office staff. These demonstrations would serve as training for field staff, as well as a source of potential refining of the Guide.

- Development of policy and guidance on contingency.

- Identification data to be used in cost estimates, and modification of program management control and data collection systems to collect these data routinely and use them for performance measurement.

Appendix A

Summaries of Discussions With Field Offices

ICF KAISER
ENGINEERS

TRIP REPORT

DOE EM-30 COST ESTIMATION PROJECT
VISIT TO OAK RIDGE OPERATIONS
JULY 15 - 16, 1992

Key Points from Oak Ridge Field Visit

- Both DOE-ORO and MMES were extraordinarily cooperative, helpful and well-prepared for this visit.

- Both DOE-ORO and MMES expressed concern about the implementation costs for cost estimation data collection. DOE EM should consider the cost-benefit tradeoff of the additional data collection burden on DOE M&O contractors, particularly for continuing operations with a significant proportion of fixed costs.

- DOE-ORO imposed a requirement on MMES to implement activity-based costing for waste management operations by September 15, 1992. MMES is working in parallel to us with respect to development of an activity-based costing system.

- It appears that MMES and DOE-ORO infrastructure exists to track and compare estimated to actual costs; primarily what is required is definition of standard activities and their use, particularly by MMES. Cost-schedule control is used at Oak Ridge only for capital construction projects, however, these practices could be extended to other projects such as continuing waste management operations.

- MMES is implementing on October 1, 1992 a new accounting system which will further increase the flexibility and responsiveness of accounting data and reports.

- The MMES Central Engineering Department has cost estimation expertise which is accessed only to a limited degree for ER and WM activities. This expertise is used almost exclusively for capital projects. Further cooperation is planned for waste management operations.

- Both DOE-ORO and MMES strongly recommended that we visit smaller facilities (e.g., Chicago, San Francisco), even though waste management operations may be limited at these facilities, because of the significant impact of EM-30 activity-based cost estimation procedures on small facilities with limited cost estimation expertise or resources.

- MMES strongly recommended that DOE EM-30 persuade DOE CR to adapt B&R codes to fit ER and WM activities rather than adding yet another layer of reporting and crosswalk.

- Close examination by DOE-HQ/OMB of "support" activities (e.g., Quality Assurance, Training), which are often centralized by DOE M&O contractors to create economies of scale, may give incentive to decentralize and "bury" support activities within operating groups. It is arguable whether this would be negative.

- For this and future trips, it would be useful to examine all relevant Activity Data Sheet (ADS) and Technical Description Document (TDD) submissions. DOE-ORO personnel would not release these documents to us because they were preliminary, but indicated DOE EM-33 had these documents. We request access to these documents.

- MMES expressed concern about DOE HQ policy of not including any contingency in budget estimates for DOE WM operations. MMES expressed this concern because of their experience with the variability of factors affecting the operating costs of OR waste management facilities (e.g., regulatory and policy initiatives). Contingency is a standard item incorporated into cost estimates for both construction projects and continuing operations in industry and other Federal agencies. ICF KE believes that if standard cost estimation practices are to be applied to cost estimates for DOE WM operations, contingency should be included in these cost estimates. DOE may wish to clarify policy concerning the use of contingency in cost estimates for DOE WM operations.

- Discussion with CR: Kathleen Lanahan of DOE CR believes two existing sets of accounting codes, i.e., B&R codes and Functional Codes, may already contain much of what may be required for higher level Code of Accounts. DOE-ORO staff indicated the CR Functional Codes apply to overhead functions only. We will investigate this further with CR and other DOE field offices.

Summary of Oak Ridge Field Visit

ICF Kaiser Engineers (ICF KE) participants: Marc Lieber (ICF KE Program Manager), Robert Lanza (Project Manager), Michael Hauser (Cost Estimation specialist), Steve Huckins (Project Controls specialist).

ICF KE and Project Time & Cost (PTC) presented briefings on the project. Oak Ridge participants emphasized that this was the 7th review by Headquarters on cost estimation in the past year, and expected this field visit was yet another review. Oak Ridge participants were initially not convinced of our protestations that this was not a review, but by the close out of the field visit were convinced that indeed we were there to help by preparing standardized procedures. DOE-ORO expressed appreciation that we demonstrated responsiveness to ORO requests: 1) we were willing to delay our visit to accommodate their schedule, and 2) we did the background visits and document review suggested by DOE-ORO.

Structure of OR Work Breakdown Structure (WBS):

Program	Waste Management
MSA	Oak Ridge
Installation	K-25
"Subproject"	Facility Operations & Maintenance
Technical Description Document	Treatment, Storage & Disposal
Facility	Central Neutralization Facility
Account	Maintenance, Upgrades, Special Projects, Operations, Special Studies, etc.

DOE-ORO organized several presentations:

Nancy Frolio	DOE-OR Waste Management	DOE-OR/MMES organization
Jim Taylor	DOE-OR Finance	Overhead interdepartmental charge structure
Ron Raglund	MMES Business Systems Manager	MMES accounting systems and recent upgrades to system
Ron Oglesby	DOE-OR ERWM	Construction Engineering: role of central engineering staff in cost estimation
Martin Brown	MMES Central Engineering, Cost Estimation Manager	Role of MMES Central Engineering staff in cost estimation.

We then broke into two separate work groups: Environmental Restoration (ER) and Waste Management (WM). ICF KE sent one representative (Robert Lanza) to the ER group with PTC representatives; the other three ICF KE staff attended the WM group because this is the focus of our task.

Key participants in the Waste Management Work Group:

Nancy Frolio	DOE-ORO Waste Management
Rolf Migun	MMES Central Waste Management (organizer of the session)
Paul Franco	Supervisor, MMES Central Waste Management
Karen Balo	MMES K-25 Waste Management
Randy Stewart	MMES-ORNL (X-10) Waste Management
Emily Gray	MMES-ORNL (X-10) Waste Management
Jack Campbell	MMES Y-12 Waste Management
Mark Shreeve	MMES Y-12 Waste Management
Jane Delaney	MMES Y-12 Waste Management

Rolf Migun compiled a 4'- thick set of notebooks with background information, including all applicable cost estimation guidance used at OR. A similar set of notebooks including information on code of accounts was compiled by MMES-ER and provided to PTC.

Items of note as expressed by WM session participants:

- MMES used to compile unit costs e.g., cost per gallon treated) but discontinued this practice when they came under EM program management.

- DOE Waste Management operations at OR should be compared to industry waste management internal to a plant (e.g., wastewater treatment plant at a Du Pont manufacturing facility), rather than to commercial, for-profit waste management operations (e.g., Chemical Waste Management incinerator or landfill). This highlights the importance of the industry comparisons portion of our task.

- Many waste management operations at OR have very high, i.e., over 80%, fixed costs. For these operations, DOE HQ should consider giving relief from burdensome cost estimation and tracking requirements because costs would not increase or decrease significantly for fluctuations in output.

- Cost estimation procedures must include factors for cost escalation, e.g., work inside fence, radioactive areas, Health & Safety levels of protection, NQA-1 associated with new DOE "Conduct of Operations" guidelines, etc.

ICF KAISER ENGINEERS

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August 12, 1992

Mr. Pramod Mallick
Program Support Division (EM-33)
Office of Waste Operations
U.S. Department of Energy
Trevion II Building
12800 Middlebrook Road
Germantown, MD 20874

Dear Mr. Mallick:

I am pleased to transmit to you the report on our second field visit for the EM-30 Cost Estimation Guidelines and Training project. As you will see from the attached trip report, the visits to DOE-Idaho and Thiokol were quite successful.

There are several items that merit discussion. These include:

- Desirability of DOE CR adapting its B&R codes to EM purposes on Code of Accounts (an issue also raised at DOE-OR);
- Need to focus on cost estimate validation procedures in developing the cost estimation guidance document;
- Approach to contingency in preparing cost estimates (also an issue raised at DOE-OR); and
- Differences between Thiokol's relationship with the U.S. Air Force and DOE M&O contractors' relationships with DOE field offices and DOE HQ.

I look forward to our further discussions on these topics.

Sincerely,

Robert Lanza

Robert Lanza
Principal Chemical Engineer
Environment Group

cc. Rick Shangraw, Project Performance
Michael Deiters, Project Time and Cost

TRIP REPORT

DOE EM-30 COST ESTIMATION PROJECT
VISIT TO IDAHO OPERATIONS
AUGUST 4 - 5, 1992

Overview of DOE Idaho Field Visit

- Representatives of DOE EM-33, ICF Kaiser Engineers (ICF KE), and Project Time and Cost (PTC) met with representatives of DOE-ID, EG&G, Westinghouse (WINCO) on Tuesday, August 4 and Wednesday, August 5, 1992 to obtain information concerning cost estimating procedures for waste management operations and code of accounts for waste management and environmental restoration operations. ICF KE and PTC gave presentations to DOE_ID, EG&G, and WINCO to provide an overview of the DOE EM-30 cost estimation guidance and code of accounts project. These presentations were followed by presentations by DOE-ID, EG&G, and WINCO concerning cost estimation procedures and code of accounts used at INEL.

- ICF KE participants: Robert Lanza (Project Manager), Michael Hauser (Cost Estimation specialist), Imre Berty (Chemical Engineer). Pramod Mallick of DOE EM-33, Jeff Kidwell of Project Performance, and representatives of Project Time and Cost also participated in the Idaho field visit.

- Mr. Kelly Lemons of DOE-ID presented a briefing on the INEL mission. EG&G provides landlord support to other site contractors and manages most Idaho site operations for DOE. Westinghouse Idaho Nuclear Company (WINCO) manages the fuel reprocessing and waste treatment operations (referred to as the "Chem Plant". Babcock and Wilcox (B&W) provides Specific Manufacturing Capability, and Westinghouse Electric manages the Naval Reactor Facility (NRF).

Key Points from Idaho Field Visit

- DOE Idaho Falls (DOE-ID), EG&G, and Westinghouse (WINCO) were extraordinarily cooperative, helpful and well-prepared for this visit.

- EG&G and WINCO both expressed concern about the lack of DOE-HQ guidelines for cost estimate validation. INEL uses a contractor to conduct cost estimate validations, and EG&G is about to initiate a detailed cost estimate validation procedure using a checklist. DOE-ID and EG&G and WINCO expressed concern that they do not know the appropriate scope and level of detail for validation of cost estimates, and that they would expend resources on validations that would not ultimately be acceptable to DOE-HQ, DOE EM-20, or to the Office of Management and Budget (OMB).

- EG&G suggested that a detailed validation checklist be prepared early on in the development of the cost estimation guidance document. This detailed checklist would in their opinion provide a "design basis" for the cost estimation guidance document.

- Both DOE-ID and EG&G suggested that guidelines for cost estimate validation procedures be tied to the expectations of the Office of Management and Budget (OMB), whom they consider the ultimate "audience" for any cost estimate validation. EG&E suggested that OMB's requirements for cost estimate validation be identified by DOE EM-30 and incorporated into the cost estimation guidance document.

- It appears that EG&G, WINCO, and DOE-ID have an accounting support system to track and compare estimated to actual costs. Cost-schedule control is used at Idaho for capital construction projects, including some ER and WM construction projects. INEL is putting more emphasis on estimating Total Project Cost (TPC)/Life Cycle Costs for new construction projects, and INEL project managers are responsible for TPC. These practices could be extended to other projects such as continuing waste management operations.

- The EG&G Landlord Department has cost estimation expertise which is accessed only to a limited degree for ER and WM activities. The EG&G Cost Estimation Handbook contains a chapter on construction cost estimation for ER projects. EG&G is developing a chapter on cost estimation for WM construction projects. EG&G cost estimation expertise is used almost exclusively for capital projects. This estimating group could support EG&G waste management operations. This support is currently being provided from within the EG&G accounting group.

- INEL strongly recommended that DOE EM-30 persuade DOE CR to adapt B&R codes to fit ER and WM activities rather than adding yet another layer of reporting and crosswalk of codes. EG&G expressed concern about the integration of their existing work breakdown structure (WBS) with the new code of accounts to be developed under this project. EG&G currently has 5 WBS levels in addition to the initial 6 levels common to all DOE facilities.

- EG&G accounts for indirect (overhead) charges differently from the system used by MMES at Oak Ridge. All organizational and waste area group (WAG) managers at EG&G are indirect charged. Most MMES managers at Oak Ridge are direct charged. EG&G distributes the costs of organizational and WAG managers and other indirect costs over all EG&G projects. Indirect charges for EG&G Landlord services, accounting services, and other services provided to WINCO are distributed over all WINCO projects.

- WINCO is placing more emphasis than in past years on reducing overhead, and is asking for written justification of all indirect charges and regulatory drivers in cost estimates for WINCO projects. WINCO prepares a monthly packages for indirect cost recovery, and such costs may be over-recovered throughout the year. Over-recovered costs are reallocated back to each B&R at the end of the fiscal year.

- WINCO expressed concern about application of activity-based cost estimation to research and development projects (e.g., HLW Process Development). Particular development tests are designed based on requests from other WINCO departments, and specific activities are difficult to define, particularly for tests related to ongoing operations. Cost estimates for such development operations are based on historical experience, and in WINCO's opinion must be based at least in part on level-of-effort estimates for specific development tasks.

- EG&G and WINCO expressed concern about DOE HQ policy of not including any contingency in budget estimates for DOE WM operations. EG&G and WINCO expressed this concern because of their experience with the variability of factors affecting the operating costs of ID waste management facilities (e.g., regulatory and policy initiatives, waste stream flow). Contingency is a standard item incorporated into cost estimates for both construction projects and continuing operations in industry and other Federal agencies. ICF KE believes that if standard cost estimation practices are to be applied to cost estimates for DOE WM operations, contingency should be included in these cost estimates. DOE may wish to clarify policy concerning the use of contingency in cost estimates for DOE WM operations.

Idaho Work Breakdown Structure (WBS):

Program	Waste Management
MSA	Idaho
Installation	Idaho National Engineering Laboratory
Facility/WAG	Radioactive Waste Management Complex (RWMC) (WAG, Waste Area Group)
Activity Data Sheet	RWMC LLW Operations
Work Package	LLW Facility Maintenance
Activity	as required

DOE-ID organized the site visit into a series of presentations, which were given over the two-day visit on Tuesday and Wednesday:

Kelly Lemons	DOE-ID	DOE-ID Organization overview
J.D. McKinney	EG&G-PI	EG&G Waste Management Operations overview
Mike Heyser	WINCO	Overhead interdepartmental charge structure
Kent Hastings	EG&G ER	EG&G Environmental Restoration Operations overview
Paul Kale	EG&G Finance	Direct/Indirect Cost Accounting
Christa Poenitz	EG&G WM/RWMC	BUD/ADS Cost Estimation Methodology Discussion
Pegge McG. Steele	WINCO	Code of Accounts and B&R Codes
Jim Cottrell	WINCO	BUD/ADS Cost Estimation Methodology Discussion
B. O. Reyes	EG&G Cost Estimator	Role of EG&G Engineering Construction cost estimating staff in cost estimation.

Because the presentations were given throughout the two-day site visit, ICF KE and PTC did not break into separate work groups to discuss Environmental Restoration (ER) and Waste Management (WM) operations, as was done at Oak Ridge. Both ER and WM operations at INEL were discussed during the presentations, with emphasis placed both on cost estimating procedures and code of accounts. Representatives of PTC met separately with DOE-ID, EG&G and WINCO on Wednesday afternoon, August 5, to continue the discussion of code of accounts.

Key participants in the DOE-ID Site Visit:

Kelly Lemons	DOE-ID WM (organizer of the session)
Joseph May	DOE-ID WM
John Orr	DOE-ID
B. P, Conlon	DOE-SMD
William Lloyd	DOE-SD Budgets
Mark Searle	DOE-ID Budgets
Blake Beck	EG&G/FS
Dono Finn	EG&G/FS
Christa Poenitz	EG&G/WM/RWMC
J.D. McKinney	EG&G-PI
Jack Simonds	EG&G
Kent Hastings	EG&G ER
Suzanne Beaderstadt	WINCO
Pegge McGuire Steele	WINCO
Mike Heyser	WINCO
Jim Cottrell	WINCO
B. O. Reyes	EG&G Cost Estimator

DOE-ID, EG&G, and WINCO provided copies of cost estimating guidance documents, example BUD, ADS, and Work Package documentation, and other cost estimation materials used at DOE-ID. Information on code of accounts will be compiled separately by INEL and provided to PTC.

TRIP REPORT

DOE EM-30 COST ESTIMATION PROJECT
VISIT TO THIOKOL-UTAH OPERATIONS
AUGUST 3 and 6, 1992

Overview of Thiokol-Utah Field Visit

- Representatives of DOE EM-33 and Project Time and Cost (PTC) gave a presentation to representatives of Thiokol-Utah, a Government-Owned/Contractor-Operated (GOCO) manufacturer of rocket motors, on Monday, August 3, 1992. This presentation served to provide Thiokol representatives with an overview of the DOE EM-30 cost estimation guidance and code of accounts project from which to prepare their presentations.

- Representatives of Thiokol-Utah gave presentations to representatives of ICF Kaiser Engineers, Project Time and Cost (PTC), and DOE EM-33 on Thursday, August 6, 1992. These presentations focused on Thiokol's cost estimation and accounting procedures and also on their contract and operational arrangements with the U.S. Air Force, the lead government agency responsible for the Thiokol-Utah plant operations.

- The primary mission of Thiokol-Utah is manufacturing solid-fuel rocket motors for the U.S. Air Force and other government contractors (e.g., Lockheed). The plant is a hybrid installation, with some parts of the facility owned by the U.S. Air Force, and other parts owned by Thiokol. The plant manufactures various types of rocket motors and also conducts research and development.

Key Points from Thiokol-Utah Field Visit

- The Thiokol-Utah environmental engineering group acts like a contractor to other Thiokol-Utah operations. Environmental management costs are overhead costs which are distributed in general by business base (i.e., product sales). Some waste management operation costs (e.g., waste water treatment operation costs) are distributed to the various Thiokol-Utah operating units on a cost per unit basis (e.g., cost per gallon of wastewater received).

- Thiokol's practice of per-gallon charges for wastewater treatment services, rather than distributing the costs as general overhead, resulted in a reduction of overall wastewater generation at the facility from 3 million gallons per year to 1.5 million gallons per year.

- Thiokol has an extensive code of accounts for their rocket motor manufacturing operations. Operations costs are included in design of new manufacturing processes, as the cost of manufacturing must be justified to the rocket motor customers (e.g., Lockheed). The cost of each manufacturing process operation can be tracked individually if required. However, manufacturing operations and costs are generally aggregated into "assemblies" for cost tracking. A less detailed code of accounts is used for waste management and environmental restoration projects, the costs of which are distributed over the various products by total sales revenue.

- Thiokol uses historical data to prepare cost estimates for waste management operations. Line supervisors prepare resource allocations, which are reviewed and approved by management. Managers are responsible for performance of project within budgets, which are tracked monthly.

- The U.S. Air Force contract officer reviews all Thiokol equipment requests and work orders. Thiokol holds a weekly meeting with the Air Force contract officer to discuss equipment requests and work orders, and to obtain approval for all Air Force property requests (for the parts of the Thiokol-Utah facility that are owned by the U.S. Air Force).

- Thiokol managers at times work on plant crews to assess the efficiency of operations. The information from managerial participation in work crews provides a basis for reviews of plant operating cost estimates.

- The uniqueness of operations at Thiokol-Utah is a major issue with respect to preparation of cost estimates for both environmental restoration and waste management operations. Thiokol used their experience in estimating costs for various waste management and manufacturing operations to estimate the operating cost of the new wastewater treatment plant (WWTP). Startup of the WWTP was planned with four operating staff. Wastewater treatment facility staff was expanded to six based on operating experience.

- Thiokol-Utah operates as a cost-plus government contractor. Although overall manufacturing costs (including distributed waste management and environmental restoration costs) are based on historical cost data, Thiokol has a large incentive to operate "below history". Thiokol products (various types of rocket motors) have a negotiated contract price associated with them. Thiokol Corporation retains as profit 60 percent of any difference between the contract price and actual manufacturing cost for most products, while receiving reimbursement for only 40 percent of any cost overrun for most products.

- Thiokol-Utah managers are compensated under a salary plus performance bonus program. The financial performance of Thiokol-Utah operating units affects the overall compensation of Thiokol operating unit managers. Thiokol operating unit managers therefore also have a large incentive to operate "below history".

Participants in the Thiokol-Utah Field Visit included:

John Slaughter	Thiokol Environmental Engineering
Hal Jaussi	Thiokol Environmental Engineering
Joseph Thompson	Thiokol Environmental Engineering
Kevin Fox	Thiokol Environmental Engineering
Pramod Mallick	DOE EM-33
Robert Lanza	ICF Kaiser Engineers
Michael Hauser	ICF Kaiser Engineers
Imre Berty	ICF Kaiser Engineers
Michael Deiters	Project Time and Cost
Marc Zocher	Project Time and Cost
Timothy Babb	Project Time and Cost
Jeff Kidwell	Project Performance

TRIP REPORT

DOE EM-30 COST ESTIMATION PROJECT
VISIT TO ALLIED-SIGNAL KANSAS CITY PLANT
AUGUST 20 - 21, 1992

Key Points from Kansas City Field Visit

- ICF KE and Project Time and Cost attended the scoping meeting for the 1993 Baseline Validation of the Kansas City Plant Waste Management Program. The preliminary Baseline Validation conducted by DOE-AL and Dames and Moore did not focus principally on cost estimation procedures, but rather on baseline documentation.

- ICF KE found that cost estimating procedures used for waste management operations at KCP are rudimentary. Activity-based costing has not been implemented at KCP, and waste management operating costs are not tracked back to quantities at KCP.

- Representatives of KCP and DOE-AL suggested that DOE EM-30 issue guidance on the application of contingency in cost estimates for waste management operations.

- KCP has separate cost-tracking and reporting procedures for DOE-EM (WM) funded and DOE-DP (P&S) funded activities. Additionally, costs are currently reported to DOE-AL and DOE-CR in different formats. Representatives of KCP recommended that cost reporting procedures be integrated throughout the DOE system.

- Representatives of KCP indicated that cost estimation guidance being issued by DOE EM-20 (including the 1991 CQMA) may conflict with guidance being developed for the DOE EM-30 cost estimation guidance document. KCP therefore recommended that DOE EM-30 coordinate their efforts closely with initiatives already under way at DOE EM-20.

- Representatives of both KCP and KCAO recommended that B&R codes developed by DOE-CR be closely integrated with the code of accounts. Both organizations also recommended that any code of accounts be closely integrated with the existing Progress Tracking System (PTS).

Overview of Site Visit

Mr. Robert Lanza, Mr. Imre Berty, and Mr. Michael Hauser of ICF KE, and representatives of Project Time and Cost, participated in a two-day meeting at the DOE Kansas City Plant (KCP). Allied-Signal is the M&O contractor for the plant, which falls under the jurisdiction of the DOE Albuquerque Field Office (DOE-AL). The first day of the two-day meeting was a Baseline Validation of the Kansas City Plant Waste Management Program. This Baseline Validation was coordinated by DOE-AL and conducted by Dames and Moore, a DOE-AL contractor. Ms. Sandy Norris of DOE-AL suggested to ICF KE that our site visit to KCP to obtain information on cost estimating practices and code of accounts used at KCP be combined with the previously scheduled Baseline Validation. ICF KE and Project Time and Cost did not participate directly in the Baseline Validation, but primarily observed the validation process as conducted by Dames and

Moore and DOE-AL. The Baseline Validation meeting was informal, however, and ICF KE and Project Time and Cost did participate in discussions initiated by Ms. Norris of cost estimation and cost estimate validation procedures.

ICF KE and Project Time and Cost interviewed representatives of Allied-Signal and DOE Kansas City Area Office (KCAO) during the second day of the two-day meeting at KCP. These interviews were based in part on information and documentation obtained by ICF KE during the Baseline Validation conducted by Dames and Moore. The interviews provided additional information concerning waste management operations and cost estimation methods at KCP.

Overview of Kansas City Plant Waste Management Operations

ICF KE and Project Time and Cost interviewed representatives of DOE KCAO and Allied-Signal on August 21, 1992 to obtain information on cost estimating practices and code of accounts used at KCP. The Kansas City Plant is a Defense Programs (DP) installation that manufactures electronic components of weapons systems. DOE-EM funded waste management operations at KCP consist primarily of wastewater treatment plant operations, excess and reclamation (scrap recycling) and hazardous waste storage and handling. Some waste management operations at KCP, including non-hazardous solid waste management, are funded through DOE-DP, not DOE-EM. Most waste management operations at KCP consist of small operations such as drum storage and handling. The KCP Environmental Management (EM) Division is divided into two departments, Program Management (200) and Waste Management (100). However there is currently little differentiation between Waste Management Department and Program Management Department functions.

Only approximately 2 percent of KCP operations are under the jurisdiction of DOE Waste Management (DOE-WM/DOE EM-30). Additional operations at KCP are under the jurisdiction of DOE Defense Programs (DOE-DP) and Environmental Restoration (DOE-ER/DOE EM-40). Approximately 60 individuals (equivalent to about 42 Full-Time Employees [FTEs]) are involved in Waste Management operations at KCP. Ten of the 60 KCP waste management employees handle administrative and other indirect functions related to environmental management.

DOE-AL WMOSD Baseline Validation

ICF KE and Project Time and Cost attended the scoping meeting for the 1993 Baseline Validation of the Kansas City Plant Waste Management Program, held on August 20, 1992. The agenda for the one-day meeting, developed by Dames and Moore, is included as Attachment I to this trip report. The Baseline Validation was based on a preliminary review by Dames and Moore of baseline documentation developed by KCP, and a second round of Baseline Validation meetings is expected to be scheduled by DOE-AL after Dames and Moore completes a more detailed review of the baseline documentation. Major observations and issues concerning the Baseline Validation include:

- The preliminary Baseline Validation conducted by DOE-AL and Dames and Moore did not focus principally on cost estimation procedures, but rather on baseline documentation. The major portion of the preliminary validation process concerned the format of the baseline document. Individual cost estimates were not reviewed in detail by Dames and Moore during the validation meeting.

- DOE-AL and DOE-HQ requirements for activity based costing were not discussed in detail during the Baseline Validation meeting. Both Dames and Moore and DOE-AL suggested that "partial" FTEs who perform waste management activities be accounted for by task in resource tables. Dames and Moore also recommended that KCP develop standard work packages for waste management functions.

- KCP applies different escalation rates to labor and materials costs. Labor escalation rates are developed by KCP Finance Department staff, based on projected wage rates and benefits, and approved by DOE HQ prior to being incorporated by KCP in cost estimates. Materials escalation rates used by KCP are standard escalation rates provided by DOE-CR. Dames and Moore recommended that KCP use a single composite escalation rate for labor and materials, and apply this escalation rate within a cost estimation software program, rather than applying escalation rates after the cost estimate has been prepared.

Cost Estimating Procedures for KCP Waste Management Operations

ICF KE found that cost estimating procedures used for waste management operations at KCP are rudimentary. Labor cost estimates for waste management operations are based on level-of effort estimates, and labor costs are not tracked by activity in the KCP code of accounts. Costs are calculated in terms of Full-Time Employee (FTE) costs and materials costs, and both labor and materials cost estimates are based almost exclusively on historical data provided by waste management operations line managers, KCP Waste Management staff, and KCP Finance Department staff. KCP Waste Management is trying to give line managers more responsibility for preparing cost estimates.

Activity-based costing has not been implemented at KCP, and waste management operating costs are not tracked back to quantities at KCP. KCP Waste Management is pursuing an initiative to identify and define waste management activities at KCP. KCP Waste Management staff did not illustrate knowledge of standard cost estimation practices, nor did they illustrate familiarity with the concept of activity-based costing. Representatives of KCP and KCAO requested that the Kansas City Plant be considered for pilot studies of cost estimation guidance document implementation and training for this reason.

KCP appears to maintain cost estimating and industrial engineering staff at the operations level. However, these staff apparently perform cost estimating functions related only to capital projects and manufacturing operations, and their expertise is not routinely accessed by KCP waste management operations staff.

Work Breakdown Structure and Code of Accounts

KCP (Allied Signal Aerospace Company) uses a 9 level WBS for waste management activities. This WBS code identifies the Location, Waste Stream, Media (Disposal), Activity (WM), Activity Data Sheet #, Fiscal Year, and Work Package #. The scheduling software, Timeline is used to forecast budgets. A resource library is maintained within Timeline and is generated as a basis for cost information. No further formal breakout of costs is performed by KCP. Cost tracking is performed informally, and backup data can be provided upon request. Manhours are not tracked against activities. Further breakout is available by tracking costs using the accounting system,

however this is not the format by which the costs are estimated or budgeted.

Issues Raised by KCAO and KCP/Allied-Signal

Contingency

- Representatives of KCP and DOE-AL suggested that DOE EM-30 issue guidance on the application of contingency in cost estimates for waste management operations. Contingency is not available for use in estimating costs of waste management operations, and the level of variability of waste management operations, in their opinion, warrants use of contingency in operating cost estimates.

Cost Tracking and Reporting

- Representatives of KCP commented that most of KCP waste management operations funded by DOE-EM are small tasks (e.g., drum storage and handling. This in their opinion makes activity based costing and reporting difficult, as an appropriate level of detail for cost reporting is difficult to define.

- KCP has separate cost-tracking and reporting procedures for DOE-EM (WM) funded and DOE-DP (P&S) funded activities. A single employee may split time between DP and WM activities. This creates the need in KCP's current estimating system to assign "partial FTEs" to various waste management cost estimates.

- Costs are currently reported to DOE-AL and DOE-CR in different formats. Representatives of KCP recommended that cost reporting functions be integrated throughout the DOE system.

Coordination with other DOE HQ Organizations

- Representatives of KCP indicated that cost estimation guidance being issued by DOE EM-20 (including the 1991 CQMA) may conflict with guidance being developed for the DOE EM-30 cost estimation guidance document. KCP therefore recommended that DOE EM-30 coordinate their efforts closely with initiatives already under way at DOE EM-20. KCP also recommended that cost estimation guidance and code of accounts be closely coordinated among EM-30, EM-40, and EM-50 programs.

- Representatives of KCP recommended that in order to reduce KCP overhead expenses, EM-30 and EM-40 programs should be integrated rather than maintaining separate ADS, project management, and budget systems.

- Representatives of both KCP and KCAO recommended that B&R codes developed by DOE-CR be closely integrated with the code of accounts. Both organizations also recommended that any code of accounts be closely integrated with the existing Progress Tracking System (PTS).

- DOE-AL and KCP indicated that DOE EM-33 (Jim Turi's office) is developing guidance on change control procedures (CCP) for waste management operations. DOE-AL and KCP are both developing internal CCP based on draft guidance from EM-33 released in 1991. The threshold at which CCP are implemented is relatively high at the DOE-HQ level of review. DOE-AL and KCP CCP will have lower cost thresholds at which change orders will be required.

Cost Estimate Validation

- DOE-AL has provided guidance to DOE-AL installations (including KCP) that cost estimates for waste management operations must be independently validated by a "certified cost estimator". KCP and KCAO representatives questioned the utility and practicality of this requirement, citing several reasons. One practical concern is that there are currently only approximately 500 certified cost estimators in the U.S. Another concern is that only 2 percent of the total KCP budget is devoted to waste management operations under DOE-EM. The remaining 98 percent of the KCP budget is under DOE-DP. Cost estimates under DOE-DP are not currently required to be independently validated by a certified cost estimator.

Cost Estimation Software Implementation

- KCP Waste Management Division uses Timeline, a project management and scheduling software package, to prepare cost estimates. KCP representatives acknowledged that Timeline is not an appropriate software package for preparing cost estimates, but indicated they were reluctant to purchase a more appropriate software package without specific recommendations from DOE-HQ. KCP representatives suggested that recommendations be included in the DOE EM-30 cost estimation guidance document.

- ICF KE advised KCAO and KCP that although developing specific recommendations is outside the scope of our effort, a discussion of the features and characteristics that an appropriate cost estimation software package should offer will be included in the guidance document.

Waste Management Costs Burden

- Burden rates for waste management operations are developed by KCP Finance Department staff and reviewed and approved annually by DOE-AL. Waste management functions at KCP are not fully burdened as a matter of Allied-Signal policy. Representatives of KCP indicated that their waste management operations unit costs therefore can not be directly compared with costs at other DOE facilities.

ATTACHMENT I

PARTICIPANTS IN KANSAS CITY PLANT PRELIMINARY BASELINE VALIDATION MEETING AND COST ESTIMATION GUIDANCE/CODE OF ACCOUNTS SITE VISIT

Sandy Norris	DOE-AL
Mona Williams	DOE-AL
Diane Solcher	DOE-KCAO
Margaret Stockdale	DOE-KCAO
Debbie Burnett	Allied Signal KCO
Nichole Westlake	Allied Signal KCO
Curt Valle	Allied Signal KCO
Dale Brown	Allied Signal KCO
Rick Mullins	Allied Signal KCO
Maceo Gray	Allied Signal KCO
Dick Mocek	Allied Signal KCO
Tom Davis	Allied Signal KCO
Richard O'Toole	Allied Signal KCO
Robert Lanza	ICF Kaiser Engineers
Imre Berty	ICF Kaiser Engineers
Michael Hauser	ICF Kaiser Engineers
Michael Deiters	Project Time and Cost
Spencer Bryan	Project Time and Cost
Darryl Wood	Project Time and Cost
Arno Wainikainen	Dames & Moore
Wesley Price	Dames & Moore
Craig Hamilton	Dames & Moore

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August 24, 1992

MEMORANDUM

SUBJECT: Cost Estimation Guidance Project Trip Report: Savannah River

FROM: Marc Lieber

TO: Pramod Mallick, DOE EM-333

Summary of Trip

DOE SRS and Westinghouse Savannah River Co. (WSRC) staff were extremely cooperative. Westinghouse is implementing a new cost accounting system (IBARS) that will be capable of tracking costs by activity through the use of individual activity codes. One facility (effluent treatment) is preparing activity-based estimates as a pilot project. Indications are the guidance will be received enthusiastically. I am attaching the key summary briefing given by Clay Jones, manager of the central program management division within WSRC. I am also attaching the list of participants.

Specifics

- The central planning support and analysis group prepared a briefing entitled "SRS Waste Cost Analysis" that detailed fixed and variable costs of waste operations. As this analysis is disseminated within SRS, it will potentially be a good source of data for estimates.

- Reviewed WSRC's method of calculating costs and backing out overhead charges. WSRC's method may be a good model for a general procedure to be used in guidance.

- Effluent Treatment Facility example showed that cost estimates can be activity based, but some estimating specifics (i.e., descriptions of activities, unit costs, number of times the activity is performed per year) of ongoing operations were not included in the presentation. We were assured these specifics are available and can be presented.

- Significant resources exist for cost estimation and cost/schedule control support, and these can be applied to ongoing waste management.

- All presenters emphasized they are on-board with EM-30 goals and general approach to estimation, and are putting the infrastructure in place to produce valid, supportable estimates. They all emphasized that this process is in its infancy, and that in one year's time they will be in much better shape than they are now. WSRC staff requested that the upcoming guidance be flexible.

- WSRC staff specifically requested better policy/guidance on calculating acceptable contingency. WSRC managers, lacking contingency, directed estimators to develop numbers with 80% certainty of being +10%, rather than the typical 90% probability of achieving +50% to -30% range. The effect of this is to raise cost estimates. We intend to develop a straw-man approach in our guidance for purposes of spurring the policy formulation process.

- Personnel cost estimation is by exempt and non-exempt employee per department. WSRC has no standard employee categories for budgeting purposes, although such categories exist in their personnel system.

- Clay Jones is responsible for maintenance of local cost guides, and will send us copies.

- Significant (200-person) central engineering staff has little potential of giving activity-based estimates, but it looked like they only do Level of Effort estimates. This is typical of central organizations, as we reported at Oak Ridge, and the effect in time may be to decentralize in order to justify estimates.

List of Participants
DOE Savannah River Cost Estimating Coordination Meeting August 19-20, 1992

Department of Energy

Jim Brown	DOE/AMERWM	803-725-5776
Randall Cline	DOE/Finance Div.	803-725-3923
E.J. Merrell	DOE/AMERWM	803-725-3548
Sandra Ordway	DOE/DWPD	803-557-1065
Lisa Sims	DOE/Budget	803-725-8925
Lena Whitlaw	DOE/Budget	803-725-3845
Jennifer Sands	DOE HQ/EM-32	301-903-7115

Westinghouse Savannah River Corporation

Jim Barry	FM&IS - Bus. Appl. Dev.	803-644-4598
Neil Davis	WSRC WM&ER Prgm. Mgmt.	803-725-1246
Roger Duke	WSRC/WM Prgm. Mgmt.	
Dennis Gass	WSRC Management Systems Int.	803-644-5616
Dave Griffith	WSRC/WM&ER Prgm. Mgmt.	803-725-7654
Clay Jones	WSRC/WM&ER	803-725-3052
F.N. Koon	WSRC/CM	803-557-1543
Paul Manci	WSRC/ WM&ER Controller	803-557-1242
Steve Mertiup	WSRC/WME	803-557-1402
Chuck Millazzo	WSRC	803-725-8474
Mike O'Rourke	WSRC/WMM	803-557-8052
W.H. Pettigrew	WSRC/DWPF	803-557-1059
Pete Steven	WSRC/ALWCM	803-557-8761
I.K. Sullivan	WSRC/WMO	803-557-8179
Mathew Zimmerman	WSRC Management Systems Int.	803-644-1423

Project Team

Steve Huckins	ICF Kaiser Engineers	305-592-4800
Marc Lieber	ICF Kaiser Engineers	703-934-3191
Dan Sullivan	ICF Kaiser Engineers	703-934-3123
Marcus Hoge	Project Time & Cost	404-259-0220
Tom Meyers	Project Time & Cost	404-259-0220
Marc Zocher	Project Time & Cost	505-829-3859
Bill Burke	Project Performance Corp.	518-395-5052

Other Contractors

Pamela Bellin	PRC Environmental Mgt.	803-642-8665
Joseph Bero	BDM	301-601-1290

PROGRAM PLANNING, BUDGETING AND COST ACCOUNTING STATUS, ISSUES AND KEY INITIATIVES

HQ COST ESTIMATION FIELD REVIEW

CLAY B. JONES

AUGUST 19 -21, 1992

CBJ

OUTLINE

- Program Management Approach
  - Background
  - Desired State

- Management System Relationships
  - Roadmaps
  - Five Year Plan
  - Annual Operating Plan
  - Progress Tracking System

- Progress to Date

CBJ
8/19/92

PROGRAM MANAGEMENT APPROACH

BACKGROUND

- Different Planning, Budgeting & Reporting for Various Site Programs
  - Defense Programs/ERWM
  - EM 30/40/50

- Site/EM Program Historically Not Aligned
  - Budget Bases
  - Budget Development Schedule
  - Format and Required Data
  - Reporting Requirements

- Both Systems Evolving to More Disciplined Approach
  - Overall Goals Aligned
  - Difficult to Modify Structure of Either System

PROGRAM MANAGEMENT APPROACH

FROM

- Broad Customer Guidance Focused on Production Output
- Cost Centers Based on Organizational Structure
- Prior Contractor Project Management System
- Incremental Budgeting Process for Operations
- Cost Variance Analysis Focused on Cost Center and Total B&R
- Broadly Defined Overheads Distributed Based on Direct Headcount
- Lack of Process Rigor Required to Defend Budget Requests and Support Task Based Reporting Systems (PTS)

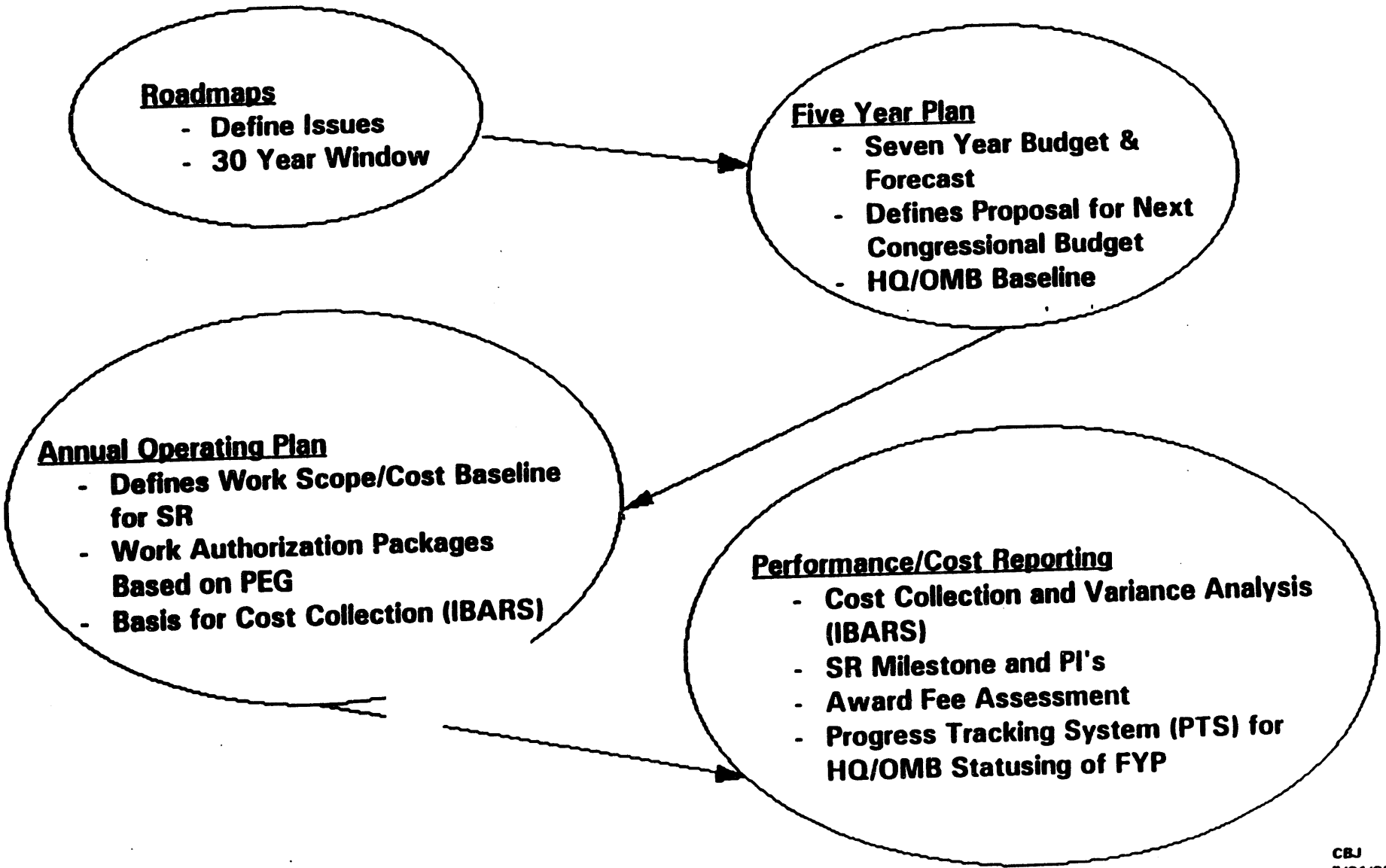
CBJ
8/19/92

PROGRAM MANAGEMENT APPROACH

TRANSITIONING TO INTEGRATED MANAGEMENT CONTROL SYSTEM

- Formalized Scope Definition Through Program Execution Guidance
- Detailed Operational Planning Based on Task Approach
- Work Authorization Process With Formal Change Control
- Milestone Statusing and Cost Accounting by Work Package
- Upgraded Overhead and Cost Accounting by Work Package
  - Overhead Catorization and Redefinition
  - Standardized Labor Cost Distribution of Site and Organizational Overhead
  - Enhanced Line Program Stewardship

KEY PLANNING / BUDGET / COST ACCOUNTING DOCUMENTS



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5/21/92

KEY ISSUES

- Rate of Change and Maturity of New Systems
  - AOP / FYP / Roadmaps
  - S&H FYP
  - Change Control

- Progress Tracking System Expectations vs Current Capability
  - Correct in FY93

- Lack of Alignment Between EM and Site Systems
  - Controlling Documents (FYP @ HQ; AOP @ SR)
  - Resolution in Progress
  - Will Require Revision to FYP as AOP is Developed and Modified Through Change Control

KEY ISSUES (Continued)

- Planning, Scheduling and Cost Estimating Expertise in Operations Organizations

- Impact of Multiple/Duplicative Assessments and Reviews

- Lack of Effective Process for Managing Contingency
  - Program Uncertainties Difficult to Handle (Permits, Cost, Schedule, Technical)
  - Always First Thing Cut

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WMERD APPROACH & IMPLEMENTATION PRINCIPLES

- Integrated EM and SR Systems to:
  - Minimize Duplication of Effort
  - Ensure Consistency
  - Improve Quality

- Align Work Breakdown Structure Based on
  - HQ Requirements at Upper Levels
  - Business Need at Low Levels
    - * Effectively Manage Work
    - * Defend Budget Requests
    - * Track Special Cost Performance as Appropriate (OPC, etc.)

- Implement Phased Improvement of Cost/Schedule Process for WMERD Activities Building on ER Program and Lessons Learned from FYP Process and Reviews (CQMA, etc.)

- Develop Effective and Mutually Agreeable Protocol for New Direction

CBJ

WMERD APPROACH & IMPLEMENTATION PRINCIPLES (Cont.)

- Develop Tiered Change Control Process to Maintain Baseline and Consistency Between AOP, FYP, IBARS and PTS
- Strive to Improve Processes in a Way That "Build On" vs "Replaces"
  - Drive Toward Stability
  - Routinize the Routinable"
- Practice Involvement of Stakeholders in Development and Execution of Enhancements
- Utilize "Network"Approach With Well Defined Roles and Responsibilities
  - Program Management/Controller/Financial Planning
  - Provide Additional Support to Facility Managers

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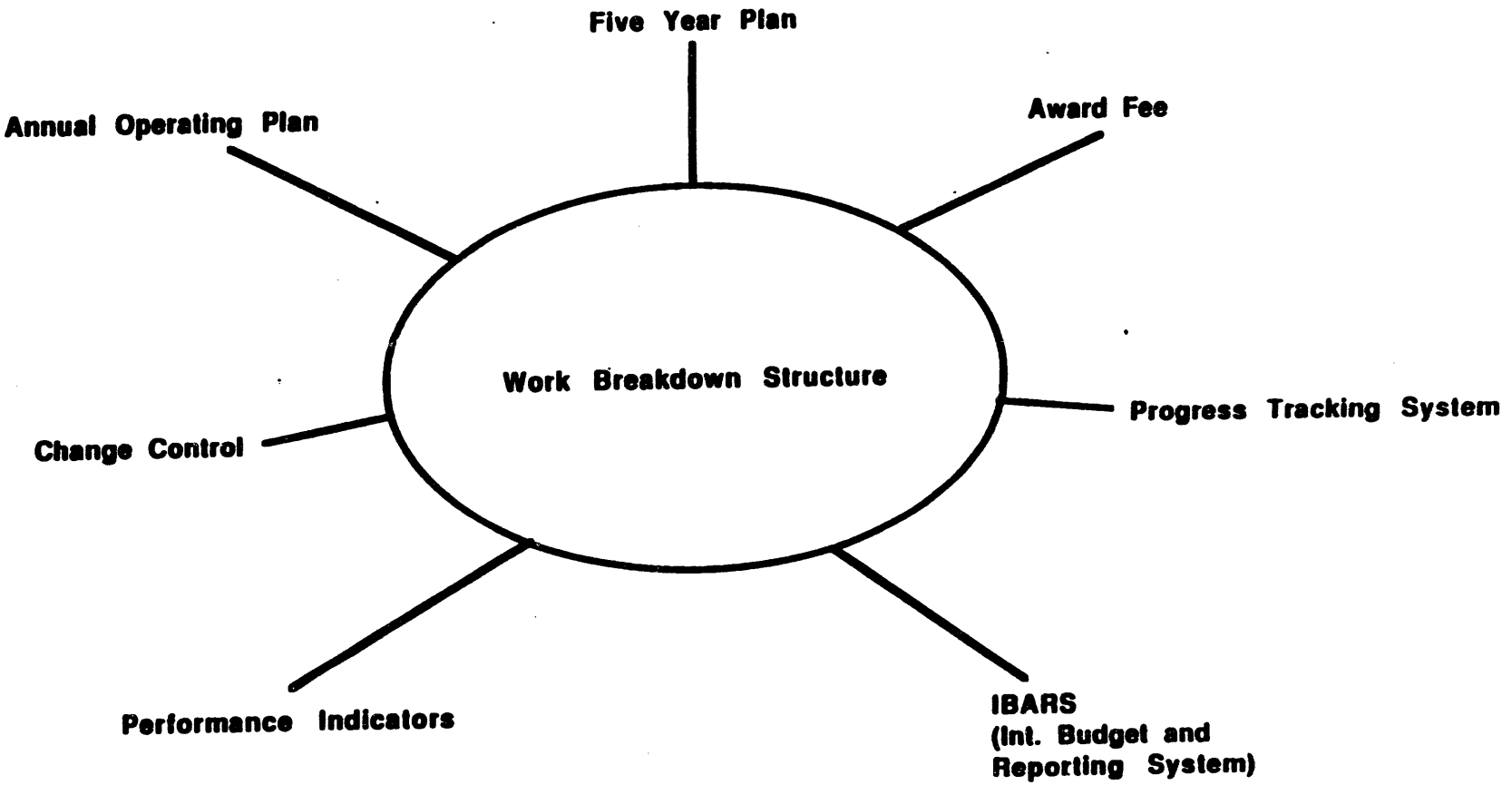
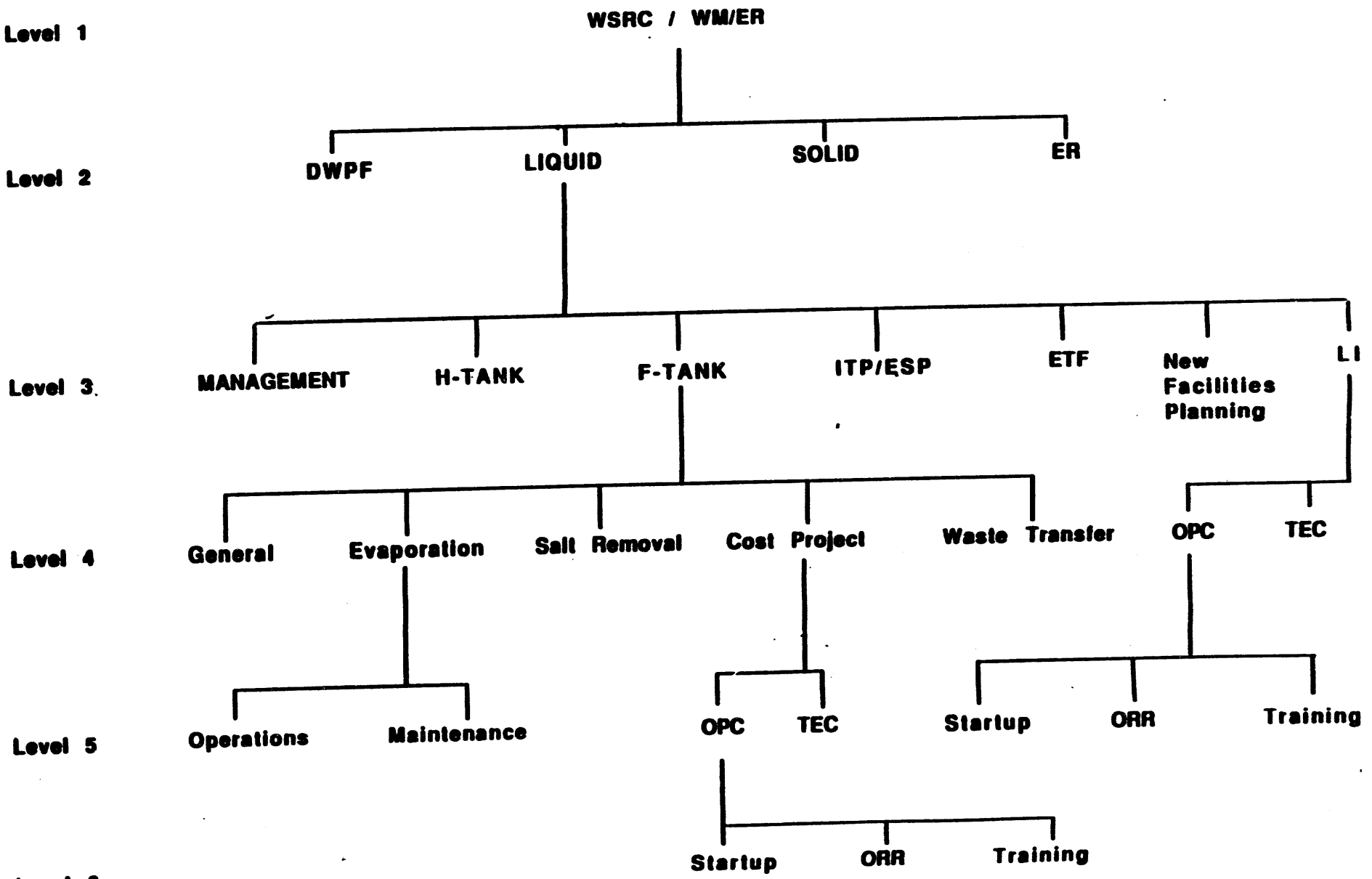
The Common Denominator



Typical WBS Approach



Note: Cost Account defined as Terminal Level in WBS

PROGRESS TO DATE

- Developed Integrated Budget Database to Support FYP and AOP
- WBS Alignment Achieved
- OPC Re-estimation in Progress
- Interim Division Change Control Procedure Issued
- Cost / Scheduler Task Team Active
  - Phased Implementation in FY93
  - Integrated with Site Management Control System (MCS) Development

TRIP REPORT

DOE EM-30 COST ESTIMATION PROJECT
VISIT TO RICHLAND OPERATIONS
AUGUST 25-26, 1992

Summary of Richland Field Visit

Staff from DOE Richland, Westinghouse Hanford Co. and Kaiser Engineers Hanford Co. (DOE-RL, WHC, KEH) were very cooperative in this visit. Westinghouse uses activity-based estimates in 5-Year Plans and has the capability to track by activity in their Management Control System. Participants expressed strong desire for increased consistency in Headquarters guidance from EM-20, 30, 40 and PR, and to consider the cost/benefit of additional guidance and Code of Account requirements.

Key Points from Richland Field Visit

- DOE-RL established an Overhead Program Analysis Branch to coordinate overhead and indirect charges for all Hanford contractors. This branch is responsible for review of overhead structure, validation of overhead budgets, review of cost-effectiveness of overhead expenditures (including benchmarking), cost reduction initiatives, and surveillance of costs incurred. Of the $1.6B site cost, approximately 23% is indirect and 18% overhead.

- Westinghouse Hanford Co. (WHC) is developing (and in large part implementing) sophisticated planning and scheduling/control systems, known as the Management Control System (MCS) and Site Management System (SMS). These establish baseline cost, schedule and budget and track changes uniformly.

- Comment by DOE-RL participants: although modifying and upgrading a management/financial system is difficult, it is equally or more difficult to change the philosophy and operating practices of staff to complete timesheets accurately, keep adequate backup data to support cost estimates, and plan and implement activities consistent with best management practices.

- Another comment by DOE-RL participants: Guidance should make distinctions in level of detail required for current versus future activities. Current activities are readily definable and able to be costed based on actual data; future activities may not be as easily scoped or estimated. Need to make provisions, in treatment of contingency or backup-data requirements, for current versus future activities.

- Kaiser Engineers Hanford uses Richland-specific escalation factors for engineering and construction projects based on DRI data, including accrued cost of health benefits for retirees and other factors.

- Contingency is applied at the work element level. Richland does not use a management reserve for contingency, but is able to roll up contingency to a summary level in a Contingency Analysis Report.

- A note on criteria for acceptability of cost estimates: OMB examiners require justification that proposed activities are required by legal drivers, and moreover, that the activities must be completed in the proposed fiscal year and not later. OMB pressures DOE to postpone activities where possible.

- Bill Jasen of WHC presented a detailed cost estimate for Hanfords solids waste management operations for the low-level waste burial ground. Items of interest: High fixed costs due to training and other base program operations that are performed regardless of volume of waste handled; can track against cost element (labor, travel, etc.) by activity; activity-specific backup data is easily available, although Bill did not have it available nor could a review of the data be scheduled. Suggest a return trip to Hanford for this.

- Dave Borders is major WHC leader in planning and estimating; suggest he be invited to October meeting.

- Borders' summary of cost estimating/planning procedures: tasks are defined at lowest level possible enabling tracking and earned value computations at the task level; WHC developed sophisticated estimate scoping and roll-up capability for building ADSs.

- Other Borders comments: Headquarters guidance is confusing and frequently changing, adding new requirement that don't aid DOE-RL in planning, e.g., ES&H crosscuts, A-106 requirements. Need emphasis on baseline definition, not reporting by whatever factors are of interest to various units in Headquarters. Existing EM-30 guidance is too generic, and DOE-RL is already doing baselines and WBS for all tasks. What is needed are clearly accepted methods, consistent definition and philosophy of cost estimation for EM rather than for each program, need coordination between EM 30 and 40 rather than merely applying estimation methods for capital projects to operations, and guidance on escalation rates and contingency. Must stop changing and adding to ADS preparation requirements, in particular, too many crosswalks exist and must not increase.

- Richland's PTS system is at an advanced stage of development, drawing from task WBS by cost element by organization. Budgets are built on these elements.

- Roger Sherman of WHC Operations Business Planning gave a valuable presentation on the Outyear Planning System and the Environmental Planning Data System to automate planning, which forces managers to think in terms of resources and activities, not just dollars. These systems have proven critical to successful performance in multiple ADS reviews. These out-year estimates are used as the starting point for annual ADS cost estimates. Multiple planning cases can be used and documented, returning to cases as budgets are handed down from HQ/RL.As

estimates are changed, "travellers" are used to document change controls for changes in assumptions.

Follow-Up Items From Richland Visit

Richland Items

1. DOE-RL and WHC organization charts
2. Ken Bracken slides
3. Louise Coddington mentioned letter to Jack Yanowski on duties of new branch for coordinating indirect rates.
4. Dictionary for Richland WBS and cost elements/cost accounts.
5. Kevin Adamson: report on valid cost centers.
6. Bill Jasen: backup for Performance Assessment for LLRW burial
7. Dave Borders: guidance packages to WHC on preparing 5-year plan submissions.
8. New Fiscal Year Work Plan (August 28) and Multi-Year Work Plan
9. RL guidance on WBS, scope definition for preparing FYPP.
10. Example of Building Block for budget prioritization.
11. Example of Hanford PTS, FTS reports
12. Documentation on EPDS (Environmental Planning Data System) and OPS (Out-year Planning System)
13. Procedures for change control on estimates (Dave Borders mentioned this).
14. PNL: procedures for budgeting R&D activities

Headquarters Items

1. PR Estimation formats
2. HQ revisions to 2250.1, and 4700N Project Controls System (PR-25 Dick Walsh).
3. HQ Chargeback system: Betsy Jordan, Bill Boda, final committee report
4. Argonne RAS
5. Notes from Zocher's Albuquerque workshop
6. EM-30 baseline

DOE EM-30 COST ESTIMATION PROJECT
VISIT TO RICHLAND OPERATIONS
AUGUST 24 & 25, 1992

List of Attendees:

Timothy Babb	Project Time and Cost	(404) 239-0220
Dave Borders	WHC Business Planning	(509) 376-9227
Marc Lieber	ICF Kaiser Engineers	(703) 934-3191
Michael A. Hauser	ICF Kaiser Engineers	(510) 419-5031
Marc A. Zocher	Project Time and Cost	(404) 239-0220
Pramod Mallick	DOE-HQ EM-33	(301) 903-7439
Craig R. Elliott	KEH	(509) 376-1239
Fred Serien	DOE-RL	(509) 376-8517
Marcie Baumann	WHC Business Planning	(509) 376-9740
Jo A. Sargent	WHC Business Planning	(509) 376-9575
Robert Lanza	ICF Kaiser Engineers	(703) 934-3211
Joe Tarcza	WHC Business Planning	(509) 376-1844
Roger Sherman	Operations Business Management (WHC)	(509) 373-2002
Lowell Peterson	WHC Controller Department	(509) 376-2655
Kevin Adamson	KEH Finance	(509) 376-9482
P. Elaine Lewis	ER Program Baseline	(509) 372-1346
John Stewart	USACE-ER Baseline	(509) 376-9101
Ken Jordan	WHC-ER	(509) 376-1122
Dee Willis	DOE-RL	(509) 372-0178
Marv Olson	PNL-Facilities Engineering	(509) 376-2198
Howard Massey	PNL-Office of Environmental Technology	(509) 375-6846
Jim Fulton	PNL-PMSD	(509) 375-6536

TRIP REPORT

DOE EM-30 COST ESTIMATION PROJECT
VISIT TO SAN FRANCISCO OPERATIONS
AUGUST 26, 1992

Summary of San Francisco Field Visit

San Francisco's four constituent operating facilities (LLNL, LBL, SLAC, and ETEC) differ significantly from most other DOE facilities in that they are relatively small and their operations have relatively little ERWM activity. Nonetheless, LLNL and LBL exhibited significant potential to produce activity-based cost estimates for ongoing waste management activities. Implementation costs to track waste management operating costs, however, may be significant for all DOE-SF facilities except Lawrence Berkeley Laboratories, which independently implemented an activity-based cost tracking system. I am attaching a list of attendees.

Key Points from San Francisco Field Visit

- DOE-SF and M&O contractor meeting participants were vaguely aware of the existence of the November, 1991 interim cost estimation guidance for waste operations activities, but indicated it was of limited usefulness. Both DOE-SF and contractors indicated that standardized formats, performance requirements would be welcome guidelines.

- Richard Scott, DOE-SF ERWM cost estimator, expressed strong desire for the DOE Cost Estimation Guidance Document or other DOE guidance to provide historical unit cost data for use in estimating.

- DOE-SF and contractors commented that the level of detail for activity-based estimates should be tailored to the audience: HQ/OMB/Congress versus DOE-SF versus M&O contractors, and that any system implemented needs flexibility.

- The four DOE-SF operating facilities illustated a broad range of WM budgets: $100M LLNL, $6M LBL, $1M SLAC, $0.5M ETEC.

- DOE-SF and contractors cpmmented strongly that DOE HQ should resolve conflicting guidance/estimation methods/documentation among DOE EM 2o, EM-30, EM-40, and DOE-PR.

- DOE-SF indicated the need for change control guidelines as part of guidance because of HQ-imposed budget limits resulting in need to redo estimates.

- DOE-SF took strong exception taken to DOE EM-20 CQMA guidelines advocating a central cost estimation/review function (too much overhead and coordination, resulting in increased cost). DOE-SF considers it better to give guidance and hold line program managers accountable and . requested that EM-30 increase direction in this area.

Lawrence Livermore National Laboratory (LLNL)

- LLNL operations are dominated by Defense Programs and Energy Research. It would be very difficult therefore to impose WM estimating/accounting requirements on LLNL, as budgetary and accounting systems are dominated by DP/ER. The existing LLNL accounting system cannot (according to participants) be modified at present to track activities. LLNL also completed last year a major, costly upgrade to its accounting system and will likely not be able to repeat it to accommodate activity-based cost tracking.

- It is very difficult to accommodate various cost data "cuts" on data requested by DOE HQ, e.g., segregating WM costs by High Level, Low Level, TRU, and hazardous waste types. This can be done manually at high cost, but again, automated modifications to the LLNL accounting system are highly unlikely.

- In contrast to all other DOE sites visited, LLNL and LBL had the capability to estimate/track waste management operating costs by labor categories (e.g., chemist, engineer, etc.). These labor categories could be easily translated into activities by a knowledgeable person, although not readily by an outside auditor. LLNL staff indicated little problem with providing supplemental documentation by activity, unit cost per activity, and number of activities.

- Approximately 50% of LLNL WM costs are fixed. Volumes of waste do not appear to fluctuate significantly, although fluctuations in waste type can have significant cost impact.

- Historically LLNL has had problems with justifying budget estimates unless the activity had a legal driver or was directed toward a non-driver item OMB happened to like (e.g., PTS). Other activities were cut or postponed. Result: resistance by LLNL to laying out detailed descriptions of activities.

ETEC

- The ETEC WM staff is only 5 of 140 total staff. From a $9M budget estimate, ETEC was given only $271,000 budget.

Stanford Linear Accelerator (SLAC)

- WM is 0.75% of SLAC budget, and will rise to 3% next year. SLAC has no waste management operations facilities, only <90 day storage areas, so all WM activities are landlord activities. SLAC has no full-time WM manager.

- SLAC indcated that it is impossible to track activities at lower level than present, e.g., to track sampling activities.

Lawrence Berkeley Laboratories (LBL)

- LBL uses activity-based cost tracking for waste management operations activities (attached).

TRIP REPORT

DOE EM-30 COST ESTIMATION PROJECT
VISIT TO ROCKY FLATS OPERATIONS
AUGUST 31-SEPTEMBER 1, 1992

Summary of Rocky Flats Field Visit

DOE RFO and EG&G Rocky Flats Inc. staff were extremely cooperative during our visit and expressed support for our efforts to develop a comprehensive handbook for developing cost estimates for ongoing waste management operations. EG&G is currently using a cost accounting system that is capable of tracking costs by activity through the use of over 75,000 charge numbers. EG&G presented an example FY93 estimate for maintenance and expansion of their WIMS database. This estimate was prepared using activity-based estimates, and was rolled up via EG&G's Management Control System (MCS) which covers estimates and subsequent cost and schedule control, tracking by activity.

Indications are that the guidance will be received enthusiastically at Rocky Flats. EG&G staff were very pleased at being included in the initial data gathering efforts for the guidance and specifically expressed interest in participating actively throughout the guidance development process.

I am attaching a list of people who participated in our two-day sessions.

Key Points from Rocky Flats Field Visit

- The central planning support and analysis group presented an informal discussion of their role in preparing budget estimates for waste management activities. This discussion focused on their current cost accounting structure and their budgeting process.

- A representative of EG&G's finance office made a short presentation describing how indirect costs are calculated for Rocky Flats. Included in this discussion was a general listing of those items considered overhead and those items that are billed directly.

- EG&G showed an example estimate for maintaining and upgrading its WIMS database system. Estimators showed us how they developed their estimate from the bottom up based on the estimated amount of time to be spent by individuals on known activities. To develop the estimate, the project manager provided his staff with a list of activities needed to fulfill a given scope of work. Each staff member estimated the time spent on each activity and returned a completed time estimate form to the project manager. The manager summed the time estimates, eliminated duplicative estimates, added overheads and material costs and arrived at a preliminary budget, which he then presented in a "work package" document. The estimated budget for the initial scope of work in this example was originally considered too high, so the scope was reduced by eliminating some system upgrades and a new budget produced. This revision process was repeated several times until a budget reflecting system maintenance only was developed. This is the current budget estimate being considered. Some backup documentation for each of the

revisions was available, as were the staff time estimate work sheets. Though this example was not "airtight" in terms of having all decisions justified and documented, it followed good procedures and had fair documentation.

- The EG&G RF central planning office has resources for cost estimation and cost/schedule control support, and they have begun this year (FY93) to apply them to ongoing waste management. All presenters emphasized they are on-board with EM-30 goals and general approach to estimation, and are putting the infrastructure in place to produce valid, supportable estimates. They all emphasized that this process has just begun, and that they expect improvement each year as their managers and estimators climb the learning curve.

- Although no other examples could be presented during this visit because of pre-existing commitments, EG&G staff invited us to return in a few weeks for additional examples of more conventional waste management activities.

List of Participants
DOE Rocky Flats Cost Estimating Coordination Meeting
August 31-September 1, 1992

Department of Energy

Dianne Hauser	DOE/Budget	303-966-7322
Gary Huffman	DOE/AMEN	303-966-7490

EG&G Rocky Flats

David Blakeslee	EG&G Funds Control	303-966-5961
Kathy Bodwell	EG&G WPIM	
Dutch Fla Havhan	EG&G Central Planning	303-966-6575
Harris Gloe	EG&G Program Integration	303-966-3832
Frank Humbert	EG&G Prog. Integration	303-966-3842←
→Lou La Moine	EG&G Central Planning	303-966-3803
Brian Pike	EG&G Cost Estimating	303-966-3237
Glenn Pinson	EG&G WES	303-966-7057
Gail Strobel	EG&G Construction Cen. Plan.	303-966-6539
Wayne Zahn	EG&G Finance	303-966-7456

Project Team

Marc Lieber	ICF Kaiser Engineers	703-934-3191
Dan Sullivan	ICF Kaiser Engineers	703-934-3123
Marc Zocher	Project Time & Cost	505-829-3859

TRIP REPORT

DOE EM-30 COST ESTIMATION PROJECT
VISIT TO PANTEX PLANT
SEPTEMBER 3-4, 1992

Summary of Trip

DOE Amarillo Field Office, Maison & Hanger (M&H), and Battelle staff were all extremely cooperative during our visit and they expressed support for our efforts to develop a comprehensive handbook for developing cost estimates for ongoing waste management operations.

Neither M&H nor Battelle is currently tracking waste management costs by activity. Battelle presented two examples of their estimates for waste operations: one for their hazardous waste storage operations and another for their hazardous waste disposal operations. Whereas both of these estimates provided detailed breakdowns of the materials and equipment needed, neither of them used activity based costing methods to develop labor requirements. Both relied upon LOE estimates. The staff stated to us that the same methods were used for all other waste management operation estimates.

Indications are that the guidance will be received enthusiastically at Pantex. Battelle staff in particular, who are responsible for waste management operations, were very pleased at being included in the initial data gathering efforts for the guidance and specifically expressed interest in serving as a beta test site for the new procedures.

I am attaching a list of people who participated in our two-day sessions.

Specifics

- The central planning support and analysis group presented an informal discussion of their role in preparing budget estimates for waste management activities. This discussion focused on their current cost accounting structure and their budgeting process.

- A representative of M&H's construction estimates department made a short presentation describing how estimates for construction in general, and construction in support of waste management operations in particular, are developed for Pantex. ICF KE noted that much of the work performed while making these estimates is done manually rather than by computerized systems.

- M&H staff presented a short discussion on the calculation of overhead charges for WM activities. M&H's policy is (until FY93) that Pantex is a DP facility and therefore WM activities are not charged a full share of site overhead. WM labor hours are assessed only a flat 15 percent for overhead. This policy will change, however, in FY93 when all site labor (including DP, WM, and ER) will be placed into the same overhead pool.

- Battelle staff showed two example estimates for their hazardous waste storage operations and their hazardous waste disposal operations. For each of these, we walked through their procedures for building up their materials and equipment estimates, but both estimates used level of effort, rather than activity based costing, to develop the labor estimate.

List of Participants
DOE Pantex Cost Estimating Coordination Meeting
September 3 & 4, 1992

Department of Energy

John Thurston	DOE/AAO	806-477-3134

M&H/Pantex

Bill Allen	M&H WM	806-477-5669
Geoff Clifford	M&H Financial Management	806-477-3710
Kyle Farmer	M&H Construction Estimates	806-477-3253

Battelle/Pantex

Gary Baker	WM Planning	806-477-4440
C.B. Lowery	ER/WM 5 Year Plan	806-477-3297
Don Smith	ER/WM Cost Estimating	806-477-5822
Jeff Yokum	ER/WM Planning	806-477-5951

Other Contractors

Mike Byers	Jacobs Engineering	806-477-4910

Project Team

Imre Berty	ICF Kaiser Engineers	703-934-3024
Steve Huckins	ICF Kaiser Engineers	305-592-4800
Dan Sullivan	ICF Kaiser Engineers	703-934-3123
Timothy Babb	Project Time & Cost	404-239-0220

Appendix B

Summary of Comments on December 1992 Cost and Schedule Estimation Guide

ICF KAISER ENGINEERS

CATEGORIZATION OF COST GUIDE COMMENTS

✓	Comment incorporated in Cost Guide
o	Internal discussion at ICF KE required to resolve comment
?	Disagree with comment or clarification required
x	No action required for this comment

Sort of Guidance Comments

01-Jun-93

	Chap	Sect	Sub	Page	Source	Comment	Resolution
✓	0	2			2	Change "...scope, schedule, and cost estimate with which..." to "...scope, schedule, and cost baselines from which..."	Accept Comment.
✓	0	3		6	2	2nd sentence. missing word. "Cost estimates should (be) based on (the) number..."	Accept Comment.
✓	0	3		6	10	Executive Summary , 4th line down - insert the word "be" between the words "should" and "based".	Accept Comment.
✓	0	3		6	10	Executive Summary, titles shown for Section V, Section VIII, and Appendix C do not match titles used in body of the guide.	Accept Comment.
✓	0	3		7	10	Executive Summary, Appendix F. Consider another word choice instead of "presents" and "presented."	Accept Comment. Use the word "Provides".
✓	1			1	2	Delete first sentence. It is understood the Introduction Section "introduces the Guide."	Accept Comment.
✓	1			1	10	First paragraph. Titles of sections are incorrectly stated (not word for word) in three places.	Accept Comment. Change the section titles to make them consistent.
	1	2		1	2	4th sentence. The acronym "CQMA" needs to be defined and added to the list of acronyms at the beginning of the document.	Accept Comment.
	1	2		1	4	The fourth sentence contains the acronym CQMA. Recommend the full term be spelled out as well since the acronym has not been used before in this text and is not identified in the Glossary.	Accept Comment.

Chap	Sect	Sub	Page	Source	Comment	Resolution
✓ 1	2		2	2	Level of Detail, 1st sentence. Does "maturity of the program" have any meaning for ongoing operating programs?	Yes, as a program/project matures, scope, documentation, and estimates can become more detailed based on more readily available cost, schedule, and other program/project data.
○ 1	2		2	2	Level of Detail, 2nd sentence. Unable to find anything in Guide that provided examples of appropriate level of detail for varying maturity.	Accept Comment. Modify the current example to give examples of estimates for different project/program phases (i.e. conceptual, design).
✓ 1	2		2	4	The fourth sentence, second bullet, "In the experience...will withstand scrutiny." Contributes nothing. In fact, it infers well documented estimates will assure budget inclusion and adequate funding which is not necessarily correct. Recommend this sentence be deleted.	Accept Comment.
✓ 1	2		2	7	"Reduced Resources for Reviews." At the proposed level of detailed required by the guide with an emphasis on "Rigorous documentation" in our opinion, it will take more resources not less. The objective should be to provide useful information in a cost effective manner in order to satisfy the fundamental question. "Are the cost estimating packages being provided to support the ADSs make sense and are reasonable?"	We aggree that it might take more resources in the short term. However, we believe that in the long term, resources required for reviews will be reduced. Change the bullet description to "Reduced Long Term Resources for Reviews"
✓ 1	2		2	10	Paragraph 4, line 8 - where "previously stated?" Suggest revised wording, "As will be discussed in Section IX, a major objective..."	Accept Comment.
✓ 1	2		3	2	Exhibit I-1. The figure should be expanded to show Approved Cost Estimate leading to Approved Budgets.	Change the word in the Approved Cost Estimate box to "Reviewed Cost Estimate". We don't want to mislead people into thinking a properly developed estimate will always result in an approved estimate.
✓ 1	2		3	7	Cost Estimate Review Flowchart, should show how the review and approval cycle fits within the budget process and Five-Year Plan.	We disagree. Estimate reviews are not intended to tie into FYP and budget reviews.

Chap	Sect	Sub	Page	Source	Comment	Resolution
✓	1	2	3	10	This chart (Exhibit I-1) does not clearly depict the iterative process of document re-issue. If one already knows the process, this chart makes some sense, but if not, the chart is of minimal assistance.	This chart is intended to depict a generic process, each Field Office needs to delineate their own iterative process.
?	1	2	3	15	On Exhibit I-1, we recommend that you split operation and construction and show PR-24 ICE interface for MSAs and selected MPs at the box currently labeled DOE/OMB BUDGET/LEVELING DECISIONS.	Accept Comment.
✓	1	2	4	2	2nd paragraph, last sentence. Do not recognize the term "annual procedure".	Accept Comment. Change the phrase "cost estimation guides and annual procedures" to "local cost estimation guides".
✓	1	3	4	4	The third paragraph, second sentence indicates, "Each review cycle should result in re-working of the estimate...". This is inaccurate. Comments received may result in some estimate rework, but more probably will result only in clarifying the estimate documentation.	Accept Comment. Change the phrase "should result" to "may result".
✓	1	3	4	4	The second paragraph refers to DOE Order 4700.5. This is an incorrect reference. 4700.1 is the correct reference.	Accept Comment.
✓	1	3	4	10	The first paragraph refers to Exhibit I-2, and states, "The estimating and scheduling process results in a technical scope, schedule, and cost estimate for each program." This may be true if various estimates are being prepared for alternative analysis, so that an optimum cost technical scope can be selected. However, a defendable estimate is usually a product of a defined technical scope, not a forerunner.	Accept Comment.. Change the sentence to read "The scoping, estimating, and scheduling process results in an integrated technical scope..."
✓	1	3	5	2	Exhibit I-3. Does this exhibit identify where documents are developed or where they are used (HQ or FO)? Will the EM-30 Cost and Estimating and Scheduling Guide be used by the FO? If so, this should be reflected in the diagram.	Yes, this is indicated by the dotted line near the bottom of the Exhibit.
✓	1	3	5	2	Exhibit I-2. The cost-technical scope-schedule activity boxes should be labeled baseline. This is where the three items become the approved baseline for the activity.	The focus of the Guide is on developing scope, cost, and schedule estimates. Baseline guidance is being developed by EM-30.

Chap	Sect	Sub	Page	Source	Comment	Resolution
1	3		5	2	Exhibit I-2. The estimating and scheduling activity boxes should be connected with a double ended arrow. Those activities are strongly interconnected, not stand-alone.	Accept Comment.
1	3		5	2	Exhibit I-2. Is the cycle represented here supposed to be an annual cycle?	Change the title to "Cost Estimation Process." This new title keeps estimating and budgeting separate.
1	3		5	7	Exhibit I-2 indicates that EM-30's review should precede budget preparation; however, it is not clear from Exhibit I-1 what the budget timeframes are for the estimate reviews and approval. Depending on when the field guidance is received and the time required to conduct each review envisioned in Exhibit I-1, it is conceivable that an estimate may not be approved until after the budget has been submitted to OMB.	This is not a time phased diagram.
1	3		5	12	Preparation of review of Cost Estimate Review Documents by various levels of review groups is an important aspect of simplifying the cost estimate review process. Exhibit I-2 should be revised to specifically include the separate steps for preparation and review of the Cost Estimate Review Documents at each review level.	This chart is intended to depict a generic process, not the overall DOE process. The Field Office process should be defined by each Field Office
1	3		6	2	Exhibit I-3. MP/MPR needs to be defined and added to the list of acronyms.	Accept Comment.
1	4		7	2	The text and insert statement interchange project managers and program managers. Needs to be consistent.	Accept Comment. The footnote on page I-4 and text on page I-13 was changed so the use of the words program and project will be consistent throughout the Guide.
1	4		7	2	Program managers should also be conversant with escalation, contingency, overhead, and indirects.	We agree, this is part of the "...estimation method used and documentation requirements."
1	4		8	2	Exhibit I-4. Cost/Schedule Reviews. Why do three groups (EM-30, Field Office, Contractor) develop process and procedures for reviewing estimates?	Because there is a review hierarchy, each group conducts their own review independent of the other groups.

Chap	Sect	Sub	Page	Source	Comment	Resolution
1	1	4		8	2 Exhibit I-4. Cost/Schedule Reviews. Resolution of EM-20 review audit comments should feedback to M&O for corrective action.	Accept Comment.
1	1	4		8	2 Exhibit I-4. Cost/Schedule Guidelines. Contractor is to address EM-30 review and assessment comments. However, there are no assessment activities required of EM-30.	Revise the exhibit to reflect the official responsibility matirx.
✓	1	4		8	2 Exhibit I-4. Cost/Schedule Guidelines. Why do both EM-30 and the Field Office develop guidance, techniques and handbooks?	The Field Offices develop local cost guides that describe Field Office specific methods and procedures.
✓	1	4		8	2 Exhibit I-4. Special Studies. The results from parametric cost estimating (especially for projects) have not been outstanding.	We agree, but this is part of EM-20's research program.
1	1	4		8	8 Another concern is "Cost and Schedule Estimating Responsibility Matrix" is in error. Many of EM-20's important functions and responsibilities have been deleted or significantly modified. A comparison of this exhibit and the official responsibility matrix results in the following discrepancies. Cost/Schedule Estimating Guidelines: The first bullet deletes the statement that EM-20 will develop quality assurance standards for preparation of cost and schedule estimates. Cost/Schedule Reviews: The first bullet deletes the statement that EM-20 will develop quality assurance standards for review of cost and schedule estimates. The second bullet deletes the statement that EM-20 will review and audit EM to assure compliance with these standards (not just policy). Field Office/HQ Integration Meetings on Cost/Schedule Estimating Issues: Deletes the statement that EM-20 will Convene steering committee of DOE and non-DOE personnel to advise EM-20 on EM-20 cost/schedule review and audit process and procedures.	Revise the exhibit to reflect the official responsibility matirx.
1	1	4		8	8 The one area of concern is that Exhibit I-4 entitled "Cost and Schedule Estimating Responsibility Matrix" is in error. Many of EM-20's important functions and responsibilities have been deleted or significantly modified. A comparison of this exhibit and the official responsibility matrix results in the following discrepancies: The modifications noted below, sub=2-5, are substantive and are completely unacceptable	Revise the exhibit to reflect the official responsibility matirx.
1	1	4		8	8 Cost/Schedule Estimating Guidelines: The first bullet deletes the statement that EM-20 will develop (quality assurance standards) for preparation of cost and schedule estimates.	Revise the exhibit to reflect the official responsibility matirx.

Chap	Sect	Sub	Page	Source	Comment	Resolution
?	1	4	8	8	Field Office/HQ Integration Meetings on Cost/Schedule Estimating Issues: Deletes the statement that EM-20 will (convene steering committee) of DOE and non-DOE personnel to advise EM-20 on EM-20 cost/schedule review and audit process and procedures.	Revise the exhibit to reflect the official responsibility matirx.
?	1	4	8	8	Cost/Schedule Reviews: The second bullet deletes the statement that EM-20 will review and audit EM to assure compliance with these (standards) not just policy.	Revise the exhibit to reflect the official responsibility matirx.
?	1	4	8	8	Cost/Schedule Reviews: The first bullet deletes the statement that EM-20 will develop (quality assurance standards) for preparation of cost and schedule estimates.	Revise the exhibit to reflect the official responsibility matirx.
?	1	4	8	10	Exhibit I-4. In matrix cell of Cost/Schedule Estimating Guidelines for Contractor EM-30 Activities, "Provide data to DOE Field Office and HQ EM-30 to address EM-(30? or 20?)?"	Revise the exhibit to reflect the official responsibility matirx.
?	1	4	8	10	In matrix cell of Cost/Schedule Reviews for EM-20 Activities, "Develop EM policy for EM- (20? or 30?)?"	Revise the exhibit to reflect the official responsibility matirx.
?	1	4	8	14	States EM-20 develops policy for EM-30. Suggest revise to state that EM-20 audits policy developed by EM-30.	Revise the exhibit to reflect the official responsibility matirx.
✓	1	4	10	2	DOE Headquarters Staff. In the past, DOE Headquarters has obtained an ICE. Will this continue in the future.	ICEs will originate from HQ. The FYP ICERs are the responsibility of the Field Offices. ICERs are reasonableness checks of the estimate.
√	1	4	10	14	States that DOE FO Program Staff/M&O Construction Manager's primary role is oversight. Suggest revise to state that primary role is management. FO Quality Assurance has oversight responsibility.	Accept Comment.

Chap	Sect	Sub	Page	Source	Comment	Resolution
1	1	6		11	4 The second and third paragraphs both indicate that "activity" applies to the "lowest level of work element...". This is incorrect and conflicts with Section II.B.3. and Exhibit II-3, as well as the third sentence in the second paragraph. It is our understanding that the term "activity" is intended to apply to work elements at a level of detail adequate to encompass that amount of work worth identifying for the purpose of collecting, reporting, and including in a cost data base for future estimating use.	Accept Comment. The next revision of the Guide will contain a better definition of "activity".
✓	1	6		11	10 Terms Used, first paragraph. Consider inserting here, words from page VII-6, paragraph 4, regarding difference between programmatic and contractor WBS.	Accept Comment. Insert text from VII-6 as the 4th sentence of this paragraph.
10	1	6		12	10 Exhibit I-5. The term "Site Contractor WBS" is used but not defined. Reader is left to develop his own concept of the term.	Accept Comment. Describe the various WBSs in the first paragraph under section I.F (Terms Used).
1	1	6		12	10 Exhibit I-5. Cost Elements (to be estimated) listed here conflict with listing paragraph II.A.1 and elsewhere is document.	This Exhibit is an example. Revise the exhibit to reflect the official responsibility matirx.
✓	2				9 The use of Activity Based Cost (ABC) estimates, and the establishment of WM baselines would appear to preclude the need for TDDs. Consideration should be given to eliminating the requirement for TDDs.	ABC is a method for integrating cost, schedule, and technical baselines and does not address TDDs or ADSs structures.
O	2	1	1	1	2 Need to define materials and equipment. This is not always consistent among contractors. Need to define fully burdened.	Material, equipment, and what is included in the fully burdened rates needs to be defined as part of the estimate documentation.
O	2	1	1	1	10 The term (fully burdened) either needs to be explained here, or referenced to another section in the manual. for instance, does fully burdened mean an effective rate applied to labor rates only, or does it mean that all the indirects (general security, power usage, site administration costs, G&A, GSP, etc) are included in a unit price? In some cases, it is highly advantageous to summarize to a direct cost level before applying a well-defined list of burdens or overheads. Recommend that the direct and indirect effort and costs for a particular task or activity be clearly defined, so that a "baseline" unit cost can be established for record keeping and project management tracking.	Material, equipment, and what is included in the fully burdened rates needs to be defined as part of the estimate documentation.

Chap	Sect	Sub	Page	Source	Comment	Resolution
✓ 2	1	2	1	10	In the 4th and 7th lines down, reword references of "pouring or poured" concrete with "placing or placed" concrete.	Accept Comment.
✓ 2	1	2	2	10	Third from last line. Delete the words "under varying conditions." R. S. means does not state production for various conditions, except for limited instances.	Accept Comment.
✓ 2	1	2	2	10	Exhibit II-2. Reword the last entry to "U.S. Army Engineers Unit Price Book, U.S. Army..."	Accept Comment.
O 2	1	2	3	2	2nd paragraph. A quantitative example should be provided, similar to the preceding paragraph.	Accept Comment.
2	1	2	3	2	1st paragraph. Value for cost of labor "3.60 per SFCA" appears incorrect. Further calculations should be provided to show where this figure came from.	Verify this value and change as appropriate.
2	1	2	3	2	1st sentence. The Means Guide is excellent as far as it goes. However, it does not include such things as vendor submittals, configuration management, OSHA, Title III overviews, Material Safety Data Sheets, etc. Estimators must be aware of the limitations associated with Means.	Means is not intended to be an inclusive estimating tool for EM-30.
2	1	2	3	4	The fourth paragraph, "For example...", is not "history" and does not contribute to the "central focus" (Section I.A) of this document. Recommend its deletion.	Accept Comment. Create two new subsections II.A.2 ("History of ABC Estimating") and II.A.3 ("Relationship Between ABC Estimating and Construction")
2	1	2	3	4	Exhibit II-2 emphasizes references for construction cost estimating. Recommend inclusion of additional references pertinent to operations industrial plant operations (e.g., Perry/Chilton's Chemical Engineering Handbook, other McGraw-Hill trade journals); and recommend both Exhibit II-1 and II-2 be moved to the end of this Section.	Expand the Exhibit to include additional references. We feel Exhibit II-1 and II-2 need to be where they are referenced.
✓ 2	1	2	3	10	Line 1. Recommend that reference is made to the year of the Means Publication data being used.	Accept Comment.

Chap	Sect	Sub	Page	Source	Comment	Resolution
✓ 2	2	2	4	10	Upper text block says Level-of-effort estimating may be appropriate... With the emphasis being placed on moving away from that method, recommend not drawing attention to its acceptability in a few instances by highlighting it in a text block.	Accept Comment.
✓ 2	2	3	4	7	"Units of work must be defined." A definition of work unit would be helpful.	The definition of the work units is a function of the activity being estimated.
✓ 2	2	3	5	10	The text for these two bullets is lost in the clutter. Cataloging is covered in Exhibit II-4, but not referenced until a later paragraph heading. The unit cost bullet does not fit under the paragraph heading of identifying activities.	Accept Comment. Change the title of the section to "Four Steps of ABC Estimating".
O 2	2	3	5	12	The first guideline for defining an activity uses the term "operation." "Operation" is not defined in the glossary, nor is it included in Exhibit I-5 which describes the terms for the hierarchy of work elements that will be used in the Guide. Either the term "operation" should be cited in Exhibit I-5, or a documentation element from Exhibit I-5 such as "program" or "subprogram" should be used instead/	Accept Comment. Add "operation" to the Glossary.
O 2	2	4	6	2	Unit costs must include or recognize special situations such as weather, rock excavation, site conditions, etc.	We agree, this information needs to be included in the estimate documentation.
✓ 2	2	4	6	4	The second paragraph, first sentence is overlimiting. Recommend deletion of the word, "subcontracting."	Accept Comment.
X 2	2	4	6	4	The first paragraph of this Section recommends, "tracking costs by activities", but only infers the tracked costs be entered into a database for future estimating. Recommend rewrite to emphasize collection of cost data into a database.	The intent of the Cost Guide is to encourage Field organizations to collect actual cost data. The means for accomplishing this is left up to each Field Office.
X 2	2	4	6	7	Third paragraph discusses, "ABC tracking procedures becomes the norm." This statement implies that a secondary procedure i.e., an Activity Control System, has been or is defined. This statement requires that all organizations develop or have an internal time system. This is not presently the case. To track at this level would require separate cost accounts for all tasks including administrative tasks. This would not only be cumbersome but costly. As a minimum administration and similar functions should not be required to go to a direct cost control system.	The means for tracking actual cost data is the responsibility of each Field Office. The data should be tracked and collected at a level of detail that corresponds with the maturity and complexity of the program.

	Chap	Sect	Sub	Page	Source	Comment	Resolution
X	2	2	4	6	10	Basing projected unit costs on actual historical cost data is okay for budget purposes, so long as a careful analysis of current requirements are compatible with past practices for a given activity. The level of effort for activities may change from time to time. Caution should be taken to insure that any affect to a given activity by changes in regulations, computerization, or modernization of equipment or facilities is factored in. Also, some work items cannot be estimated using unit price estimating procedures, and will require a detailed labor, equipment, materials, and productivity analysis. The need to establish historical databases is addressed in paragraph 4, but no specific procedure to create these databases is provided. Also, no reference is given to establishing a central database accessible by all Field Offices and HQ DOE. Establishment of a central database in the future would provide a vehicle to track actual costs, and would provide a basis to develop future program and budget costs, using the cautions mentioned above. If the intent of the manual is to informally, develop historical database information at each facility for the short term, perhaps mentioning that future efforts will be undertaken to establish formal procedures would be beneficial.	The intent of the this Guide is to encourage Field organizations to collect actual cost data. The means for accomplishing this is left up to each Field Office.
✓	2	2	4	7	2	Exhibit II-4. The example discussed here using unit costs assumes all elements (drums) are created equal. This is not true, and enough contingency must be included to accommodate unusual situations.	The Exhibit is an example. Change the title of the Exhibit to show it is an example. Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.
X	2	2	5	6	10	Agree that technical program managers (PM) best know and understand the activities and resources of their organization, and the vital information needed to assemble a reliable cost estimate. At the onset, managers will need to dedicate a portion of their time to insure that reliable information is included in cost estimates. However, we recommend specialists with input from the technical PM. Managers could then review and approve the estimates, once they are developed.	We agree, see page II-8.
X	2	2	5	7	10	3rd para. This para states that "...each worker should keep his/her own daily written records of time (to the nearest 0.5 hour), materials expended, equipment used, and subcontract money spent on each activity for a period of 1 month..." This is a good starting point for defining activities and setting standards. However, future quality assurance checks may require an independent time/motion study to verify tasks and durations, much the same as is done in private industry production.	We agree. The Cost Guide leaves the responsibility for doing motion studies to the Field.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	2	2	5	7	14 Requesting workers to keep detailed records of costs virtually assures padded estimates.	We agree that this is possible, however, accuracy is a quality assurance function beyond the focus of the Cost Guide.
✓	2	2	5	8	4 The last paragraph, second sentence indicates, "cost estimating specialists should...", while the last sentence indicates, "specialists could...". Recommend rewrite of this paragraph to express the value of these specialists while eliminating the ambiguity.	Revise the sentence to read "However, the availability of cost estimating specialists may be advantageous for..."
✓	3				4 This section is extremely verbose, contains much redundancy, and is poorly organized and difficult to follow. One forms the impression that the writer was being paid by the word. Since this Section is primarily of interest to managers, recommend it be rewritten in a more succinct manner in a format similar to that of other Sections and without assigning responsibilities. Further, recommend Section III.D. be deleted as redundant to Appendix F. To illustrate, Section III.A. could be rewritten as follows: "This Section provides guidance to managers on methods and approaches for developing technical scope documents for subsequent use in preparing schedules and cost estimates. The major elements of this Section are Methods and Approaches (III.B) and Deliverables (III.C.). The complete estimate package for a program or subprogram consists of a technical scope, cost estimate and schedule. The focus of this Section is on the steps essential to planning and technical scope development."	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition. Some of the long explanations are needed for the wide audience being addressed. Delete the sentences on change control in III.A. Guidance on baselines is being developed by EM-30.
X	3				8 This section addresses milestone requirements, resource identification, and deliverables associated with the planning process. Assessment criteria are provided for the review of the planning process and serve as a checklist to the planners. We recommend that the guidance document discuss the requirements for the FYP and beyond, if feasible, for waste operations programs.	The Cost Guide assists in planning for the estimate, not programmatic planning.
O	3				10 Consider a rewrite of this chapter. It appears wordy and repetitive. Also, consider changing the words "estimate preparer" to "cost engineer", "estimator", or "cost estimating specialist."	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition. Some of the long explanations are needed for the wide audience being addressed.
X	3	1		1	2 2nd paragraph, 3rd sentence. Delete "procedures". Would then read: "...change control applied to..."	Accept Comment. HANDLED ABOVE

Chap	Sect	Sub	Page	Source	Comment	Resolution
X 3	1		1	7	Second paragraph, "Each program should...which the technical scope was based." If baselining is truly within the scope of this estimating guide as was addressed in the General Comments above, then to be useful baselining should not only address technical scope change but also schedule changes (reprioritizing) and cost changes (Financial Plan amendments) as well.	Delete the sentences on change control in III.A. Guidance on baselines is being developed by EM-30.
7 3	2		1	14	Request Mission Definition be revised to Mission Need.	Accept Comment. We changed the word to "Mission Need" and moved it to the Glossary.
O 3	2		2	4	Recommend the third, fourth and fifth sentences be deleted as they are redundant to the first paragraph under Section III.B.1.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
✓ 3	2	1	2	4	Delete from the last sentence, first paragraph, as redundant to the second paragraph, the phrase, "as well as....responsibility".	Accept Comment.
O 3	2	1	2	4	From the fourth paragraph, delete the second sentence and the phrase in the third sentence, "descriptions in the Planning Documentation", as redundant. Further, revise the last sentence to identify the need for a documentation plan (if a formal plan is truly required) and eliminate the assignment of work to "...(each) DOE contractor..."	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
O 3	2	1	2	4	Delete the last two sentences, second paragraph as redundant to the third paragraph.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
✓ 3	2	1	2	4	Recommend, "method of accomplishment," be inserted in the second sentence, first paragraph, after, "major milestones,".	Accept Comment.
O 3	2	1	2	4	Amend the third paragraph by inserting in the second sentence, the phrase, "Activity Dictionary (see Appendix)", after the acronym "WBS", and by deleting the remaining sentences which are redundant to the fourth paragraph.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.

	Chap	Sect	Sub	Page	Source	Comment	Resolution
X	3	2	1	2	8	Bottom of page, a requirement is mentioned for the planning documentation to include a description of organization responsibilities and authorities, accountability, and funding responsibility. We recommend that further direction and specific guidance on this topic be provided.	Guidance for this topic is left for each Field Office to develop (i.e. local cost guides).
X	3	2	1	2	10	3rd paragraph. Introduces a term "estimate-specific WBS." This infers that the structure of the estimate will dictate the WBS. The WBS should be project-specific. It follows that the estimate will conform to the WBS, not the reverse. Recommend changing all references from "estimate-specific WBS" to "project-specific WBS" throughout entire document.	We agree, but due to the confusion between project and program, we elected to use the term "estimate".
1.	3	2	1	2	12	The reference to the estimate-specific WBS in Section VI.B.4 does not seem correct.	Accept Comment.
X	3	2	1	2	12	It would be helpful to include an example of "a description of the planning methodology employed"	The chapter mentions various planning tools (i.e. flow charts). Which planning methodology to employ for developing an estimate is left up to each Field Office. See Chapter VIII for an example.
X	3	2	2	3	2	1st bullet, 6th dash. Work not included would be impossible to define. Too open ended.	We feel estimate exclusions are appropriate.
√	3	2	2	3	2	1st bullet, 4th dash. Milestones must not only be discrete, but must also be measurable.	Accept Comment. Add the word "measurable".
O	3	2	2	3	4	Recommend the remaining paragraphs of this Section be completely rewritten in a more concise form to eliminate redundancies (e.g., the last two paragraphs), statements inappropriate to this Section, and statements assigning responsibilities.	Accept Comment. Add an example and a definition to the Glossary for "performance criteria".
o	3	2	2	3	4	In the second paragraph, recommend inserting the words, "be developed", before the word, "incorporated".	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.

	Chap	Sect	Sub	Page	Source	Comment	Resolution
J	3	2	2	3	4	Recommend deletion of the words, "DOE EM programmatic and contractor" from the second and third bullets. Add a sentence after the bullets to the effect, "The subprogram WBS should be a logical extension of the DOE EM WBS (Appendix C)".	Accept Comment. Change the bullet to read "Estimate-specific WBS Dictionary and Index."
O	3	2	2	3	12	The Guide should explain how to develop performance criteria. An example of the steps taken to develop performance criteria would also clarify this concept. At a minimum, performance criteria should be defined in the glossary.	Accept Comment.
X	3	2	2	4	2	2nd paragraph, 2nd sentence. A single cost estimate can be prepared. However, it must include all the elements of the 26 individual work efforts.	We agree.
X	3	2	2	4	2	3rd paragraph. Working backward from an end point to establish a schedule is one way to start, but schedule must be realistic, include all activities, be properly sequenced, and include contingency. One shouldn't be mislead into thinking scheduling is easy. It is both involved and complicated, and must be approached very carefully. Lower schedules must also be resource loaded.	We agree, the schedule should be developed to a level of detail commensurate with the program/project maturity and complexity. Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30. Resource loading of schedules is addressed in Chapter VII (pg. VII-8).
✓	3	2	2	4	2	4th paragraph, 2nd sentence. Following "Process Flow Sheet", replace the period with a comma.	Accept Comment.
X	3	2	2	4	7	First paragraph, to allow an estimate that averages 26 separate operations seems to be extreme and may defeat one of the uses of the estimate: i.e., management on an incremental basis (as defined on page II-3, para B.1., items (1), (2) and (3)). In 26 operations, there could be a wide variation of costs. Maybe a limit on cost variation could also be applied in this case, such as: 26 could be used, as long as they were within a given range of each other.	We agree, the basis of costs and units must be consistent across all elements/tasks/areas. The paragraph states that these decisions are related to the maturity of the program.
O	3	2	2	4	12	The benefit of the Milestone Description Sheet in addition to a Milestone Log is not clear. The description of a milestone in the Milestone Log should include the identification of the task completed (or started).	The Milestone Description Sheet provides documentation to help reviewers understand definition of milestones. Revise redundant wording.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	3	2	2	5	2 4th paragraph. RAM (responsibility, authority matrix) could be confused with RAM (reliability, availability, maintainability).	We feel this is O.K. since RAM is defined in the acronym list.
O	3	2	2	5	2 3rd paragraph. The difference between an Activity Dictionary and a WBS Dictionary with work package descriptions is not clear. Are both needed and why?	Add a new diagram that more clearly shows the relationship between the Activity Dictionary and the WBS. The AD is analagous to a Code of Accounts (see Appendix B). The AD provides a cross-cutting description of work in the WBS.
O	3	2	2	5	7 Highlighted box "The technical..., estimate-specific WBS. This is not true. There can be a *functional WBS and cost estimate WBS which are in fact different*, however what is important is being able to translate from one to another.	Add a new diagram that shows the various *levels of the WBS and its connection the the* Activity Dictionary.
X	3	2	2	5	10 2nd paragraph. This paragraph briefly describes programmatic WBS and estimate-specific WBS. The reason that each field office has its own WBS is not clear. It appears that the intent is to have a programmatic WBS and an estimate-specific WBS at a lower level. The programmatic WBS may be necessary, but it may be difficult to compile a standardized historical database. For instance, lower levels of the programmatic WBS do not appear to be consistent; i.e., the fifth digit relating to type of operation does not always match the same type of operation at different locations. For example, 1.3.2.3.6 at Chicago Field Office, Argonne National Laboratory East, is for PCB Transformer Disposal, while the same number at Argonne National Laboratory West is for New Facility Planning (Non-Defense). With this WBS, it appears there could be standardization problems at this level. In lieu of the cost estimate preparer (page VI-3, paragraph C) "developing" an estimate-specific WBSs unique to each estimate, we recommend that a standard EM-30 WBS be developed for DOE process operations, so that information from each field office can be reported in a uniform, consistent manner. For capital construction, we recommend that the existing HTRW interagency remedial action WBS be used as a structure for cost estimates.	The DOE WBS is an activity oriented system, not used as a Code of Accounts, that is developed by each Field Office below the programmatic WBS. HTRW is not compatible with the DOE approach, this Guide focuses on waste operations, not projects.
✓	3	2	2	5	12 The references to the estimate-specific WBS in Sections VI.3.4, VI.B.4, and VIII.B.4 are incorrect.	Accept Comment. The correct reference is VI.B.2.C.

	Chap	Sect	Sub	Page	Source	Comment	Resolution
X	3	2	3	5	2	5th paragraph. Resource loaded schedules should be prepared with resources allocated to activities. Preparation must be from bottoms-up to a) assure linking of activities and continuity, b) allow roll-up, c) assure ownership by Cost Account Managers.	We agree, see II.B.3 (pg. III-5) and VII.B.3 (pg. VII-8).
√	3	2	3	5	4	Suggest consideration be given to adding, "contract types", as an item for resource consideration since both the contract cost and contract management costs will differ dependent upon the contract type.	Accept Comment. Added to last sentence.
O	3	2	3	5	4	Recommend rewrite of this Section in a more concise form. Elimination of repetitive phrases should permit provision of adequate information in one paragraph.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
√	3	2	3	6	7	Resource Plan is redundant. The activity estimate can address the number and kinds of resources needed via the details. The cost estimating system being used at Energy Systems can produce a report by labor or material categories if required. Why generate a separate document given the limited available resources, and reduced future funding?	Change the sentence to read "A Resource Plan and Resource Dictionary, if appropriate, should be...". Field Offices can use their existing systems if they satisfy the intent of the Cost Guide.
O	3	2	3	6	12	Provide examples of a Resource Plan and Resource Dictionary in the Guide.	Accept Comment.
O	3	2	4	6	2	4th paragraph. Fixed and Variable Costs should not be defined twice. Delete definitions/explanations in paragraph four; this information is repeated in the indented definitions.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
X	3	2	4	6	2	5th paragraph. Examples of fixed costs should be included.	See box on page III-7.
X	3	2	4	6	2	3rd paragraph. Is this breakdown used in the cost estimates of Section VIII.	Yes, see Chapter VIII example (pg. VII-6).

Chap	Sect	Sub	Page	Source	Comment	Resolution
O	3	2	4	6	4 Recommend restructuring and rewrite of this Section to eliminate repetitive definitions. This might be done as follows: a) Delete the 1st para, b) Initiate the Section with the 1st sentence of the existing 2nd para, "Planning...variable costs." Delete the 2nd and 3rd sentences from the existing 2nd para, c) continue this new 1st para with the existing 5th para after: deleting the 6th and 7th sentences; and the words, "in the planning and scoping process.", from the 1st sentence, and d) Delete the last para	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
O	3	2	4	6	7 Fixed and Variable Cost Analysis. This section does not discuss semi-variable costs and the concept of relevant range. These are important issues when expending valuable resource for refining cost estimates. All costs are variable when the capacity of facility is reached.	Change the section to reference semi-variable costs and provide an example. When the capacity of a facility is reached, revamps and add-ons can generate fixed costs.
X	3	2	4	6	10 Fixed and variable costs of an operation process cannot always be likened to capital direct and indirect costs. The next to the last sentence is not always true. Indirect costs for a capital project can be either fixed or variable, depending on the work item. Likewise, direct costs for a capital project may either be fixed or variable. We agree there may be some similarities between fixed and indirect costs, and variable and direct costs, but also feel that the differences between them warrant separate discussions. A separate discussion of direct and indirect costs is needed.	We agree, see discussion of direct and indirect costs on page IV-3.
?	3	2	4	7	2 3rd paragraph, 2nd sentence. The use of the word "production" is misleading. EM facilities are often not in the production mode, but still incur variable costs. Recommend replacing "production volume" with 'operation level'.	Accept Comment.
O	3	2	4	7	7 Highlighted box, the example of fixed maintenance costs can be misleading. If vehicles are used at twice the expected rate, the maintenance costs are semi-variable.	Accept Comment. Modify the example.
L	3	2	4	7	10 2nd paragraph, 3rd line down. Recommend changing the word "activities" to "work items."	Accept Comment.
L	3	3	1	8	2 Additional documentation includes work packages and Cost Account Plans.	Accept Comment. Add "Cost Account Plans" to Work Plans under Technical Scope Documentation.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X 3	3	1	8	7	The planning documentation is already addressed in the ADSs and the Technical Descriptions Documents (TDDs). Why generate additional documentation beyond that level? Technical scoping is performed with those two documents prior to generating cost estimates. This would waste scarce resources. This position should also apply to the "Technical Scope Documentation."	We feel a document hierarchy is needed for large scale, complex programs.
X 3	3	1	8	7	Document Hierarchy is generally applied in a contractual relationship where precedence is set forth, however the WBS clearly describes the structure from HQs to the Activity and Subactivity. This provides bottom to top pathway. Since this information is detailed, this document is not necessary.	ADSs and TDDs are budget documents that estimates are fed into.
O 3	3	1	8	12	Performance criteria and requirements are listed on Page III-8 as part of the Back-up Documentation and as part of the Technical Scope Documentation on Page III-3; which is preferable?	Accept Comment. Include the proper back up documentation under planning documentation and technical scope documentation.
?. 3	4		9	2	1st paragraph. Program maturity should not be as important as work effort size, length, uniqueness, cost. Also, the less mature the program the more detail that may be needed to evaluate status.	Accept Comment.
X 3	4		9	2	1st paragraph. A period should follow the word "maturity", the word "and" deleted, and a new sentence with "Cost estimate preparers", to read as follows: "a program should be appropriate for its maturity. Cost estimate preparers, reviewers....."	We feel lack of maturity is addressed through more detailed assumptions, not necessarily more estimate detail.
O 3	4		9	4	Recommend this Section and those on Assessment Criteria in the following Sections be consolidated and moved to Section IX. Assessment Criteria	Accept Comment. Move Chapter IX to the front end of Appendix F and change the title of Appendix F to "Assessment Criteria and Checklist".
X 3	4		9	7	Assessment Criteria. In general the assessment criteria goes beyond cost estimating. The planning questions are addressed in technical scoping meetings prior to the development of cost estimates in support of ADS submissions which after a number of iterations becomes the provided funding for both operations and projects.	We feel technical scope is integral to sound estimate development.
⌋ 3	4	1	9	2	Question marks should follow bullets three and five.	Accept Comment.

Chap	Sect	Sub	Page	Source	Comment	Resolution
3	4	1	9	2	The second "has" should be deleted from the first sentence of bullet seven.	Accept Comment.
3	4	1	9	7	Suggest addition: "have change control procedures been developed and implemented?" (Reference Page III-1, 2nd paragraph, which talks to the need for change control and procedures).	Delete the references on change control. Guidance on baselines is being developed by EM-30.
3	4	1	9	12	The level of detail of planning, scoping, cost estimating, and scheduling should be determined more by the risk associated with the program/project than by program/project maturity. Project maturity seems a subset of risk, in that experience should provide a greater grasp of risk. The risk-based graded approach of establishing project control system guidelines, including cost estimating and scheduling, is described in DOE N 4700.5, with which this Guide should be consistent.	Management controls is not discussed in the Cost Guide and is part of other guidance that is being considered by EM-30.
3	4	2	10	2	9th bullet. The word "are" following the parenthesis should be deleted.	Accept Comment.
3	4	2	10	2	First bullet, 4th dash. Intermediate measurable milestones are also needed in Level II and II schedules to measure and evaluate progress.	Accept Comment. Change to read "Discrete tasks and measurable deliverables."
4				8	We recommend that further detail be provided in this chapter on documentation of estimating assumptions and conditions.	Provide an example in Chapter VIII and reference the example in this chapter.
4	1		1	2	1st paragraph. Delete "a" from "methods" for developing (a) well-documented cost estimates..."	Accept Comment.
4	1		1	10	First line, use singular "estimate."	Accept Comment.
4	2			12	This section should also describe the method and approach for preparing an estimate for new, not fully defined work (i.e., future work that is unlike any work performed in the past and that will not begin until after the estimate is prepared and reviewed).	Modify the current example to give examples of estimates for different project/program phases (i.e. conceptual, design).
4	2	1	1	4	Delete the words, "as well", from the end of the second paragraph	Accept Comment.

	Chap	Sect	Sub	Page	Source	Comment	Resolution
X	4	2	1	1	7	Documentation needed to prepare the Estimate. The assumption made by the manual is that an internal cost system has been in place at the level of detail to capture the salient features needed for the development of "Work Units." In many instances this information is not available. In order to get to the stated position, resources must be made available to (1) time study operations to develop time units, (2) set up an internal time system which will capture these costs into the defined categories, (3) train all parties in the implementation and execution of this new system, and (4) measure the work units to see if they are realistic and make the appropriate changes. This process will not only require an unspecified amount of additional resources, but is obviously more time than is planned for the execution of this procedure for the 1996 budget submission. How can this effort be accomplished to support the ADS cycle which begins in Nov.? In our opinion this is not possible.	We agree that in some cases the information required to support the necessary documentation might not fully be developed for FY 1996 submissions. The Field Offices need to show progress towards collecting this information. Also, the pilots will assist in developing this information (see example II-4).
√	4	2	1	1	10	Last paragraph, rewrite to read, "Total activity costs can be divided by the quantity of work performed during the historical period resulting in the unit cost for each activity."	Accept Comment.
√	4	2	1	1	10	First line, delete "In order."	Accept Comment.
√	4	2	2	2	2	1st bullet. Define the acronym LOE.	Accept Comment.
O	4	2	2	2	4	The stated requirement for files retention, 4 and 9 years, should be checked for consistency with DOE Records Management requirements.	Accept Comment.
O	4	2	2	2	7	Back-up Documentation Files. Retention of cost estimates for ongoing waste operations for a period of nine years is excessive. The purpose and reason for this requirement should be stated. Contracts/subcontracts are not maintained beyond 3 to 6 years depending on dollar amount and these times are legal documents. Cost estimates are not legal documents. Secondly, the cost of maintaining and securing these items in accordance with DOE requirements would be excessive.	Accept Comment. Verify the requirement and change accordingly.

	Chap	Sect	Sub	Page	Source	Comment	Resolution
X	4	2	2	2	10	Last subparagraph. This paragraph addresses a "Cost estimate reviewer," and indicates that this reviewer may recommend adjustments during reviews of cost estimates. However, the paragraph does not address who this reviewer may be, and his or her responsibility or authority to change the cost estimate. Caution should be exercised in allowing the cost estimate to be changed without concurrence, or at least consultation with the cost estimator.	Field Offices need to implement their own specific review and concurrence procedures in local cost guides.
O	4	2	2	2	17	Specific definitions and examples for both direct and indirect costs should be provided.	Accept Comment. Add to glossary.
✓	4	2	2	3	2	Exhibit IV-1, General and Job-Specific Training Costs, 1st bullet. Delete the word "their" and insert 'to the'. The sentence should read: 'general training that is not directly related (to the) performance of...'	Accept Comment.
✓	4	2	2	4	2	Cost estimate change control, tracking, and documentation is extremely important and can not be over emphasized.	Delete the references on change control. Guidance on baselines is being developed by EM-30.
X	4	2	2	4	10	First paragraph. As a follow-on too comment number 35 above, this paragraph again addresses changes to the cost estimate without addressing who is authorized to make these changes. Again, it should be cautioned that allowing unrestricted changes to the cost estimate violates the premise of developing and ICE.	Field Offices need to implement their own specific review and concurrence procedures in local cost guides. Guidance on baselines and change control is being developed by EM-30.
✓	4	3		4	7	Deliverables. The first bullet provides cost estimate levels e.g., feasibility study, conceptual design, etc. Cost estimates may very well have mixture of information which is very firm and information which is a best guess. Slotting an estimate into one level of estimate or the another may misrepresent the type of cost estimate being presented.	Accept Comment. Add maturity of the estimate to the terminology.
O	4	3		4	12	The term "Peer Review Document" is introduced and refers to the document that describes the summary findings and recommendation of the peer group cost estimate review. This type of documentation is also called the Cost Estimate Review Document in the Introduction Chapter of the Guide. To minimize new terminology in the Guide, the Peer Review Document should be called the Cost Estimate Review Document prepared by the peer review group.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition and make terminology consistent.

Chap	Sect	Sub	Page	Source	Comment	Resolution
4	3		4	17	A complete technical scope description of the work to be performed should also be included under Scheduling Methods Deliverables (VII.C).	We don't feel it is necessary to include this information in both places. Review the Guide to ensure consistency between Appendix F and the Deliverable sections at the end of each chapter.
4	3		4	17	A summary of the rationale for schedule logic and selection of milestones should also be included under Scheduling Methods Deliverables (VII.C).	We don't feel it is necessary to include this information in both places. Review the Guide to ensure consistency between Appendix F and the Deliverable sections at the end of each chapter.
4	3		4	17	A product-oriented WBS and WBS Dictionary should also be included under Scheduling Methods Deliverables (VII.C).	We don't feel it is necessary to include this information in both places. Review the Guide to ensure consistency between Appendix F and the Deliverable sections at the end of each chapter.
5				8	This section includes a fairly general description of cost estimating methodologies and procedures. It provides a comparison of capital cost estimates to waste management cost estimates and then compares it further to ER estimates. The primary focus of this chapter is the capital estimate. Reference is made to adhering to the standards in DOE. Order 5700.2D and DOE Notice 4700.5. However, detailed guidance is not provided.	This Chapter is just an overview of the existing construction project estimation procedures and guidance. Add a sidebar to indicate that this chapter is a summary.
5				8	We recommend more guidance be provided in this section on the estimation of capital projects. In particular, specific guidance for TPC and TEC and Life Cycle Cost (LCC) estimates should be provided. The only mention TEC and TPC estimates is in the form of a question from a checklist on page V-12 which states "Have TEC and TPC definitions been properly applied?".	This Chapter is just an overview of the existing construction project estimation procedures and guidance. Add a sidebar to indicate that this chapter is a summary.
5				8	This section should also provide guidance for performing LCC analyses, trade-off studies, and sensitivity analyses.	This scope of this Guide is just cost estimation. Cost analysis guidance is being considered for future EM-30 guidance. Add a sidebar to indicate that this chapter is a summary.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	5			8	Cost and schedule risk analyses and their relation to contingency estimating and contingency management should also be addressed.	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.
O	5			8	Appendix E, Value Engineering, includes only DOE Order 4010.1A and OMB Circular A131. Specific guidance regarding the application of these orders should be provided.	The draft Value Engineering Implementation Guidelines was sent to the Field as an addition to Appendix E of the Guide. Review Appendix E for the appropriateness of its inclusion in the Guide.
O	5			8	An explanation of allowable items to be included in capital cost estimates as opposed to waste operations cost estimates should be provided. For example,conceptual design, NEPA, SAR, licenses, and preparation for operations are not included in the capital cost estimates.	The issue of defining TEC and TPC is being reviewed.
?	5			10	Summary of Capital Cost Estimation Procedures. The chapter gives a good overview and checklist of capital costs. However, since the EM-30 budget includes costs for capital cost construction, the manual needs to be as explicit for capital cost construction as it is for process operations costs. In estimating for capital costs, total capital costs need to be reflected, not just annual costs that are common to process operation functions. An example estimate for capital construction would be advantageous, reflecting both direct and indirect costs, and their application.	This Chapter is just an overview of the existing construction project estimation procedures and guidance. Add a sidebar to indicate that this chapter is a summary. ?
✓	5	1		1	10	Line 2. After "material" add "construction equipment."	Accept Comment.
O	5	2		1	2	Capital project efforts also include designs, Title III, inspection, procurement, management, data review, etc.	Review definitions (AACE and DOE) and revise.
O	5	2	1	1	4	Repeating those comments furnished on prior drafts of this document; the AACE definition is not consistent with DOE definitions (e.g., it ignores such capital costs as engineering and initial spares). Its continued insertion does not contribute to this Section on estimating methods. Therefore, deletion of the first sentence, second paragraph is recommended.	Review definitions (AACE and DOE) and revise.
✓	5	2	1	2	4	Recommend the phrase, "because...capital cost estimation." be deleted from the last sentence, third paragraph.	Accept Comment.

	Chap	Sect	Sub	Page	Source	Comment	Resolution
X	5	2	1	2	7	First paragraph, suggest eliminating "where available" from the fourth sentence; experienced cost estimation specialists should be required on capital projects.	We don't want to make the use of experienced cost estimation specialists a requirement.
O	5	2	1	2	15	In Exhibit V-1, the title and date for DOE Order 5700.2D is incorrect.	Verify citation and change as appropriate.
X	5	2	2	2	2	Analogy and parametric methods are very limited in their application and not very accurate. Not at all useful in unique or complex facilities/activities.	We agree, there is a place for this tool as described, it depends on the level at which the estimate is developed.
X	5	2	2	3	2	Bottoms-up provides the best, most accurate estimates. The others are faster and cheaper, but you get what you pay for. Also, a detailed WBS for a detailed estimate is good practice, but it's not required. In addition, bottoms-up are the most costly.	We agree, see paragraphs one and two on page V-3.
O	5	2	3	3	4	There are inconsistencies between the definitions in this Section, those in the Glossary, and those in DOE Orders. All definitions should be reviewed and amended, as necessary, to be consistent with those contained in DOE Orders 4700.1 and 5700.2D.	Accept Comment. Reference the correct DOE Orders.
O	5	2	3	3	4	Recommend moving the definitions in this Section to Appendix A and amending the second paragraph to reference this Appendix. Before moving, amend the Conceptual Design and Title I Design estimate definitions to delete the word, "Reports". These estimates are not based upon their respective design reports but are components of the reports. See DOE 4700.1, Appendices V-9 and V-11, pages 95 & 101.	Accept Comment. Reference the correct DOE Orders.
?	5	2	3	4	2	Title I Design Estimates. The contingency % can decrease as the estimate accuracy improves. Also, the DOE Code of Accounts is a very poor way to break an estimate and leads to lots of confusion.	Accept Comment.
√	5	2	3	4	15	We recommend that the definition of Independent Cost Estimate (ICE) be rewritten to show that ICEs are only developed by the PR-24 staff to agree with the definition in DOE Order 5700.2D. Any similar estimates developed in proponency channels should be labeled Check Estimates to avoid confusion.	Accept Comment.
O	5	2	4	4	4	Recommend the third sentence, first paragraph be amended to read, "Although the (category designations) of the estimates...(are not) exactly the same...."	Accept Comment. Rewrite this section.

Chap	Sect	Sub	Page	Source	Comment	Resolution
√	5	2	4	5	2	3rd paragraph, second sentence. Clarify by inserting the words 'capital project'. Sentence should read, 'Estimates for waste management operations, for instance, differ from capital project estimates...'	Accept Comment.
√	5	2	4	5	4	In the third paragraph, the reference to DOE Notice 4700.5 is incorrect. This Notice provides guidance on control systems, not estimates. The correct reference is DOE 4700.1. In addition, the referenced documents are not DOE standards, but policy and procedures. Since there are also "DOE Standards", substitution of the word, "requirements", for, "standards", is recommended	Accept Comment.
O	5	2	4	5	4	The value of the sixth paragraph, particularly it's last sentence, is questionable. Recommend consideration be given to deleting this paragraph.	Accept Comment. Rewrite this section.
X	5	2	4	5	4	Recommend the last sentence, first paragraph be deleted.	We feel this sentence is correct.
√	5	2	4	5	10	Paragraph 3, line 2, change to read"...for instance, differ from capital project estimates..."	Accept Comment.
O	5	2	4	6	4	The last two paragraphs are not in keeping with the subject of this Section, and their value to EM-30 is questionable. Recommend consideration be given to their deletion.	Accept Comment.
O	5	2	4	6	14	States that EM-40 projects have greater risk that EM-30 projects. Suggest this differential be eliminated.	We agree. Delete the two paragraphs.
X	5	3		7	2	Number 9. Most of the major Architectural Engineers have fully computerized estimating capability. Hard to get back up sheets.	Printouts from computerized systems are acceptable, estimates need to be traceable.
O	5	4		7	14	Assessment criteria paragraph should be streamlined.	Accept Comment. Move this section to Appendix F.
ↄ	5	4		8	2	Number 10. Safety levels must also be identified and considered in the estimate.	We agree, but we can't modify this checklist since it is a PR-24 (Program/Project Management Division) checklist. Replace the checklist with the most current version and move it to Appendix F.

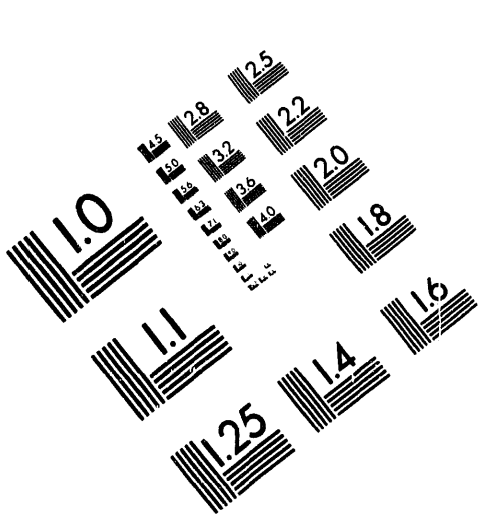
	Chap	Sect	Sub	Page	Source	Comment	Resolution
O	5	4		9	2	Other estimate considerations include weather, labor relations, union contracts, productivity factors, OSHA, RAM.	We agree, but we can't modify this checklist since it is a PR-24 (Program/Project Management Division) checklist. Replace the checklist with the most current version and move it to Appendix F.
✓	5	4		10	2	Number 9, 2nd sentence. Delete "od" and replace with 'to'. Sentence should read, "Has this been factored into the risk assessment (to) determine the..."	Accept Comment.
O	5	4		10	2	III. Schedules must contain contingency as well as cost estimates.	We agree, but we can't modify this checklist since it is a PR-24 (Program/Project Management Division) checklist. Replace the checklist with the most current version and move it to Appendix F.
O	5	4		10	4	Recommend Section be amended to add a factor, "Contract types".	We can't modify this checklist since it is a PR-24 (Program/Project Management Division) checklist. Replace the checklist with the most current version and move it to Appendix F.
O	5	4		10	4	Recommend this Section be amended to add "Are bulk material placement times consistent with that for comparable projects?"	We can't modify this checklist since it is a PR-24 (Program/Project Management Division) checklist. Replace the checklist with the most current version and move it to Appendix F.
✓	5	4		11	2	IV, A, Number 5, 4th sentence. Change "o" to 'of'. Sentence should read, "What changes in estimates have occurred as a result (of) changes... "	Accept Comment.
O	5	4		11	2	IV, A, Number 9 & 12. Government furnished equipment needs to be warehoused.	We can't modify this checklist since it is a PR-24 (Program/Project Management Division) checklist. Replace the checklist with the most current version and move it to Appendix F.

Chap	Sect	Sub	Page	Source	Comment	Resolution
O	5	4	11	2	IV, A, Number 9 & 12. The method of estimating indirects is very important, especially on subcontracts. May need to lay out the subcontractor's organization to get the best estimate of people required.	We agree, but we can't modify this checklist since it is a PR-24 (Program/Project Management Division) checklist. Replace the checklist with the most current version and move it to Appendix F.
✓	5	4	11	2	IV,A, Number 6, 3rd sentence. Change "e.c" to 'i.e.'	Accept Comment.
O	5	4	12	2	B. Other considerations for construction work include enclosed space, radiation, contamination, training, access (security), clearances.	We can't modify this checklist since it is a PR-24 (Program/Project Management Division) checklist. Replace the checklist with the most current version and move it to Appendix F.
O	5	4	13	2	D. Costs also include spare parts, chemicals, testing and checkout, cold operation, and documents - QAP, PMP, procedures, FSAR, EA, PTC.	We can't modify this checklist since it is a PR-24 (Program/Project Management Division) checklist. Replace the checklist with the most current version and move it to Appendix F.
O	5	4	14	2	Insert the word 'manager'. Sentence should read, "Program and field office comments should be resolved by the program (manager) prior to..."	We can't modify this checklist since it is a PR-24 (Program/Project Management Division) checklist. Replace the checklist with the most current version and move it to Appendix F.
X	6			8	Planning Estimates. This guidance document focuses on only the annual budget estimate. There is no discussion of out-year estimating requirements. We recommend that this guidance document follow the DOE EM FYP which includes the current year, the budget year, and five planning years. If the total quantity of waste (or the end of production) can be estimated, then a Life Cycle Cost (LCC) estimate should also be prepared. The LCC perspective will provide management with valuable planning information and may effect the current technical planning e.g., purchase of new of new equipment/processes. The guidance should stress this situation.	The Guide only covers cost estimation, not budget development. Cost analysis guidance is being considered for future EM-30 guidance.
O	6			8	Planning Estimates. We recommend that this guidance document discuss techniques for estimating waste operations when there is little detailed technical information available to the estimator. This guidance should recognize and specifically address this situation.	Modify the current example in Chapter VIII to give examples of estimates for different project/program phases (i.e. conceptual, design).

Chap	Sect	Sub	Page	Source	Comment	Resolution
O	6			8	Cost Analysis. There is no discussion of cost analysis in this chapter. We recommend that the guidance discuss the many cost analyses that should be made available to the project/program manager. The analyses listed in Attachment II include LCC analysis, trade-off studies, benefit cost analysis, and sensitivity analysis. A description of the purpose for each of these analyses should be included. It may be appropriate to develop a white paper on these analyses or provide an example.	The Guide only covers cost estimation, not budget development. The draft Value Engineering Implementation Guidelines was sent to the Field as an addition to Appendix E of the Guide. Review Appendix E for the appropriateness of its inclusion in the Guide.
O	6	2		1	4 Recommend the fifth and sixth sentences, second paragraph, be rewritten for clarification. Suggest: "Once baselined, the cost estimate provides a basis for funding and cost performance measurement. It may also be used as one basis for evaluating bids received. The cost estimate for an EM operation may be similarly used."	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
X	6	2	1	2	2 Exhibit VI-1. An estimate without a schedule is not wise. They go together and should not be separated.	We agree, see Chapter VII.
X	6	2	1	2	2 Exhibit VI-1. Estimate contents should include contingency.	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.
O	6	2	1	2	4 Recommend eliminating Section B.1, by moving the first paragraph and first sentence of the second paragraph to Section B.2.o, and deleting the remainder of B.1, including Exhibit VI-1. Renumber B.2 as B.1.	Accept Comment. Consolidate B.1 with B.2.o and delete exhibit VI-1.
O	6	2	1	2	7 Exhibit VI-1, bullet C. In order to respond to the budget process as well as the cost control process, the WBS for the cost estimates should correspond directly with the HQs and Site WBS. In doing so, budgets, cost estimates, and cost reporting can be tied to one WBS number.	We agree, each Field Office is responsible for developing a WBS that rolls into the programmatic WBS. Add a new diagram in Chapter III that shows the relationships between the various WBS levels.
✓	6	2	1	2	10 Delete Exhibit VI-1. It is a repeat of Exhibit VI-2.	Accept Comment.
✓	6	2	1	2	14 Suggest substitute Exhibit VI-2 for Exhibit VI-1	Accept Comment.
✓	6	2	2	2	2 paragraph a, 3rd sentence. Insert 'the' to read, "The purpose statement should indicate to (the) best of the..."	Accept Comment.

Chap	Sect	Sub	Page	Source	Comment	Resolution
6	2	2	2	4	Recommend the words, "specifically, each", be substituted for the word, "all". Too often, WBS dictionaries are not specific enough to differentiate between work components.	Accept Comment.
6	2	2	2	4	Recommend: Exhibit VI-2 be deleted; the first paragraph, third sentence be amended to read, "Generally, these steps occur in the Order shown in Section VI.C; and the fourth sentence be deleted.	Delete Exhibit VI-1 instead. Revise the title of Exhibit VI-2 to "Estimate Development Outline-Contents". Revise Exhibit VI-2 the reflect the exact estimate development steps and content.
6	2	2	2	4	In subsection "a.", delete the second sentence and the phrase, "to the best of the estimator preparer's ability", from the third sentence. Also, delete the words, "planning and", from the last sentence since, in prior Sections, planning estimates are synonymous with study estimates.	Accept Comment. Revise the wording to differentiate between estimates and budgets.
6	2	2	2	4	In subsection "c.", delete the last sentence, first paragraph. It conflicts with subsections "d." and "e.". Also, delete the second paragraph. It is unnecessary and is misleading in stating, "For most facilities in the DOE complex...". To be correct, every DOE site, building, structure, and utility system would have to have a WBS number assigned. They don't and should not.	Delete the last sentence first paragraph. Delete the first sentence second paragraph and add the following sentence to the end of the second paragraph: "The estimate-specific WBS must be a logical extension of the contractor and programmatic WBS."
6	2	2	3	4	Delete the second paragraph from subsection "b.", or rewrite to eliminate redundancies.	Accept Comment.
6	2	2	3	10	Rewrite paragraphs "d" and "e" to separate information by paragraph heading or combine into one paragraph.	Accept Comment. Rewrite "e" to concentrate more on the development of activities and move all activity dictionary references to "d".
6	2	2	5	2	paragraph h. Unit pricing has major limitations that need to be recognized if this method is used i.e., many DOE projects are unique.	Each Field Office needs to develop their own unit prices.
6	2	2	5	4	Digest subsection "h.". This could be done by: consolidating the first and fifth paragraphs (including bullets); deleting from the second paragraph the sentences, "DOE EM-30....activity based estimate" as redundant to Section IV.B.1.; and deleting the unnecessary last paragraph.	Rewrite this Section. The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.

	Chap	Sect	Sub	Page	Source	Comment	Resolution
O	6	2	2	5	10	Listing at bottom of page is very similar to list at top of page. Recommend combining lists into one list.	Rewrite this Section. The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
O	6	2	2	6	4	In subsection "i.": delete the phrase, ", for example,"; delete the last sentence n the box; and consider eliminating the box inclosure.	Rewrite this Section. The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
O	6	2	2	6	4	Recommend reference be made to the appropriate PR Cost Guide volume in subsection "k.". Also, recommend the second paragraph on page VI-8 be amended to substitute the phrase, "activity or project", for the word, "project", since both methods of applying escalation are commonly used. Further, recommend the last paragraph in this subsection be deleted. ENR indices are not applicable to most plant operations.	Accept Comment. Reference the correct PR Cost Guide. Delete the sentence on ENR indices. The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
X	6	2	2	6	8	We recommend that the development of the "estimate factors" be based on cost, schedule and technical risk analyses. Comprehensive guidance should be provided regarding these risk analyses.	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.
X	6	2	2	6	8	Cost and Schedule Risk Analysis. Page VI-6 discusses the development of "estimating factors" to adjust productivity. Some of these estimating factors are listed in exhibit VI-3. The factors address some of the elements of cost risk. However, the subject of cost or schedule risk is not discussed. There is no discussion of systematic method of calculating the value of these factors (in terms of cost/schedule impacts).	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.
√	6	2	2	6	10	Paragraph J. change last line to read "...may consider when developing an estimate factor."	We feel this sentence is correct. Add a period to the end of the sentence.
O	6	2	2	7	2	Exhibit VI-3. Other influences on productivity include weather, rock depth, water level, OSHA, enclosed space, high-consequence lifts, radiation, contamination, heights, access, etc.	Accept Comment. Include DOE specific factors.
1	6	2	2	8	2	2nd box. Question is unclear, implies three different examples at three different escalation rates. Specify 2% in year one, 3% in year two, etc.	Accept Comment. Provide percentages for each year.



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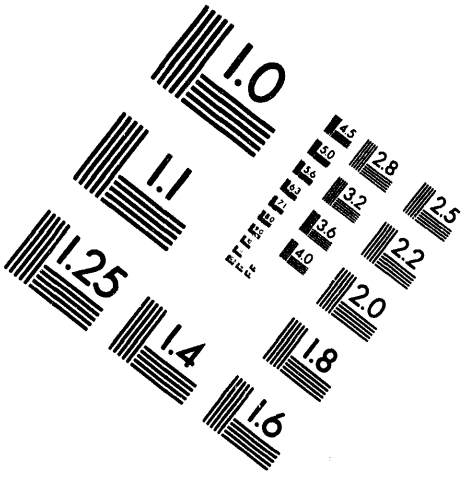

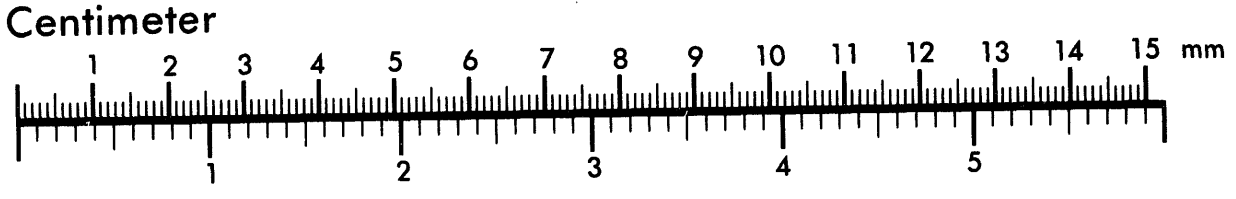

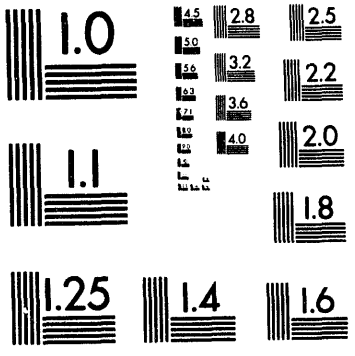

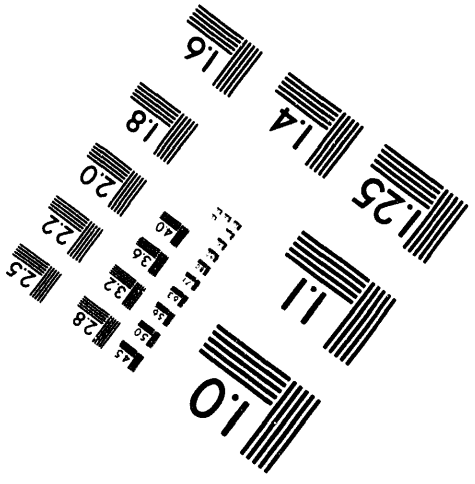

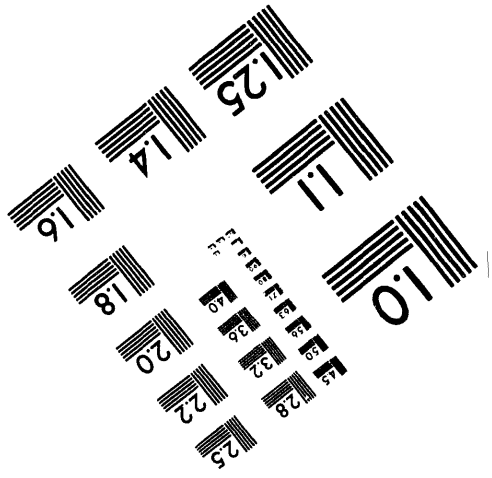

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Chap	Sect	Sub	Page	Source	Comment	Resolution
6	2	2	8	4	Recommend restructuring Section B to relocate subsections, "l." and "n." to before the subsection on escalation. Escalation is applied based upon the schedule, and escalation impacts indirects as well as direct costs.	Accept Comment.
6	2	2	9	2	paragraph m, last sentence. Parentheses need to be closed.	Accept Comment.
6	2	2	9	2	paragraph p. Part of estimate review includes review and resolution of comments.	We agree, see page VI-10, paragraph one.
6	2	2	9	4	Revise subsection "o." As recommended in comment 20.b and delete the second paragraph as redundant.	Accept Comment.
6	2	2	9	7	"o.", Develop estimate criteria document. This information can be put under g. Identify assumptions and exclusions. Why generate another separate paragraph or document when this information is available in g? Again, efficiency can be gained by keeping the approach as simple as possible.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
6	4		10	2	Estimates need annual updates with continuous change control.	Estimates should be updated as the program/project matures.
7				8	We recommend a discussion of schedule risk be included in this chapter. There are schedule risk analysis models and techniques available for this analysis which should be mentioned in this section.	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.
7	1		1	2	Schedules need to be resource loaded especially at Levels II and III.	We agree, all schedules should be resource loaded at the appropriate level.
7	1		1	4	Recommend this Section be restructured to eliminate intermingling of discussion of bar charts and CPM.	Accept Comment. Relocate bar chart and add subheadings.
7	2		1	4	Delete the words, "Critical Path Methods, from the section title.	Accept Comment.
7	2	1	1	10	Line 4. Change to "...for its performance and shows when that activity is planned..."	Accept Comment.

Chap	Sect	Sub	Page	Source	Comment	Resolution
7	2	1	2	2	3rd paragraph. Exhibit VII-1 should follow this paragraph.	Accept Comment.
7	2	1	2	4	Delete the fourth paragraph and replace it with Exhibit VII-1.	Relocate Exhibit VII-1.
7	2	1	2	4	Amend the existing third paragraph (new second para.): to eliminate overly positive statements (e.g., many organizations do base bar chart schedules on past experience and calculated duration curves, and do indicate inter-relationships between activities on bar charts.); and to delete the redundant and undefendable sentences, "This type of schedule....operations. The bar chart....operations."	Delete the 6th sentence and revise the 5th sentence to read "..of any appreciable size and scope, including most ongoing..."
7	2	1	2	4	Delete from the first paragraph, the phrase, "; use of such software...software packages.", and delete the second paragraph.	Put a period after the words software packages on the second line and delete the rest of the paragraph.
7	2	1	4	2	3rd paragraph, last sentence. This sentence should reference Exhibit VII-2 to clarify the exhibit. For example, Activity Number 4 should be identified as critical, Activity 3 as free float (or non-critical?).	The critical path can't be determined from Exhibit VII-2.
7	2	1	5	2	2nd paragraph, last sentence. A bar in Exhibit VII-3 should be partially filled in to illustrate this.	Accept Comment.
7	2	2	5	2	Highlighted box. The information in this box should be in the form of bullets, or at least reduced/condensed. Little is offered to the reader by repeating the text of the accompanying paragraph.	Accept Comment.
7	2	2	6	7	References Section III.B.5. There is no section on risk analysis principles in the guide. It appears to have been omitted. On the subject or risk, definitions and discussions of the types and impacts of risk needs to be addressed in a more complete manner. Several areas of risk might be financial (fee and unallowable cost), human health and safety, environmental, contractual risk, etc. All of these play a part in what goes into the cost estimate. The guide has not addressed these.	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.
7	2	2	6	8	Risk analysis in mentioned and references "Section III.B.5" for a further discussion of this topic. This section does not exist, however. Was it deleted from a previous draft?	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.

Chap	Sect	Sub	Page	Source	Comment	Resolution
7	2	2	7	2	3rd paragraph, 1st sentence. Delete "the" preceding the word "widely". Sentence should read, "by use of one of the many widely available..."	Accept Comment.
7	2	2	7	10	Paragraph 3, line 1. Change to "...one of the many widely..."	Accept Comment.
7	2	3	8	2	2nd paragraph, 3rd sentence. Insert 'or' before the word "equipment".	Accept Comment.
7	2	3	8	7	Resource Loading and Schedule. Resource loading of schedules should be limited to the funded year only and only if it makes sense to do so. The detail that is required, the labor requirements of the efforts, and most importantly the number of technical and funding changes that occur, would make the cost and tracking effort very difficult and expensive. It is recommended that the degree of application be left to the responsible managers to determine at what level to manage. Total dollars per activity may be the best way to track an activity for baselining purposes.	Resource loaded schedules are required. Estimates are developed commensurate with the level of information available (See page I-2).
7	2	4	8	10	"Examples..." Suggest moving entire paragraph text to Section VIII annotated example, with only a note here "See Section VIII for example."	Accept Comment.
7	3		9	7	Deliverables, first bullet. A detailed network calculation may not make sense for a continuous operation where the input is decided by the outflow of others e.g., a sewage treatment plant.	This depends on the level of detail, maturity of the program, and ability to differentiate operation activities.
7	3		9	10	Deliverables. Delete duplicated third sentence. Add the word "including:" at end of second sentence.	Accept Comment.
X 8				7	Given this simplistic example, the cost for developing, tracking, and reporting is not clearly evident. There is a section entitled "Record keeping, reporting, and compliance" which has 2052 hours which appears to be for inventory waste tracking. the question is, what is the cost to develop, charge, track, maintain, update and report in a manner consistent with the approach being recommended. The hours utilized and the associated cost may not be cost effective. Administrative costs are not free, especially when one is tracking and reporting at the hourly level.	We agree, pilot studies will indicate these costs.

Chap	Sect	Sub	Page	Source	Comment	Resolution
O	8			7	Example of Annotated Cost Estimate. This example is good illustration of the concerns presented above concerns involving the level of resource required to maintain this proposed system. This system is too detailed given the amount of changes that occurs in the Waste Management Program. One of our major clients is Environmental Restoration, whose budget and technical changes are even more dramatic than Waste Management. Another consideration is a situation (radiation contaminated materials) where there is much greater complexity than the one found in this example. This could only complicate the matter even more.	Estimates will be prepared commensurate with the level of detail available and the maturity of the program. Modify the current example to give examples of estimates for different project/program phases (i.e. conceptual, design).
O	8			8	The annotated estimate follows the guidance, of course, and therefore suffers from the findings mentioned above (reference the discussion on Chapter VI). The stated purpose of this estimate is "to prepare in FY95 operating budget," which is not sufficient to satisfy the FYP General Guidance requirements or the EM Cost and Schedule Estimating Policy which require the waste operations estimates cover the five planning years as a minimum.	Modify the current example to give examples of estimates for different project/program phases (i.e. conceptual, design).
✓	8		1	2	1st paragraph, 3rd sentence. Replace the word "this" with 'the following'. Sentence should read, "These steps occur roughly in (the following order."	Accept Comment.
✓	8		1	2	1st paragraph, 4th sentence. Delete entire sentence, it is unnecessary.	Accept Comment.
O	8		1	2	Purpose of Estimate section. Paragraph is repetitive. Delete 2nd and 3rd sentences, the information is contained in the fourth sentence. Should read, "...clear, unambiguous terms. The purpose statement should indicate to the best..."	Accept Comment. Revise to be consistent with Chapter VI.
O	8		1	2	Delete 6th sentence starting, "The purpose is stated..."	Accept Comment. Revise to be consistent with Chapter VI.
✓	8		1	10	Paragraph below list of 15 items, add the sentence, "See Exhibit VIII-1 for Activity Flowchart."	Accept Comment. Relocate Exhibit below the 15 items.
✓	8		2	2	Scope box, last sentence. Delete "All too often.". Begin sentence 'The process of...'	Accept Comment.

Chap	Sect	Sub	Page	Source	Comment	Resolution
O	8		3	2	Activity Dictionary box, last sentence. Delete "a." Sentence should read"... be referenced to WBS and Activity Dictionary descriptions..."	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
O	8		5	10	Assumptions and Exclusions, 4th bullet. The estimate does not include costs for equipment to move the drums, but instead states that the motor pool will supply the equipment. Likewise, the cost example spreadsheet do not include a column for equipment costs. Equipment costs for activities such as On-Site Transportation and Security Escort would thus be buried in motor pool costs, thereby reducing the actual total cost of the activity. Recommend that equipment costs be included in the estimate by work item or activity. Otherwise, the unit cost will be incomplete.	Accept Comment. Revise example to indicate how labor rates are developed. Each Field Office must include all the correct costs in their units costs. The important issue is to ensure all costs are accounted for and are not double counted.
O	8		5	10	Estimated Labor. The example quotes show different hourly labor rates. The rates appear to be burdened, but this is not apparent. Also, it is not apparent whether the rate is for a certain class of skilled labor, or if it is a combination rate for different classes of labor. Does the rate mix in hourly costs for supervisors, clerical, etc.? Recommend that the chapter devote a section to a detailed development of labor rates.	Accept Comment. Revise example to indicate how labor rates are developed.
O	8		6	2	3rd paragraph, Inspection and Inventory Check. Average time should be '2.0 labor-hours per (inspection).' Each inspection includes more than one drum.	Accept Comment. Correct units.
X	8		6	2	Weekly checks of charges to accounts are essential to verifying charges and controlling costs.	We agree, however, this is a management control issue; the estimate assumes the data is correct.
X	8		6	8	The sections of the annotated estimate addressing the basis of the estimate provides very valuable guidance. For example, the discussion regarding the "Basis for Activity Time Estimates" provides the answer to many of the CQMA findings throughout the DOE complex. Examples of the basis include statements such as "work sheets, time sheets summaries, and storage facility inventory records supporting each of the time estimates are on file in the central file of the Waste Management Office, Budget File Number 1.2.3.3.93." If the Field Offices develop this supporting documentation system with a well delineated explanation fo the calculations based on history, vendor quotes, or extrapolations of the referenced data, then a major obstacle to the validation/ reconciliation of the estimates will be removed resulting in a defensible and credible estimate. However, either this HQ guidance or FO guidance should be given to the estimator regarding the procedures for developing and formatting this supporting documentation.	We agree.

Chap	Sect	Sub	Page	Source	Comment	Resolution
O	8		7	10	Supplies Needed for FY95. The charges shown for supplies are in fact those for materials and supplies. Recommend the charges address whether or not the materials are invoice priced, and if they include the costs of purchasing, warehousing, and distributing.	Modify example to indicate purchasing, warehousing costs, etc...
O	8		7	14	Detailed breakdown not provided for more than 50% at the estimate (5000 coveralls, gloves, etc.).	Accept Comment.
O	8		9	2	Exhibit VIII-2. Where are the costs of audits, surveillance, technical safety appraisals, and health physicists?	Modify Example.
X	8		9	2	Exhibit VIII-2. Units (i.e., dollars or drums) should be identified at the top of each column and in the report total.	We feel this is covered, see quantity column.
X	8		11	2	Columns with no headings and zeroed out should be deleted.	The is reported at the summary level, see page VIII-9.
?	8		11	2	Units (i.e., dollars or drums) should be identified at the top of each column and in the report total.	This is a function of the software being used, it may not be possible to delete.
O	8		12	8	The example on page VIII-12 regarding the application of "estimating factors" mentioned that these factors must be considered but did not illustrate how to develop these factors for the annotated estimate. There was no explanation of which factors would be appropriate, of what value these factors should have, or how to apply them to the annotated estimate.	Accept Comment.
O	8		12	14	Repeat of page VI-7.	Accept Comment. Revise to indicate how to develop and apply factors.
O	8		13	14	Repeat of page VI-8.	Accept Comment. Reference equation and show how to apply escalation.
O	8		15	2	Exhibit VIII-5. Activity titles are not always the same as those in the cost estimate.	Accept Comment. Revise as appropriate.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	8		16	2	Exhibit VIII-6. Where are supplies reported?	This Exhibit does not include supplies; labor only.
O	8		16	2	Exhibit VIII-6. What does the line curve represent (ACWP or BCWS).	Accept Comment. Revise to read "cumulative labor hours."
O	8		16	2	Exhibit VIII-6. Need units on the right hand scale, thousands of what?	Accept Comment. Revise to read "cumulative labor hours."
X	8		16	2	Exhibit VIII-6. Should include the time-now line.	The project has not started, the time now line = 0.
O	8		17	2	Exhibit VIII-7. Where are supplies tracked and reported?	Accept Comment. Modify example and remove Exhibit.
O	8		17	2	Exhibit VIII-7. Units must be identified to avoid confusion.	Accept Comment. Modify example and remove Exhibit.
O	8		17	2	Exhibit VIII-7. A variance report should accompany this report.	Accept Comment. Modify example and remove Exhibit.
O	8		17	2	Exhibit VIII-7. The quantities (drums?) should not be added to hours in the Budget Labor Hours column.	Accept Comment. Modify example and remove Exhibit.
O	8		20	2	Exhibit VIII-8. Average usage for week needs units. Assume its hours.	Accept Comment. Revise as appropriate.
O	8		20	2	Exhibit VIII-8. Totals don't agree with those in Exhibits VIII-7, nor does the monthly usage.	Accept Comment. Revise as appropriate.
O	9			4	Recommend this Section be expanded to incorporate Assessment Criteria from prior Sections. Any duplication in criteria should be eliminated during this relocation.	Move this section to Appendix F as an introduction.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	9			8	This chapter discusses the EM-30 review process. Outside reviews are excluded from this discussion. Exhibit I-1 on page I-3 "DOE EM-30 Cost Estimate Review Hierarchy" is the focus of discussion. No reference is made in this chapter, or anywhere else in the guidance document, to the "General Guidance for Preparing Cost/Schedule Estimates and conducting Independent Cost Estimate Reviews (ICER). The guidance for conducting peer reviews does indicate that the quantities and activities will be reviewed by the M&O contractor. However, there is no discussion of developing independent check estimates. There is no direction to the FO to conduct, or hire an independent source to conduct, independent check estimates.	ICERs are beyond the focus of this guide, Standard Operating Practices and Procedures will address ICERs.
X	9			8	We recommend that the FYP guidance on ICER be included in this chapter.	ICERs are beyond the focus of this guide, Standard Operating Practices and Procedures will address ICERs.
X	9	1	1	10	Assessment Criteria. The "Assessment Criteria" for review of cost estimates as laid out n the introduction and in Chapter IX may invite closer scrutiny of estimates by OMB and Congress. The last paragraph on page IX-1 states, "DOE EM-30 recommends that higher level reviews conducted by DOE Headquarters or DOE Field Office management focus on relatively broad issues related to the cost estimate, schedule, and technical scope, and not dwell on the technical details of the cost estimate." The second box found on page IX-2 clearly indicates that the technical review of M&O prepared estimates will be accomplished by the M&O contractor through a "peer review" process. USACE considers technical review as a "contractor oversight" responsibility, and therefore, inherently a "Government Function." USACE accomplishes technical review with Government employees or in some cases with contractors that are independent of the contractor contractor providing the estimate. The EM-30 position appears to delegate this oversight function to the M&O contractor. Delegation of Government Oversight functions may result in outside agencies having less confidence in the estimate. We recommend the M&O "peer review" be required as part of the contractors quality assurance program, and that the DOE Field Office provide "Government Oversight" by performing a detailed technical review of all contractor prepared estimates.	ICERs/ICEs address this concern. Also, DOE Field Offices employing independent contractors will perform this level of review.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X 9	2		3	7	Paragraph 2, "As previously discussed, a major objective is to standardize and simplify the internal assessment and review process for cost estimates." If simplification is an objective why is the Assessment Criteria guide 15 pages long and your example cost estimate 19 pages long. In our opinion your objective is not being met. To be applied consistently, the assessment guide requires training in its interpretation and application. We recommend the following simplified questions be used in place of the assessment guide: (1) Is the technical/operation scope understandable and appropriate, (2) Is the schedule consistent with the scope, and (3) are the direct and indirect costs appropriate and reasonable. If the answer to these 3 simple questions is yes, then the cost estimating objective has been met.	The assessment criteria is all-inclusive and is not required for all estimates; only for the greatest level of cost, detail, and maturity.
O 10				4	Amend the definitions to agree with those already defined in DOE Orders (e.g., 4700) and amend the description of "Project", for consistency with the footnote on page I-4	Accept Comment.
O 10				4	Expand this Section to identify the meaning of additional terms used in this document (e.g., CQMA)	Accept Comment.
O 10				7	ICE: "An independent cost estimate also serves as a basis for verifying cost risk assessment." This sentence needs clarification. What does "cost risk" mean?	Accept Comment. Revise to be consistent with DOE Order 5700.2D. Guidance for contingency and risk analysis will be developed by EM-30.
√ 10		A4		7	Logic: This definition is not useful as stated. Perhaps something like, "the application of normative formal principles or reasoning in the development of cost estimates" would be better.	Accept Comment. Delete definition.
O 10				7	Risk Level: This definition is in error. Risk, in an economic sense, is the chance that particular decision or action can give rise to a variety of outcomes for which one can calculate the mathematical probability, and hence derive the risk levels. Uncertainty is the inability to predict the outcome of an event in advance. In addition, something that is complex does not necessarily have a high level or risk and/or uncertainty associated with it.	Accept Comment. Revise to be consistent with DOE Order 5700.2D. Guidance for contingency and risk analysis will be developed by EM-30.
√ 10				10	Appendix A, Glossary. Recommend addressing the terms, "Direct Cost," Indirect Cost," and "Target Cost."	Accept Comment. Revise to address "Direct Costs" and "Indirect Costs".

Chap	Sect	Sub	Page	Source	Comment	Resolution
O	10			12	"Undistributed budget" should be defined, and an example of how it applies to on-going waste management operation should be provided.	The Cost Guide focuses on how to prepare an estimate, not a budget. Find references to undistributed budget and delete them.
O	10		A4	2	Time Scaled Logic Diagram: "PERT" is not listed.	Accept Comment. Add PERT definition.
✓	10		1	2	Procurement Documents: Not generally used to determine purchase requirements, unless they include drawings and specifications.	Accept Comment. Delete definition.
O	10		1	2	Generally, cost estimates are prepared not conducted (several places).	Accept Comment. Revise as appropriate.
O	10		1	2	Need to define undistributed budget, certified cost consultant, and thresholds.	The Cost Guide focuses on how to prepare an estimate, not a budget. Find references to undistributed budget and delete them. Add AACE definition for certified cost consultant. Thresholds depend on the activity being estimated.
?	10		1	2	Account Structure. Account Structure: What is "control account work?"	Delete the phrase "cost account work".
O	10		5	10	Appendix. Definition for "Productivity." Last sentence is FALSE. Make it true by changing "labor factor" to "labor-hour" in two places.	Research and modify definition as appropriate.
✓	10		7	10	Appendix. Definition for "Time-Scaled Logic Diagram." Delete "(See also "PERT)." Glossary has no such entry.	Accept Comment. Add PERT definition.
BB. O	11			7	Activity Dictionary: The example provided on the first page of this Appendix is incorrect, and contradicts statements made throughout the document. Activity analysis may be performed using an organizational, function, or process approach, each approach has advantages and disadvantages and the option of which approach to select should be left to discretion of the responsible manager and cost estimator.	Review and revise as appropriate.
✓	11		1	4	Question the advisability of using the acronym, "AD". The uninitiated can too readily confuse it with the acronym, "ADS".	Accept Comment. Use full terminology.

Chap	Sect	Sub	Page	Source	Comment	Resolution
O 11			2	4	Recommend the definitions on pages B-2 and B-3 be moved to Appendix A, Glossary.	The Activity Dictionary is not a glossary, it is a description of the work that occurs in a program. Revise AD to explain this. Use the correct DOE definitions.
X 11			3	4	The definition shown for ,"Capital Construction" is over simplified. Revise to agree with that in DOE Order 4700.1, Change 1, Attachment 3.	This is a description of the work, not an accepted definition.
APP B 11 D 12			2	15	Page B-2 seems to need some transition/introductory words from B-1 for clarity.	Accept Comment.
APP. D. O 13			1	10	Appendix. Recommend changing the term"target" to "baseline" to be more consistent throughout the document.	Review and revise as appropriate.
X 13			1	10	Appendix. Be consistent in verb use with "cost estimate and schedule." Is it singular or plural?	Baselines are beyond the focus of the Guide, guidance on baselines is being developed by EM-30.
✓ 13			2	10	Appendix. Paragraph 4, line 4. Should reference be to "Section VIII" instead of "Chapter 7?"	Accept Comment.
O 13	2			7	Program Controls, paragraph 5. This paragraph discussed the S-curve utilized in some projects. In operations this curve in many instances is not appropriate. What is appropriate is the production rate and the proportion of variable costs to fixed costs. The expenditure level is proportional to extent that the percentage of variable costs increase.	Accept Comment. Revise accordingly.
APP. E. O 14				7	Value Engineering: This section should be deleted.	Review Appendix E for the appropriateness of its inclusion in the Guide.
APP. F X 15				7	Page F2 through F15, Assessment Criteria. Many of the assessment criteria listed in Appendix F use terminology that is discussed in detail in the guide. We recommend that the section and page that discusses the terminology be references in the assessment criteria. This should make it easier for a person to determine exactly what the terminology means.	We feel the individual criteria at the end of each Chapter satisfies this.

Chap	Sect	Sub	Page	Source	Comment	Resolution
15				9	It was our observation that the Checklist shown in Appendix F appears to include components that would be included in a baseline establishing activity, but not necessarily in a traditional cost estimate. It was unclear whether this is because of the emphasis placed on estimating waste operations activities, or if the emphasis will merely be shifted to include baseline preparation at some point in the future. It is suggested that this be clarified, it possible.	Similarities exist between baselines and establishing estimates.
X	16			2	In several sections of the guide, the need to have well-documented cost estimates is discussed. Estimates also need to be accurate and timely. Suggest that these two requirements be added to the discussion. (Executive summary, B; p. vi Section VIII; and p. I-2)	These are budget driven objectives, not estimating.
X	16			2	Little is said in the document about conceptual vs operating, conceptual vs capital, or operating vs capital dollars. A brief discussion concerning the colors of money would be helpful.	This is a budgeting issue, not required for estimates.
O	16			2	Some sections (i.e., Chapter III) are a bit dense. Efforts should be made to make them more "user friendly" and easily accessible for quick references.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
O	16			2	Acronyms should be spelled out with their first use in each section.	Accept Comment. Revise accordingly.
O	16			2	The content of the shaded boxes is often inconsistent. In some chapters they highlight the content of the adjoining paragraphs, in other chapters they act as a supplement or provide an example (section VI) to the adjoining discussion. Recommend shaded boxed be used only to highlight paragraphs for easy reference.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
X	16			3	Refer to Chapter II, Page 6, Section B4, Paragraph 2: The recommendation for low-tech, low cost, short term pilot studies to develop interim unit rates may have a financial impact, no matter how simplified the text intends it to be. This could require additional personnel.	We agree, the field needs to provide resources accordingly.
)	16			3	Appendix D, Program Controls and Appendix E, Value Engineering, clearly do not belong in the estimating guide and should be omitted.	Review Appendix E for the appropriateness of its inclusion in the Guide.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	16			3	Contingency needs to be considered and how the risks estimates are developed and what the factors are based on certain circumstances or risk.	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.
O	16			3	Refer to Chapter II, Page 1 Section A1, Paragraph one: The term "fully burdened" should be defined for labor, material, equipment and subcontracts. Burdened is a term normally used in conjunction with labor for labor costs, taxes and fringe benefits. Exhibit IV-1 indicates labor fringe benefits are indirect costs, which does not appear consistent with fully burdened direct labor dollars.	Add to Glossary to clarify the meaning. See II.B.4 (page II-6). Revise exhibit IV-1 as required.
X	16			3	There are several references to obtaining vendor quotes for estimate preparation with no guidance to avoid FAR violations. Specific instructions should be included in the guide to preclude compromising the procurement process.	This should be described in local cost guides.
X	16			3	It is easier to develop estimates at a level lower than actual costs can be reasonably collected. While parity between the two is desirable, there may be significant expenditures involved in developing actual cost collection systems that will parallel the estimating process. Since this is an estimating guide it should not propose to set criteria for other DOE/contractor systems.	The Cost Guide is not a budget driven document, actual cost collection systems are not specified and the guide does not ask for changes in the system.
X	16			3	The workshop recommended not relying on historical costs for estimating future needs. Hanford has many operations and procedural requirements that do not change from year to year. Consequently, historical costs may be appropriate to use. Again, we need to be pragmatic in considering the costs of developing estimates for estimates sake.	Historical activity data, including activity times and production rates should be evaluated.
X	16			3	It would be helpful if EM developed an overall manual that consolidated each of the organizational (EM-20, EM-30, and EM-40 and others if they plan to issue their own) cost estimating guidelines. A balanced guidance document would be very useful in the field particularly for cross training of estimators. The EM-24 criteria is very much project oriented, the EM-30 guidelines are process oriented (unit cost breakdown of a process) and EM-40 is predicated on a total program baseline approach (life cycle costs). Such an approach would resolve issues on estimating where HQ offices do not agree.	We agree, however this is out of scope for now.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	16			3	The Guide puts a great deal of focus on the assignment of unit costs to each scheduled activity. Unit cost methodology is further portrayed as a critical element for a justifiable cost estimate. We agree with the basis for developing unit cost for a discrete activity, we disagree that each scheduled activity needs a unit cost to be a viable and defendable e- -te. Many discrete activities (such as waste pretreatment research, and waste retrie- -e not elements that unit cost can readily be applied to, but they are still discrete items. We believe that a justifiable basis for an estimate begins with a solid definition of the work scope, supported by logic/schedules and documented with the assumptions and basis for the estimate. This can be done in many cases without an actual unit cost calculation. There is also a tradeoff whereby one must consider the cost of developing estimates against their ultimate value. Estimating should not be the goal of the program. The Guide needs to be more pragmatic in this approach.	The guide emphasizes estimating according to the level of program/project maturity and complexity.
X	16			3	There currently exists a great deal of direction on capital cost estimates. This section should either be removed or expanded consistent with our first comment.	Chapter V is intended to be a summary.
ↄ	16			4	Previous comments have not been fully acted upon and errors in definitions and references still remain.	The Guide is currently being revised.
ↄ	16			4	Sections of the Guide (e.g., Section III) are still verbose, containing numerous redundant statements.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
ↄ	16			4	Inappropriately, in several Sections, specific responsibilities are assigned.	Review this issue. It is important to clarify roles.
X	16			5	The cost estimate documentation, using appropriate WBS ABC breakdowns, is very essential. Change Control is not possible without a good scope, schedule and estimate, all well documented. In order to control changes I would suggest tracking changes by defined classes. Some of these could be: additions or deletions in scope; errors in the estimate; errors in the scope definition; and problems in execution, like low work productivity.	We agree, this will be investigated when baseline, change control guidance is developed by EM-30.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	16			5	Standardization of estimating, scheduling and documentation methods at all waste management sites is very essential the success of the system. This will enable you to compare similar activities from site to site.	We agree. The Activity Dictionary provides a high level activity framework -- Field Office will expand and EM-30 will examine the expanded Activity Dictionaries for commonality. A complex-wide database is not consistent with the Departments emphasis on decentralization.
X	16			5	Exhibit 1-2 is a good planning process. Performance of M&O contractors should be measured against approved budgets and schedules. This cannot be given superficial treatment. The accounting procedures should report costs on the basis of the WBS/ABC break downs and activity progress must be monitored and compared to the estimated cost and schedule.	We agree, however the Guide does not specify cost collection and cost control procedures. Cost control guidance is being considered for future EM-30 Guidance.
X	16			5	I would suggest that the program controls section be given greater emphasis. It should be equivalent to the other major sections. The follow through with good program controls, where execution is compared to plan, cost and schedule is absolutely essential to assure success of the system.	Cost control guidance is being considered for future EM-30 Guidance.
X	16			6	An example of a completed Task Description Document (TDD) should be included as part of this cost and schedule estimating guide; providing a TDD would benefit all sites by demonstrating the level of detail needed for effective activity based cost estimating.	The Cost Guide focuses on how to prepare an estimate, not a budget. We feel, Chapter VIII provides sufficient guidance for basis of the estimate.
X	16			6	An additional training session should be provided at the time the final revision is issued.	This is under consideration.
ↄ	16			7	Suggest adding an acronym list. Some acronyms are not included in the glossary.	The acronym list is in the front of the Guide and will be made consistent with the Glossary, etc...

Chap	Sect	Sub	Page	Source	Comment	Resolution
16				7	The guide continually alludes to the similarities between commercial construction and manufacturing processes and DOE M&O subcontractor Environmental Projects and Waste Management Operations. These activity comparisons have striking differences. An example of this difference would be a site have co-contamination problems. The health and safety requirements substantially reduce productivity of workers in this area. This reduction is acknowledged by many in the industry, however cost data is not yet available for comparison purposes. The guide's assumptions and approach is predicated on the similarities.	Benchmarking studies are planned to address these issues. The major emphasis of the Guide is not that DOE and industry are compatible, examples are for reference only.
16				7	We recommend a graded approach moving from the present state of cost estimates to the ABC requirements. The position between these two points would be determined by such constraints as available funding, available personnel, and most importantly maintaining cost effectiveness. Cost effectiveness would look at areas such as usefulness of information versus the associated cost of that information. This would allow the estimating process to reach a level of cost-effectiveness to be determined by available fiscal resources, human resources, and quality added. We have included as Attachment 1, an actual cost estimate from one of our facilities.	We agree, The Guide emphasizes that the level of detail of the estimate should be commensurate with the maturity and complexity of the project.
16				7	The guide does not integrate the schedule for cost estimating and the budget process. One of the original purposes not mentioned is the support of the Activity Data Sheets (ADSs). The guide as structured; does not offer a strategy for consideration of the seven year ADS planning period. Reality dictates that the definition of operations and the associated assumptions whether financial or otherwise are much more defined in the funded year than seven years out into the future. However, the guide offers no distinction between the funded year and the seventh year. Given the level of detail required by the guide, the seven year period involved, and the multiplicity of technical and funding changes the program experiences (monthly), meeting the requirements of the guides "Assessment Criteria" would not only be extremely difficult, but would require more resources than are available in the near term with known funding constraints.	The Cost Guide focuses on how to prepare an estimate, not a budget. Modify the current example to give examples of estimates for different project/program phases (i.e. conceptual, design).
16				7	We concur with the emphasis on Activity Based Costing as the technique of choice, but we are concerned, at the level of application implied by the guide. On pageII-5 the guide defines an activity as "the lowest level function of any operation at which costs are tracked and performance is evaluated." Oak Ridge Operations has developed activity based cost estimates consistent with this definition. However, the example provided in the guide drives the activity definition 2 or 3 levels lower in the work breakdown structure (WBS) than those used in our estimates. The benefit of the additional detail does not appear to justify the increase in costs.	The Guide emphasizes that the level of detail of the estimate should be commensurate with the maturity and complexity of the project.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	16			7	The Purpose Section defines the primary scope as improving the quality of cost estimates. However, the scope of this guide goes far beyond the stated purpose. The guide essentially addresses the entire "Program Management System" i.e., cost control, planning process, internal cost accounting, finance, activity management, staffing, and reporting. This guide not only affects those activities performed by cost estimators in conjunction with their technical counterparts are to do, but in many instances dictates the requirements of organizations who interface with EM-30.	The Cost Guide focuses only on how to prepare an estimate.
X	16			7	OR is very concerned about the amount of resources and cost involved to implement the requirements of the Guide. A preliminary estimate indicates it will cost approximately $2.4 million for implementation. Full impact studies on the cost of implementation have not been conducted.	This is a Guide only, everyone needs to prioritize and examine if current resources are effectively and effeciently utilized.
X	16			8	Negotiation process is not addressed.	Negotiation is beyond the scope of the Guide.
X	16			8	Internal Independent Cost Estimate Reviews (ICER) is an area that is only mentioned, makes brief reference to DOE Orders with no discussion of its implementation, and lacks an important concept.	ICERs are beyond the focus of the Guide, guidance exists in FYP for this.
)	16			8	As mentioned above, this draft guidance does provide much of the vital instruction and information needed to produce consistent, defensible, and credible estimates. Many of the cost/schedule elements noted as missing in Attachment II are included in the "EM Policies on Cost and Schedule Estimating and Analysis" released December 3, 1992. Since this draft guidance document was produced December 8, 1992, it could not consider the policy document. The final version of the guidance document should cite the policy and indicate which elements will be discussed and where to find specific information addressing the remaining ones.	The crosswalk from the Guide to the EM Cost Policies is in draft form and is intended to be sent to the Field. The crosswalks cite the policy and indicate which elements will be discussed and where to find specific information addressing the remaining ones.
)	16			8	The modifications noted above are substantive and are completely unacceptable. The official responsibility matrix is included as Attachment IV.	Revise the exhibit to reflect the official responsibility matirx.
(	16			8	The guidance does discuss independent cost reviews at some length, but appears to be missing an important concept. The guidance does not mention that the Field Office should conduct independent check estimates. Peer reviews by the contractor are encouraged, but the Field Office is responsible for conduction an (independent) cost estimate review.	ICERs are beyond the focus of the Guide, guidance exists in FYP for this.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	16			8	Formal approval of indirect rates is an area that is only mentioned, makes brief reference to DOE Orders with no discussion of its implementation, and lacks an important concept.	This is beyond the scope of the Guide, refer to the Office of the Chief Financial Officer (CR).
X	16			8	Contracting methods is an area that is only mentioned, makes brief reference to DOE Orders with no discussion of its implementation, and lacks an important concept.	Contracting is beyond the scope of the Guide.
X	16			8	Database development/maintenance is an area that is only mentioned, makes brief reference to DOE Orders with no discussion of its implementation, and lacks an important concept.	The is left to the Fild Offices discretion, the Guide does not intend to proscribe database development.
X	16			8	Cost analyses including trade-off studies, benefit cost analysis, and sensitivity analysis are not addressed.	Cost Analysis is beyond the scope of this Guide. Cost analysis guidance is being considered for future EM-30 guidance.
X	16			8	Value Engineering is an area that is only mentioned, makes brief reference to DOE Orders with no discussion of its implementation, and lacks an important concept. Note: A new attachment to this guidance, dated February 23, was just received which supplements Appendix E, "Value Engineering" the comments on VE in Attachment I do not consider this new information. Comments on value engineering will be provided at a later date.	The draft Value Engineering Implementation Guidelines was sent to the Field as an addition to Appendix E of the Guide. Review Appendix E for the appropriateness of its inclusion in the Guide.
X	16			8	In order to develop a DOE EM-wide cost database, the AD guidance, as described in Appendix B, should provide more detail. Each AD category should be broken down into at least one more level of detail for all sites to use.	The Activity Dictionary provides a high level activity framework -- Field Office will expand and EM-30 will examine the expanded Activity Dictionaries for commonality. A complex-wide database is not consistent with the Departments emphasis on decentralization.
X	16			8	LCC Analysis is an area that is only mentioned, makes brief reference to DOE Orders with no discussion of its implementation, and lacks an important concept.	Cost Analysis is beyond the scope of this Guide.Cost analysis guidance is being considered for future EM-30 guidance.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	16			8	Life Cycle Cost (LCC) for capital projects is an area that is only mentioned, makes brief reference to DOE Orders with no discussion of its implementation, and lacks an important concept.	Chapter V is a only summary of existing guidance. Cost analysis guidance is being considered for future EM-30 guidance.
X	16			8	Total Project Cost (TPC) for capital projects is an area that is only mentioned, makes brief reference to DOE Orders with no discussion of its implementation, and lacks an important concept.	Chapter V is a only summary of existing guidance.
X	16			8	Total Estimated Cost (TEC) for capital projects is an area that is only mentioned, makes brief reference to DOE Orders with no discussion of its implementation, and lacks an important concept.	Chapter V is a only summary of existing guidance.
X	16			8	Submission and review of indirect costs are not addressed.	This is beyond the scope of the Guide, refer to the Office of the Chief Financial Officer (CR).
X	16			8	Contingency management for capital projects are not addressed.	Contingency management is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30. Cost analysis guidance is being considered for future EM-30 guidance.
ↄ	16			8	Areas that are not addressed: Planning estimates or FYP estimates for Waste Operations estimates. (Only annual estimates are discussed.)	The Cost Guide focuses on how to prepare an estimate, not a budget. Modify the current example to give examples of estimates for different project/program phases (i.e. conceptual, design).
X	16			8	Contingency estimating for capital projects is an area that is only mentioned, makes brief reference to DOE Orders with no discussion of its implementation, and lacks an important concept.	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	16			9	The guide as presently drafted does not allow for the development and use of line item contingency. CH strongly opposes this portion of the guide. If developed in a risk based manner, formally documented and controlled, contingency provides not only a valuable management tool, but represents a legitimate cost of doing business. Not recognizing contingency as a legitimate and useful estimating tool is contrary to standard methods used by the estimating profession, and good management practice. Forcing estimates to be submitted without line item contingency encourages attempts to "game" the process, i.e., hide the contingency in other items in the estimate, as was discussed during the EM-30 training. If unchallenged, these "gamed" estimates would then provide inaccurate and distorted premises for baseline development and performance reporting. If, on the other hand, best efforts estimates are honestly submitted without contingency, the system will become congested in change control actions needed to incorporate minor scope changes. This will result in delayed work increased costs. Now is the time to address this subject with other interested organizations such as PR and OMB. To introduce the concept of contingency at a later time with PR and OMB would seem to be an awkward strategy and not convey the proper guidance to DOE Field Offices and contractors performing waste operations for EM-30 it is strongly recommended that contingency be recognized and encouraged as a legitimate, integral part of every estimate.	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.
X	16			9	The guidance provided essentially calls for Laboratories, which have little in the way of unit price historical data, to base fairly significant estimates upon a one-month sampling of costs. While better than no data at all, the limited sample size would likely lead to potentially significant deviations. It is suggested that, in such instances, the gathered data be supplemented by a defined factor of management experiences to reduce the potential size of inherent deviations.	We agree, if pilots do not yield the proper data, adjustments are appropriate.
X	16			9	If the Guide is closely followed in preparing estimates, the data that results could easily provide the basis for approving baselines. Recognized baselines offer significant advantages to managing current work and planning future activities. It is suggested that this concept be included and articulated as an integral part of this process.	We agree, guidance on baselines is being developed by EM-30.

Chap	Sect	Sub	Page	Source	Comment	Resolution
O	16			9	No attempt is made in the guide to acknowledge the graded approach now being promulgated by PR-20 through DOE Notice 4700.5. Although several references to "appropriate levels of detail" are made, no assistance was offered as to what these appropriate levels might be. It is recommended that examples addressing the appropriate levels of detail for various projects/activities be included in the Guide.	Modify the current example to give examples of estimates for different project/program phases (i.e. conceptual, design). Revise the Guide to associate appropriate level of detail with varying levels of program/project maturity and complexity.
)	16			9	The training focused on waste operations and made no real attempt to acknowledge capital funded projects. Only those activities funded by operating funds were addressed. Since training in ABC techniques is required for managers of both, the entire process would be better served if the training addressed and discussed the special elements of both.	Accept Comment.
O	16			9	The Guide includes references to both change control procedures and the change control process. While such procedures may now be under development, they do not presently exist. This should be noted in the Guide.	Accept Comment. Add notes.
O	16			10	Table of Contents, Appendix C, change title to read "DOE WORK BREAKDOWN STRUCTURE" as it appears in the appendix.	Accept Comment.
)	16			10	Table of Contents. Suggest "Executive Summary" be added to table.	Accept Comment.
(	16			10	Recommend that DOE HQ and FO, rather than DOE contractors, conduct detailed reviews of cost estimates to assure conformance with DOE guidelines, and safeguard the efficient and effective use of taxpayer funds (see specific comment 52).	We agree, this is dependent on each Field Office.
)	16			10	Tables of Contents, Section VIII, change to read "EXAMPLE ANNOTATED COST ESTIMATE." the title which appears in the text.	Accept Comment.
)	16			10	List of Acronyms, suggest adding: TDD - Technical Description Document, MP - management Plan, MPR - Management Procedures and Requirements.	Accept Comment.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	16			10	The large block on page VIII-8 states that estimate information should be entered onto a spreadsheet or estimate-generating software program that will organize the data and provide an easy means of performing the calculations. While it is realized that needs differ at the various Field Offices, DOE should consider requiring that standardized automated cost estimating software be used to develop cost estimates, and that the software be compatible with at least one of the major scheduling software programs. Standardized software used by all EM-30 Field Offices would assure a common base for development of cost estimates and schedules.	The intent of the Guide is to provide the criteria the software should be able to accomplish, not specify what software to use.
X	16			10	Recommend that DOE establish a WBS for the EM-30 that can be applied uniformly be DOE headquarters and FOs, to assure consistency and a common understanding for categorizing costs when preparing cost estimates (see specific comment 29).	The Activity Dictionary will address this. The programmatic, contractor, and estimate specific WBS already exist -- consistency is impossible due to the disparate nature of work done at each site.
X	16			10	Recommend that DOE establish a central database of historical project and program costs for easy access by DOE HQ and FOs that will track actual costs, and provide a basis to develop future project and program costs (see specific comment 24).	This is not being considered at this time.
O	16			10	The document appears to be well thought out on many general phases of project management and cost estimating. However, the document does seem repetitive and less succinct than the initial draft dated 18 September 1992. Consequently, the reader may tend to get "lost" in the process to find detailed "how to" instructions. In part, this is attributable to the attempt to encompass in a single document, guidance not strictly for estimate preparers, but also for schedulers and project managers. Those sections meant primarily for schedulers, for instance, include pertinent estimate related information which has already been covered in greater detail in sections meant primarily for estimate preparers.	The interrelationship between scope, cost, and schedule drives some overlap. The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
X	16			10	Recommend that DOE assure that costs for equipment are included in the estimate and separated from labor and material costs to assure accuracy in activity and total project costs. Activity and project costs will be incomplete when the cost of equipment is assigned to other support pools (see specific comment 49).	We agree.

Chap	Sect	Sub	Page	Source	Comment	Resolution
	16			10	Although the guide is intended for use by DOE Field Offices and their M&O contractors in preparing cost estimates, the reason for the document is not entirely clear, since it does not appear to be directive in nature and is not detailed enough to be a "how to" manual for cost estimating. The language used in the document (such as "should"or "would be advantageous") is somewhat weak as far as requiring or even strongly recommending any specific procedures. Since this document recognizes that Field Offices have their own guides, it is notclear whether the document is intended to be strictly informative or somewhat regulatory in nature.	Accept Comment. Add objectives to the executive summary.
	16			10	Recommend that several sections be streamlined to avoid repetition and to facilitate an understanding of the guidance (see specific comments 1 and 27)	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
	16			10	Recommend that DOE consider requiring the use of standardized automated cost estimating software to develop cost estimates, and that the software be compatible with at least on the major scheduling software programs. Standardized software used by all EM-30 Field Offices would assure a common base for development of cost estimates and schedules (see general comment 5).	The intent of the Guide is to provide the performance criteria for the software, not specify what software to use.
	16			10	Recommend that DOE more clearly define the terms for direct and indirect costs and labor burdens to assure consistency in estimating labor costs (see specific comments 17 and 30).	Accept Comment. Add to Glossary.
	16			10	The text blocks are great attention grabbers. It is curious however, that the block does not always appear in the paragraph from which the block text is extracted. The term "Activity Based Cost" estimating may be the preferred term to use for preparing cost estimates into discrete, quantifiable activities for EM-30 processes; however, for those fixed-price construction features, a term more common to cost engineers that could be considered is "Unit Price Cost" estimating.	Modify the text blocks to place them in logical positions. This Guide is primarily for EM-30 operations activities.
	16			10	Recommend that DOE provide greater detail, together with and example estimate, of the procedures for estimating direct and indirect costs for capital construction projects, since they may involve significant expenditures (see specific comment 37).	Chapter V is only a summary of existing guidance.
	16			11	Noted on written comments" The Guide does not adequately explain all terms and subject matter covered. For example, what is a WBS?	The terms are defined in the glossary, see page A-7 for WBS definition.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	16			11	How can this Guide be used to estimate or budget for the cost of miscellaneous and crisis requirements that constantly come down from HQ?	Make assumpions and estimate as an activity.
X	16			11	How will EM follow-up on this Guide? Will EM's reviewers receive orientation in this guide before reviews? Many prior reviewers appeared to have little knowledge of the missions and purpose of the ADS's.	EM-30 is developing a long range plan for estimating. Reviewers will receive training prior to reviews.
X	16			11	Will EM-30 require force-fitting all estimates into one format, or will the field office be allowed to establish formats to fit the "Activity?"	Field Offices will establish format -- Guide gives criteria for information to be included in a good estimate.
X	16			11	At multiple program sites (e.g., OR) will added staff be allocated to adequately prepare budgets for the differing formats required by the respective HQ program Offices.	This is a Guide only, everyone needs to prioritize and examine if current resources are effectively and effeciently utilized.
X	16			11	Will all reviewers (e.g., OMB, Corps of Engineers, DOE PR, other EM elements) base their review inquiries on this Guide, or will each reviewing organization have its own scenario?	This is a EM-30 Guide only. EM-30 will base their reviews on this Guide but outside agencies might not.
X	16			11	How should risk analysis and contingency be factored into estimates?	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk will be develoed by EM-30.
X	16			11	Is the "activity based" estimating approach of EM-30 compatible with the "issue based" approach of EM-14? If not, can they be made compatible?	ABC is a tool for estimating issues/programs identified by the issue based approach of EM-14.
X	16			11	Does EM-30 plan to have the field offices collect costs for the purpose of developing a DOE wide data base?	Not at this point.
X	16			11	Will use of the approach cited in the Guide result in fewer reviews? Fewer reviewing organizations?	This is the intention of the Guide, however we can't make any guarantees.
X	16			12	Changes made to the December 1992 Guide should be described in the Final Guide transmittal letter.	We will use a formal comment resolution process.

Chap	Sect	Sub	Page	Source	Comment	Resolution
X	16			12	To make the most effective use of limited resources, EM-30 should coordinate requirements with other HQ organizations, FO, and area offices. For example, the AL plants need to include in the Work Authorization Directives (WADs) those cost estimating activities recommended by the Guide which are in addition to current work scope.	EM-30 is clarifying and focusing its estimating effort. Field offices need to determine specific actions to implement guidance.
X	16			12	Instead of conducting separate reviews for each involved office, a single HQ review could be conducted by a team composed of representatives of each organization responsible for cost estimate review and oversight. Alternatively, on a rotating basis one organization could conduct the review and provide the needed information to the others.	We agree, however many external reviews are beyond the control of Headquarters.
X	16			12	Successful implementation of the Guide will be measured by the quality of the cost estimates prepared by DOE and its contractors. The Guide should help standardize the cost and schedule estimation process, produce better documentation and lead to criteria by which the estimates may be assessed. Two ideas for improving the estimate review process are: (a) to utilize peer reviews more extensively, and (b) to encourage combined reviews by FO and HQ (re. Exhibit I-1, pg. I-3)	We agree, this is a good idea but it is outside the scope of the Guide. EM-30 will investigate for feasibility.
X	16			13	The guidance recognizes the time frame required for proper accumulation of historical data and databases and further recommends short-term pilot studies to do so. However, it was verbalized in the training session that full implementation of activity-based cost estimates would be required in the next budget cycle (FY1996-2000). The time required to properly develop the tools, structure, and databases does not seem adequate for full implementation by the next budget cycle.	We agree, it will take time to fully implement activity based estimates. Attempt as much as possible in time available and improve process from that point.
X	16			13	The guidance appears to assume that resources (FTEs) are applied on an as-needed basis to EM-funded activities. Additionally, activity-based costing does not account for allowances such as meetings, required breaks, downtime, etc. Therefore, the labor estimates resulting from activity-based costing techniques could be understated.	These are productivity factors that should be applied to estimates.
)	16			14	Sections I through IV should be streamlined. The focus of the Guide is sections V through VIII.	The Cost Guide will be reviewed by a technical editor to ensure elimination of repetition.
O	16			14	List of Acronyms. Suggest delete CASE, EM-20, EM-30 GE, PR-241 and RAM.	Revise acronym list as appropriate.

Chap	Sect	Sub	Page	Source	Comment	Resolution
O	16			14	List of Acronyms. Suggest use SF instead of SFCA.	Revise acronym list as appropriate.
O	16			14	List of Acronyms. Suggest use AD instead of ORFM	Revise acronym list as appropriate.
O	16			14	List of Acronyms. Suggest add TDD.	Revise acronym list as appropriate.
X	16			14	Section II Activity-Based Cost Estimating is not a new technique. The message should be that status quo based on FTE's is no longer an acceptable technique.	We agree.
X	16			15	We could find no provisions for adding contingency to the estimates for waste operations. Is this an oversight or do you believe that contingency should not be included in this type estimate?	Contingency is beyond the focus of the Cost Guide. Guidance for contingency and risk analysis will be developed by EM-30.
X	16			15	The Guide appropriately refers to the use of audited indirect and overhead rates. Whereas we acknowledge that these rates must be used, it has been our experience that auditors are more interested in accounting systems and what items are allowable than whether the overhead pools have more resources than they need. We recommend that these pools be examined from time to time with the objective of reducing them to the minimum allowable for performing the mission.	We agree, but this is beyond the scope of the Guide.
X	16			15	Using historical data to build your unit cost databases is a logical way to begin; however, we believe you must be careful that any bad practices that may be in existence today ar not perpetuated in future estimates by the use of unexamined and unnormalized data of past operations. In this regard, we recommend the pilot studies, mentioned in the guide, plus any other external, analogous data be used to cross check the current historical data. Moreover, should-cost studies and data from other operations offices might be useful.	We agree, benchmarking studies are planned to address this issue.
X	16			15	We recommend that you state that all estimates will be baselined, maintain in a central area, and be traceable and compared to all subsequent estimate updates, with documented variance analysis included in the estimate file.	This is an estimating Guide only. Guidance on baselines is being developed by EM-30.

Chap	Sect	Sub	Page	Source	Comment	Resolution
O	16			16	Specific references to the Federal Facility Compliance Act reporting obligations/treatment requirements and RCRA fines and penalties, notices of violation poor permitting restrictions and the implication of poor or lacking NEPA documentation which may impact the project were not specifically mentioned. Because these elements could stop work, accelerate work schedules or otherwise seriously impact a project, I think that some discussion should be included to guide reviewers who may not be familiar with the generic reference to "regulatory drivers".	Accept Comment. Further explain potential effects of regulatory uncertainty on cost estimates.
X	16			17	To ensure consistency with all of EM, it is suggested this guidance be coordinated for use by those at DOE-HQ responsible for budgets and issuing guidance for ADS/TDDs/planning packages.	This is beyond the scope of the guide.

Appendix C

Summary Evaluation of DOE EM-30 Cost and Schedule Training Course

ICF KAISER ENGINEERS

SUMMARY EVALUATION OF THE DOE EM-30 COST AND SCHEDULE ESTIMATION TRAINING COURSE: DECEMBER 1992 - FEBRUARY 1993

Prepared For: *Los Alamos*
National Laboratory
Los Alamos, New Mexico

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BACKGROUND

During the months of December 1992 through February 1993, ICF Kaiser Engineers (ICF KE), operating as a subcontractor to Los Alamos National Laboratory, conducted a series of nine training sessions on Cost and Schedule Estimating for waste management operations at Department of Energy facilities around the country. This training course was designed to supplement the working draft of the EM-30 Cost and Schedule Estimating Guide that was released for field office comment in December 1992. The purpose of the Guide and the subsequent training course is to provide to DOE field office staff and their contractors the requirements, methods, and tools for preparing valid cost estimates for DOE's ongoing waste management program. Waste management represents the largest component, in terms of dollars spent annually, within DOE's Environmental Restoration and Waste Management program. Ongoing waste management operations represent approximately 70 percent of the Waste Management budget and, therefore, the validity of cost and schedule estimates is critical to the success of DOE's waste management program. Valid estimates ultimately result in acceptance of budgets by officials responsible for budget development, thereby resulting in budgets that enable DOE to accomplish its mission. Valid estimates are also more likely to be accurate, resulting in adequate resources and high public confidence in DOE. Furthermore, valid estimates reflect good planning, which promotes good management.

A basic requirement of the guidance and the training is that cost estimates for ongoing waste management operations should be activity-based. This requirement is in contrast to the past practice of many DOE organizations, which used a level-of-effort cost estimation approach, i.e., identification of the number of Full Time Equivalents (FTEs) required for the entire operation. The development of well documented activity-based cost estimates for ongoing waste management operations requires development of detailed definitions of the activities required for each operation and historically-based estimates of actual activity costs. In the past, level-of-effort cost estimates for ongoing waste management operations were often prepared based on historical data indicating the number of FTEs performing the waste management operation in previous years, without including any documentation in the cost estimate identifying in detail the function(s) (i.e., activities) each FTE performed related to the waste management operation.

Activity-Based Costing (ABC) is a cost estimation method that consists of defining the activities required to conduct a task, and relating each identified activity to a quantity. Each defined activity is related to a quantity representing the objective of that activity (e.g., the amount of waste handled in that activity). Activity-based cost estimates for ongoing waste management operations are developed by defining the "activities" required to conduct the task, and relating each identified activity to a quantity.

TRAINING SCHEDULE

ICF KE conducted two-day training sessions at nine DOE facilities during the course of an eight week period that spanned the Christmas/Hanukkah/New Year holiday season. The schedule completed is as follows:

Kansas City Plant (Trial Run)	December 10 - 11, 1992
Idaho National Engineering Laboratory	January 4 - 5, 1993
Richland Field Office	January 6 - 7, 1993
Headquarters	January 11, 1993

Savannah River Plant	January 14 - 15, 1993
San Francisco Field Office	January 21 - 22, 1993
Oak Ridge National Laboratory	January 25 - 26, 1993
Rocky Flats Field Office	January 28 - 29, 1993
Albuquerque Field Office	February 2 - 3, 1993
Chicago Field Office	February 9 - 10, 1993

EVALUATION OF THE TRAINING

Logistics

DOE field offices were responsible for meeting room arrangements and audio-visual equipment. In all nine locations, the meeting rooms very comfortable and functional. No problems were encountered in any of the hotels or government buildings used. All of the audio-visual equipment supplied was satisfactory.

Training Materials

ICF KE was responsible for providing trainers and materials for up to 1,000 students in nine locations around the country. This aspect of the training course was very successful. All training materials were of a high quality and were available on-time and in the proper quantities. There were no problems with presentation materials or shortages of materials at any of the nine locations.

The training materials provided by ICF KE included an site-specific agenda; bound copies of the slides used during the presentation (suitable for note-taking); four exercises that included separate handouts for the problem and a solution; copies of the EM-30 Cost and Schedule Estimating Guide (December 8, 1992 working draft); and evaluation forms for both Day 1 and Day 2.

Training Format

This training series was divided into three sessions at each location. The first session was a briefing for senior managers who have oversight responsibility for the preparation of Waste Management cost estimates. The second session was designed to provide a more in-depth understanding of activity-based cost estimating to anyone who had any responsibilities with regard to cost estimates, either as an estimate preparer or as a reviewer. This second session was considered an "all-hands" presentation. The third session was designed to provide hands-on experience with activity-based cost estimating to those persons who are actually responsible for developing and preparing cost estimates.

This three-part training format was regarded by most participants as being a good method of providing the correct level of detail to the correct audience. The Senior Management Briefing was very successful in accomplishing this goal, as was the "all-hands" session. The final in-depth session was considered by some participants to be too redundant with the "all-hands" session, whereas other participants thought it was too difficult. One of the problems encountered regarding the "hands-on" session was that, at most sites, the class was a mix of people who had been at the "all-hands" meeting and others who had not. This required an accelerated rehashing of all activity-based cost

estimating techniques, which probably turned off those who had been present the first day, but did not meet the needs of those who had skipped day 1.

There are two corrective actions that should be taken together to rectify this problem. First, the DOE field office must be clearer in publicizing the training formats and identifying those whose should attend each session (i.e., tell people who needs to be at each of the three sessions). Second, the third session should be streamlined somewhat to avoid redundancy. This would be best accomplished by cutting back on the slide presentations and incorporating additional hands-on exercises.

In general, the three-part format used for these training sessions was successful because it provided a great deal of flexibility for both the students and the trainers. This format allowed students to self-select the level of detail they felt they needed to perform their jobs and did not needlessly require them to sit through the details of cost estimating.

Attendance

DOE field offices were responsible for publicizing this training series and making sure the proper people attended. A total of approximately 651 persons attended this training, not including about 25 persons at the DOE Headquarters briefing. Attachment 1 presents attendance figures for each of the sessions at each location. Attendance ranged from a high of 160 persons at Idaho Falls to a low of 20 persons in Chicago. In general, the DOE field offices and their contractors did a satisfactory job of publicizing this course despite relatively short notice of training dates (one to three weeks notice), holiday vacation schedules, and severe winter weather.

There was some concern among participants (both trainers and students) that there were additional DOE and contractor staff who should have been present. In some cases the course was well publicized in the budget offices, but not well publicized in the program offices where cost estimates are actually prepared. This may have been a significant shortcoming that definitely should be addressed during subsequent training. Cost estimate preparers in the waste management program offices must be identified and specifically invited. Additional lead time would make this focused publicity effort more effective.

Evaluations of Course

Each student from each of the two day's sessions was asked to fill out an evaluation form that asked over 40 questions regarding their opinions of activity-based cost estimating in general and this training course in particular. Overall, about 80 percent of the participants rated this course as "good" or as "excellent". We believe this is a very high success rate given the complex nature of the subject material covered and the resistance to changing estimating methods that was evident in many of the DOE field locations. A summary of the evaluation forms is included as Attachment 2.

Evaluations of Instructors

ICF KE presented nine DOE EM-30 Cost and Schedule Estimating training sessions at field office locations throughout the country on a compressed schedule that spanned the Christmas/Hanukkah/New Year holiday season. In order to accomplish this task efficiently, ICF KE used a flexible team of six trainers (comprised of cost estimators, schedulers, and environmental scientists) who could substitute for each other at various locations.

The six instructors used for this training series were given very high ratings by the course evaluators. Participants overwhelmingly agreed that the instructors were friendly, well prepared, helpful, and knowledgeable about cost estimating. The results of the evaluation are contained in Attachment 2.

Evaluation of Information Transfer

One of the goals of the evaluation form used during this training series was to gain a feeling for how well the "how to" techniques of activity-based cost estimating were transferred to the participants. Responses to the evaluation indicate that more than 70 percent of those participating felt they now understood the basics of activity-based cost estimating and 65 percent said they now understood the basic components of a valid activity-based cost estimate. We believe that this result, given the complex nature of the subject material, the short time provided, and the fact that some persons were not receptive to these concepts at all, is indicative of a very successful training course.

Recommendations for Follow-Up

It is clear from the evaluations and from the number of people attending these training sessions that not all of those persons in the DOE complex who are involved in the preparation of cost estimates for waste management operations were present at these training sessions. Because of this, there will be an ongoing need for additional cost estimation training for several years into the future, at least until the use of activity-based cost estimation techniques become part of the institutional culture of DOE waste management operations nationwide. ICF KE recommends that several training related activities be conducted over the following 18 months:

- The EM-30 Cost and Schedule Estimating Guide should be given as wide a distribution as possible;
- Follow-on training should be developed to assist field personnel in developing site specific model estimates that incorporate activity-based cost estimating techniques;
- Refresher/New Hire training should be developed and delivered prior to the beginning of the next budget cycle;
- An effort should be made to utilize on-site training capabilities through a "train-the-trainer" program for cost estimating;
- A high quality computer or video based training module should be developed to replace, in the long term, traveling training shows.

Attachment 1

DOE EM-30 Cost Estimating Training

Attendance Matrix

DOE EM-30 Cost Estimating Training

Attendance Matrix

FACILITY	NUMBER ATTENDING SENIOR MGMNT BRIEFING	NUMBER ATTENDING ALL-HANDS BRIEFING	NUMBER ATTENDING HANDS-ON WORKSHOP	TOTAL ATTENDEES (WITHOUT DUPLICATES)
Albuquerque Feb. 2-3	15	40	30	50
Chicago Feb. 9-10	8	12	6	20
Headquarters Jan. 11	30	N/A	N/A	30
Idaho Falls Jan. 4-5	70	85	45	160
Kansas City Dec.	10	15	15	23
Oak Ridge Jan. 25-26	14	37	21	68
Richland Jan. 6-7	19	60	34	110
Rocky Flats Jan. 28-29	10	60	35	70
Savannah River Jan. 14-15	20	60	40	90
San Francisco Jan. 21-2?	15	45	30	60
GRAND TOTALS	211	414	256	651

Attachment 2

Summary of Participant Evaluations

Attachment 2

Summary of Participant Evaluations

EM-30 COST ESTIMATION TRAINING
SUMMARY OF PARTICIPANT EVALUATIONS
February 1992

ICF Kaiser Engineers (ICF KE) conducted Cost Estimation Training at ten DOE field offices during the months of December 1992, January 1993, and February 1993. As part of the program, participants were requested to complete evaluation forms. A total of 411 evaluation forms were completed and returned by participants of the program-- 268 evaluation forms for the Overview Training session (Day 1, afternoon) and 143 forms for the Cost Estimating Workshop session (Day 2, morning and afternoon).

The following is a summary of the ratings, opinions, and comments offered by the participants. Each statement or question from the evaluation form is presented with the percentage of respondents who either agreed or strongly agreed, along with a summary of the number of respondents to each question. It should be noted that not all attendees completed evaluation forms, and of those completed, most had at least one question left blank.

Attached is a summary table showing the number of attendees at each training session.

DAY 1 (Afternoon session)

Thoughts on Activity-Based Cost Estimation

1. ***Activity-Based Cost Estimates will provide data to help managers manage.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	90%	75%	79%	91%	50%	55%	74%	80%	69%	73%
n	30	12	48	15	24	40	38	35	26	268

2. ***Activity-Based Cost Estimating techniques will improve the accuracy and quality of cost estimates over time.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	87%	83%	79%	66%	67%	74%	74%	89%	77%	77%
n	30	12	48	15	24	39	38	35	26	267

3. ***The use of Activity-Based Cost Estimating techniques should reduce the number and extent of estimate reviews over time.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	62%	33%	54%	17%	30%	40%	42%	38%	40	40%
n	29	12	48	15	23	40	38	34	25	264

4. ***Activity-Based Cost Estimation will help to produce defensible, credible cost estimates.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	87%	83%	79%	91%	79%	74%	82%	79%	69%	80%
n	30	12	48	15	24	39	39	34	26	267

5. ***The use of Activity-Based Cost Estimating techniques will increase the likelihood of budget approvals in the future.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	72%	27%	50%	75%	25%	37%	47%	46%	28%	45%
n	29	11	48	15	24	38	38	35	25	263

6. ***Activity-Based Cost Estimating techniques can be implemented at my facility without too much difficulty.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	19%	0%	57%	18%	21%	27%	47%	16%	39%	27%
n	27	9	47	15	24	37	38	31	26	254

7. ***The concepts of Activity-Based Cost Estimating are easy to understand.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	63%	58%	83%	67%	71%	55%	82%	74%	62%	68%
n	30	12	47	15	24	40	39	34	26	267

8. ***It is feasible to implement Activity-Based Cost Estimating at my facility.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	42%	33%	77%	63%	50%	49%	66%	58%	58%	55%
n	26	9	48	15	24	35	38	31	26	252

Evaluation of the Training

9. ***The training session was well organized and well presented.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	83%	66%	54%	83%	42%	59%	49%	71%	42%	61%
n	30	12	48	15	24	39	37	35	26	265

10. ***The course materials were well prepared and easily understood.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	80%	75%	62%	83%	54%	46%	57%	89%	50%	66%
n	30	12	47	15	24	39	37	35	26	265

11. ***Exercise 1 was well prepared and well presented.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	60%	64%	47%	NA	29%	35%	55%	77%	58%	53%
n	30	11	45		24	37	31	34	26	238

12A. ***Exercise 1 showed me how to identify and define activities for use in Activity-Based Cost Estimates.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	61%	75%	49%	NA	26%	51%	65%	59%	46%	54%
n	28	12	47		23	35	31	34	26	236

12B. ***Exercise 1 showed me how to develop an estimate-specific Work Breakdown Structure.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	46%	50%	38%	NA	26%	43%	55%	56%	50%	46%
n	28	12	47		23	35	31	34	26	236

12C. ***Exercise 1 showed me how to identify cost elements associated with activities.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	50%	55%	40%	NA	19%	37%	52%	59%	46%	45%
n	28	11	47		21	35	31	34	26	233

13. At the end of this session, I understood the basics of Activity-Based Cost Estimating.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	83%	75%	76%	83%	48%	56%	82%	77%	77%	73%
n	29	12	46	15	23	36	34	35	26	256

14. At the end of this session, I understood the basic components of an acceptable cost estimate.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	76%	50%	61%	83%	33%	49%	75%	68%	65%	62%
n	29	12	46	15	24	35	36	34	26	257

Instructors

15. The instructors were friendly and enthusiastic.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	93%	83%	92%	92%	83%	74%	81%	91%	73%	85%
n	30	12	47	15	24	39	36	35	26	264

16. The instructors were knowledgeable about their material.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	87%	92%	90%	92%	79%	74%	67%	97%	73%	83%
n	30	12	48	15	24	39	36	35	26	265

17. The instructors were well prepared for their presentations.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	93%	92%	75%	83%	63%	71%	72%	89%	65%	78%
n	30	12	48	15	24	38	36	35	26	264

General Opinions

18. Do you support expanding the use of Activity-Based Cost Estimating techniques at your facility? Why? Why not?

The majority of respondents support the use of ABC estimating. There were indications that some groups in fact were already using some aspects of ABC estimating. Favorable comments on ABC estimating included:

- ABC is a logical way of estimating costs;
- ABC is the only way to fully document estimates;
- ABC will be a helpful tool in justifying costs;
- ABC estimates will promote better project management and cost tracking/accountability;
- ABC will create a better basis for future estimates;
- ABC will assist in justifying funding needs;
- ABC will assist in developing more defensible estimates;
- ABC can help evaluate the cost impact of unexpected activities;
- ABC techniques will help in standardizing estimate documentation; and
- ABC will, in the long run, reduce the number of estimate reviews and audits by headquarters and other agencies.

There were, however, some respondents that do not support the expanded use of ABC. These respondents all gave the same four general reasons:

- ABC estimating may require more resources (i.e., employees and funding) than are presently expended preparing estimates and budgets.

- ABC does not seem to lend itself to all types of projects (e.g., rapidly changing R&D programs, very small operations, or start-up programs).

- ABC would only be successful implemented if was mandated by upper management and if upper management increased its involvement in initiating the program.

- There is a lack of historical cost information and a lack of staff to develop and maintain a system for collecting these historical costs.

19. What do you see as the advantages and/or disadvantages of using Activity-Based Cost Estimating at your facility?

The respondents overwhelmingly listed advantages associated with the use of ABC techniques. Answers to this question listed several advantages to the use of ABC estimating techniques, most of which were repeats of answers for the previous question. The advantages noted ten training classes consistently included the following:

- ABC increases the defensibility and credibility of estimates;

- ABC increases the level of standardization for cost estimating;

- ABC will have a positive impact on project scheduling because it will force managers to plan better;

- ABC will eventually reduce the number of cost estimate reviews;

- ABC techniques permit identification of cost elements for financial planning, reporting, and change control; and

- ABC will allow managers to actively and intelligently practice cost control based on a prioritization of identified activities.

Several respondents did, however, list some of the disadvantages they perceived as being part of the use of ABC. The comments, which were consistent at all training locations, included the following:

- ABC is too labor intensive and would create additional administrative work.

- Not all activities can be accurately estimated as envisioned. For example, ABC may be difficult to apply to multiple, non-repetitive tasks and for long range planning estimates where tasks may be difficult to accurately identify to the level required by ABC estimating.
- There will be a need for additional resources to implement this system;

- There is a lack of historical cost data from which to build ABC estimates;

20. How can we improve the content or presentation of this training course?

Comments concerning the content and presentation of the course were generally favorable. Most of the people that attended the course indicated that they found it informative and well presented. Comments concerning the content of the course included:

- Provide more examples of activities using different units of measure;
- Try to expand examples, and possibly use examples from the host facility in an effort to bring the concepts "down home";
- Develop an example that highlights administrative functions, such as research, regulatory compliance, or "paperwork preparation";
- Establish a consistent definition for the use of the word activity, which seems to have a different meaning at each site;
- Intermix the concept of estimate preparation with long-term need to build a cost database;
- Present a clearer distinction between activities that can legitimately use LOE estimates versus those where ABC techniques should be used; and
- Concentrate efforts on waste operations, for which ABC makes a lot of sense, rather than administrative activities that will be a "force-fit" at best.

Several suggestions for improving the course logistics were also received from the groups:

- Training announcements should be distributed earlier and to a wider group of people;
- Increase the frequency of breaks;
- Reduce the number of bullet items per slide;
- Limit class size to smaller groups, which would allow for more interaction with instructors;
- Provide separate training for DOE and contractor personnel (this person felt that discussion and pupil feedback were limited due to the mixed audience);
- Provide some information on the manpower and resources needed to implement ABC techniques;
- Have more site management remain in the class for the second day to show commitment for the new techniques;
- Use feminine pronouns as well as masculine;
- Use double sided copying on all presentation materials and exercises;
- Use fewer instructors to make the presentation more continuous and fluid; and

- Power-up presentation graphics with color and diagrams.

21. Overall, how would you rate this training course?

Poor ***Fair*** ***Good*** ***Excellent*** ***Outstanding***

Percentage of respondents rating the course "Good" or better.

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	39%	75%	74%	100%	83%	77%	75%	45%	73%	71%
n	28	12	43	15	24	35	36	33	26	252

22. Please add any general comments regarding the subject matter of this course, its presentation, or the EM-30 cost estimation improvement initiative.

For the most, there were limited responses to this question. Individuals indicated that the comments they made for questions #18, #19, #20 had already answered question #22. Re-occurring comments included the following:

- Respondents requested that ABC experts came to the facilities and assist in developing a few estimates using ABC techniques;
- There is a need for development of an "activity dictionary" that would consistently define activities across the sites or across the whole DOE complex and document work items that would be included in each activity;
- Commentors from several sites commented that the audience was not well targeted, i.e., that the presentation may not be appropriate for the entire staff that was attending and suggested that project managers and cost estimators be targeted as the audience;
- Simplify the peer assessment criteria for ABC cost estimates. A checklist is perceived to be too rigid and lacks the shading of concepts necessary when evaluating estimates of a widely varied nature. This writer suggested the use of a written procedure manual rather than a checklist;
- Some organizations and operations are ready and willing to implement ABC techniques, whereas other are not and may never be. This writer suggests that Headquarters spend more time differentiating between the two and focusing its efforts where this estimating technique will work and reap benefits, rather than forcing it on all waste management organizations, some of which will never benefit;
- The goals of ABC estimating seem to be at odds with the incentives of the cost-plus-fee contracts used at DOE facilities. To fully implement this system and have it make any

meaningful difference, the incentive for contractors must be changed;

- One commentor saw the implementation of ABC techniques as a tool to be used by DOE or any oversight group to compare one waste management group against another and "beat up on the one who has a lower efficiency factor" without considering individual program differences;
- DOE HQ, and particularly EM-30 and EM-40, should coordinate their cost estimating/budgetary requirements;
- Resources to implement ABC techniques may be lacking; and
- DOE site personnel must be sold on the virtues of this technique or it will never be fully implemented.

DAY 2 (Morning Session)

1. The morning training session was well organized and well presented.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	61%	83%	73%	100%	39%	61%	18%	71%	75%	65%
n	23	6	26	15	13	18	17	17	8	143

2. The morning session presentation materials were well prepared and easily understood.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	57%	83%	58%	100%	23%	44%	6%	77%	75%	58%
n	23	6	26	15	13	18	16	17	8	142

3. Exercise 2 was well prepared and well presented.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	52%	50%	54%	67%	23%	33%	41%	65%	50%	48%
n	23	6	26	15	13	18	17	17	8	143

4A. Exercise 2 showed me how to identify and define activities for use in Activity-Based Cost Estimates.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	61%	80%	58%	88%	46%	56%	41%	65%	43%	60%
n	23	5	26	15	13	18	17	17	7	141

4B. Exercise 2 showed me how to develop an estimate-specific Work Breakdown Structure.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	52%	80%	42%	NA	46%	50%	41%	47%	29%	48%
n	23	5	26		13	18	17	17	7	126

4C. Exercise 2 showed me how to identify cost elements associated with activities.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	57%	80%	39%	NA	39%	44%	24%	53%	29%	46%
n	23	5	26		13	18	17	17	7	126

5. At the end of this session, I understood the basics of identifying activities.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	65%	83%	62%	88%	39%	56%	50%	65%	75%	65%
n	23	6	26	15	13	18	16	17	8	142

6. At the end of this session I understood the criteria for acceptable documentation of cost estimates.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	70%	83%	36%	67%	54%	39%	38%	59%	75%	58%
n	23	6	25	15	13	18	16	17	8	141

DAY 2 (Afternoon Session)

7. The afternoon training session was well organized and well presented.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	61%	67%	58%	78%	39%	50%	13%	53%	75%	55%
n	23	6	26	15	13	18	16	15	8	140

8. The afternoon presentation materials were well prepared and easily understood.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	48%	67%	58%	100%	39%	44%	24%	67%	75%	58%
n	23	6	26	15	13	18	17	15	8	141

9. Exercise 3 was well prepared and well presented.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	39%	20%	29%	NA	25%	17%	18%	35%	43%	28%
n	23	5	24		12	18	17	17	7	123

10A. Exercise 3 showed me how to develop quantities associated with activities in Activity-Based Cost Estimates.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	41%	20%	35%	NA	33%	17%	24%	38%	29%	30%
n	22	5	26		12	18	17	16	7	123

10B. Exercise 3 showed me how to develop labor hours and other unit costs associated with activities in Activity-Based Cost Estimates.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	41%	20%	42%	NA	42%	17%	25%	35%	29%	31%
n	22	5	26		12	18	16	17	7	123

10C. Exercise 3 showed me how to provide appropriate documentation to support Activity-Based Cost Estimates.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	36%	0%	39%	NA	33%	22%	27%	38%	29%	28%
n	22	5	26		12	18	15	16	7	121

11. ***Exercise 4 was well prepared and well presented.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	39%	67%	54%	NA	31%	41%	31%	60%	29%	44%
n	23	6	26		13	17	16	15	7	123

12. ***Exercise 4 showed me how to apply assessment criteria to Activity-Based Cost Estimates.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	48%	50%	50%	NA	39%	47%	25%	40%	14%	39%
n	23	6	26		13	17	16	15	7	123

13. ***At the end of this session, I understood how to prepare an acceptable cost estimate.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	44%	50%	40%	38%	39%	29%	25%	47%	29%	38%
n	23	6	25	15	13	17	16	15	7	137

Instructors

14. ***The instructors were friendly and enthusiastic.***

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	87%	83%	96%	100%	69%	78%	94%	77%	71%	84%
n	23	6	25	15	13	18	16	17	7	140

15. The instructors were knowledgeable about their material.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	87%	83%	96%	100%	77%	72%	81%	82%	57%	82%
n	23	6	25	15	13	18	16	17	7	140

16. The instructors were well prepared for their presentations.

Percentage of respondents either "Agreeing" or "Strongly Agreeing".

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	78%	83%	92%	100%	62%	67%	69%	75%	57%	76%
n	23	6	24	15	13	18	16	16	7	138

General Opinions

17. How can we improve the content or presentation of this training course?

In general, the course was well received and participants noted that it had changed their attitudes towards ABC techniques. People who attended the second days sessions had many of the same suggestions for improving the training course that first day attendees had, as well as a few suggestions that were specifically directed towards Day 2 materials. Their suggestions and comments include:

- The second day became repetitive;
- The audience should be given time to share problems encountered while doing ABC estimating.
- The exercises should be simplified
- Definitions of key words used in the guide and the training, such as activity, category, task, should be coordinated with the usage of these terms at the various DOE facilities.
- Training groups should be organized so that there are smaller groups, thereby allowing more audience/trainer interaction;
- Site specific ADS/TDD estimates should be used during the discussions and exercises as a method of bringing the ideas "close to home".

- The scheduling module of the course should be expanded.

- There should be more samples of estimates and required documentation, particularly in the areas of administration and technical support. Other respondents requested that the course be expanded further and that additional exercises be included.

- Create a need to encourage participants to open and use the guide during the training. This would facilitate familiarization of the materials contained in the manual. Instructors could also answer questions related to the manual which arise during the actual training sessions;

- More and higher level managers need exposure to this course in order for the concept of ABC to take hold;

- DOE-HQ should be present during the entire course and be prepared to defend the necessity of ABC estimating;

- Demonstrate each exercise on the black-board prior to the class beginning their work; thereby providing the class with an example of the expected results. The class could then perform a slightly different version of the exercise to reinforce the lesson, after which the instructors should provide answers.

- Target this course better to reach its intended audience, i.e., teach project management tools to the project managers, not just the budget analysts and planners.

- EM-30 must integrate this cost estimating requirement with their other requirements.

- A single one-day training session would have been enough, provided separate breakout sessions were conducted to provide individual guidance to different waste management groups.

18. Overall, how would you rate this training course?

Poor ***Fair*** ***Good*** ***Excellent*** ***Outstanding***

Percentage of respondents rating the course "Good" or better.

SITE	AL	CH	ID	KC	OR	RL	RF	SR	SF	TOTAL
%	100%	100%	92%	100%	50%	69%	81%	82%	88%	85%
n	21	6	25	15	12	16	16	17	8	136

19. Please add any additional general comments regarding the subject matter of this course, its presentation, or the EM-30 cost estimation improvement initiative.

Overall, people were pleased with the course and, in some cases, the course changed people's opinions concerning the validity of ABC estimating. Most of the responses to this question reiterated responses to previous questions. The most often repeated comments are listed below:

- Additional training may be needed for a wider audience and that additional training may be necessary every 6-12 months to re-familiarize estimators with ABC estimating and to bring new people up to speed.
- This training and the Guide should be shared with EM-40.
- The assessment criteria seemed to exhaustive, overbearing, and difficult to use;
- EM-30 must ensure that its requirements are consistent with other requirements set forth by other DOE organizations (including EM-20/40/50/60).
- Integration issues between EM-30/40/60/50 estimating requirements should be pursued further so that detailed discussions could have been held during the class.
- More notification should have been given regarding the content of the course so that more individuals could have take advantage of the training. Additionally, more information regarding the information covered during Day 2 should have been presented during the Day 1 training session so that individuals could have made a more informed decision regarding their attendance of the Day 2 session.
- The contractor should distribute materials before the training so that the class is familiar with it before the class starts.
- This process is going to require a significant amount of DOE (Field Office and HQ) follow-up to ensure that contractors use this guidance.
- ABC techniques are long overdue and are desperately needed at this facility.

- This cost estimating technique should be required in other programmatic areas within the DOE complex as well as within EM. The other programs need to have a consistent approach to planning and cost estimating as well.

- The expectation that other agencies will agree to using this systematic review process may be too optimistic, in which case the individual operations do not receive the forecasted benefit of fewer reviews and audits.

- Because each facility, contractor, and operation is likely to define its activities differently, unit costs will not be comparable across facilities.

- Contingency should be a normal, standard element of every estimate. Prohibiting its use encourages attempts to hide it within other elements.

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