INL/EXT-13-29839

EVMS Self-Surveillance of Remote Handled Low Level Waste (RHLLW) Project

July 2013

The INL is a U.S. Department of Energy National Laboratory
operated by Battelle Energy Alliance

INL/EXT-13-29839

EVMS Self-Surveillance of Remote Handled Low Level Waste (RHLLW) Project

INL Project # 31055

Assessment Report: IAS 131076

July 2013

Idaho National Laboratory
Idaho Falls, Idaho 83415

http://www.inl.gov

Prepared for the
U.S. Department of Energy
Office of Nuclear Energy
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517

Idaho National Laboratory

EVMS Self-Surveillance of
Remote Handled Low Level Waste (RHLLW) Project

INL Project # 31055

Performed by
Project Management Office
Battelle Energy Alliance, LLC
for
Director, Project Management Office
Battelle Energy Alliance, LLC

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INL EVMS Self-Surveillance Review Team
Assessment Report: IAS131076
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EXECUTIVE SUMMARY

DOE G 413.3-10A, Section 3.a states: "The Contractor has primary responsibility for implementing and maintaining a surveillance program to ensure continued compliance of the system with ANSI/EIA-748B. DOE O 413.3B requires the FPD to ensure the contractor conducts a Self-Surveillance annually. This annual Self-Surveillance…should cover all 32 guidelines of the ANSI/EIA748B. Documentation of the Self-Surveillance is sent to the CO and the PMSO (copy to OECM) confirming the continued compliance of their EVMS ANSI/EIA748B..." This review, and the associated report, is deemed to satisfy this requirement.

The self-surveillance is the process of reviewing the implementation and use of the Idaho National Laboratory's (INL) Earned Value Management System (EVMS), processes, and procedures. The project being evaluated for this review is the Remote Handled Low Level Waste (RHLLW) Disposal project. The purpose of this self-surveillance is to focus on the RHLLW projects use of the EVMS to effectively plan, monitor, and manage cost, schedule, and technical performance.

Not only did the review evaluate the RHLLW project's implementation and compliance with INL's EVMS procedures and processes, it also evaluated INL processes to ensure continued satisfaction of EVMS requirements, reviewed the EVMS procedure set to ensure that there have been no significant changes made since completion of the Department of Energy Headquarters' (DOE HQ) Acquisition and Project Management (APM) certification review. The review also validates that the corrective actions implemented as part of the APM certification review are in place and implementation is continuing.

The Self-Surveillance Review Team (SRT) finds that the overall performance rating for the INL's continued implementation of EVMS requirements is effective. The "effective" rating is based on the program and process being documented and understood by all personnel interviewed. There is one corrective action request and five continuous improvement opportunities written that to correct relatively minor administrative noncompliances. During personnel interviews, and review of the objective evidence, the SRT found that occasional deviations occurred, but felt that personnel are following the processes and procedures reliably and continue to work toward refining and improving their individual skills. Personnel are taking an active role in identifying and resolving problems and demonstrate a continuous improvement attitude.

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TABLES

ACRONYMS

ACWP	Actual Cost of Work Performed
APM	Acquisition and Project Management
BCP	Baseline Change Proposal
BDSIS	Business Decision Support Information System
BEA	Battelle Energy Alliance, LLC
CABS	Contract Accrual Bolton System
CAM	Control Account Manager
CAP	Corrective Action Plan
CAR	Corrective Action Request
CIO	Continuous Improvement Opportunity
CPR	Cost Performance Report
CUI	Controlled Unclassified Information
DOE	Department of Energy
DOE-HQ	Department of Energy Headquarters
DOE	Department of Energy Order
EAC	Estimate at Completion
ETC	Estimate to Complete
EV	Earned Value
EVMS	Earned Value Management System
FY	Fiscal Year
INL	Idaho National Laboratory
IWAD	INL Work Authorization Document
LWP	Laboratory-Wide Procedure
MCP	Management Control Procedure
MJES	Manual Journal Entry System
MSC	Material Security and Consolidation
NDIA	National Defense Industrial Association
OBS	Organizational Breakdown Structure
OECM	Office of Engineering and Construction Management
PFCS	Planning and Financial Control Specialist
PMB	Performance Measurement Baseline
PS	Project Scheduler
PSR	Performance Summary Report
RHLLW	Remote Handled Low Level Waste

SRT	(EVMS) Self-Surveillance Review Team
STARS	Standard Accounting and Reporting System
TIMS	Transportation Information Management System
TPC	Total Project Cost
VAR	Variance Analysis Report
WBS	Work Breakdown Structure

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1. INTRODUCTION

Idaho National Laboratory (INL) maintains a robust Earned Value Management System (EVMS) process that is audited through self-surveillance and assurance activities. These assurance activities ensure that projects with a Total Project Cost (TPC) over $20 million, or projects where EVMS is deemed appropriate, remain in compliance with the American National Standards Institute/Electronic Industry Alliance's (ANSI/EIA) 748-B, "Earned Value Management Systems," and INL EVMS requirements. The EVMS assurance activities are documented in the Battelle Energy Alliance, LLC (BEA) Contractor's Assurance System (CAS). This report documents the activities performed, personnel on the review team, and personnel and EVMS guidelines that were reviewed while performing the self-surveillance of INL's certified EVMS. The self-surveillance is performed in accordance with the process outlined in Department of Energy Order (DOE O) 413.3B G10A, "Earned Value Management System."

2. SELF-SURVEILLANCE OVERVIEW

The self-surveillance is the process of reviewing the implementation and use of the INL's EVMS systems, processes, and procedures. The project being evaluated for this review is the Remote Handled Low Level Waste (RHLLW) Disposal project. The purpose of this self-surveillance is to focus on The RHLLW projects use of the EVMS to effectively plan, monitor, and manage cost, schedule, and technical performance. An effective self-surveillance process provides assessment, training, and mentoring of personnel involved with implementing the EVMS processes and procedures so that the elements of the process are maintained over time and on subsequent applications. Successful practices identified during this self-surveillance will be shared as part of the INL's continuous improvement process.

All applicable aspects of EVM will be considered during this self-surveillance. The self-surveillance will address the content of the PDD-7002, "Earned Value Management System Description," and INL's EVMS procedures listed in Table 5. INL EVMS procedure set. INL EVMS Procedure Set. In addition to evaluating the EVMS procedures the SRT recognized that INL has secondary support procedures and guides. The SRT performed a review of these secondary procedures and guides listed in Table 6 to ensure that they are EVMS compliant.

This EVMS self-surveillance will be based upon the risk associated with the remaining work and content that is specific to the RHLLW project being reviewed. The selection of EVM guidelines and processes reviewed will be relevant to the project phase. Due to recent funding constraints, much of the work for this project has been placed on stand-down until further notice, and a Baseline Change Proposal (BCP) has been processed that delays the majority of the project work scope until Fiscal Year (FY) 2014. At this time the RHLLW project has no subcontract or material purchases of any significance. Therefore, there is no objective evidence to review and the review will not focus on those elements.

3. SURVEILLANCE REVIEW OBJECTIVES

3.1 EVMS Self-Surveillance Goals

The goals of this EVMS self-surveillance are as follows. First, to confirm that INL's processes and procedures continue to satisfy the requirement from DOE O 413.3B for continued compliance with the 32 EVMS guidelines in the ANSI/EIA 748-B standard. Second, to ensure that the RHLLW project is appropriately implementing the INL processes and procedures. Third, to satisfy DOE O 413.3B and DOE G 413.3-10A, "Earned Value Management System," for performing an annual self-surveillance. Lastly, it evaluates whether the corrective actions from the March 2012 Acquisition and Project Management (APM) review are still being implemented.

An overview of the self-surveillance process includes a review of each of the five ANSI guideline categories:

1. Organization
2. Planning
3. Execution
4. Results
5. Management control and corrective action.

4. SCOPE OF REVIEW

The review evaluated the RHLLW project's implementation and compliance with INL's EVMS procedures and processes, evaluated that INL processes continue to satisfy EVMS requirements, and reviewed the EVMS procedure set to ensure that there have been no significant changes made since completion of the Department of Energy Headquarters' (DOE HQ) APM certification review. The review will validate that the corrective actions implemented as part of the APM certification review are in place and continuing.

Due to delays in congressional authorization, the RHLLW project has recently been directed to place the project in stand down mode. At this time, the duration of the stand down is unknown, but the project will not receive CD-2/3 approval until after direction is given to proceed and funding authorization is given. The RHLLW project's data (objective evidence) for February, March, and April, and the latest BCP (CR-13-029 R1) were evaluated for compliance with INL's EVMS procedures and processes. The review for the RHLLW project includes both an evaluation of the objective evidence and Control Account Manager (CAM) interviews to ensure that the project is continuing to implement EVMS principles and is maintaining procedural compliance.

DOE G 413.3-10A, Section 3.a states: "The Contractor has primary responsibility for implementing and maintaining a surveillance program to ensure continued compliance of the system with ANSI/EIA-748B. DOE O 413.3B requires the FPD to ensure the contractor conducts a Self-Surveillance annually. This annual Self-Surveillance…should cover all 32 guidelines of the ANSI/EIA748B. Documentation of the Self-Surveillance is sent to the CO and the PMSO (copy to OECM) confirming the continued compliance of their EVMS ANSI/EIA748B..." This review, and the associated report, is deemed to satisfy this requirement.

In the APM certification review there were Corrective Action Requests (CARs) and Continuous Improvement Opportunities (CIOs) that resulted from the review. INL provided Corrective Action Plans (CAPs) for all of the identified issues. After the CAPs were approved, INL implemented the corrective actions and successfully completed the follow-up APM review. This self-surveillance will evaluate the continued implementation of these CAPs to ensure that the corrective actions continue to be implemented.

5. ASSESSMENT TEAM

EVMS Self-Surveillance Review Team (SRT) members who participated in the review are listed in Table 1.

Table 1. EVMS SRT members.

Assessment Team Member	Title/Position	Area(s) Evaluated and Expertise
Doug Parker	Integrated Planning Office	All
James Jardine	DOE ID Representative	Independent Evaluator
Kimberly Case	INL Audit	Business Processes
Linda Hergesheimer	Planning & Financial Controls	Budget & Cost
Maxine Johnson	Project Management Office	ETC/EAC & Change Control
Michael L. Nelson	BEA Lead Assessor	All
Rick Staten	Scheduling Manager	Scheduling Practices
Scott Taylor	Accounting	Accounting Practices

Biographies for the BEA SRT members are included in Appendix A.

6. EVMS REVIEW GUIDELINES

The EVMS SRT evaluated RHLLW Project objective evidence against the 32 EVMS guidelines as defined in the National Defense Industrial Association (NDIA) "Earned Value Management Systems Intent Guide." The 32 NDIA EVMS guidelines are outlined below. Note that the RHLLW project has no major subcontracts in place at this time. The project is a design/build project and when the project was directed to go into stand-down they were awaiting authorization to award. In the RHHLW project Work Breakdown

Structure (WBS), the work for the design/build subcontract is in planning packages and will be detailed after the subcontract is awarded. Due to the fact that this information is source-selection sensitive, this self-surveillance did not evaluate the larger material and subcontract purchases that are planned in planning packages in the future.

6.1 Organization

6.1.1 Verify that the WBS contains all of the project's authorized work scope (Guideline 1, Intent Guide):

- All project work, including revisions for authorized changes
- All contract line items and end items
- All external reporting elements
- Extended to the control account level
- Map to WBS dictionary.

6.1.2 Verify that a Work Authorization with scope, schedule, and budget exists at control account level (Guideline 2, Intent Guide).

6.1.3 Verify that the Organizational Breakdown Structure (OBS) is documented (Guideline 3, Intent Guide).

6.1.4 Verify that the same WBS is linked between schedules, work authorization, and control account plans (Guideline 3, Intent Guide).

6.1.5 Verify that Responsibility Assignment Matrix or equivalent documents control accounts at appropriate level (Guideline 3 and 5, Intent Guide).

6.2 Planning, Scheduling, and Budgeting

6.2.1 Ensure the project schedule specifics (Guideline 6, Intent Guide) include:

- WBS/OBS identifiers exist in the project schedule at activity level for summarization
- Project schedule reflects entire WBS Dictionary
- Critical target/contractual dates are identified in the project schedule
- The project schedule identifies significant interdependencies
- Task durations are meaningful and relatively short

- Longer tasks use objective Earned Value (EV) techniques and EV plans
- Resource estimates are reasonable and consistent with the schedule and cost estimate
- The baseline is reasonable to achieve project requirements as demonstrated through schedule analysis techniques
- The project schedule baseline is established
- The schedule provides current status and forecasts of completion dates for all discrete work
- The project has a critical path.

6.2.2 Verify that objective completion criteria are used as basis to determine achievement (Guideline 7, Intent Guide).

6.2.3 Verify that CAM updates schedule status (Guideline 7, Intent Guide).

6.2.4 Verify that the integration of scope, schedule and budget at the control account level (Guidelines 8/9, Intent Guide).

6.2.5 Verify that the time-phased Performance Measurement Baseline (PMB) equals the work authorization and summarizes above the control account to the contract value (Guidelines 8/9, Intent Guide).

6.2.6 Verify that control account budgets identify elements of cost including subcontracts (Guideline 9, Intent Guide).

6.2.7 Verify that management reserve and undistributed budget, if any, track to logs (Guidelines 9/14, Intent Guide).

6.2.8 Verify that schedule and cost variances are collected at control accounts (Guideline 10, Intent Guide).

6.2.9 Verify the work packages are uniquely identified, have a budget, and have an EV technique (Guideline 10, Intent Guide).

6.2.10 Verify that planning packages are not within 60 days of execution and reflect the manner in which the work will be performed (Guideline 10, Intent Guide).

6.2.11 Verify that the control account work packages and planning packages (if any) add to the control account total budget (Guideline 11, Intent Guide).

6.2.12 Identify level of effort designated work is appropriately categorized and identifiable (Guideline 12, Intent Guide).

6.2.13 Intent Guideline 13 is generally omitted in project self-surveillance.

NOTE: *Guideline 13 deals with the establishment of overhead budgets for indirect costs. There is an existing requirement for BEA to submit indirect budgets to DOE-ID for review and approval.*

6.2.14 Verify that management reserve and undistributed budget logs reconcile with last 2 months of Cost Performance Reports (CPR) (Guideline 14, Intent Guide).

6.2.15 Verify that baseline control logs reconcile with performance measurement baseline Guideline 15, Intent Guide).

6.3 Accounting Considerations

6.3.1 Verify that Actual Cost of Work Performed (ACWP) in the CPR reconcile with books of record (Guideline 16, Intent Guide).

6.3.2 Verify that WBS and OBS summarize direct costs from one control account (Guideline 17/18, Intent Guide).

6.3.3 Verify that indirect costs are applied to the direct costs per Laboratory policy (Guideline 19, Intent Guide).

6.3.4 Verify that unit cost are identified when needed (Guideline 20, Intent Guide).

6.3.5 Verify that effective performance measurement is assessed on material no earlier than point of receipt and consistent with the method budgeted (Guideline 21, Intent Guide).

6.3.6 Verify that an established process exists for reporting subcontract and material actual costs (Guideline 21, Intent Guide).

6.4 Analysis and Management Reports

6.4.1 Verify that variance analysis is performed to the project thresholds as required (Guideline 22, Intent Guide).

6.4.2 Verify that variance analysis contains cause, impacts, and corrective action as appropriate (Guidelines 22/23, Intent Guide).

6.4.3 Verify that corrective actions are assessed and closed in a timely manner (Guidelines 23/26, Intent Guide).

6.4.4 Intent Guideline 24 is normally omitted in project self-surveillance.

NOTE: *Guideline 24 deals with application of indirect costs. BEA provides a fully burdened rate for each work discipline code. This process has not changed since the APM review and no further evaluation was performed.*

6.4.5 Verify that variance analysis as reported to the customer reconciles with the analysis at the control account level (Guideline 25 Intent Guide).

6.4.6 Verify Estimate to Complete (ETC)/Estimate at Complete (EAC) (Guidelines 26/27, Intent Guide) by validating:

1. Comprehensive EACs are updated per requirements and take into account efficiencies.

2. CAMs review achievability of control account EAC monthly.

3. Time-phased ETC reconciles with the EAC as reported externally.

4. Risks and opportunities are integrated into summary schedule and ETC resource plans.

6.5 Revisions and Data Maintenance

6.5.1 Verify that work authorization plus any baseline change documentation equal current control account budget (Guidelines 28/29, Intent Guide).

6.5.2 Trace last change proposal authorized. Verify schedule and cost integration at control account level and that the WBS is updated as appropriate (Guidelines 23/29, Intent Guide).

6.5.3 Verify that change logs reconcile and contain justification (Guideline 28/29, Intent Guide).

6.5.4 Verify that retroactive changes are made only for correction of errors, accounting adjustments, and effects of customer management-directed changes to improve accuracy of data. If any have been made, verify that they are consistent with disclosed EVMS policy (Guideline 30, Intent Guide).

6.5.5 Verify, in at least one control account that last month's changes, as reported to the customer and this month's PMB, reconcile to entries in the contractual baseline log (Guideline 30, Intent Guide).

6.5.6 Verify that negative EV status, if any, has been adequately explained (Guideline 31/32, Intent Guide).

6.5.7 Verify that all baseline changes within 1 month reconcile to BCPs or the equivalent (Guidelines 31/32, Intent Guide).

7. EVMS SELF-SURVEILLANCE TEAM MEMBERS

The assignments noted in Table 2 are primary assignments for evaluating the objective evidence against EVMS guidelines. During the course of the surveillance, each of the team members bridged across into other subject areas in an effort to ensure that their questions/observations were resolved to their satisfaction and that a thorough assessment was performed.

Table 2. EVMS SRT EVMS guideline assignments.

Team Member	Responsible Area	EVMS Guidelines
Doug Parker Michael Nelson	Organization	1–5
Linda Hergesheimer Rick Staten	Planning, Scheduling & Budgeting	6–15
Kimberly Case Scott Taylor	Accounting	16–21
Doug Parker Maxine Johnson Michael Nelson	Analysis and Management Reports	22–27
Maxine Johnson Linda Hergesheimer	Revisions & Data Maintenance	28–32

8. EVMS SELF-SURVEILLANCE INTERVIEWEES

The personnel in Table 3 below are the main participants from the RHLLW project team that supported the EVMS self-surveillance. There are other ancillary personnel that supported the reviews, but they are not listed here for brevity.

Table 3. RHLLW project team members interviewed.

Interviewee	Title/Position
David Duncan	Project Manager
Danny Anderson	Control Account Manager
Josh Jacobson	Control Account Manager
Don Darrington	Control Account Manager
Rodney Ashton	Project Scheduler (PS)
Rodney Phippen	Planning & Financial Controls Specialist (PFCS)

To aid in a thorough assessment of INL's business systems, the lead assessor employed the services of personnel working in INL's Internal Audit organization. Internal Audit is familiar with the business processes, accounting guidelines, etc., that must be satisfied. Table 4 contains a listing of the personnel interviewed and the business system(s) they support. The results from this review are documented in Section 9, "Assessment Results."

Table 4. Personnel interviewed by BEA internal audit.

Interviewee	Business System Supported
Andrea Gilstrap	Business Systems – Oracle P6, Deltek Cobra, Deltek wInsight, IPS2000
Bryan Larson	Business Management
Cherene Laird	Fleet Maintenance (TIMS)
Dave Searle	Travel, Benefits, and Accounting
Debra Schriner	Cost Estimating (Form 415.08)
Diana Skoy	Cost Monitoring
Gregg Landon	Indirect Rates
Janaye Sanders	DOE Fin Plan
Joe Gunter	Misc. Transactions, Manual Journal Entry (MJES), Financial Reporting (STARS)
John Anderson	Materials and Services (PCard)
Jordan Stone	Asset Suite
Keith Barney	Data Warehouse (BDSIS), Oracle Financials
Mike Olson	PeopleSoft, Oracle
Nathan Stohl	PeopleSoft, Oracle
Rachel Burch	Contract Accrual Bolton System (CABS), Asset Suite
Ryan Hart	Data Warehouse (BDSIS)
Sandy Wierman	PeopleSoft, Oracle
Steph Hunt	PeopleSoft (Labor Transactions, Organization, Employees)

9. DISCUSSION

The assessment was requested by the director of the Project Management Office to ensure continued implementation of EVMS principles and processes for the RHLLW project, procedural compliance, and compliant application of INL's business processes. PDD-7002 was used as the requirements basis.

The EVMS SRT reviewed the objective evidence and identified areas requiring additional clarification discussions with the project team. CAM interviews followed the format of the "BEA – INL CAM Preparedness and Interview Assessment" shown in Appendix B, "Master Interview Questionnaire."

10. ASSESSMENT RESULTS

10.1 Procedure Review

There have been no significant changes to either the EVMS procedures or supporting procedures as listed in Table 5 and Table 6. In addition to evaluating the EVMS procedures set the SRT recognized that INL has secondary supporting procedures and guides. The SRT performed a review of these secondary procedures and guides to ensure that they were EVMS compliant.

Table 6The SRT evaluated each of the procedures to identify changes that might have been incorporated since the APM review and confirmed that there were no significant changes that should have been submitted to APM for consideration. Appendix C, "INL EVMS Procedure Set Evaluation," documents the evaluation performed and the results.

Table 5. INL EVMS procedure set.

Procedure Number	Procedure Title	Revision Number
PDD-7002	Earned Value Management System Description	4
LWP-3204	Contract Accruals	4
MCP-3334	Indirect Budget Management	3
MCP-3335	Monitor and Control Indirect Budgets	2
MCP-7344	Project Work Definition, Assignment, and Authorization	5
MCP-7345	Project Baseline Schedule Development and Management	4
MCP-7346	Project Budgeting and Baseline Development	2
MCP-7347	Project Materials and Subcontract Management	4
MCP-7348	Project Data Accumulation, Reporting, and Variance Analysis	2
MCP-7349	Project Estimate to Complete and Estimate at Completion Development	2
MCP-7400	Project Baseline Change Management	3
STD-5	Time and Attendance Reporting	7

In addition to evaluating the EVMS procedures set the SRT recognized that INL has secondary supporting procedures and guides. The SRT performed a review of these secondary procedures and guides to ensure that they were EVMS compliant.

Table 6. Secondary supporting procedures and guides.

Procedure Number	Procedure Title	Revision Number
CAS	Cost Accounting Standard disclosure Statement	FY-13
GDE-489	Planning and financial Controls Desktop Reference	2
GDE-620	P6 Desktop Reference	3
LWP-2016	Disposing of Government Property	3
LWP-3201	Authorizing and Controlling Expenditures	5
MCP-7342	Formal Cost Estimates	3
MCP-7350	Project Risk Management	1
STD-7032	Charging Practices	10
STD-7034	Charging Practices for Construction Projects	7

At the time of the APM certification review GDE-620, "P6 Desktop Reference," was under development. The APM review Team submitted a CAP for CAR 2, "Network Schedule Review Practices," to resolve identified issues with BEA's scheduling practices (EV techniques, excessive float, excessive constraints, schedule diagnostics, etc.). In addition to modifying the EVMS procedures to address these concerns, the team chose to develop additional validation filters and included the direction for implementing the validation filters, and other scheduling guidance in a desktop guide (GDE-620).

GDE-620 establishes a consistent "rule set" as to how scheduling is accomplished at INL. The guide defines the "how to" mechanics along with a structured approach when developing, maintaining and controlling schedules in P6 while meeting the intent of ANSI/EIA-748B, June 2007.

This INL-initiated "Opportunity for Improvement" functions as a supplement to MCP-7345, "Project Baseline Schedule Development and Management," and supports all scheduling aspects for capital asset projects at INL.

10.2 Evaluation of INL Business Systems and Processes

To aid in a thorough assessment of INLs business systems the lead assessor employed the services of personnel working in INL's Internal Audit. An audit report IA-52-13, "Results of Requested Earned Value Management System Review," was published. This report contains Controlled Unclassified Information (CUI) and cannot be reproduced or attached in its entirety. If a copy of this report is required, it can be requested from the

lead assessor and they will work to provide a copy. However, the background information and scope and methodology used can be released and is shown below.

Background Information

An EVMS is an integrated set of policies, procedures, and practices to support program and project management as a decision enhancing tool and a critical component of risk management. EVMS measures actual performance of work scope and the associated cost and schedule against an agreed upon baseline plan. Per your request, we have completed our review of the business systems supporting the INL EVMS.

Scope and Methodology

In conducting their review, the INL audit team:

- Identified changes in INL business systems and system owners
- Interviewed system owners and users to gain an understanding of the process flow of individual systems and how these systems interact with other business systems within the EVMS
- Updated the overall process flowchart between the various systems
- Confirmed that reconciliations are performed monthly to ensure complete and accurate information is passed between different systems and that these reconciliations are formally documented
- Performed limited validation of the reconciliations
- Selected a sample of capital asset projects and reviewed the Performance Summary Reports (PSR) and applicable variance reports for the most current three months' of data to ensure active cost monitoring was occurring
- Determined if there were any changes in the indirect recovery rate development process
- Verified that the correct recovery rates are loaded into the different business systems
- Reviewed selected CAR and CIO issued by the external EVMS review team to ensure corrective actions reported have been completed.

After completing the audit, audit report IA-52-13 identifies no corrective actions or findings.

10.3 RHLLW Project EVMS Implementation Evaluation

10.3.1 Corrective Action Requests

10.3.1.1 CAR-001 – RHLLW Project WBS Integrity

The RHLLW project team had previously prepared a WBS that was product oriented and successfully passed several reviews including a DOE-HQ EVMS certification review. During the self-surveillance interviews it became apparent that the delay in congressional authorization has resulted in conflicts for the RHLLW project team. In attempting to address the delay in congressional authorization, the RHLLW project team made several changes to the project WBS to improve the "timing" for implementation of some work scope and have caused issues with the integrity of the product-oriented WBS.

The SRT is concerned with the movement of work scope between WBS elements to satisfy potential "timing" issues. While it is understood that the problems with congressional authorization and funding have created some significant challenges, moving work scope within WBS elements is not a preferred solution.

The SRT is concerned that the partial movement of work scope from various work packages into one affects the integrity (i.e., vertical alignment) of the WBS and affects the ability to report progress at the control account level and to accurately reflect costs for the individual work products. The WBS should remain as a product-oriented breakdown of the work and should not be changed solely due to funding or timing constraints.

As a result of these concerns CAR-001 was written and is attached as Appendix D, "INL Corrective Action Request (CAR) from 2013 EVMS Self-Surveillance." A CAP will be prepared for this CAR. However, it should be noted that, due to the direction for stand-down, the CAP for the RHLLW project will not be able to be implemented until a future unidentifiable date.

10.3.2 Continuous Improvement Opportunities

10.3.2.1 CIO-001 – Deficiencies in Project INL Work Authorization Documents (IWADs)

INL's work authorization process utilizes an IWAD for the work authorization document. One portion of the IWAD is the official

record for the scope statement for the WBS element (i.e., project level, subproject level, control account, and work package).

During the review, the SRT found that the scope statements in the IWADs are written at a level that is too high and the scope statement must be more definitively defined. During review of the BCP, the IWADs were reviewed and as the review team tried to track the changes, they discovered that there were significant changes to the scope, but the IWADs did not have identifying redline/strikeout to identify the change(s).

CIO-001 was written to address this finding.

10.3.2.2 CIO-002 – Automatic Adjustments made by COBRA to the ETC/EAC

While reviewing the Variance Analysis Reports (VAR)s that were provided as objective evidence the SRT observed that there were variances in the EAC value from month to month. However, the "New/Revised ETC Needed?" box was checked "No." When questioned the CAMs were aware that the EAC was changing and explained that it was a result of a Cobra calculation, the changes were relatively small, and it was beyond their control.

In discussion with the Cobra system administrator it was confirmed that the CAM can give instructions to manually override the $ETC_{calculated}$ by Cobra and hold the EAC to the original value until the decision is made that it should be changed.

CIO-002 was written to address this finding.

10.3.2.3 CIO-003 – Issues and Concerns with RHLLW Disposal Project Master Budget Log

The RHLLW project team is using the master budget log, but not in the way the form was intended. There is not a clean journal to allow identification of control account budgets associated with the changes.

CIO-003 was written to address this finding.

10.3.2.4 CIO-004 – Lack of Clarity and Preciseness in RHLLW BCP

During review of the BCP, the SRT noted several inconsistencies and issues and there was a lack of clarity and preciseness in the BCP. It was difficult for the SRT to understand the changes being

incorporated and evaluate whether these changes were EVMS compliant. During CAM interviews the SRT identified several concerns that must be evaluated and addressed.

CIO-004 was written to address this finding.

10.3.2.5 CIO-005 – Improvements to BEA Procedures and Forms

During the review the SRT identified that there were process improvements that could be implemented that would add to the clarity of the EVMS procedures and processes and provide additional guidance to project teams implementing EVMS principles.

CIO-005 was written to address this finding.

The CIOs above are attached as Appendix E, "INL Continuous Improvement Opportunities (CIOs) from 2013 EVMS Self-Surveillance." CAPs will be prepared for all CIOs. However, it should be noted that, due to the direction for stand-down, the CAPs for the RHLLW project will not be able to be implemented until a future unidentified date. The CAP for CIO-005 will be prepared and completion dates for implementation will be identified.

10.4 Continued Implementation of Corrective Actions for OECM/APM CARs/CIOs

The SRT performed an evaluation of the corrective actions that were implemented to resolve the CARs and CIOs from the DOE OECM/APM certification review in March 2012. The CARs and CIOs from the DOE OECM/APM review are attached as Appendix F, "CARs and CIOs from DOE APM EVMS Certification Review, March 2012."

OECM/APM CAR-1 identified an issue with EV plans not being prepared at the time that the planning packages were converted to work packages. The SRT found that there have been no planning package conversions after the OECM/APM review. The SRT also evaluated the procedures and processes and identified no significant changes (see Appendix C, "INL EVMS Procedure Set Evaluation").

OECM/APM CAR-2 identified issues with the RHLLW project schedule. At the time of the review the OECM/APM review team identified excessive float, too many hard constraints, and lack of horizontal integration. The baseline change corrected these issues in the RHLLW project schedule and BEA implemented improvements to the EVMS procedure set, schedule checklist, and established

additional schedule evaluation filters. No changes have been made to these enhancements since the OECM/APM certification review (see Appendix C, "INL EVMS Procedure Set Evaluation").

OECM/APM CAR-3 identified issues with a lack of documentation for the accounting process in BEA's PDD-7002. The corrective action added the required documentation to PDD-7002 and no changes to this section have occurred since the certification review completed.

OECM/APM CIO-1 identified issues with the RHLLW project's assignment of EV methods to their activities. The EV method assignment was corrected by the same BCP that resolved the comments for CAR-002 referenced above

OECM/APM CIO-2 identified issues with the WBS for the Material Security and Consolidation (MSC) project that do not have a "product oriented" WBS at the control account level. BEA changed MCP-7344, "Project work Definition Assignment, and Authorization" and added Appendix C, "WBS Development Guidance." There have been no changes to this appendix following the OECM/APM certification review. (Note that the OECM/APM review team did indicate that they felt that the MSC project WBS was product oriented at the work package level.)

OECM/APM CIO-3 identified an issue that there was no documented process for conducting reconciliations between the EVMS and General Ledger. GDE-489, "Cobra Section of the Planning and Financial Controls Desktop Reference," was updated to document the reconciliation process. GDE-489 has been updated since the OECM/APM certification, but the only significant update to the guide is to address the changes from updating to a more recent version of the Cobra software (see Appendix C, "INL EVMS Procedure Set Evaluation").

OECM/APM CIO-4 identified an issue with BEA not having finalized the indirect rates at the time of the review (approximately a 6-month period). This issue was resolved and the recent audit confirmed that the indirect rates for FY-13 were finalized in a timely manner.

OECM/APM CIO-5 identified issues resulting from timekeeping floor checks identified employees were not following BEA procedure, STD-5, "Time and Attendance Reporting," for filling out and submitting timecards. CIO-005 also identified that some managers were not performing timely approvals of time cards. This issue was corrected and BEA continues to monitor and report these metrics to BEA senior management. See Appendix G, "BEA Follow-up Actions for Timekeeping CIO," for objective evidence that these follow-up actions are continuing.

11. OVERALL PERFORMANCE RATING

The SRT finds that the overall performance rating for the INL's continued implementation of EVMS requirements is effective. The "effective" rating is based on the program and process being documented and successfully implemented by the RHLLW project team and other supporting personnel interviewed. There is one CAR and five CIOs written to correct relatively minor administrative noncompliances. During personnel interviews and review of the objective evidence, the SRT found that occasional deviations occurred but felt that personnel are following the processes and procedures reliably and continue to work toward refining and improving their individual skills. Personnel are taking an active role in identifying and resolving problems and demonstrate a continuous improvement attitude.

12. APPENDIXES

Appendix A, "INL Self-Surveillance Team Member Biographies"

Appendix B, "Master Interview Questionnaire"

Appendix C, "INL EVMS Procedure Set Evaluation"

Appendix D, "INL Corrective Action Request (CAR)" from 2013 EVMS Self-Surveillance"

Appendix E, "INL Continuous Improvement Opportunities (CIOs) from 2013 EVMS Self-Surveillance"

Appendix F, "CARs and CIOs from DOE APM EVMS Certification Review, March 2012"

Appendix G, "BEA Follow-up Actions for Timekeeping CIO"

Appendix A

INL Self-Surveillance Team Member Biographies

BEA Self-Surveillance Review Team (SRT) Biographies

Table 1 provides an alphabetical listing of the INL's Self-Surveillance Review Team (SRT), their title/position, and their areas evaluated and expertise. Following the table are brief biographies of the SRT members describing their background and work experience.

Table 1: INL EVMS SRT Members

Assessment Team Member	Title/Position	Area(s) Evaluated and Expertise
Doug Parker	Integrated Planning Office	All
Kimberly Case	INL Audit	Business Processes
Linda Hergesheimer	Planning & Financial Controls	Budget & Cost
Maxine Johnson	Project Management Office	ETC/EAC & Change Control
Michael L. Nelson	INL Lead Assessor	All
Rick Staten	Scheduling Manager	Scheduling Practices
Scott Taylor	Accounting	Accounting Practices

Doug Parker

Doug Parker has over 30 years' experience in program/project management along with nuclear waste and fuel cycle operations at Idaho National Laboratory (INL). Most recently, he has functioned as the Project Management System Lead responsible for development, implementation, practical application/tailoring, and performance of the INL project management system, including Earned Value Management System (EVMS) certification. Parker currently provides staff support to various INL programs and projects focused on practical application and implementation of the INL project management system, including integrated life-cycle project planning, business system applications and processes, program/project reviews, and mentoring. Parker holds a bachelor's degree in chemical engineering from the University of Idaho and is on staff in INL's Project Management Office.

Kimberly Case

Kimberly Case has been with INL's Internal Audit department for 13 years. Case has expertise in planning, performing, and leading audits in accordance with INL procedures, Inspector General Audit Strategy, and Institute of Internal Audit professional audit standards. Case has demonstrated competencies in both leading and participating on audit teams, defining and developing information technology audit process requirements, and promoting a positive, collaborative work environment. Case is a Certified Public Accountant , Information Systems Auditor, and Internal Auditor. She holds a bachelor's degree in business administration with an emphasis in accounting, and a master's in business administration, also with an emphasis in accounting.

Linda Hergesheimer

Linda Hergesheimer has worked at INL for 23 years in the Planning and Financial Controls organization, specifically supporting construction (GPP/IGPP/LICP) budgets/schedules. Hergesheimer has acted as the Construction Coordinator supporting all construction activities between INL and DOE-ID on Project Authorization, DOE-ID Approved Funding Program (FIN Plan), and focal point for the Project Data Sheets for the fiscal year budget submission. Along with these, she also performed special requests involving DOE-HQ, Inspector General's office, and the Government Accountability Office. Hergesheimer was recognized as the Construction Technical Lead and provided assistance to program personnel in planning new construction projects as well as planning and reporting of life-cycle construction projects.

Maxine Johnson

Maxine Johnson is currently working in INL's Project Management Office as a program coordinator, an active team member, and an integral part of sustaining the EVMS certification. Johnson has more than 15 years of experience at INL with emphasis in scheduling, project controls, Earned Value Management, and program/project integration. Johnson has been highly effective in preparing several projects for internal and external assessments of INL's EVMS in order to obtain EVMS Certification. She is knowledgeable of DOE Order 413.3B capital asset project requirements, including application of ANSI STD-748B EVMS principles. Johnson is the INL lead for development and maintenance of the Detail Cost Estimating Spreadsheet. This responsibility requires interface with Information Management and Planning and Financial Controls along with Project Managers. Johnson is the V.P. of Professional Development for the Eastern Idaho PMI Chapter.

Michael L. Nelson

Michael L. Nelson is the lead assessor for INL's 2013 EVMS Self-Surveillance Review. He has over 35 years' experience providing leadership in the project management, project controls, and operations disciplines. Nelson was the Project Manager leading INL's EVMS Certification effort, and his current assignment is Subject Matter Expert for Earned Value Management. In this position, he leads efforts for reviewing and improving procedures, processes, and training classes; identifying and overcoming cultural barriers; and improving assurance assessment activities. Nelson is active in the Eastern Idaho Chapter of Project Management Institute (PMI) and has served in several officer positions over a six year period. He has represented the chapter as a guest speaker with local companies and universities, discussing the benefits of project management processes and an association as a project management professional with PMI. Nelson has a bachelor's in general engineering from Idaho State University and a master's in engineering management from the University of Idaho.

Rick Staten

Rick Staten, PSP, PMP, is the Scheduling Manager for INL. He has 24 years of Department of Energy (DOE) Laboratory experience which includes 17 years of advanced management experience in project scheduling, schedule integration, and resource management. Staten is currently responsible for strategic and tactical leadership in the development and management of processes, procedures, and tools associated with scheduling in support of EVMS at INL. He functions as the Scheduling Subject Matter Expert for INL. Staten was a primary contributor in the development of the INL processes and procedures that implemented the DOE O 413.3B requirements for managing

capital asset projects. Staten holds a master's degree in industrial technology from the University of Idaho. He holds a Planning and Scheduling Professional (PSP) credential from the Association for the Advancement of Cost Engineering International and a Project Management Professional (PMP) credential from the PMI.

Scott Taylor

Scott Taylor is a Certified Public Accountant originally licensed in Colorado in 1981 and currently licensed in Idaho, license #CP-3603. Taylor has broad accounting experience in construction, public accounting, software development, health care, and governmental contracting environments. Since 2005, Taylor has worked for INL. Taylor served as the subject matter expert for implementing and maintaining the requirements of DOE Circular A-123, "Management's Responsibility for Internal Controls" from late 2005 through mid-2012. Taylor worked with Accounting, Supply Chain, Human Resource, Information Technology, and Line Management and Subject Matter experts to document the internal controls surrounding accounting transactions. Taylor is familiar with the operations and controls in the Oracle general ledger, fixed asset, accounts receivable, cash receipts, PeopleSoft human resources and payroll, Asset Suite supply chain and accounts payable, and myriad supporting web-based and excel-based control systems, logs and related control processes. Taylor is a qualified lead assessor and has participated in over twenty assessments in his tenure with INL.

BEA - INL CAM Preparedness and Interview Assessment

	CAM Name:
	Control Account(s) Reviewed:
	CAM Support Staff Present:
	Interview Leader:
	Date of Interview:
	Scoring range 0 (low) - 3 (high) for each question or NA (not Applicable) DNA (Did Not Ask)
	ORGANIZATION PROCESS
1	Describe your responsibilities on the program.
2	How long have you been in this position & what is your technical background?
3	How do you fit into the organization and to whom do you report?
4	What is a control account? How many control accounts are you responsible for? How many are currently active?
5	What is the total dollar value of your control accounts? How much of this budget is for work yet to be done?
6	How much of your budget is associated with material and/or subcontracts?
7	How many people directly report to you?
8	What are the major risks/challenges to accomplishing your program responsibilities?
	SCHEDULING PROCESS
9	Describe your role in developing the detailed schedule for your control account?
10	Is the work that you are responsible for completing currently on the program's critical path? How do you know this?
11	What process do you use to ensure that your schedules are aligned with the schedules of other CAMs and within the program schedule?
12	How do you receive schedule information? How do you provide schedule information?
13	Do you directly support any major programmatic milestones that appear on the master/level 1 schedule?
14	Are any of your schedule activities specifically designed to mitigate a risk? If so, which are they?
15	How often are your detailed schedules updated to reflect accomplishments, progress and forecasts? What is your role?
	WORK/BUDGET AUTHORIZATION
16	Discuss any risks to achieving the work within budget
17	How are you authorized to begin work?
18	What is the scope of work for this CA? How do you know this is what has been contractually authorized?
19	Where are any technical requirements associated with your control accounts documented?
20	Do you have a Control Account Plan (CAP)? Please show it to me
21	How do you define a work package (WP)? Planning package (PP)? What is the difference between a WP and a PP?
22	When must planning packages be detail planned?
23	Is the time-phased Budgeted Cost for Work Scheduled (BCWS) for each of your work and planning packages consistent with the resource requirements of the associated schedule activities? Is the BCWS adequate for the work?
24	How do you determine earned value (Budgeted Cost for Work Performed - BCWP) for work in progress on each of your work packages?
25	What portion of your work is measureable or discrete effort? What portion is Level of Effort (LOE)?
26	How does the schedule status of the activities on the schedule relate to the BCWP being claimed at the WP level?
27	For selected WP [pick one] demonstrate how BCWP will be earned consistent with how the work/budget is planned.
	ACCOUNTING & INDIRECT COST MANAGEMENT PROCESSES
28	Do you review the actual cost charges in your control account for accuracy and reasonableness?
29	In your view, are costs collected at an appropriate level or “sort” for effective control account management?
30	Are any actual costs allocated to two or more WBS elements or IPTs?
31	How are corrections to reported actual costs made? Who can make such changes?

	CAM Name:
	Control Account(s) Reviewed:
	CAM Support Staff Present:
	Interview Leader:
	Date of Interview:
32	Do you have responsibility for indirect costs? If your budget includes these, how do you address rate variances?
	Scoring range 0 (low) - 3 (high) for each question or NA (not Applicable) DNA (Did Not Ask)
	MANAGERIAL ANALYSIS PROCESS
33	What reports do you receive that identify cost and schedule status of your control accounts?
34	What are the variance thresholds for your control accounts?
35	How do you know when you must prepare a variance analysis report?
36	Do you have samples of any variance analysis reports? [determine that these show a statement of problem, the variance, its cause and impact and proposed corrective action]
37	Do you develop corrective action plans for variances? Who approves these plans?
38	How do you monitor corrective action plans to ensure they are carried out? Who reviews?
39	What does Estimate at Complete mean to you? Does your current EAC consider whether recent cost and schedule performance is a good indicator of future performance?
40	How often is your EAC revised?
41	What does it mean to have your EAC approved?
	CHANGE INCORPORATION PROCESS
42	What is the process for making changes to your budgets? Can you rephase or replan work? In what circumstances?
43	Have you had budget transfers between your control accounts and Management Reserve and/or Undistributed Budget? Describe the process that was used.
44	Have you made any changes to completed work or actual costs? If so, describe the reasons and the process.
	MATERIAL MANAGEMENT PROCESS **Only CAMs with material content should be asked these questions**
45	How are material budgets planned (e.g. part number, assembly, kit, etc.)?
46	What earned value technique is used for material? At what point in the process is the earned value taken for material?
47	Is ACWP for material items recorded in the same reporting period as BCWP is recorded? Do you use estimated actuals for material ACWP? If so why and what is your role in the process?
48	How do you track material prior to delivery or when deliveries are made?
49	How are EACs calculated for material?
	SUBCONTRACT MANAGEMENT PROCESS **Only CAMs with subcontract content should be asked these questions**
50	Are you responsible for an subcontracts? How many subcontractors are you responsible for? What is the dollar value for these subcontracts?
51	How was BCWS determined and planned for each of these subcontractors?
52	How do you monitor the performance of your subcontractors?
53	How do you take earned value for subcontracts?
54	Does the subcontracted effort support key milestones? Is it integrated into the schedule?
55	How often are subcontractors required to update their EAC?
	GENERAL MANAGEMENT or SYSTEM IMPLEMENTATION
56	Are your technical responsibilities for the Control Account compromised by reporting progress to schedule or cost goals?
57	When/how often do you communicate/use EV metrics, EACs and Variance impacts to include critical path analysis with your internal management AND / OR with your government counterparts?

Appendix C

INL EVMS Procedure Set Evaluation

EVMS Procedure Set

Procedure Number	Procedure Title	Revision Number	Previous Rev
1) PDD-7002	"Earned Value Management System Description"	4	3
2) LWP-3204	"Contract Accruals"	4	3
3) MCP-3334	"Indirect Budget Management"	3	2
4) MCP-3335	"Monitor and Control Indirect Budgets"	2	1
5) MCP-7344	"Project Work Definition, Assignment, and Authorization"	5	4
6) MCP-7345	"Project Baseline Schedule Development and Management"	4	-
7) MCP-7346	"Project Budgeting and Baseline Development"	2	-
8) MCP-7347	"Project Materials and Subcontract Management"	4	-
9) MCP-7348	"Project Data Accumulation, Reporting, and Variance Analysis"	2	-
10) MCP-7349	"Project Estimate to Complete and Estimate at Completion Development"	2	-
11) MCP-7400	"Project Baseline Change Management"	3	-
12) STD-5	"Time & Attendance Reporting (STD-5)	7	-
Secondary, Supporting Procedures & Guides			
13) CAS	"Cost Accounting Standard Disclosure Statement"		
14) GDE-489	"Planning and Financial Controls Desktop Reference"		
15) LWP-2016	"Disposing of Government Property"	3	-
16) LWP-3201	"Authorizing and Controlling Expenditures"	5	-
17) MCP-7342	"Formal Cost Estimate"	3	2
18) MCP-7350	"Project Risk Management"	1	0
19) STD-7032	"Charging Practices"	10	8
20) STD-7034	"Charging Practices for Construction Projects"	7	4

1) PDD-7002 – – Summary of Changes
   The changes made within this document were editorial in nature. They were primarily corrections to incorrect references to sections within the PDD, changes in an organization name, corrections of typos, spelling errors, grammatical corrections, etc.

2) MCP-3204, "Contract Accruals" – Summary of Changes
   a) Paragraph 4.1.2.1 – added clarification for "… manual accrual maintenance…" A screen shot documenting the change is shown below.

"Develop an accrual forecast and provide to the appropriate PFCS for manual accrual maintenance and/or to input into CABS."

3) MCP-3334, "Indirect Budget Management" – Summary of Changes
   a) Section 2, "Applicability" – added clarification and screen shots documenting the changes are shown below.

      The Financial Operations Website, found on the Idaho National Laboratory (INL) Nucleus portal, provides general fiscal year planning guidance for the development of all indirect budgets.

      Indirect activities that are managed as *projects* (see def.) should refer to LWP-7390, "Project Management Process," ~~for~~which provides instructions for managing, monitoring, and controlling projects and/or budgets that will earn performance.

   b) Section 4.3, "Laboratory Work Breakdown Structure (LWBS) Creation and Maintenance" –added clarification as follows:

      4.3.1 ~~Control Account Manager (CAM) (see def)/Work Package Manager (WPM) (see def)~~Designated Manager: Review existing work breakdown structure ~~(LWBS)~~ to determine if a new LWBS should be developed or if the existing structure is appropriate to enable accurate performance reporting, accounting, and analysis.

         4.3.1.1 Working with a *Planning and Financial Controls Specialist (PFCS)* (see def.), align and establish a new LWBS structure~~, or approve the existing LWBS~~.

      4.3.2 PFCS: Enter the LWBS changes identified by the ~~CAM/WPM~~ Designated Manager in the appropriate business system.

   c) Section 4.4, "Develop Indirect Budgets" - added clarification as follows:

      4.4.1 LMT Members: Provide direction, priorities, schedule and guidance to the ~~CAM/WPM D~~designated m~~M~~anagers to develop indirect budgets.

      4.4.2 ~~CAM/WPM~~Designated Managers: Develop indirect budgets.

      4.4.3 PFCS: Provide support to the ~~CAM/WPMd~~D~~d~~esignated m~~M~~anager:

         4.4.3.1 Enter indirect-budget data in the business systems.

         ~~4.4.3.1~~4.4.3.2 Provide schedules and priced resources to the ~~CAM/WPM D~~designated ~~M~~manager for review and reconciliation.

         ~~4.4.3.2 Enter indirect-budget data in the business systems.~~

Section 6, "Definitions" – Some editorial changes in the definitions – clarification only

4) MCP-3335, "Monitor and Control Indirect Budgets" – Summary of Changes
   a) Section 2, "Applicability" – added clarification as follows and a screen shot documenting the change is shown below.

This procedure provides instructions to meet the minimum requirements for managing indirect work scope. This procedure applies to ~~*Control Account Managers (CAMs)* (see def.), *Work Package Managers (WPMs)* (see def.)~~ Designated Managers who manage ~~the~~ indirect activities along with associated *Planning and Financial Controls Specialists (PFCSs)* (see def.)

This MCP does not apply to direct funded projects or indirect activities that are managed as *projects* (see def.). Instructions for managing, monitoring, and controlling projects and/or budgets that will earn performance, see LWP-7390, "Project Management Process." Unallowable funds are authorized and managed per LWP-3202, "The Budgeting and Expenditure of Unallowable Funds."

Section 6, "Definitions" – Some editorial changes in the definitions – clarification only

Remainder of the changes in the procedure change references to "CAMs" and "WPMs" to "Designated Manager," clarifications only.

5) MCP-7344, "Project Work Definition, Assignment, and Authorization" – Summary of Changes
Add instructions, in Appendix C, for managing WBS numbering and a screen shot documenting the change is shown below.

The laboratory work breakdown structure (LWBS) elements in Levels 1–3 are managed through the LWBS coordinator or Systems Administrator. (See LWP-3400, "Laboratory Work Breakdown Structure [LWBS] Change Control.") Only the LWBS coordinator can enter those elements into the Integrated Planning System (IPS) 2000 (IPS2000). The Planning and Financial Controls Systems Administrators/Baseline Control personnel can enter LWBS elements Levels 4–7 into IPS2000.

The LWBS coordinator within the Planning and Financial Controls Systems group controls changes to the LWBS for Levels 1–7. LWBS additions or deletions on Levels 1–5 require completion of Form 120.03, "LWBS Change Request Form," available through the electronic document management system (EDMS). As part of the process of establishing the LWBS, a unique WBS number will be assigned for each level of the Project WBS (see **Error! Reference source not found.**). The WBS numbering system assigned to the project are hierarchical and lower levels of the project WBS will "tie" to the previous WBS levels. The PM or CAM will work with the assigned PFCS to establish the unique WBS numbering system for their work scope in IPS2000.

NOTE: *Each WBS element is assigned to a unique work scope. Once the WBS numbers are assigned in IPS2000, the unique WBS numbers are not to be reused or reassigned. For example, if work scope is deleted or transferred to another project the WBS is closed. If new work scope is added to the project the WBS number for the deleted/transferred work scope will not be reused. The new work scope will be assigned a new, unused WBS number within the project WBS.*

Considered a clarification and not a significant change.

6) MCP-7345, "Project Baseline Schedule Development and Management" – There has been no change since DOE-HQ APM review in March 2012.

7) MCP-7346, "Project Budgeting and Baseline Development" – There has been no change since DOE-HQ APM review in March 2012.

8) MCP-7347, "Project Materials and Subcontract Management" – There has been no change since DOE-HQ APM review in March 2012.

9) MCP-7348, "Project Data Accumulation, Reporting, and Variance Analysis" – There has been no change since DOE-HQ APM review in March 2012.

10) MCP-7349, "Project Estimate to Complete and Estimate at Completion Development" – There has been no change since DOE-HQ APM review in March 2012.

11) MCP-7400, "Project Baseline Change Management" – There has been no change since DOE-HQ APM review in March 2012.

12) STD-5, "Time and Attendance Reporting (STD-5)" – There has been no changes since DOE-HQ APM review in March 2012.

Secondary, Supporting Procedures and Guides

13) CAS, "Cost Accounting Standard Disclosure Statement"

14) GDE-489, "Planning and Financial Controls Desktop Reference"

15) LWP-2016, Disposing of Government Property" – There has been no changes since DOE-HQ APM review in March 2012.

16) LWP-3201, "Authorizing and Controlling Expenditures" – There has been no changes since DOE-HQ APM review in March 2012.

17) MCP-7342, "Formal Cost Estimate." This procedure has undergone a major revision. However, the changes within the procedure do not affect EVMS criteria. The procedure provides direction and guidance to cost estimators for preparing a "formal" cost estimate. Appendix A includes a redline/strikeout of the revised procedure. There is also further discussion as to the impact of the changes to this procedure in the introductory section of Appendix A.

18) MCP-7350, "Project Risk Management"

1.1.1 PM: Develop and maintain a Risk Register to document and track the progress of risk events through project closure. Use Form 415.29, "Project Risk Register," ~~will be used~~ for the Project Risk Registers.

NOTE: *~~The~~ Form 415.29 ~~form~~ may be added too, but must include the minimum information already included on the form.*

Guidance: *Use the Risk Register to identify what actions are to be taken and when they are to be implemented. By doing so, the Risk Register will document how risks are going to be controlled. Continually using the Risk Register to status and identify when risk mitigation should begin or when it is finished emphasizes that risk assessment should not be a static, one-time operation, but a continuous operation throughout the life of the work, starting with initial planning. Maintain awareness of the status of all significant risks and progress being made to manage them.*

There were other editorial (grammatical, punctuation, etc.) changes within the document. This change requires that each project use a standardized risk register for identifying, tracking, and monitoring risk.

19) STD-7032, "Charging Practices – The changes since the APM review are essentially editorial clarifications. The primary change throughout the document is to change from the singular of "project" to the plural of "projects." An example of this change is shown below. The changes within this document are administrative or clarifications in nature.

Not every specific instance can be included in this policy, thus a general guide to follow is that the direct or indirect ~~project~~projects or organization benefiting, causing, or requiring the cost should be charged for the activity.

The preference is that all labor, material, and other costs should be charged to the benefiting direct~~-~~-funded ~~project~~projects to the maximum extent practical. This should be done when:

- The cost is identified specifically with a particular final cost objective~~,~~ (program/~~project~~projects).
- The treatment is consistent with other costs incurred for the same purpose in like-circumstances.

Other costs are charged to the appropriate indirect account and subsequently allocated to ~~project~~projects in accordance with Idaho National Laboratory (INL) Cost Accounting Standards Disclosure Statement.

20) STD-7034, “Charging Practices for Construction Projects”

Revision 5 - Minor administrative/clerical changes. There was further definition that defines the “color of money” that will be used and differentiates between Design Build and Design Bid Build Projects. The changes to the table are shown below.

Construction Project Classification Matrix

This matrix does not identify all project activities, nor do all of the identified activities apply to each construction project. The matrix identifies exceptions to the general funding type for each phase.

Item	Activity[3]	Support[1]			Project[2]		
		OPER	OPC	TEC	OPER	OPC	TEC
1.Initiation (Preconceptual) Phase							
Design Build Project							
1.01	**All Activities Performed ~~During This Phase~~Prior to CD0**	X	~~X~~		X	~~X~~	
1.02	All Activities Performed Post CD0		X			X	
Design Bid Build Project							
1.50	**All Activities Performed ~~During This~~Prior to CD0 Phase**	X	~~X~~		X	~~X~~	
1.51	All Activities Performed Post CD0		S			X	

[1] Support - Quality, ES&H, Safety, Fire Protection, Health Physics, Operational Engineering, Safeguards & Security, Training, Nuclear Safety Analyst, Other Support

[2] Project - Project Manager, Project Coordinator, Construction Field Representative, PFC, Cost Estimator, Procurement, Design Engineer

[3] Activities apply to INL Construction Projects including Design Build and Design Bid-Build

Revision 6 – Minor administrative/clerical changes that are clarifications in nature.

Revision 7 – Minor administrative/clerical changes that are clarifications in nature.

Appendix A – Description of Changes to MCP-7342, Formal Cost Estimates"

The description entered into BEA's Electronic Change Request (eCR) system is as follows:

> "Update to reflect new cost estimate classification matrix, range estimating, identification of the INL project number, identification of capital asset projects, assignment of the cost value of schedule reserve, and the inclusion of thee P6 schedule and the schedule recapitulation sheets with the estimate package for capital asset projects."

The procedure was not issued to personnel outside of the Cost Estimating organization. A focused review, involving only the Cost Estimators that will be following the procedure when preparing formal cost estimates, was performed.

> Note: Within the procedure, as revised, there are no actions for a Project Manager, Control Account Manager, Work Package Manager, or Project Controls personnel. The impact of this procedure focuses on bringing additional rigor, within the cost estimating organization, when performing a "formal" cost estimate.

Also note that the entire cost estimating department completed the required training prior to the procedure being issued in BEA's Electronic Document Management System (EDMS).

Document ID: MCP-7342
Revision ID: 3
Effective Date: 02/21/2013

Management Control Procedure

Formal Cost Estimating

REVISION LOG

Rev.	Date	Affected Pages	Revision Description
0	04/01/2011	All	See eCR 510526. New issue.
1	10/17/2007	Subsection 4.2.2.11	See eCR 555481. Minor revisions.
2	04/04/2011	All	See eCR 589127. Revisions reflecting EVMS and minor changes.
3	02/21/2013	All	See eCR 612142. Update to reflect new cost estimate classification matrix, range estimating, identification of the INL project number, identification of capital asset projects, assignment of the cost value of schedule reserve, and the inclusion of thee P6 schedule and the schedule recapitulation sheets with the estimate package for capital asset projects.

ACRONYMS

AFC	approved for construction
BOE	basis of estimate
cc	carbon copies
DOE	Department of Energy
G&A	General and Administrative
INL	Idaho National Laboratory
ISM	Integrated Safety Management
LOE	level of effort
MCP	Management Control Procedure
PMB	Performance Measurement Baseline
PREPS	Proposal Risk Evaluation and Preparation System
ROM	Rough Order Magnitude
SOW	Statement of Work
T&FR	technical and functional requirements
TEC	Total Estimated Cost
TPC	Total Project Cost
WBS	Work Breakdown Structure
WDC	Work Discipline Codes

CONTENTS

1. PURPOSE

The policy of Idaho National Laboratory (INL) is that all *scopes of work* (see def.) are estimated prior to request for funding or execution. This Management Control Procedure (MCP) is intended to bring consistency to *formal cost estimates* (see def.) prepared for INL. The Department of Energy (DOE) and INL place importance upon the accuracy and validity of cost estimates, because they are the basis of funding requests, and budget~~cost~~ and schedule baselines.

The purpose of this procedure is to:

- Define the processes, responsibilities, and documents used for formal cost estimating of scopes of work
- Ensure:
  - All scopes of work have an estimated cost
  - Estimate aligns with the work breakdown structure (WBS) and schedule estimate
  - The expected cost estimate maturity meets the requirements of the classification needed
  - Scope is adequately defined relevant to the maturity needed to cost class required
  - Basis of estimates (BOEs) are defendable and documented
  - Assumptions bound the cost estimate
  - Risks that have been identified are documented and mitigated
  - The cost value of schedule reserve has been included
  - Management reserve has been ~~assigned~~ included
  - The estimate incorporates high and low ~~-~~end range values
- Define a company-wide consistent estimate format
- Incorporate a process to achieve compliance to INL contractual requirements specific to cost estimating.

The application of this procedure provides for the following benefits to INL customers: increased probability of business success, support of sound business decisions, and increased confidence, creditability, and ability to defend cost estimates.

Integrated Safety Management (ISM) is a fundamental component of INL's processes for work planning, budgeting, work authorization, and change control. The goal of this project management and controls procedure is to ensure scope of work objectives, including ISM objectives, are properly planned with work tasks properly identified, prioritized, and funded to accomplish the work safely. Risks associated with safety issues are managed separately from the programmatic risks discussed in this procedure.

2. APPLICABILITY

This procedure applies to Program Management, Project Management, Funds Management, Control Account Managers, Cost Estimating, and Business Management. The responsibilities of the identified performers are defined in Appendix A, "Responsibilities."

This procedure defines the estimating process and requirements for creation of a formal cost estimate.

The fundamental characteristic of consistent and accurate cost estimates is based on the quality and availability of supporting documentation equal to the scope maturity of the needed and/or publicized cost estimate classification.; This process ~~which~~ provides definitive traceability of information both vertically, from the lowest to the highest levels of detail within the Work Breakdown Structure (WBS), and laterally traceable from the technical scope definition, to the estimate, and to the BOE. This documentation minimizes variability that is associated with the inherent uncertainty of the estimating process.

The instructions included in this MCP provide the process for preparing a standardized, consistent, and traceable formal ~~cost~~ estimate package that is substantiated with appropriate scope maturity and documentation. This process includes how to initiate, organize, develop, document, review, and maintain formal cost estimates.

NOTE: *Responsibilities identified in the Appendix A, ~~"Responsibilities,"~~ may be performed by an individual other than one's Work Discipline, depending upon the particular structure, size, and nature of the programs and projects and the qualifications of the individual performing said responsibility. Individual "functional titles" may also be different than shown in the responsibility chart depending on the organization providing the function. However, the intent is to show specific responsibilities normally delegated by the Project Manager (PM) to project participants while performing in the indicated capacity.*

~~3. Responsibilities as indicated below represent "functional titles," which do not necessarily align with typical Laboratory Work Discipline Codes (WDC). These responsibilities may be performed by an individual other than one's work discipline depending upon the particular structure, size, and nature of the programs and projects and the~~

~~qualifications of the individual performing said responsibility.However, the intent is to show specific responsibilities normally delegated by the Project Manager (PM) to project participants while performing in the indicated capacity.~~

~~4.~~3. ~~LABORATORY-WIDE PROCEDURE~~ALL EMPLOYEE KEY ACTIONS

Not applicable.

~~5.~~4. INSTRUCTIONS

~~5.1~~4.1 Preparation of Formal Estimate Information and Development Assignment

~~5.1.1~~4.1.1 Preparing the Cost Estimate Information

~~5.1.1.1~~4.1.1.1 ~~Responsible Party~~Requester: ~~Support~~Determine the cost estimate classification required support the use of the cost estimate. (For capital projects ~~ref.~~ see LWP-7391, "Capital Asset Project Planning and Initiation" for the applicability of Preliminary Class 5 and MCP-7001, "Management of Capital Asset Projects," for the applicability of Classes 5, 4, 3, 2, and 1. For all other work, contact Cost Estimating for assistance if needed.)~~-~~

~~5.1.1.2~~4.1.1.2 Using Form 415.44, ~~the~~ "INL Cost Estimate Class Determination Matrix," ~~(orm 415.44),~~ provide to the cost estimator(s) the extent and maturity of information needed for the classification of estimate development.

NOTE: *Information not meeting the required extent or maturity level may require an extension of the estimate due date to allow for the development of the information.*

~~5.1.1.3 Gather at a minimum, the following information:~~

~~A. Statement of work~~

~~B. Approved Form 136.29, "Funding Determination Request Form"~~

~~C. Contracting Strategies~~

~~D. Assumptions~~

~~E. Exclusions~~

~~F. WBS and WBS dictionary~~

~~G. Schedule and milestones~~

~~H. Team members and points of contact~~

~~I. Environment, Safety, Health, and Quality Assurance scope.~~

~~5.1.1.4~~4.1.1.3 Obtain a project number from the INL Project Numbering System. Acquire and provide this number to the cost estimator.

~~5.1.1.5~~4.1.1.4 Notify the Cost Estimator if this scope of work is "Capital Asset."

~~5.1.1.6~~4.1.1.5 Notify the Cost Estimator of the type of funding to be addressed in the estimate~~,~~ (~~e.g.,~~ indirect, direct, etc.).

~~5.1.1.7~~4.1.1.6 Identify and integrate the ISM system practices, as found in PDD-1004, "Integrated Safety Management System," into planning of the work.

~~5.1.1.8~~4.1.1.7 Determine if a similar scope of work was performed previously at INL.

~~5.1.1.9~~4.1.1.8 Investigate and research historical data of similar work scope performed, and evaluate the applicability and cost effectiveness in using the historical data as a benchmark.

~~5.1.1.10~~4.1.1.9 Notify the cost estimator of any differences in the scope of work and cost collection structure between the historical costs and the scope to be estimated.

NOTE: *As deemed appropriate, benchmarking may be performed on similar work scope performed outside INL. Both private sector and government contract history may be used for benchmarking costs for work within INL. The Cost Estimating department can provide input to the adjustment factors for applicability for this work.*

~~5.1.1.11~~4.1.1.10 Coordinate elements of the estimate with other team members to ensure the completed estimate will accurately reflect the required activities, durations, logic, and costs to complete the scope of work.

5.1.1.124.1.1.11 Team Members: Support the preparation of cost estimates.

5.1.1.134.1.1.12 Alert the ~~responsible party~~requester of potential cost and schedule impacts during the development that could occur during execution of the work.

5.1.24.1.2 Cost Estimate Preparation Assignment

5.1.2.14.1.2.1 Requester: Identify the cost estimate developer (INL Cost Estimating department~~,~~ or subcontractor).

5.1.2.24.1.2.2 If the INL Cost Estimating department is requested to prepare the formal cost estimate, proceed to Subsection 4.2.

5.1.2.34.1.2.3 If the formal cost estimate is to be prepared by a non-INL (subcontracted, master task, or task baseline agreement) cost estimator, notify the Cost Estimating Manager and then proceed to Subsection 4.3.

5.24.2 Preparing Formal Estimates by INL Cost Estimating

5.2.14.2.1 Request for Cost Estimating Services

5.2.1.14.2.1.1 ~~Responsible Party~~Requester: Contact the Cost Estimating manager via Form 415.10, "Request for INL Estimating Services," located on the Project Management home page to request estimating services.

5.2.1.24.2.1.2 Cost Estimating Manager: Receive the cost estimate request.

5.2.1.34.2.1.3 Review the request to determine the resource requirements in conjunction with the existing workload of the department.

5.2.1.44.2.1.4 Negotiate the cost ~~revised~~ estimate performance or completion schedule with the ~~responsible party~~requester if required.

~~5.2.1.5~~4.2.1.5 Assign resources to prepare the cost estimate. (This may involve a single cost estimator or a lead cost estimator with support cost estimators.)

~~5.2.1.6~~4.2.1.6 Cost Estimating Administrative Support: Enter the request in the log, assign the estimate file number to the estimate, and prepare the estimate file folder.

~~5.2.2~~4.2.2 Preparation of the Cost and Schedule Estimates

~~5.2.2.1~~4.2.2.1 ~~Responsible Party~~Requester: Provide the information (see Step 4.1.1.2) required to meet the classification of the cost estimate~~base the estimate~~ and the names of team members who will provide the documentation and information for the cost estimate preparation.

~~5.2.2.2~~4.2.2.2 Cost Estimator: Coordinate all the subsequent cost-estimating activities. (The size and complexity of the cost estimate may necessitate a team of cost estimators be assigned for the cost estimate preparation.)

~~5.2.2.3~~4.2.2.3 Review and verify the information on the request for cost estimating services and contact the ~~responsible party~~requester to indicate assignment of responsibility.

~~5.2.2.4~~4.2.2.4 Using ~~the INL Cost Estimate Class Determination Matrix (~~Form 415.44~~)~~, confirm with the r~~R~~equester of the extent and maturity of information needed to meet the requested classification to allow for the cost estimate development.

NOTE: *Information not meeting the required extent or maturity level may require an extension of the estimate due date to allow for the development of the information.*

~~5.2.2.5 For capital asset cost estimates, review the approved Form 136.29, "Funding Determination Request Form," Form 136.29 to determine the correct cost estimate template to be used based on the funding type.~~

~~5.2.2.6~~4.2.2.5 Collect the project ~~adequate~~information provided by the requester that is required to ~~base~~ prepare~~the estimate~~ the cost estimate (see Step 4.2.2.1). ~~and~~ Verify the project information to support the cost estimate development meets maturity of the required classification.

~~5.2.2.7~~4.2.2.6 Notify the requester if the deliverables have not been provided or do not meet the requirements or maturity for the desired classification.

~~5.2.2.8~~4.2.2.7 Review the scope of work provided by the ~~responsible party~~requester and provide comments to assure the information is accurate and ~~as~~ complete ~~as possible~~.

~~5.2.2.9~~4.2.2.8 Collect the cost estimating information required to produce the cost estimate (vendor quotes, records of conversation, recorded actual/historical costs, quantity take-off, field investigation notes, etc.).

~~5.2.2.10~~4.2.2.9 Enter the cost elements aligned with the WBS into the Cost Estimate organization's approved estimating software and Form 415.31, "Formal Cost Estimate Support Data Recapitulation."

~~5.2.2.11~~4.2.2.10 Coordinate the cost estimate preparation and deliverable with the schedule estimate and the Form 415.25, "Formal Schedule Data Recapitulation," sheets ~~(orm 415.25)~~ development and the assigned project scheduler ~~(if one is assigned)~~. Notify the requester if the cost and schedule estimates do not align with WBS and each other.

NOTE: *Best practices have the development of the cost ~~estimate~~ and schedule estimates being develop concurrently as both provide input to each other. The cost and the schedule estimates must align with each other and both must align with the WBS.*

The information provided in this document highlights the importance of three closely interrelated processes to help define the project baseline: development of a Work Breakdown Structure (WBS) for scope definition, cost, and schedule estimate development.

The work breakdown structure process provides:

- *A complete decomposition of the project into the discreet products and activities needed to accomplish the desired project scope. (The WBS dictionary should contain in a narrative format describing what each activity includes.)*

- *Compatibility with how the work will be done and how costs and schedules will be managed.*
- *The visibility to all important project elements, especially those areas of higher risk, or which warrant additional attention during the planning and execution.*
- *The mapping of requirements, plans, testing, and deliverables.*
- *A clear ownership by managers and task leaders.*
- *Organization of data for performance measurement and historical database.*
- *Information that is the basic building block for the planning of all authorized work.*

The cost estimate process provides to the schedule estimate:

- *The activity quantities that make up the scope of work.*
- *The resources (labor and non-labor) needed to complete the products/deliverables.*
- *The minimum resource hours and non-labor values that make up the work.*
- *The detail items that define and make up the activities.*
- *Additional WBS elements and schedule activities mined during the detailed take-off.*

The schedule estimate process provides to the cost estimate:

- *The activity durations based on the "crew" production rates per quantity and other work influences hold points, space restrictions, cure time, etc.*
- *Critical path that calculates the overarching paths to support the level of effort (LOE) activities (i.e., hotel loads).*
- *Logic lags, hold points, and constraints that support the project logic.*

- *The time phasing of activities that identify new activities or costs (winter work, escalation needs, etc.).*
- *The milestones and activity relationships that define possible impacts (overtime needed to complete activities).*
- *Additional WBS elements and cost estimate activities mined during the development of the schedule estimate logic.*

~~5.2.2.12~~4.2.2.11 Project Scheduler: Develop the project schedule estimate and the formal schedule data recapitulation sheets in accordance with LWP-7390, "Project Management Process," and MCP-7345, "Project Baseline Schedule Development and Management," only for baselines, in concert with the cost estimate development.

~~5.2.2.13~~4.2.2.12 Deliver the project schedule estimate and formal schedule data recapitulation sheets~~ref.see,""~~ to the cost estimator for inclusion into estimate package.

~~5.2.2.14~~4.2.2.13 Cost Estimator: During preparation, include the following for each ~~cost estimate~~estimate package transmittal:

A. Cover letter

B. Form 415.31, "Formal Cost Estimate Support Data Recapitulation" ~~Support Data sheet Form 415.31.~~

C. Summary sheets, including Total Estimated Cost (TEC) or Total Project Cost (TPC) rollups

D. Overhead and Profit Mark Up and Labor Summary reports

E. Detail sheets

F. For capital asset projects the P6 schedule estimate and the schedule recapitulation sheets

G. *Management reserve* (see def.)/risk analysis (where applicable)

~~H.~~ *Cost value of schedule reserve (see def.).*

~~I.~~H. ~~*Cost Estimate Recapitulation Support Data sheet Form 415.31.*~~

~~5.2.2.15~~4.2.2.14 *If applicable, add escalation* (see def.) to the cost estimate. Include the appropriate adders, such as material handling fees and General and Administrative (G&A) costs, as determined in the current INL fiscal planning guidance.

~~5.2.2.16~~4.2.2.15 Using ~~the INL Cost Estimate Class Determination Matrix (~~Form 415.44~~)~~, validate that ~~Identify~~ the information~~Classification of Estimate~~ met ~~on~~ the extent and maturity of information received and assign the appropriate classification to the cost estimate.

~~5.2.3~~4.2.3 Requester Review of the Estimate Package

~~5.2.3.1 (reference Association for the Advancement of Cost Engineering – AACE Recommended Practices No. 17R-97 *Cost Estimate Classification System,* and No. 18R-97*, Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries.*~~

~~5.2.3.2~~4.2.3.1 Cost Estimator: Distribute a draft copy of the estimate package for review by the ~~responsible party~~requester.

~~5.2.3.3~~4.2.3.2 ~~Responsible Party~~Requester: Review the estimate package and provide comments to the cost estimator for incorporation into the estimate package.

~~5.2.3.4~~4.2.3.3 Cost Estimator*:* Revise the estimate package to incorporate review comments from the ~~responsible party~~requester.

~~5.2.3.5~~4.2.3.4 Project Scheduler: Support revisions to the estimate package.

~~5.2.4~~4.2.4 Jury Review of the Estimate Package

~~5.2.4.1~~4.2.4.1 Cost Estimator: Arrange for and conduct a Jury~~/Risk~~ Review of the estimate package for all high--risk, budget requests, Performance Measurement Baseline (PMB), or Title II Approved for Construction (AFC) at a minimum. Also, reference ~~INL Cost Estimate Class~~

~~Determination Matrix (~~Form 415.44~~)~~ as to the level of engagement for these reviews.

~~If the responsible party and estimator determine that a Jury/Risk Review is not required, the Cost Estimating manager must concur.~~

NOTE: *The intent of the cost estimate Jury~~/Risk~~ Review is to involve all team members, including the Cost Estimating manager (or designee~~ and~~), Scheduling manager (or designee), and customer(s), i~~n~~s an effort to challenge and improve the estimate package, through agreement on key scope, direction, intent, ~~costs~~resources, durations, logic, and assumptions. ~~The risk analysis can be performed during or after the Jury Review with the input from the team members~~that ~~.~~*

~~5.2.4.2~~4.2.4.2 Distribute draft copies of the estimate package to the reviewers in advance of the estimate package Jury~~/Risk~~ Review meeting.

~~5.2.4.3~~4.2.4.3 Co-chair with the ~~responsible party~~Rrequester ~~during~~ the estimate package Jury~~/Risk~~ Review meeting, present the estimate package, and collect comments and action items.

~~5.2.4.4~~4.2.4.4 ~~Responsible Party~~Requester: Co-chair with the estimator ~~during~~ the Jury~~/Risk~~ Review of the ~~cost~~ estimate package.

~~5.2.4.5~~4.2.4.5 Ensure team invitation and participation in the review of the estimated ~~costs~~resources, basis, durations, assumptions, scope, planning, etc.~~and risk analysis.~~

~~5.2.4.6~~4.2.4.6 Ensure the BOEs support the rationale and justification for the estimated resources.

~~5.2.4.7~~4.2.4.7 Cost Estimator: Revise the estimate package to incorporate review comments from the Jury Review.

~~5.2.4.8~~4.2.4.8 Project Scheduler: Support revisions from the Jury Review to the estimate package.

~~5.2.5~~4.2.5 Risk Review of the Estimate Package

~~5.2.5.1~~4.2.5.1 Cost Estimator: Arrange for and conduct a Risk Review of the estimate package for all high~~-~~risk, budget requests, Performance Measurement Baseline (PMB), or Title II Approved for Construction (AFC) at a minimum. Also, reference ~~INL Cost Estimate Class Determination Matrix (~~Form 415.44~~)~~ as to the level of engagement for these reviews.

NOTE: *The intent of the estimate package Risk Review is to involve all team members, including the Cost Estimating manager (or designee), Scheduling manager (or designee), and customer(s), is an effort to identify and mitigate the known unknown risks ~~through the use of~~using management and schedule reserve. The risk analysis can be performed during the Jury Review on smaller less~~-~~complex scopes of work with the input from the team members. It has been found that the Risk Review is most effective if held after all Jury Review comments and changes have been incorporated into the estimate package.*

~~5.2.5.2~~4.2.5.2 Distribute draft copies of the estimate package to the Risk Review participants in advance of the estimate package Risk Review meeting.

~~5.2.5.3~~4.2.5.3 Co-chair with the requester the estimate package Risk Review meeting, present the estimate package, and collect comments and action items.

~~5.2.5.4~~4.2.5.4 Requester: Co-chair with the estimator the Risk Review of the estimate package.

~~5.2.5.5~~4.2.5.5 Ensure team invitation and participation in the review of the identification and mitigation of known unknown risks.

~~5.2.5.6~~4.2.5.6 Provide the lead role in identification of significant or unusual risk factors in the work.

~~5.2.5.7~~4.2.5.7 Identify areas of risk in the scope of work and/or the execution and assist in identifying and quantifying the magnitude of each area of risk (see MCP~~LWP~~-7350, “Project Risk Management”).

~~5.2.5.8 Determine and apply management reserve to the cost estimate based on the scope and execution risks.~~

~~5.2.5.9~~4.2.5.8 Review the results of the risk analysis ~~and management reserve~~that will be included in the estimate package to ensure the management and schedule reserve reflects the consensus of the team members.

~~5.2.5.10 Ensure the BOEs support the rationale and justification for the estimated costs.~~

~~5.2.5.11 tmce see "".~~

~~5.2.5.12~~4.2.5.9 Estimator: Coordinate the review comments and revise ~~the estimate~~the estimate package in accordance with changes agreed to in the cost estimate ~~Jury/~~Risk Review.

~~5.2.5.13~~4.2.5.10 Develop and include management reserve/risk analysis and the supporting documentation on the risk basis and management reserve rate application.

NOTE: *The Cost Estimating department currently utilizes risk application software that generates values by a Monte Carlo simulation.*

~~5.2.5.14~~4.2.5.11 Project Scheduler: Support revisions from the Risk Review to the estimate package.

~~5.2.5.15~~4.2.5.12 Develop and include schedule reserve/risk analysis and the supporting documentation on the risk basis and schedule reserve total duration.

NOTE: *The Project Management Office (PMO) Scheduling department currently utilizes risk application software that generates values by a Latin Hyper Cube simulation.*

~~5.2.5.16~~4.2.5.13 Deliver the updated project schedule estimate and formal schedule data recapitulation sheets to the cost estimator for inclusion into estimate package.

~~5.2.6~~4.2.6 Establishment of the Cost Value of the Schedule Reserve into the Estimate Package

~~5.2.6.1~~4.2.6.1 Cost Estimator: Establish the *Cost Value of the Schedule ~~r~~Reserve* (see def.) and communicate this approach and value in the estimate package cover letter and

Form 415.31~~, "Formal Cost Estimate Support Data Recapitulation."~~

~~5.2.6.2~~4.2.6.2 Ensure this value is included in the cost estimate value stated in the cover letter.

~~5.2.7~~4.2.7 Establishment of the Cost and Schedule High and Low-End Range Values of the into the Estimate Package

~~5.2.7.1~~4.2.7.1 Cost Estimator: Arrange for and establish the cost and schedule high and low-end ranges.

~~5.2.7.2~~4.2.7.2 Requester: With the team members and the cost estimator, establish and assign the high and low-end range values (see Appendix D, "Development of Range Estimates").

~~5.2.7.3~~4.2.7.3 Project Scheduler: Support the establishment of the range values.

~~5.2.7.4~~4.2.7.4 Cost Estimator: Document the range approach and values in the estimate package cover letter and Form 415.31~~, "Formal Cost Estimate Support Data Recapitulation."~~

NOTE 1: *The intent of the range values is to involve all team members, including the Cost Estimating manager (or designee), Scheduling manager (or designee)~~,~~ and customer(s)~~,~~ is an effort to mitigate the unknown unknowns that are of risks ~~through the use of~~using management and schedule reserve. The unknown unknowns will never be known until they materialize.*

~~the cost value for schedule reserve and the high and low--end ranges~~

NOTE 2: *Ranges are not required for subcontractor comparison only estimates~~,~~ (i.e., change order and bid).*

~~5.2.8~~4.2.8 Organizational Quality Control Review of the Estimate Package

~~5.2.8.1~~4.2.8.1 Cost Estimator: Present the completed estimate package to the Cost Estimating technical lead.

~~5.2.8.2~~4.2.8.2 Cost Estimating Technical Lead: Review the completed estimate package for completeness, accuracy, and reasonableness.

~~5.2.8.3~~4.2.8.3 Discuss any concerns with the cost estimator/scheduler and agree on any revisions to the estimate package.

~~5.2.8.4~~4.2.8.4 Deliver the peer review copy of the estimate package, with redlined revisions, to the Cost Estimating administrative support for clerical review.

~~5.2.8.5~~4.2.8.5 Cost Estimating Administrative Support: Review the completed estimate package for formatting, typographical, punctuation, spelling, and grammatical errors.

~~5.2.8.6~~4.2.8.6 Discuss any concerns with the cost estimator and agree on any revisions to the estimate package.

~~5.2.8.7~~4.2.8.7 Return the peer review copy of the estimate package to the cost estimator for final revisions.

~~5.2.8.8~~4.2.8.8 Cost Estimator: Revise the estimate package per agreement with the technical lead and the Cost Estimating administrative support staff.

~~5.2.8.9~~4.2.8.9 Notify and discuss any revision needed to the schedule estimate with the scheduler.

~~5.2.8.10~~4.2.8.10 Confirm technical and cost/schedule changes with the ~~responsible party~~~~R~~requester.

~~5.2.8.11~~4.2.8.11 Deliver the completed estimate package to the Cost Estimating technical lead for final review and approval.

~~5.2.8.12~~4.2.8.12 Cost Estimating Technical Lead: Review and sign the estimate package as the checker to verify the agreed to changes have been made.

~~5.2.8.13~~4.2.8.13 Ensure the delivery of the completed estimate package to the Cost Estimating administrative support staff.

~~5.2.8.14~~4.2.8.14 Cost Estimating Administrative Support: Review the estimate package to verify that agreed changes have been made.

~~5.2.8.15~~4.2.8.15 Deliver the completed estimate package to the Cost Estimating manager.

~~5.2.8.16~~4.2.8.16 Cost Estimating Manager: Review the estimate package, discuss any concerns with the estimator and/or scheduler, and sign the completed estimate package as the approver.

NOTE: *Review the ~~estimat~~estimate package to ensure the risks have been identified and addressed through inclusion, exclusions, or mitigated with the use of management reserve/~~management~~schedule reserve, the basis of estimates and assumptions are appropriate and sound, the estimate package meets the company ~~cost~~ estimating procedures, and the estimate package reflects a good business practice and company position.*

~~5.2.8.17~~4.2.8.17 Deliver the completed estimate package to the Cost Estimating administrative support staff for transmittal.

~~5.2.9~~4.2.9 Distribution of the Estimate Package

~~5.2.9.1~~4.2.9.1 Cost Estimating Administrative Support: Distribute the completed estimate package, including copies of the estimate package to the ~~responsible party~~requester and other team members as indicated on the transmittal letter.

~~5.2.9.2~~4.2.9.2 Return the original copy of the completed estimate package to the cost estimator.

~~5.2.9.3~~4.2.9.3 Cost Estimator: Place the original copy of the completed estimate package in the estimate file.

~~5.2.9.4~~4.2.9.4 Organize the estimate package file to facilitate future reference.

~~5.2.9.5~~4.2.9.5 Deliver the completed estimate package file to the Cost Estimating administrative support staff. This includes the action of developing and delivering to the Cost Estimating administrative support, complete, ordered, electronic versions of the estimate after final approval is obtained in both native and PDF formats.

~~5.2.9.6~~4.2.9.6 Cost Estimating Administrative Support: Document the completion of the estimate package.

~~5.2.9.7~~4.2.9.7 Copy the transmitted estimate package to a compact disc and place in the estimate file.

~~5.2.9.8~~4.2.9.8 File the estimate package file in the Cost Estimating Library.

~~5.2.10~~4.2.10 Other Reviews of the Estimate Package

~~5.2.10.1~~4.2.10.1 ~~Responsible Party~~Requester: Arrange for appropriate reviews if required.

NOTE: *Estimates intended for external transmission or release must ~~have a one-over-one review and approval~~compile with INL requirements for review and approval.*

~~5.2.10.2~~4.2.10.2 Arrange for, review, and obtain approval of the ~~cost~~ estimate package.

~~5.2.10.3~~4.2.10.3 Document one over review comments and transmit those comments to the cost estimator.

~~5.2.10.4~~4.2.10.4 Cost Estimator: Discuss comments with the ~~responsible party~~requester. Incorporate comments and repeat steps ~~beginning with Step 4.2.2.327.~~ necessary to complete the estimate package in accordance with this procedure.

~~5.3~~4.3 Formal Estimates Prepared by Other Contracted Estimating Professionals and Reviewed by INL Cost Estimating

~~5.3.1~~4.3.1 Procurement of Cost Estimating Services

~~5.3.1.1~~4.3.1.1 ~~Responsible Party~~Requester: Contact Cost Estimating via Form 415.10~~, "Request for INL Cost Estimating Services"~~ to request estimating support in the development of the cost estimating deliverables, formatting, etc.

~~5.3.1.2~~4.3.1.2 Prepare subcontract, master task agreement, etc., for estimating services using the Statement of Work (SOW) listed in Appendix C, "Subcontracted Estimating Professionals Statement of Work."

~~5.3.1.3~~4.3.1.3 Cost Estimating Manager: Provide support to the requester in the preparation of the subcontract, master task agreement, etc.

~~5.3.1.4~~4.3.1.4 ~~Responsible Party~~Requester: Issue subcontract.

~~5.3.1.5~~4.3.1.5 Support the subcontractor estimating effort.

~~5.3.1.6~~4.3.1.6 Ensure contractual obligations are met by the subcontractor.

~~5.3.1.7~~4.3.1.7 Receive cost estimates from subcontractor and review and accept the deliverable.

~~5.3.1.8~~4.3.1.8 Arrange for appropriate reviews.

~~5.3.1.9~~4.3.1.9 Maintain the deliverable file throughout the scope of work life.

~~5.3.1.10~~4.3.1.10 Cost Estimating Manager: Provide resource support and assist in the review of the final deliverable prior to acceptance.

~~5.3.1.11~~4.3.1.11 Follow similar steps starting with Step 4.2 to completion as required.

~~6.~~5. RECORDS

~~Form 136.29, "Funding Determination Request Form"~~

Form 415.10, "Request for INL Estimating Services"

Form 415.25, "Formal Schedule Data Recapitulation"

Form 415.31, "Formal Cost Estimate Support Data Recapitulation"

Form 415.44 "INL Cost Estimate Class Determination Matrix"

NOTE: *LWP-1202, "Records Management," the INL Records Schedule Matrix, and associated record types list(s) provide current information on the retention, quality assurance, and/or destruction moratorium requirements for these records. Contact a Records Coordinator for assistance if needed.*

~~7.~~6. DEFINITIONS

Cost Value of Schedule Reserve (SR). The monetary value of time allowance added to schedule for potential risks within the contractor's scope of work. SR is not part of PMB.

Escalation. The provision in actual or estimated costs for an increase in the cost of equipment, material, labor, and so forth over that specified in the purchase order or contract due to continuing price level changes over time. Inflation may be a component

of escalation, but non-mandatory policy influences, such as supply and demand, are often components.

Formal Cost Estimates. A cost estimate prepared by professional cost-estimating resources or qualified subcontractor personnel.

Management Reserve. An amount of the total allocated budget withheld for management control purposes by the contractor. MR is not part of the PMB.

Schedule Reserve. Time allowance as determined through schedule risk analysis (e.g., risk analysis software) to account for identified risks and schedule duration uncertainty. Represented within the project schedule and outside the Performance Measurement Baseline (PMB) as the time difference between the contractual milestone dates and the contractors planned dates of accomplishment.

Scopes of Work. The detailed description of work to be performed, including deliverables.

~~8.~~7. REFERENCES

~~AACE, Recommended Practice No. 17R-97, "Cost Estimate Classification System," Association for the Advancement of Cost Engineering, 2005.~~

~~AACE, Recommended Practice No. 18R-97, "Cost Estimate Classification System – As Applied in Engineering Procurement, and Construction for the Process Industries," Association for the Advancement of Cost Engineering, 2005.~~

~~Contract No. DE-AC07-05ID14517, "Management and Operation of the Idaho National Laboratory (INL)"~~~~Form 136.29, "Funding Determination Request Form"~~

~~Form 415.10, "Request for INL Estimating Services"~~

~~Form 415.25, "Formal Schedule Data Recapitulation"~~

~~Form 415.31, "Cost Estimate Support Data Recapitulation"~~

MCP-7001, "Management of Capital Asset Projects"

MCP-7345, "Project Baseline Schedule Development and Management"

MCP~~LWP~~-7350, "Project Risk Management"

LWP-1202, "Records Management"

LWP-7390, "Project Management Process"

LWP-7391, "Capital Asset Project Planning and Initiation~~Construction and Capital Equipment Project Planning and Initiation~~"

PDD-1004, "Integrated Safety Management System"

~~9.~~8. APPENDIXES

Appendix A, Responsibilities

Appendix B, Responsibility Checklist

Appendix C, Subcontracted Estimating Professionals Statement of Work

Appendix D, Cost Estimating Best Practice, No. CEBP 70-10, Development of Range Estimates, June 21, 2012

Appendix A

Responsibilities

Performer	Responsibilities
~~Responsible Party~~Requester (may include the Project Manager, Work Package Manager, Control Account Manager, etc.)	Determine the cost estimate classification required support the use of the cost estimate.~~Support the estimate development in obtaining information from applicable sources within and outside the company.~~ Provide to the cost estimator(s) the extent and maturity of information needed for the classification of estimate development. Obtain a project number from the INL Project Numbering System. Notify the Cost Estimator of the type of funding to be addressed in the estimate. Identify and integrate the ISM system practices into planning of the work. Identify the cost estimate developer. Request estimating services. Provide the information required to meet the classification of the cost estimate. Review the estimate package and provide comments to the cost estimator for incorporation into the estimate package. Arrange for appropriate reviews if required. Issue subcontract.~~ Gather necessary information.~~ ~~Identify and integrate the ISM system practices, as found in PDD-1004, "Integrated Safety Management System," into planning of the work.~~ ~~Determine if a similar scope of work was performed previously at INL.~~ ~~Investigate and research historical data of similar work scope performed, and evaluate the applicability and cost effectiveness in using the historical data as a benchmark.~~ ~~Notify the cost estimator of any differences in the scope of work and cost collection structure between the historical costs and the scope to be estimated.~~ ~~Coordinate elements of the estimate with other team members to ensure the completed estimate will accurately reflect the required activities and costs to complete the scope of work.~~ ~~Identify the cost estimate developer (INL Cost Estimating department, or subcontractor).~~ ~~If the INL Cost Estimating department is requested to prepare the formal cost estimate, proceed to Section 4.2.~~ ~~If the formal cost estimate is to be prepared by a non-INL (subcontracted, master task, or task baseline agreement) cost estimator, proceed to Section 4.3.Contact the Cost Estimating~~

Performer	Responsibilities
	~~manager via Form 415.10, "Request for INL Estimating Services," located on the Project Management home page to request estimating services.~~ ~~Provide information (see Step 4.1.1.1) to base the estimate and the names of team members who will provide the documentation and information for the estimate preparation.~~ ~~Review the estimate and provide comments to the estimator for incorporation into the estimate.~~ ~~Co-chair with the estimator during the Jury/Risk Review of the cost estimate.~~ ~~Ensure team invitation and participation in the review of the estimate costs, assumptions, scope, planning, and risk analysis.~~ ~~Provide the lead role in identification of significant or unusual risk factors in the work.~~ ~~Identify areas of risk in the scope of work and/or the execution and assist in identifying and quantifying the magnitude of each area of risk (see LWP-7350, "Project Risk Management").Determine and apply management reserve to the cost estimate based on the scope and execution risks.~~ ~~Review the results of the risk analysis and management reserve included in the estimate to ensure the management reserve reflects the consensus of the team members.~~ ~~Ensure the BOEs support the rationale and justification for the estimated costs.~~ ~~Arrange for appropriate reviews if required.~~ ~~Arrange for, review, and obtain approval of the cost estimate.~~ ~~Document one over review comments and transmit those comments to the estimator.~~ ~~Contact Cost Estimating via Form 415.10 to request estimating support in the development of the cost estimating deliverables, formatting, etc.~~ ~~Prepare subcontract, master task agreement, etc., for estimating services using the Statement of Work (SOW) listed in Appendix C, "Subcontracted Estimating Professionals Statement of Work."~~ ~~Issue subcontract.Support the subcontractor estimating effort.~~ ~~Ensure contractual obligations are met by the subcontractor.~~

Performer	Responsibilities
	~~Receive cost estimates from subcontractor and review and accept the deliverable.~~ ~~Arrange for appropriate reviews.~~ ~~Maintain the deliverable file throughout the scope of work life.~~
Cost Estimating Manager	Receive and review the cost estimate request, and n~~.~~ ~~Review the request to determine the resource requirements in conjunction with the existing workload of the department.~~ ~~N~~egotiate revised estimate schedule with the ~~responsible party~~~~R~~requester if required. Assign resources to prepare the estimate. Review the estimate package, discuss any concerns with the estimator and/or scheduler, and sign the completed estimate package as the approver. Deliver the completed estimate package to the Cost Estimating administrative support staff for transmittal. Provide support to the requester in the preparation of the subcontract, master task agreement, etc. ~~Provide support to the requester in the preparation of the subcontract, master task agreement, etc.~~ Provide resource support and assist in the review of the final deliverable prior to acceptance. ~~Follow similar steps starting with Step 4.2.2.29 to completion.~~
Cost Estimator	Coordinate all the subsequent cost-estimating activities. Review and verify the information ~~on the request for estimating services and contact the responsible party~~Requester to indicate assignment of responsibility, and~~.~~ the information on the request for cost estimating services. Contact the requester to indicate assignment of responsibility.~~For capital asset cost estimates, review the approved Form 136.29 to determine the correct cost estimate template to be used based on the funding type.~~ ~~Collect adequate information to base the estimate and verify the information to support the estimate.~~ ~~Review the scope of work provided by the responsible party~~Requester ~~and provide comments to assure the information is accurate and as complete as possible.~~

Performer	Responsibilities
	Collect the project information provided by the requester that is required to prepare the cost estimate. Verify the project information to support the cost estimate development meets maturity of the required classification. Present the completed estimate package to the Cost Estimating technical lead.~~Collect the information required to produce the estimate (vendor quotes, records of conversation, recorded actual/historical costs, quantity take-off, field investigation notes, etc.).~~ ~~Enter the cost elements aligned with the WBS into the organization's approved Form 415.31, "Cost Estimate Support Data Recapitulation."~~ ~~Coordinate estimate preparation and deliverable with the schedule development and the assigned project scheduler (if one is assigned).~~ ~~During preparation, include the necessary information for each cost estimate transmittal.~~ ~~Include the appropriate adders, such as material handling fees and General and Administrative (G&A) costs, as determined in the current INL fiscal planning guidance.~~ ~~If applicable, add *escalation* (see def.) to the estimate.~~ ~~Identify the Classification of Estimate (reference Association for the Advancement of Cost Engineering—AACE Recommended Practices No. 17R-97 *Cost Estimate Classification System,* and No. 18R-97, *Cost Estimate Classification System—As Applied in Engineering, Procurement and Construction for the Process Industries.*~~ ~~Distribute a draft copy of the estimate for review by the responsible party~~Requester~~.~~ ~~Revise the estimate to incorporate review comments from the responsible party~~Requester~~.~~ ~~Arrange for and conduct a Jury/Risk Review of the estimate for all high risk, Performance Measurement Baseline (PMB), or Title II Approved for Construction (AFC) at a minimum. If the responsible party~~Requester~~ and estimator determine that a Jury/Risk Review is not required, the Cost Estimating manager must concur.~~

Performer	Responsibilities
	~~Distribute draft copies of the estimate to the reviewers in advance of the Jury/Risk Review meeting.~~ ~~Co-chair with the responsible party~~Requester ~~during the Jury/Risk Review meeting, present the estimate, and collect comments and action items.~~ ~~Coordinate the review comments and revise the estimate in accordance with changes agreed to in the Jury/Risk Review.~~ ~~Develop and include management reserve/risk analysis and the supporting documentation on the risk basis and management reserve rate application.Present the completed estimate to the Cost Estimating technical lead.~~ ~~Revise the estimate per agreement with the technical lead and the Cost Estimating administrative support staff.~~ ~~Confirm technical and cost changes with the responsible party~~equester.~~Deliver the completed estimate to the Cost Estimating technical lead for final review and approval.~~ ~~Place the original copy of the completed estimate in the estimate file.~~ ~~Organize the estimate file to facilitate future reference.~~ ~~Deliver the completed estimate file to the Cost Estimating administrative support staff.~~ ~~Discuss comments with the responsible party~~Requester.~~Incorporate comments and repeat steps beginning with Step 4.2.2.27.~~
Team Member	Support the preparation of cost estimates. Alert the ~~responsible party~~requester of potential cost and schedule impacts during the development that could occur during execution of the work.
Cost Estimating Technical Lead	Review the completed estimate package for completeness, accuracy, and reasonableness. Discuss any concerns with the estimator and agree on any revisions to the estimate. Deliver the peer review copy of the estimate, with redlined revisions, to the Cost Estimating administrative support for clerical review. Review and sign the estimate package as the checker to verify the agreed to changes have been made. Ensure the delivery of the completed estimate package to the Cost Estimating administrative support staff.

Performer	Responsibilities
Cost Estimating Administrative Support	Enter the request in the log, assign the estimate file number to the estimate, and prepare the estimate file folder. Review the completed estimate package for formatting, typographical, punctuation, spelling, and grammatical errors. Discuss any concerns with the cost estimator and agree on any revisions to the estimate package. Return the peer review copy of the estimate package to the cost estimator for final revisions. Review the estimate package ~~to verify that agreed changes have been made~~. Deliver the completed estimate package to the Cost Estimating manager. Distribute the completed estimate package~~, including copies of the estimate to the responsible party~~Requester ~~and other team members as indicated on the transmittal letter~~. Return the original copy of the completed estimate package to the estimator and document the completion of the estimate package. Copy the transmitted estimate package to a compact disc and place in the estimate file. File the estimate package file in the Cost Estimating Library.

Appendix B

Responsibility Checklist

Responsibility Checklist	~~Responsible Party~~Requester	Estimator
Coordinate all subsequent estimating activities	X	
Ensure team members support the preparation of the estimate	X	
Ensure all activities are estimated as ones "most likely to occur" and management reserve is not buried in the activities	X	
Ensure work package detail and BOE documentation is updated and controlled for future reference	X	
Ensure the management reserve analysis is documented in the recapitulation sheet and maintained in the estimate file	X	
Ensure the BOE supports the rationale and justification for the estimated costs	X	
Ensure the proper reviews and approvals have been obtained	X	
Ensure the estimate is integrated with the schedule	X	
Ensure basis of estimate backup files are developed, complete, and maintained to support estimate validation, change impact analysis, future reference, and compliance reviews	X	
Ensure the estimate file is organized to facilitate future reference		X

Appendix C

Subcontracted Estimating Professionals Statement of Work

C-1. WORK INCLUDED

C-1.1. Provide a complete estimate package. Work included is as follows:

C-1.1.1. Perform a take-off, quantification, and pricing of items (labor, materials, equipment, etc.) required for estimating.

C-1.1.2. Document all information used to develop the cost estimate package including, but not limited to, the objective, the scope of work that makes up the components of the objective, the basis of estimate, assumptions, and risks.

C-1.1.3. Establish and maintain an estimate file for establishing accountability and traceability of all information and data pertaining to this scope of work.

As a minimum, the estimate file will include the following information:

C-1.1.3.1. All documentation established by the cost estimator.

C-1.1.3.2. Hard and electronic copies of the completed estimate.

C-1.1.3.3. Any other information deemed pertinent to the estimate.

C-1.1.3.4. Identification and documentation of potential cost savings.

C-1.1.3.5. Identification and documentation of unconstructible or unrealistic designs, philosophies, etc.

C-1.1.3.6. Attendance and participation at kickoff/scoping meetings.

C-1.1.3.7. If requested, attendance and participation at value engineering meetings.

C-1.1.3.8. If requested, attendance and participation at team members “jury/risk” review meetings.

C-2. TECHNICAL AND FUNCTIONAL REQUIREMENTS

C-2.1. The entire estimate package will identify the information provided to be in sufficient detail to allow for complete understanding, traceability, and validation by individuals not involved in the development of the estimate.

C-2.2. Develop and structure the estimate in an activity-based format.

C-2.3. Organize activities in the project work breakdown structure (WBS) format unless otherwise stated.

C-2.4. Working with the INL Cost Estimating Department, identify the Classification of Estimate using the INL Cost Estimate Classification Determination Matrix (~~reference~~ Ff~~rm~~orm 415.44). ~~Association for the Advancement of Cost Engineering – AACE Recommended Practices No. 17R-97 *Cost Estimate Classification System,* and No. 18R-97, *Cost Estimate Classification System – As Applied in Engineering, Procurement and Construction for the Process Industries.*~~

C-2.5. Use a "Bottom-Up Technique" method of estimating to document within the cost estimate the quantities required to complete the scope of work unless otherwise agreed to by the INL Cost Estimating manager and the ~~responsible party~~requester.

C-2.6. The cost estimate(s) will reflect the labor rates used at INL or as provided to the subcontractor.

C-2.7. Apply direct labor, materials, equipment, and overhead costs to these quantities to determine the estimated costs.

NOTE: *The level of detail within the estimate will be at a minimum equal to the ability to derive that detail from the scoping information provided.*

C-2.8. Break down the estimate into sufficient detail to reflect virtually each step in the process and all labor, material, and equipment applied to the scope of work.

NOTE: *Use allowances only on items where a definitive scope cannot be established (i.e., amount of contaminated soil, or on minor items) whose total is an insignificant portion of the total cost.*

C-2.9. Allowances will be included in the estimate for subcontractor's overhead and profit, including the cost of such items as sales tax, insurance, and bonds when required.

C-2.10. Develop the high and low-end ranges values (~~ref.~~see Appendix D).

C-2.11. Use of level of effort (LOE) activities and items shall be kept to a minimum.

C-2.12. Document all information that appears in the final estimate and include it in the estimate file.

NOTE: *Unless otherwise stated, the subcontractor will maintain storage of its copy of the cost estimate file for a minimum of 5 years.*

C-2.13. As a minimum, document the following items in the subcontractor's estimate file:

C-2.13.1. Drawings, specifications, technical and functional requirements (T&FR), studies, schedules, and any other documents or directives that form the basis of the estimate.

C-2.13.2. Estimate backup data to include quantity takeoffs, calculations, databases used, historical data, quotations, and crew development.

C-2.13.3. Record of conversations or implementing directives from the contractor or other cognizant parties, which change the scope or direction of the estimate or otherwise impact costs.

C-2.13.4. Copies of draft estimates or other documents with contractor's comments, as appropriate.

C-2.13.5. Any other information deemed pertinent to the estimate.

C-2.14. Use the following estimating sheet formats to prepare and support the cost estimate package(s).

C-2.14.1. Cover Letters

C-2.14.1.1. Address the cover letter from the subcontractor to the contractor. The cover letter will at a minimum include:

C-2.14.1.1.1. The name of subcontractor submitting the estimate package.

C-2.14.1.1.2. The subcontractor's address.

C-2.14.1.1.3. Date of delivery to the contractor.

C-2.14.1.1.4. The subcontractor's management's name and phone number of contact.

C-2.14.1.1.5. The subject of estimate.

C-2.14.1.1.6. The total cost(s) of the range estimate(s) and any alternative cost(s).

C-2.14.1.1.7. Any outstanding or critical information that would need immediate attention.

C-2.14.1.1.8. Identify the classification of the estimate.

C-2.14.1.1.9. Listing of attachments.

C-2.14.1.1.10. Listing of carbon copies (cc).

C-2.14.1.1.11. The subcontractor's file number.

C-2.14.1.1.12. The name(s) and signature(s) of the subcontractor's representatives that have checked the estimate. This will be designated in an area within the letter as "Checked by:"

C-2.14.1.1.13. The name and signature of the subcontractor's management that has approved the estimate. This will be designated in an area in the letter as "Approved by:"

C-2.14.2. Summary Sheets

NOTE: *The cost estimate summary sheet will summarize the costs for each activity of the work shown in the detail sheets in the WBS format.*

C-2.14.2.1. Using the cost estimate summary sheet, total the summarized costs horizontally and vertically.

C-2.14.2.2. Title the cost estimate summary sheet "Cost Estimate Summary" and include the following:

C-2.14.2.2.1. Subcontractor's company name.

C-2.14.2.2.2. Scope of work title.

C-2.14.2.2.3. Scope of work location.

C-2.14.2.2.4. The subcontractor file number.

C-2.14.2.2.5. The contractor's requester name.

C-2.14.2.2.6. The name of the estimator(s) that prepared the estimate.

C-2.14.2.2.7. Page number and total number of pages (for example, 1 of 10).

C-2.14.2.2.8. Date and time of printing.

C-2.14.2.2.9. If requested, escalation and management reserve dollars.

C-2.14.3. Detail Sheets

C-2.14.3.1. Provide estimate detail sheets with a detailed accounting of the items that make up the activities of the total estimate scope of work.

C-2.14.3.2. Total the activities within the detail sheets horizontally and vertically.

C-2.14.3.3. Title the cost estimate detail sheet "Estimate Detail Sheet" and include the following:

C-2.14.3.3.1. Description of the activities and items.

C-2.14.3.3.2. The assumed subcontractor performing the work, (~~i.e.,~~ electrical, flooring, fire protection, etc.). Abbreviations may be used (Elect, Floor, F-Prot, etc.).

C-2.14.3.3.3. The quantities that make up the items.

C-2.14.3.3.4. Unit of measurements for the quantities.

C-2.14.3.3.5. Material unit costs and total costs.

C-2.14.3.3.6. Labor hourly rates, production units, total hours and total costs.

C-2.14.3.3.7. Operating equipment hourly rates, production units, total hours, and total costs.

C-2.14.3.3.8. Item total costs.

C-2.14.3.3.9. Item comments and basis of estimate.

C-2.14.3.3.10. Subcontractor's company name.

C-2.14.3.3.11. Scope of work name.

C-2.14.3.3.12. Scope of work location.

C-2.14.3.3.13. The subcontractor file number.

C-2.14.3.3.14. The name of the estimator(s) that prepared the estimate.

C-2.14.3.3.15. Page number and total number of pages (1 of 10 or as applicable).

C-2.14.3.3.16. Date and time of printing.

C-2.14.3.4. Summarize the items at the activity levels showing the total material cost, total labor hours and labor cost, total equipment hours and cost, and the activity total cost.

C-2.14.3.5. Summarize these detailed activities to the WBS format that is to be shown on the "Cost Estimate Summary" sheet.

C-2.14.3.6. At a minimum, provide a basis of estimate for each WBS element/activity for those resources estimated.

C-2.14.4. Cost Estimate Support Data Recapitulation Sheet:

C-2.14.4.1. The support data recapitulation sheets will identify the information provided to be in sufficient detail to allow for complete understanding, traceability, and validation by individuals not involved in the development of the estimate. Section the cost estimate support data recapitulation sheets to describe the following:

C-2.14.4.1.1. The scope of work that includes a brief statement of the scope of work's objective, which is a thorough overview and description of the proposed scope.

C-2.14.4.1.2. Identified work to be accomplished, as well as any specific work to be excluded.

C-2.14.4.1.3. The basis of estimate upon which the estimate was developed, including an overall methodology and rationale of how the estimate was developed.

C-2.14.4.1.4. Source documents including drawings, design reports, engineers' notes, and other documentation upon which the estimate originated.

C-2.14.4.1.5. Overall explanation of sources for resource pricing.

C-2.14.4.1.6. The assumptions used in arriving at the total cost, such as condition statements accepted or supposed true without proof of demonstration and statements adding clarification to scope, as an assumption has a direct impact on total estimated cost.

C-2.14.4.1.7. The scope of work and execution risks and an explanation and identification of the potential risks and methodology used to mitigate these risks.

C-2.14.4.1.8. If requested, an explanation and the basis as to how the management reserve amount was established in the estimate.

C-2.14.4.1.9. A summary of the total dollars/hours and Rough Order Magnitude (ROM) allocations of the methodologies used

to develop the cost estimate (see Table 1).

Table 1. ROM allocation.

Estimate Methodology	ROM Percentage of the Total Cost
SME/Team Input (Unrecorded)	
Recorded Actual/Historical Costing	
Parametric/Analogy Comparison	
Vendor Quotes (Preliminary)	
Other (Pricing Manuals, etc.)	
Total (Must equal 100%)	

C-2.14.4.1.10. Any other comments regarding the estimates evolving relationship to previous estimates will be shown, as well as any other relevant comments or concerns, or potential cost savings.

C-2.14.4.2. Title the cost estimate support data recapitulation document "Cost Estimate Support Data Recapitulation" and include the following:

C-2.14.4.2.1. Subcontractor's company name.

C-2.14.4.2.2. Scope of work name.

C-2.14.4.2.3. Scope of work location.

C-2.14.4.2.4. The subcontractor file number.

C-2.14.4.2.5. The name of the estimator(s) that prepared the estimate.

C-2.14.4.2.6. Page number and total number of pages (1 of 10 as applicable).

C-2.14.4.2.7. The date of delivery.

C-2.15. Unless approved prior to the award of the contract for this work, all cost estimates will be developed in the Success Estimating software by US Cost. If an alternative software is to be requested, submit in writing to the Contractor

the proposed changes and samples of estimate packages to be used to the contractor for review and approval prior to the award of this work.

C-3. QUALITY ASSURANCE/CONTROL

C-3.1. Prior to delivery of any draft or final cost estimate packages, internally check and verify the cost estimate package for the following:

C-3.1.1. Check that scope statements in the accompanying text are clear and match the scope included in the calculations.

C-3.1.2. Ensure units of scope in the accompanying text match the units included in the calculations.

C-3.1.3. Ensure assumptions in the text match the scope and units included in the calculations.

C-3.1.4. Ensure the contracting strategy discussed in the text matches the resource and cost information used on the calculation of cost.

C-3.1.5. Ensure the calculation of cost (i.e., number of units multiplied by the hours and cost) is correct.

C-3.1.6. Verify subtotals are correct.

C-3.1.7. Ensure adders are correct.

C-3.1.8. Ensure information contained in supporting references and reference materials match the text and calculations.

C-3.1.9. Ensure the estimate contains all of the necessary scope, cost, and if requested, schedule information.

C-3.1.10. If requested, ensure all appropriate life cycle phases are addressed.

C-3.1.11. Verify that all calculations are performed.

C-3.1.12. Ensure supporting reference materials are included (or referenced).

C-3.1.13. Ensure the estimate is current, internally consistent, and complete.

C-3.1.14. Ensure the scope and units match the overall objective.

C-3.1.15. Ensure the level of detail is appropriate to the WBS.

C-3.1.16. Ensure the estimate makes sense when compared to cost estimates (or actual costs) for other work that is similar in scope and size.

C-3.1.17. Check mathematical calculations and extensions for accuracy.

C-3.1.18. Verify basis of estimate, unit prices, and labor rates.

C-3.1.19. Verify whether vendor quotations used as direct costs do or do not include indirect costs.

C-3.1.20. Check takeoffs for omissions and oversights. (For example, a scope of work that is primarily mechanical in nature may have some electrical, structural, civil work, or demolition required with it).

C-3.1.21. Evaluate whether labor force density can adequately function on the work site, whether shift work may be required and whether total labor hours are adequate to complete required work.

C-3.1.22. If requested, check the rates used for escalation and management reserve for compliance with the accepted industry guidelines.

C-3.1.23. Compare activities and effort for engineering and management functions to verify a logical relationship to the scope.

C-3.1.24. Verify current INL procurement and G&A rates.

C-3.1.25. Compare the completed estimate against previous estimates of similar scope and nature, or a separate parametric estimate can be prepared by the project manager, if requested, in order to confirm the logic of the estimate.

C-3.1.26. Check for creditability, completeness, consistency, formatting, and presentation of the estimate package.

C-3.1.27. Ensure that person(s) performing this check and verification sign the estimate cover letter in the designated “checked by” area. This checker’s signature(s) will be of one that is independent of the preparation of this package.

C-3.1.28. Confirm the quality control requirement and subcontractor validation of this cost estimate by the subcontractor via management signature in a designated “approved by” line on the cover letter.

NOTE: *The cost estimate validation ensures that a cost estimate is internally consistent, complete, and defensible. This management signature will be of one that is independent of the preparation or checking of this package.*

C-4. DELIVERABLE SCHEDULE

C-4.1. Provide two hardcopies of the final estimate(s) stamped "DRAFT" for review to the contractor. These draft copies will be submitted *(insert days here)* working days prior to the review(s).

C-4.2. Incorporate information, comments, and data obtained at these reviews in the final cost estimate.

C-4.3. Perform a quality check (as outlined in the Quality Assurance/Control) prior to the submission of the draft document for the contractor's review.

NOTE: *The approval of the draft document is not required at this time. The subcontractor will allow a (insert days here) working days for the contractor's review. The subcontractor will be required to answer any questions by the contractor during this review period.*

C-4.4. If requested, incorporate information and data obtained at value engineering sessions in the final cost estimate package. Include the session, dates, and number of hours attended per value engineering session.

C-4.5. If requested, include attendance numbers at Jury/Risk Reviews and hours per review in the proposal.

C-4.6. Incorporate the information and data obtained at the Jury/Risk Reviews in the final cost estimate.

C-4.7. At the time of delivery of the completed estimate, provide the contractor with a copy of all estimate **file information. This will include copies of vendor quotes,** meeting notes, e-mails, and any other generated information by the subcontractor during the development of the cost estimate deemed pertinent.

NOTE: *Copying of pricing taken from costing manuals or electronic databases (e.g., RS Means) will not be required for the estimate file. Reference these sources in the "Basis of Estimate" section in the "Cost Estimate Support Data Recapitulation" sheets.*

C-4.8. Provide to the contractor two hardcopies and one electronic CD copy (including both native and PDF format) of the approved final cost estimate package. The cost estimate package must include at a minimum the items listed below and be organized in the following order:

C-4.8.1. A cover letter from the subcontractor to the contractor.

C-4.8.2. Cost estimate summary sheet(s).

C-4.8.3. Overhead and Profit Mark up and Labor Reports.

C-4.8.4. Cost estimate support data recapitulation sheets.

C-4.8.5. Cost estimate detail sheets.

C-4.9. Delivery of the estimate package and file information *(insert days here)* calendar days upon award of this work.

C-5. ACCEPTANCE OF SUBCONTRACTOR DELIVERABLES

C-5.1. Receipt of subcontractor deliverables that are approved by the contractor is considered acceptance.

Appendix D

Development of Range Estimates

Cost Estimating Best Practice

No. CEBP 70-10

Development of Range Estimates

November 12, 2012

Contributor(s):

John Baker, CEP (Author)

Formatte

PURPOSE

As a best practice of Idaho National Laboratory (INL) Cost Estimating organization, Development of Range Estimates provides guidelines for applying the general principles of estimate ranges to project cost estimates. Development of Range Estimates maps the phases and stages of project cost estimating, together with a generic project scope definition maturity and quality matrix, which can be applied across a wide variety of scopes of work. This best practice provides guidelines for applying the principles of range estimating specifically to formal estimates at INL.

The intent of this best practice is to improve communications among all of the stakeholders involved with preparing, evaluating, and using formal cost estimates at INL.

The overall purpose of this best practice is to provide an approximate representation of the relationship of specific design input data and design deliverable maturity to the estimate accuracy and methodology used to produce the cost estimate range. The estimate accuracy range is driven by many other variables and risks; therefore, the maturity and quality of the scope definition available at the time of the estimate is not the sole determinate of accuracy; risk analysis is required for that purpose.

INTRODUCTION

Single-point estimates do not represent the variability in the actual resources required for a project. Cost estimates that are developed early in a project's life may not be derived from detailed engineering designs and specifications, but they should be sufficiently developed to account for the estimate uncertainties (e.g., known/unknowns and unknown/unknowns) to support budget requests for the remainder of the project definition phase. Over the life of the project, cost estimates become increasingly more definitive and reflect the scope and schedule of work packages and planning packages defined for the project.

Estimate uncertainty is part of the project planning process for the development of complete estimates. Estimate uncertainties are fundamental contributors to cost growth and are expected to decrease over time as the project definition improves and the project matures. Estimate uncertainty is a function of, but not limited to, the quality of the project scope definition, the current project life-cycle status, and the degree to which the project team uses new or unique technologies. Estimate uncertainties occur throughout the project baseline. This best practice outlines the preferred approach to account for estimate uncertainty of the accuracy range in the estimating process.

Estimate accuracy will generally be correlated with estimate classification (and therefore the level of project definition) and the range, all else being equal. The proposed range should be sufficiently broad such that it fully bounds all possible project cost outcomes, understanding the very limited design basis that exists at the time and the more imprecise methodologies used at this stage of the project.

However, specific accuracy ranges will typically vary by type of work. Also, the accuracy of any given estimate is not fixed or determined by its classification category. Significant variations in accuracy from estimate to estimate are possible if any of the determinants of accuracy vary (such as technology, quality of reference cost data, quality of the estimating process, and skill and knowledge of the estimator). Accuracy also is not necessarily determined by the methodology used or the effort expended. Estimate accuracy must be evaluated on an estimate-by-estimate basis, usually in conjunction with some form of the risk analysis process.

Establishment of the range estimates helps to compensate for the uncertainty in the estimate and supports the project's ability to meet the resource commitments of the project. It is imperative that projects address the unknown/unknowns throughout the planning cycle. Failure to address these can lead to projects underestimating the uncertainties associated with the unknowns at the level of maturity at that phase of the planning (see Figure 1).

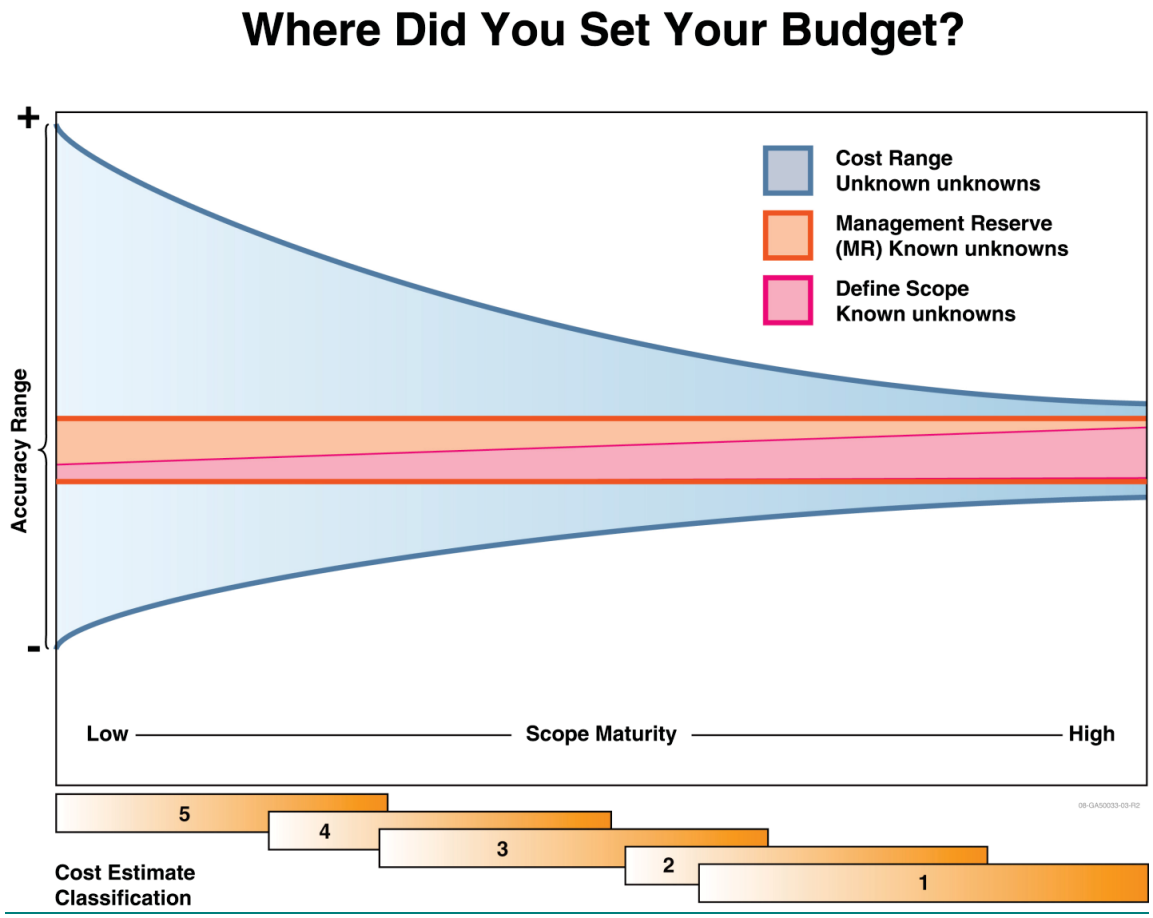


Figure 1.Scope maturity versus estimate accuracy.

RANGE ESTIMATING

Range estimates are required for Critical Decision 0 and Critical Decision 1 packages and are recommended for all Class 5, 4, and 3 estimates. Range estimates take into account the impacts of the work that cannot be predicted (e.g., the unknown/unknowns). Therefore, all cost estimates will incorporate the use of ranges.

The cost estimate's range values will be communicated in the cover letter of the cost estimate.

The value components of a range estimate are as follows:

- Estimated work (known/knowns) – most likely (assumed to be a 50% confidence level)
- Escalation (known/knowns) – most likely (assumed to be a 50% confidence level)
- Management reserve (known/unknowns) – set at an 85% confidence level and made up of the following:
  - Specific risks identified
  - Inherent risks to the estimate
  - The cost value of the schedule reserve
- Range values (unknown/unknowns) – as determined by the Association for the Advancement of Cost Engineering Expected Accuracy Range Tables (see Tables 1 and 2).

Table 1. 18R-97: Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries (to be used for nuclear and research and development type work).

Estimate Classification Accuracy Ranges for Nuclear and Research and Development Type Work[a]		
Estimate Class	Expected Accuracy Range (Typical Variation)	
	Low Range	High Range
Preliminary Class 5	L: -20% to -50%	H: +30% to +100%
Class 5	L: -20% to -50%	H: +30% to +100%
Class 4	L: -15% to -30%	H: +20% to +50%
Class 3	L: -10% to -20%	H: +10% to +30%
Class 2	L: -5% to -15%	H: +5% to +20%
Class 1	L: -3% to -10%	H: +3% to +15%
a. The state of process technology, availability of applicable reference cost data, and many other risks affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.		

Table 2. 56R-08: Cost Estimate Classification System – As Applied for the Building and General Construction Industries (*to be used for non-nuclear and non research and development type work).*

Estimate Classification Accuracy Ranges for Non-Nuclear and Research and Development Type Work[a]		
Estimate Class	Expected Accuracy Range (Typical Variation)	
	Low Range	High Range
Preliminary Class 5	L: -20% to -30%	H: +30% to +50%
Class 5	L: -20% to -30%	H: +30% to +50%
Class 4	L: -10% to -20%	H: +20% to +30%
Class 3	L: -5% to -15%	H: +10% to +20%
Class 2	L: -5% to -10%	H: +5% to +15%
Class 1	L: -3% to -5%	H: +3% to +10%
a. The state of construction complexity and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual cost from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.		

Estimate Classification Accuracy Ranges for Non-Nuclear and Non-Research and Development Type Work		
Estimate Class	Expected Accuracy Range Typical variation in low and high ranges [a]	
Preliminary Class 5	L: -20% to -30%	H: +30% to +50%
Class 5	L: -20% to -30%	H: +30% to +50%
Class 4	L: -10% to -20%	H: +20% to +30%
Class 3	L: -5% to -15%	H: +10% to +20%
Class 2	L: -5% to -10%	H: +5% to +15%
Class 1	L: -3% to -5%	H: +3% to +10%
Note: [a] The state of construction complexity and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual cost from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.		

Tables 1 and 2 are provided for guidance as the starting point for the discussion of what range is needed for this scope. Upon discussion by the project team, it may be found the percentages listed may actually be greater or less than the values. The inability to predict unknown impacts encompasses the art of planning and is not an exact science. Final estimate ranges are to be established by the requester with input from the project team.

EXAMPLES

Nuclear Cost Estimate Range:

Class 5 estimated work value	$10,500,000
Base estimated cost from success	$10,000,000
Escalation cost from success	$500,000
Management reserve	$3,500,000
Specific risks identified from risk analysis	$1,500,000
Inherent risks to the estimate from risk analysis	$1,000,000
Cost value of the schedule reserve (calculated)	$1,000,000
~~Most likely~~Point value	$14,000,000
Starting point range (for discussion)	
Low end @ -50% (ref. Table 1)	**$7,000,000**
High end @ +100% (ref. Table 1)	**$28,000,000**

Non-Nuclear Cost Estimate Range:

Class 5 estimated work value	$10,500,000
Base estimated cost from success	$10,000,000
Escalation cost from success	$500,000
Management reserve	3,500,000
Specific risks identified from risk analysis	$1,500,000
Inherent risks to the estimate from risk analysis	$1,000,000
Cost value of the schedule reserve (calculated)	$1,000,000
~~Most likely p~~Point value	$14,000,000
Starting point range (for discussion)	
Low end @ -30% (ref. Table 2)	**$9,800,000**
High end @ +50% (ref. Table 2)	**$21,000,000**

DEFINITIONS

Base estimate. Estimate, excluding escalation, foreign currency exchange, contingency, and management reserve.

Cost range. An expected range of costs for a project or its components. The absolute difference between the maximum and minimum (or some stated confidence interval) values in a set of values; the simplest measure of the dispersion of a distribution.

Escalation. The provision in actual or estimated costs for an increase in the cost of equipment, material, labor, etc., due to continuing price level changes over time. Inflation may be a component of escalation, but non-monetary policy influences (such as supply-and-demand) are often components.

Estimate uncertainty. The inherent accuracy of a cost or schedule estimate. Represents a function of the level of project definition that is available, the resources used (skill set and knowledge) and time spent to develop the cost estimate and schedule and the data (~~e.g.,~~ vendor quotes, catalogue pricing, historical databases, etc.) and methodologies used to develop the cost estimate and schedule.

Inherent risk. A risk that exists (but may or may not be identified) due to the very nature of the asset, project, task, element, or situation being considered.

Known. A quantity or condition characterized by certainty.

Known-unknown. An identifiable quantity or value having variability or an identifiable condition lacking certainty.

Management reserve. Determined by the contractor and represents the amount of the contractor budget that will be used for cost contingency arising from estimate uncertainties and realized risk events that are within the contractor's contractual obligations. Developed by the contractor, management reserve is maintained separately from the performance measurement baseline and is utilized by means of the contractor's change control process.

Monte Carlo analysis. A method of calculation that approximates solutions to a variety of mathematical problems by performing statistical sampling experiments on a computer; applies to problems with no probabilistic content and to those with inherent probabilistic structure.

Schedule reserve (SR). Time allowance as determined through schedule risk analysis (e.g., risk analysis software) to account for identified risks and schedule duration uncertainty. Represented within the project schedule and outside the Performance Measurement Baseline (PMB) as the time difference between the contractual milestone dates and the contractors planned dates of accomplishment.

Simulation (Monte Carlo). Process for modeling the behavior of a stochastic (probabilistic) system. A sampling technique is used to obtain trial values for key uncertain model input variables. By repeating the process for many trials, a frequency distribution is built up, which approximates the true probability distribution for the system's output. This random sampling process, averaged over many trials, is effectively the same as integrating what is usually a very difficult or impossible equation.

Unidentified risks. Risks that were not anticipated or foreseen by the Integrated Project Team. Unidentified risks might originally be unanticipated because the probability of the event is so small that its occurrence is virtually unimaginable. Alternatively, an unidentified risk might be one that falls into an unanticipated or uncontrolled risk event category. (These risks also are categorized as "unknown-unknown" risks.)

Unknown-unknowns. A quantity, value, or condition that cannot be identified or foreseen, otherwise referred to as unknowable.

REFERENCES

AACE International Recommended Practice No. 10S-90, "Cost Engineering Terminology," American Association of Cost Engineers, Rev. January 19, 2012.

DOE Guide 413.3-7A, "Risk Management Guide," Department of Energy, January 18, 2011.

DOE Guide 413.3-21, "Cost Estimating Guide," Department of Energy, May 9, 2011.

Appendix D

INL Corrective Action Request (CAR) from 2013 EVMS Self-Surveillance

During the 2013 EVMS Self-Surveillance INL's EVMS Self-Surveillance Review Team only identified one CAR. CAR-001, "RHLLW Project WBS Integrity" follows deals with a concern with the management of the RHLLW Project's WBS.

1. Subject: RHLLW Project WBS Integrity	2. EVMS Guideline Ref: (if applicable) 1 & 28 MCP-7344, MCP-7345, & MCP-7400	3. Control Number CAR-001
4. CA #, WBS #, or Functional Area: C.R.60.20 – RHLLW Project WBS Changes and Modifications		

5. Requirement(s):

The NDIA EVMS Intent Guide, regarding guideline 1 states the following: "A WBS is a direct representation of the work scope in the project, documenting the hierarchy and description of the tasks to be performed and their relationship to the product deliverables. The WBS breaks down all authorized work scope into appropriate elements for planning, budgeting, scheduling, cost accounting, work authorization, measuring progress, and management control."

The NDIA EVMS Intent Guide, regarding guideline 28 states the following: "Incorporate the work scope for authorized changes into the performance measurement baseline in a documented, disciplined, and timely manner. The timely and accurate incorporation of authorized and negotiated changes into the performance measurement baseline ensures that valid performance measurement information is generated for the new scope being executed. Adherence to this guideline helps to ensure that budget, schedule, and work remain coupled."

6. Discussion:

The RHLLW Project Team had previously prepared a WBS that successfully passed several reviews including a DOE-HQ EVMS certification review. During the Self-Surveillance interviews it became apparent that the congressional authorization actions have resulted in conflicts for the RHLLW Project Team. In attempting to address the congressional authorization issue, the RHLLW Project Team made several changes to the project WBS to improve the "timing" for implementation of some work scope. The project team removed portions (activities) from several planning packages and combined them into a new work package titled "FY13 Work Aheads" even though the schedule for performing these activities did not change.

This work package was added to the Project Management subproject and the planning activities were assigned the new work package WBS number which moved them from a planning package to a work package but retained the original schedule logic.

There was also work that was planned in the "CD-2/3 Documents" control account as discrete work that was moved to future work in a Summary Level Planning Package titled "CD 4 Documents." After the activities were moved from discrete work to the planning package they retained the original resource assignments and did not follow the proper nomenclature for denoting the PP description in the activity IDs.

As a result of this change the WBS dictionaries in the IWADs were updated. The Project Team has included a copy of the WBS dictionaries as Appendix B in the RHLLW PEP. The WBS dictionaries in the Appendix B were not updated at the time of this review.

7. Observations / Findings:

The Self-Surveillance Review Team (SRT) is concerned with the movement of work scope between WBS elements to satisfy potential "timing" issues. While it is understood that the problems with congressional authorization and funding have created some significant challenges moving work scope within WBS elements is not a preferred solution. The SRT is concerned that the partial movement of work scope from various work packages into one affects the integrity (i.e., vertical alignment) of the WBS and affects the ability to report progress at the control account level and to accurately reflect costs for the individual work products. The WBS should remain as a product oriented breakdown of the work and should not be changed solely due to funding or timing constraints.

The RHLLW Project Team must work to ensure that the changes processed in the BCP are properly documented and updates are carried through to other project documents. The planning package nomenclature should be updated and the Appendix B of the RHLLW PEP should have been updated and included as part of the BCP.

8. Recommendation(s):

The SRT recognizes that when the RHLLW Project receives funding and authorization to proceed that there will be a Baseline Change Proposal (BCP) required to establish the Performance Management Baseline (PMB) for the remaining work. When preparing the BCP the project team shall correct the changes made to the WBS.

However, in future changes the RHLLW Project Team is encouraged to maintain the integrity of the WBS by not letting funding or timing issues drive WBS changes. The work evaluated should have been replanned to accommodate the funding and timing constraints without changing or moving within the previously approved project WBS structure.

Appendix E

INL Continuous Improvement Opportunities (CIOs) from 2013 EVMS Self-Surveillance

During the 2013 EVMS Self-Surveillance INL's EVMS Self-Surveillance Review Team (SRT) identified four CIOs.

CIO-001 – Deficiencies in Project IWADs (INL Work Authorization Documents)

The scope statements in the IWAD are written at too high a level and are not definitively defined. While tracking the scope changes the Self-Surveillance Review Team (SRT) discovered that there were significant changes to the scope but the IWADs did not have any markups to show the changes.

CIO-002 – Automatic Adjustments Made by Cobra to the Project ETC/EAC

BEA has elected to hold the EAC unless the CAM requests, and the PM approves, an adjustment. However, the costing software, Cobra, performs calculations and if the ACWP + BCWR exceeds the forecast EAC it will recalculate the EAC. To hold the EAC the CAM must request a manual override be entered in Cobra. This was not understood and, in some cases, the Control Account EAC was varying on a monthly basis.

CIO-003 – Project Master Budget Log

The SRT found that the projects Master Budget Log (MBL) was not filled out correctly and it was no a clean journal that allowed tracking budget changes throughout the process.

CIO-004 – Lack of Clarity and Preciseness in BCP Documentation and Form

While evaluating the BCP the SRT found issues with the clarity and definition of the BCP. Some of the more significant issues include, movement of scope to facilitate changes to execution strategy rather than work products, customer direction but no discussion or attachments of the customer direction, increase in MR with no explanation as to what caused the increase, inconsistencies between the various sections of the BCP, etc.

CIO-005 – Improvements to BEA Processes, Procedures and Form

During this review the EVMS Self-Surveillance Review Team (SRT) identified that there were process improvements that could be implemented that would add to the clarity of the EVMS procedures and processes and provide additional guidance to Project Teams implementing EVMS principles.

1. Subject: Deficiencies in Project IWADs	2. EVMS Guideline Ref: (if applicable) 1	3. Control Number CIO-001
4. CA #, WBS #, or Functional Area: Project INL Work Authorization Document (IWAD)		

5. Requirement(s):

The NDIA EVMS Intent Guide, regarding guideline 1 states the following: "A WBS is a direct representation of the work scope in the project, documenting the hierarchy and description of the tasks to be performed and their relationship to the product deliverables. The WBS breaks down all authorized work scope into appropriate elements for planning, budgeting, scheduling, cost accounting, work authorization, measuring progress, and management control. The WBS must be extended to the level necessary for management action and control based on the complexity of the work. A WBS dictionary is typically used to define the work scope for each unique element in the WBS."

The NDIA Intent Guide also describes one of the WBS attributes as, "The WBS elements should collectively provide a complete definition of work scope requirements. "

6. Discussion:

The scope statements in the IWADs are written at too high a level and the scope statement must be more definitively defined. During review of the BCP the IWADs were reviewed and as the review team tried to track the changes, they discovered that there were significant changes to the scope but the IWADs did not have identifying redline/strikeout to identify the change(s).

7. Observations / Findings:

There are several issues identified with the IWADs reviewed.

- C.R.60.20.02.01 – Unable to identify changes in scope written in the IWAD
- C.R.60.20.05.04. – Unable to identify changes in scope written in the IWAD
- C.R.60.20.04.02, Infrastructure, Milestone section of IWAD. This identifies milestones for the control account and then has a note that states, "…(see project schedule for dates)." The project schedule is dynamic. As a minimum this should provide the activity ID and a reference to the schedule that was used to establish the baseline so that the baseline is properly documented. The preferred method is to provide the activity ID, activity description, and the date of the milestone so that it is documented and can be identified in the schedule.
- C.R.60.20.02.03, "Operational Readiness." A new work package was added to this control account. The work package is titled as "FY13 Work Ahead Products and Deliverables."
    - The activities were selected and moved from several Planning Packages (PPs). Only a portion of the activities identified in these planning packages were rebaselined into the new work package. The Self-Surveillance Team (SRT) is concerned that the partial movement of work scope affects the integrity (i.e., vertical alignment) of the WBS.

  - The title for the work package is FY13 Work ahead Products and Deliverables" and the work is planned in FY14.
- C.R.60.20.04.05, "Infrastructure Liner Alternatives Analysis." The SOW section of the IWAD identifies that the "Miscellaneous modeling and simulation is also included in this scope." However, it the Major Deliverables and Milestones, the "Documentation of the modeling and simulation" has been redlined out. This creates confusion as to whether the scope is in the project or not.
- C.R.60.20.05.02, "Vault Performance." IWAD identifies that the budget changed reduced by ($7.9K). There is no reduction shown in the scope section of the IWAD. Also, when one reviews the BCP it only states that it was reduced. One cannot determine the reason for the reduction and a decision cannot be made if this change is EVMS compliant.
- C.R.60.20.06.02, "Cask transportation System Subcontract Award, Hardware Fabrication and Delivery." The front page of the IWAD identifies a ($3,215,340) reduction in budget. The scope description is written at such a high level that there are redlines showing scope that is deleted.
- INL processes define that the scope statement in the IWAD is the document of record for the scope being included in the WBS. The project team chose to include a copy of the scope statements, as an Appendix in the PEP, to define the WBS dictionary. The appendix in the PEP does not appear to have been updated.

8. Recommendation(s):

The SRT recommends that the RHLLW Project Team work to provide a more definitive and complete description for the project work scope (IWADs) during future Baseline Change Proposals (BCPs). Also the WBS dictionary, extracted from the IWAD, that is included as an Appendix in the RHLLW PEP be updated with any revision to the scope defined in the IWAD.

1. Subject: Automatic Adjustments Made by COBRA to the Project ETC/EAC	2. EVMS Guideline Ref: (if applicable) 27 MCP-7348 & MCP-7349	3. Control Number CIO-002
4. CA #, WBS #, or Functional Area: All RHLLW Project Control Accounts		

5. Requirement(s):

The NDIA EVMS Intent Guide, regarding guideline 14 states the following: "On a monthly basis, the control account manager should review the status of the expended effort and the achievability of the forecast and significant changes briefed to program management. This analysis should focus on performance to date within the control account, an assessment of the effort to complete the remaining work, and an evaluation of the type and quantity of resources required to complete the effort. When updates are made to existing forecasts of cost to complete, significant changes are briefed to program management. Prudent maintenance of the control account-level EAC by the control account manager ensures that the EAC reflects a valid projection of project costs. Periodically, a comprehensive EAC should be prepared using all available information to arrive at the best possible estimate at completion."

MCP-7349: "Project Estimate to Complete and Estimate at Completion Development" states: "The CAM is responsible for reviewing the ETC/EAC on a monthly basis and updating if required." In addition MCP-7349, step 4.3.7 states: "Review variance analysis reports (VARs). Identify whether an update to the EAC is required as a corrective action…"

MCP-7348, "Project Data Accumulation, Reporting and Variance Analysis," step 4.2.3.2 states: "CAM: Develop the VAR, and identify the problem and root cause of each variance using Form 415.30, 'BEA/INL – Control Account Variance Analysis Report'" requires that the CAM identify whether or not a "New/Revised ETC Needed?" Step 4.2.4.5 goes on further to state: "CAM: Create and/or update the project corrective action log using Form 415.28, 'Variance Analysis Report Corrective Action Log'…"

6. Discussion:

MCP-7349 requires that the CAM evaluate and assess the ETC/EAC monthly and make adjustments as necessary and the CAM identify whether the EAC should be updated as a corrective action. In addition, to ensure that the CAM evaluate the ETC/EAC and identify any corrective actions, Form 415.30, "BEA/INL – Control Account Variance Analysis Report" requires that the CAM check a box to validate whether an ETC/EAC update is required.

Prepared by :	Date:	Reviewed by:	Date:	Outbrief Date:
Michael L. Nelson	07/22/2013	Doug Parker Andrea Gilstrap Maxine Johnson	07/30/2013	08/07/2013

BEA has elected to setup the Cobra software to hold the EAC. However, there are two cases where COBRA will make an adjustment to the EAC without input from the CAM.

1. If the actual costs (ACWP) exceeds the BAC Cobra automatically adjusts the EAC. When COBRA makes the adjustment the $ETC_{calculated}$ is set as the Budgeted Cost Work Remaining (BCWR). Once the ETC calculation is complete, Cobra then calculates the EAC with the standard formula of EAC = ACWP + $ETC_{calculated}$.
2. If a worker(s) charges to the control account that has a work discipline code (WDC) that is not included in the WDC's planned in the budget, COBRA will increase the value of the $ETC_{calculated}$ by the amount charged by the unplanned WDC. The algorithm in COBRA assumes that all of the WDCs planned are needed + the unplanned WDCs.

Both of these instances result in an $ETC_{calculated}$ that is likely to vary on a monthly basis. It is the responsibility of the CAM to review the $ETC_{calculated}$ and evaluate if this change is required and should be authorized. It should be noted that the monthly calculations may occur on all Control Accounts even if variance thresholds are not exceeded. The CAM is responsible to evaluate the EAC calculated in Cobra and if the CAM makes the decision to authorize the change, then the CAM will follow the process and document this decision on the VAR form (when applicable), and enter into the project corrective action log.

If the CAM evaluates the calculated EAC and determines that the EAC should not be changed, the CAM will notify the Planning & Financial Controls Specialist (PFCS). There are two methods for updating the EAC. The PFCS will provide guidance whether a manual entry should be performed or the Resource Assignment Spreadsheet should be used.

7. Observations / Findings:

While reviewing the VARs that were provided as objective evidence the SRT observed that there were variances in the EAC value from month to month. However the "New/Revised ETC Needed?" box was checked "No." When questioned the CAMs were aware that the EAC was changing and explained that it was a result of a Cobra calculation, the changes were relatively small, and it was beyond their control.

8. Recommendation(s):

There are two recommendations that come from this situation.

1. The RHLLW Project Manager shall discuss this issue with the Project Team and provide training to ensure that the EAC doesn't change unless requested by the CAM and approved by the Project Manager.
2. A note identifying that this situation may occur and that a manual override can be performed to maintain the EAC forecast should be added to MCP-7348, MCP-7349, and PDD-7002.

Prepared by :	Date:	Reviewed by:	Date:	Outbrief Date:
Michael L. Nelson	07/22/2013	Doug Parker Andrea Gilstrap Maxine Johnson	07/30/2013	08/07/2013

1. Subject: Issues and Concerns with RH LLW Disposal Project Master Budget Log	2. EVMS Guideline Ref: (if applicable) NDIA ANSI/EIA-748-B 14, 15 & 32 INL MCP-7346	3. Control Number CIO-003
4. CA #, WBS #, or Functional Area: C.R.60.20 Master Budget Log		

5. Requirement(s):

The NDIA EVMS Intent Guide, regarding guideline 14, states the following: "Identify and control management reserve and undistributed budget."

The NDIA EVMS Intent Guide, regarding guideline 15 states the following: "Reconcile the project value (target cost plus authorized, unpriced work) with the sum of all control account budgets, indirect budgets, management reserves, and undistributed budgets."

The NDIA EVMS Intent Guide, regarding guideline 32 states the following: "The performance measurement baseline should always reflect the most current plan for accomplishing the effort. Authorized changes must be promptly recorded in the system and incorporated into all relevant planning. Planning and authorization documents must be updated accordingly, prior to commencement of new work."

Management Control Procedure (MCP) 7346 provides details on entering information into the Master Budget Log. It is noted in the procedure that the MBL shows all transactions pertaining to the total project budget and where it is located. It shows:

- Source of the budget such as the initial negotiated amount
- Contracting officer authorized changes
- Total negotiated amount, the estimated cost of authorized unpriced work
- Project Budget Base (also known as the Contract Budget Base)
- Amount of any Over-Target Baseline
- Total Allocated Budget
- Amount of Management Reserve
- Value of the Performance Measurement Baseline
- Undistributed Budget
- Distribution of budget to summary level planning packages and control accounts.

6. Discussion:

The RHLLW Project Team is using the master budget log but not in the way the form was intended. There is not a clean journal to allow identification of Control Account budgets."

7. Observations / Findings:

Prepared by :	Date:	Reviewed by:	Date:	Outbrief Date:
Maxine Johnson	07/02/2013	Michael L. Nelson	07/02/2013	08/07/2013

The Self-Surveillance Review Team (SRT) is concerned with RH LLW Disposal Project Master Budget Log (MBL) does not follow the example given. It is not a clean journal that allows one to track the budget changes throughout the process.

- There is no form or revision number displayed on the MBL (Form #415.06).
- The Project Budget Base (PBB) is being changed with each transaction for each control account. This should reflect the total of the PBB at the completion of the changes in the subtotal column and the total of the changes to the PBB in the second column.
- There is a similar issue with the two columns for the Undistributed Budget (UB). The change column should reflect any change in UB as it assigned to each control account. However the summary line should provide a total for the changes and The subtotal line should reflect the changed budget in the summary line (without the running total shown in this column).
- As prepared for the RH LLW Disposal Project, one cannot determine the budget for a particular control account. The change column does show the change to the control account, however the entry in the Subtotal column is a running total of the amount of work currently budgeted for the sum of the control accounts. The Subtotal column should show the revised baseline for the individual control account. The total value for the control account is the sum of the controls accounts that should be entered as formula on the dark, blue line at the bottom of each change transaction.

Similar instructions should be followed for the Summary Level Planning Packages (SLPP), Management Reserve (MR), and Authorized Unpriced Work (AUW) sections of the form.

8. Recommendation(s):

The SRT recommends that the RH LLW Disposal Project Team revise their MBL form during the next update cycle per MCP-7346 and use the example given in Form 415.06 as a guide.

1. Subject:	2. EVMS Guideline Ref: (if applicable)	3. Control Number
Lack of Clarity and preciseness in BCP Documentation and Form	1, 14, 28, 29, & 32 MCP-7400, MCP-7345	CIO-004
4. CA #, WBS #, or Functional Area: All RHLLW Control Accounts		

5. Requirement(s):

ANSI Guideline 1 states the following: "Define the authorized work elements for the program. A work breakdown structure (WBS), tailored for effective internal management control is commonly used in this process."

The NDIA EVMS Intent Guide, regarding guideline 14 states the following: "Undistributed budget is budget that is applicable to specific project effort but has not yet been distributed below the project level either directly to control accounts or to summary level planning packages. It is a transient amount because, once it is distributed to either control accounts or to summary level planning packages, it ceases to be undistributed budget. Because undistributed budget is budget that is tied to work, it does form part of the performance measurement baseline."

The NDIA EVMS Intent Guide, regarding guideline 28 states the following: "Incorporate the work scope for authorized changes into the performance measurement baseline in a documented, disciplined, and timely manner. The timely and accurate incorporation of authorized and negotiated changes into the performance measurement baseline ensures that valid performance measurement information is generated for the new scope being executed. Adherence to this guideline helps to ensure that budget, schedule, and work remain coupled."

The NDIA EVMS Intent Guide, regarding guideline 29 states the following: "Budget changes are controlled and understood in terms of scope, resources, and schedule. Budgets reflect current authorized work. Budget revisions are made when work is added to the contract and are traceable from authorized contract target costs to the control account budgets or from management reserve. Management reserve may be used for future work when additional in-scope work has been identified."

The NDIA EVMS Intent Guide, regarding guideline 32 states the following: "The performance measurement baseline should always reflect the most current plan for accomplishing the effort. Authorized changes must be promptly recorded in the system and incorporated into all relevant planning. Planning and authorization documents must be updated accordingly, prior to the commencement of new work."

6. Discussion:

During review of the Baseline Change Proposal (BCP) the Self-Surveillance Review Team (SRT) noted several inconsistencies and issues.

Prepared by :	Date:	Reviewed by:	Date:	Outbrief Date:
Michael L. Nelson Linda Hergesheimer	07/11/2013	Doug Parker	07/23/2013	08/07/2013

The NDIA EVMS Intent Guide regarding guideline 1 states: "The WBS is a product-oriented division of project tasks depicting the breakdown of work scope for work authorization, tracking, and reporting purposes that facilitates traceability and provides a control framework for management." The guide also states "the WBS must be extended to the level necessary for management action and control based on the complexity of the work." As part of this baseline change the RHLLW Team moved activities from several planning packages and placed them in a new work package titled, "FY13 Work Aheads." This movement was primarily to identify work that could be performed in the future if funding was provided. The work previously was assigned into product oriented WBS elements and was moved into a new WBS element solely for funding and convenience reasons. The work was grouped into a new WBS element solely for convenience in the event that funding became available.

There were concerns identified during review of this BCP. The movement of budget from discretely planned work back to Undistributed Budget (UB) rather than into MR and the absence of schedule reserve being planned in the project schedule are two examples. The NDIA EVMS Intent Guide regarding guideline 14 states: "Undistributed budget is budget that is applicable to specific project effort but has not yet been distributed below the project level either directly to control accounts or to summary level planning packages. It is a transient amount because, once it is distributed to either control accounts or to summary level planning packages, it ceases to be undistributed budget." The CAMs interviewed stated that this was done at the direction of the FPD and that direction was documented in a letter from the Contracting Officer. During the review it became apparent that the reasons for these decisions were sound and understandable, however, there was no mention of this direction in the BCP descriptive text and the documentation for this direction was not attached.

The Self-Surveillance Review Team (SRT) found that the language of the BCP was vague and difficult to follow and understand. The BCP was prepared for several reasons and one of the primary reasons was to incorporate comments resulting from four, independent reviews. Even though this was stated as an objective, the text of the BCP did not identify these comments and none of the comments were attached. The BCP text identified the changes to each of the control accounts but tended to discuss only the increases and decreases in budget and changes to schedule but, in many cases, did not identify the reason for the change. Much of the work was in planning packages that would be detailed at a later time and the reasons for making changes to planning packages at this time were not clear. When coupled with the issues identified in the IWADs (see CIO-001) the scope movement, and reasons for movement were difficult to evaluate and determine EVMS compliance.

There is a $4.2M change in the Contract Budget Base (CBB) and the BCP does not provide a clear explanation/justification for this increase. The SRT assumes that this results from the delay for congressional authorization and is the delay to the project that will push it into the out years and the increase results from escalation costs. The BCP also identifies a significant amount of work that

is being pulled from the project scope and assigned to DOE. At the same time there is an increase in MR and there are no explanations in the BCP descriptive text that explain these anomalies.

The BCP included an updated schedule but schedule changes weren't really addressed in the BCP descriptive text. The schedule changes appeared to be more to support the movement of budget and budget changes rather than the re-sequencing of work and schedule optimization.

7. Observations / Findings:

During CAM interviews the SRT identified that there were several changes for which the Federal Project Director (FPD) gave direction. Sometimes this direction resulted in deviations from either EVMS guidelines, or BEA procedures and processes (or sometimes both). The direction from the FPD is not documented in the BCP.

Section 16, "Impact if NOT Approved, "states "Customer directed scope for FY13 will not be approved." There is no discussion of this direction in the text following nor are there any attachments identified in section 18 of the BCP form that documents this customer direction.

When the CAM was questioned concerning the movement of previously planned work scope back to Undistributed Budget (UB) rather than Management Reserve (MR),the CAM stated that this was done at the direction of the FPD. Investigation revealed that this direction was documented in a letter from the FPD, letter No. CCM 229660, dated February 13, 2013. This documentation was not included with the BCP and there is no discussion of this direction in the BCP descriptive text.

During review of the project schedule the SRT noted that there was no schedule reserve identified. The CAM questioned stated that this was done at the direction of the FPD. Further discussion established that there was good justification for not spending the time and effort to identify schedule reserve at this time. However, the direction from the FPD was not identified in the descriptive text nor was it attached to the BCP.

Section 14, "Required Concurrence/Approval Signatures" – Control Account Manager. There were changes made to control accounts within the "Project Management" subproject. The signature for the CAM authorizing/accepting these changes was not entered on the BCP form.

Section 15, "Reason and Justification for Change" states, "This BCP addresses directed changes resulting from four different CD-2/3 Package reviews…" The descriptive text did not identify which of the four reviews resulted in the proposed changes. Also, none of the comments from the review teams was attached as information.

Section 16, "Impact if not Approved." This section only identifies the impacts due to funding delays. However, in Section 15 above it is identified that the BCP is directed changes from four different

independent reviews. A significant impact that should have been included is the directed changes from the independent reviews would not be implemented in a timely manner.

Section 17, "Description of Change Summary" – demonstrated good organization but had several issues.

Several control accounts addressed increases/decreases to budget but did not provide narrative to identify whether the changes were EVMS compliant. All changes to the baseline need sufficient descriptive text to allow reviewers to fully understand and evaluate the change. When the WBS dictionaries in the IWADs were reviewed, in some cases, the SRT was unable to identify the changes in scope.

Several control account changes had references to "Removed management reserve from…" This is an error because management reserve is held at the project level and is not held at the control account level. A follow up discussion with the CAM identified that this was the removal of "estimating contingency."

Second bullet from the bottom states: "Subcontractor General and Administrative (G&A) cost was recalculated and placed in MR…" The "Funding Change and Impact Explanation states: Undistributed Budget holds costs for potential labor rate changes, material price adjustments, and subcontract G&A." These two statements are in direct conflict with each other. Discussion identified that subcontract G&A was ultimately included in UB at the FPD's direction.

(This movement also resulted in an unauthorized change to the BCP Form. However, this identifies a need to accommodate the inclusion of UB in the form and will result in a future revision to the form.)

Statement was made that, "Revised estimate to include the hold point milestones and related Acquisition Executive (AE) Design Review activity for…" In Section 18 the cost estimate is identified as "N/A." The cost estimate supporting/documenting this change should have been attached.

The TPC portion is not filled out correctly as it only identifies the CBB and not the TPC. There is text in the "Funding Change and Impact Explanation" section above that identifies the amounts for DOE contingency and DOE's Other Project Costs (OPCs). This section of the form needs to be filled out to reflect the project's TPC which would include these items.

Even though the BCP included a P6 schedule that had a column for identifying the activities that changed with this BCP the SRT had problems/issues with identifying the schedule changes and reasons for the schedule change. There was not enough information given in the text of the BCP to identify which activities were affected and the reasons/justifications for the schedule

changes. The schedule could be reviewed and identify the activities that were changed, compare them to the original baseline bar, but not reach a conclusion as to the validity or reason for the change.

8. Recommendation(s):

The review was completed after the BCP was finalized, approved, and implemented. The SRT recommends that the RHLLW Project Team evaluate the information above and submit a Corrective Action Plan (CAP) to resolve the issue.

9. Subject: Improvements to BEA Processes, Procedures and Form	10. EVMS Guideline Ref: (if applicable) Form 415.14, Form 415.19, MCP-7345, MCP-7348, MCP-7349, PDD-7002, & GDE-489	11. Control Number CIO-005
12. CA #, WBS #, or Functional Area: All RHLLW Project Control Accounts		

13. Requirement(s):

BEA is committed to providing integrated procedures and processes that support customer expectations for successful completion of work scope. This CIO is written as a portion of the continuous improvement opportunity employed at the INL.

14. Discussion:

During this review the EVMS Self-Surveillance Review Team (SRT) identified that there were process improvements that could be implemented that would add to the clarity of the EVMS procedures and processes and provide additional guidance to Project Teams implementing EVMS principles.

15. Observations / Findings:

1. Form 415.14, "Baseline Change Proposal," Section 17, Budget Baseline (Direct)
   - This section of the form does not allow for the identification of Undistributed Budget (UB).
   - This section of the form does not have a field for recording narrative concerning the Budget Baseline (Direct)
2. Form 415.19, "INL Work Authorization Document" (IWAD) does not have a field for entering UB.
3. ETC/EAC – There is confusion concerning the ability to maintain the EAC within the Cobra software until such time as the CAM wants to authorize a change to the EAC.

16. Recommendation(s):

1. Form 415.14, Section 17, Budget Baseline (Direct)
   - Modify this section of the Form 415.14 to allow for the identification of UB.
   - Modify this section of Form 415.14 to provide a field for a narrative.
     - Modify BCP Instructions, Form 415.14A, to include directions for these two new fields.
2. Form 415.19, IWAD – modify the form to provide a field for recording UB.
3. Update the following guides and procedures to provide additional clarification/instruction for maintaining the EAC.
   - MCP-7348, "Project Data Accumulation, Reporting, and Variance Analysis"
   - MCP-7349, "Project Estimate to Complete and Estimate at Completion"
   - GDE-489, "Desktop Reference"
- PDD-7002, "Earned Value Management System Description"

Appendix F

CARs & CIOs from DOE APM EVMS Certification Review, March 2012

CAR or CIO No.	Description	EVMS Guideline(s)	Observation/Finding
Corrective Action Requests (CARs)			
CAR-001	Conversion of Planning Packages to Work Packages	ANSI Guideline 10 states the following: "To the extent it is practicable to identify the authorized work in discrete work packages, establish budgets for this work in terms of dollars, hours, or other measurable units. Where the entire control account is not subdivided into work packages, identify the far term effort in larger planning packages for budget and scheduling purposes."	The team's concern regarding this issue is (1) work packages should be detail planned and (2) once a planning package is converted to a work package, it is baselined and approved for implementation without further review. As a result, the work package will be implemented without a predetermined plan for claiming performance and subjective measures for claiming performance might be employed. Further, when an EV Plan (e.g., schedule of values for claiming performance) is prepared in advance, the resources are spread in the EVM system based on when resources are to be applied and when performance is claimed. Without a detailed EV Plan, resources are spread evenly across the work package period of performance. When the work package is executed, cost variances will result because resource implementation will likely be different than that contained in the baseline. For the above reasons, the team found BEA not fully compliant with ANSI Guideline 10, as not all scope within some work packages had been detail planned. As a result, the baseline is not an accurate representation of how and when the work is to be accomplished.

CAR or CIO No.	Description	EVMS Guideline(s)	Observation/Finding
Corrective Action Requests (CARs)			
CAR-002	Network Schedule Review Practices	ANSI Guideline 6 states the following: "Schedule the authorized work in a manner which describes the sequence of work and identifies significant task interdependencies required to meet the requirements of the program."	The team found that a true critical path cannot be currently calculated for the RHLLW project. The team observed many tasks with excessive total float durations. Excessive total float indicates that task logic is missing or that links are broken or inappropriate. During the in-brief the review team also noted that there were 24 hard constraints in the schedule. Some of the hard constraints were on LOE tasks to address FY funding constraints. LOE tasks should not drive schedule logic. The excessive number of tasks having long total float durations and the use of hard constraints represent a schedule that is not horizontally integrated. As a result a true critical path cannot be calculated. The review team also observed instances of long duration tasks with inappropriate earned value methods such as 50/50 and 0/100. Additionally, during RHLLW CAM interviews, the team confirmed with the CAM and his scheduler that many tasks had inappropriate successors and that some successors were placed in the schedule solely to prevent open-ended tasks from being present. Such practices compromise the validity of the schedule and the ability to calculate a true critical path. For the above reasons, CAR 2 was written.
CAR-003	Documenting Accounting System Compliance with EVMS	ANSI Guidelines 16–21 requires that the contractor's EVMS be described in a system description and procedures that accurately explain how the contractor will implement the 32 EVMS guidelines.	In reviewing the BEA's Earned Value Management System Description (EVMSD) document, PDD-7002, the team found it to be lacking key details required to be used by project controls personnel, control account managers (CAMs), and EVMS review teams to gain a clear and complete understanding of how BEA's accounting functions operate within the EVMS. Some specific examples of where the EVMSD is deficient are as follows: • No mention of monthly reconciliation process between GL and Cobra or where to find more information (GL 16) • No mention of direct labor/timekeeping policy or when labor costs are input into system (GL 16) • No reference to details of full accountability for material purchases to include residual inventory (GL 21)

CAR or CIO No.	Description	EVMS Guideline(s)	Observation/Finding
Corrective Action Requests (CARs)			
			• No mention of if or how rate changes are incorporated into EAC/ETC updates (GL 27) • Listing of indirect cost pools needs to be updated to reflect the CASD (GL 19) • No system diagram or explanation of components or flow of information in the EVMS and accounting systems (ANSI) • No reference to additional accounting manuals and/or handbooks that describe accounting processes (accruals, timekeeping, etc.) The team also found Appendix C of the EVMSD incomplete, as it does not accurately cross reference ANSI accounting guidelines to the appropriate BEA procedures. For example, the current diagram links all accounting guidelines to only two procedures: MCP-7347, "Project Material and Subcontract Management," and MCP-7348, "Project Data Accumulation, Reporting, and Variance Analysis," yet there are at least six other accounting procedural documents that were provided to the review team, but were not referenced in the EVMSD. Based on the discrepancies mentioned above, the team finds the BEA EVMSD not fully compliant with the ANSI standard.

CAR or CIO No.	Description	EVMS Guideline(s)	Observation / Finding
Continuous Improvement Opportunities			
CIO-001	Use of Discrete EV Methods on LOE Work	ANSI Guideline 7 states the following: "Identify physical products, milestones, technical performance goals, or other indicators that will be used to measure progress."	Relative to RHLLW Critical decision (CD)-2/3, several of the activities in the 435.1 & NEPA Documents (CD 2/3) WBS activities (C.R. 60.20.03.03.01) and General Conditions WBS activities (C.R. 40.10.30.24.02) were coded as discrete EV methods but are activities that cannot be tied to specific milestones or specific technical performance goals and were not using true discrete EV methods to claim earned value. The work being conducted in these activities were review and management functions with no products or milestones and a consistent level of personnel to accomplish the task. During CAM interviews it was discovered that since these activities could not be tied to specific milestones. The CAM was either using some form of apportionment (not a technique described in its EVMS Description) for discrete work activities or using methods that could not be objectively measured. Some of the discrete methods were chosen to reduce LOE activities in the project. This practice creates situations where performance is claimed in periods different than when actual costs are incurred or accrued. This results in under runs and over runs that are not valid and often cause variance reports to be generated unnecessarily. This also results in inaccurate performance reports used by managers internal to the project and the external customer.

CAR or CIO No.	Description	EVMS Guideline(s)	Observation / Finding
Continuous Improvement Opportunities			
CIO-002	Use of Product-Oriented WBS	ANSI Guideline 1 states the following: "Define the authorized work elements for the program. A work breakdown structure (WBS), tailored for effective internal management control is commonly used in this process."	The Material Security and Consolidation (MSC) project consists of refurbishing building CPP-651, fencing, and documented safety analysis (DSA) in order to support storage of sodium bonded fuel disposition product. The Project Execution Plan (PEP), Section 4.1.2, provides guidance regarding WBS development that was not truly product-oriented, as it includes at level 2 (WBS 40.10.30.XX) elements entitled "Long Lead Procurements" and "Subcontractor Construction." As a result of DOE guidance, the scope associated with the MSC project was organized into functions with scope, schedule, and budget assigned to various WBS elements associated with a single product area. For example, the procurement of the security door (BAC = ~$207K) is in Long Lead Materials (WBS 40.10.30.22), installation of the door (BAC = ~$227K) is in Construction Subcontractor (WBS 40.10.30.24), and design/engineering was in another WBS. Without a product-oriented WBS, it is less likely that performance issues related to a specific product area will exceed performance thresholds and receive the coordinated attention necessary to resolve key issues. Further, the historical data collected from various products associated with this project will be of limited utility when used as a basis to estimate the cost of future scope or other similar procurements.

CAR or CIO No.	Description	EVMS Guideline(s)	Observation / Finding
Continuous Improvement Opportunities			
CIO-003	Documenting EVMS & General Ledger Reconciliation Process	ANSI Guideline 16 states the following: "Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account."	The team found that BEA performs a monthly reconciliation of ACWP between the Business Decision Support Information System (BDSIS – a data warehouse which receives data directly from the general ledger) and the cost processor (Cobra). However, there were no documented procedures for conducting such reconciliations. The reliability of EVMS reports is dependent on accuracy of data recorded in the accounting and EVM systems. Without a documented, repeatable process for performing monthly reconciliations between the EVMS and the accounting system, the accuracy and reliability of such reconciliations may be compromised by the use of a different process or because a new person is performing the task.
CIO-004	Indirect Rate Process Does Not Support the Budget	ANSI Guideline 13 states the following: "Establish overhead budgets for each significant organizational component of the company for expenses which will become indirect costs. Reflect in the program budgets, at the appropriate level, the amounts in overhead pools that are planned to be allocated to the program as indirect costs."	During the review of BEA's indirect rate procedures and in discussions with CFO personnel it was discovered that the FY-12 DOE approved indirect rates do not support the FY-12 indirect budget. Since the start of the fiscal year, the indirect budget has been ~$50M greater than the approved indirect rates can recover. When asked about why six months into the year the situation has not been fixed by either increasing rates or reducing the indirect budget the team was informed of steps that BEA leadership has taken to resolve the issue, such as increased direct funding and work force reductions. Unfortunately, due to management and legal delays, the situation still exists. The team and DOE-ID were advised by the finance office that a lower indirect budget baseline will be in place by the end of March 2012, which will resolve the situation. ANSI guideline 13 requires that overhead budgets and the associated indirect rates be actively managed.

CAR or CIO No.	Description	EVMS Guideline(s)	Observation / Finding
Continuous Improvement Opportunities			
			Although BEA is working a solution to this problem, the team finds that resolution has been slow. For this reason CIO 4 is written to document and call attention to the need for BEA to ensure timely and effective corrective action is taken to resolve the problem.
CIO-005	Timecard Practices	ANSI Guideline 16 states the following: "Record direct costs in a manner consistent with the budgets in a formal system controlled by the general books of account." BEA Time and Attendance Reporting (STD-5) requires the following: "Record hours worked/absent in the timesheet on a daily basis at the end of every workday charging the hours to the appropriate benefitting project or pool with the appropriate Time Reporting Code (TRC). If unable to complete the timesheet at the end of the workday, record labor first thing the following day or at the first possible opportunity. Employees who only charge one charge number may complete their timesheet weekly." "There are only two situations when an employee is authorized to complete timesheets in advance: 1) For special processing requirements during certain times of the year…	During floor checks of BEA's exempt employees it was found that six of fifteen employees (40%) sampled did not have current week timecards filled out, eleven of fifteen employees (73%) charged time to more than one charge code and two of fifteen employees (13%) had their timecards completed in advance of work performed. In discussions with these employees, all were aware of the correct BEA time keeping policy (i.e., daily time recording, and filling out time in advance), yet they still did not follow the required procedures. Therefore, the team finds BEA is not fully adhering to its own Time and Attendance Reporting (STD-5) procedure. Further, in discussions with BEA's Payroll Department, it was disclosed that an average of 300–400 employee timecards are not approved by managers each pay period (weekly). This is also counter to STD-5 direction. When managers do not approve time sheets at the end of a payroll period, the BEA payroll system administratively approves all unapproved time cards in order for the payroll to run on time. This administrative approval process then circumvents BEA policy that requires managers to certify employee timecards are true and accurate. Faulty time recording, either because of employees' not recording time daily or because of absence of supervisor approval, may lead to incorrect cost performance reporting in monthly EVMS reports and incorrect charges to the customer.

CAR or CIO No.	Description	EVMS Guideline(s)	Observation / Finding
Continuous Improvement Opportunities			
		2) When an employee is scheduled to take PL or other approved leave or will be on business travel, a timesheet maybe completed in advance up to two weeks."	

Appendix G

BEA Follow-up Actions for Timekeeping CIO

Battelle Energy Alliance, LLC **June 2013**

Description of Ongoing Efforts with Timesheet Recording

Last year's EVMS timekeeping review identified certain areas of recommended improvement on the part of BEA with respect to communicating/training employees and monitoring compliance in this area. During the timeframe of the assessment and up until the point of closeout certain follow-up activities were either initiated or improved upon to improve timekeeping performance and were deemed satisfactory at that time. The company has continued many of these efforts since that point in time, and these activities are identified as follows:

Timekeeping Floor Checks

Preparations are currently underway to conduct a timekeeping floor check schedule for the summer of 2013. This effort is being lead by our Internal Audit organization and will be supported by General Accounting. This floor check will be targeting areas within our company that are being viewed as higher risk, and will be quite extensive and thorough in the organizations being focused on.

Communications/Training

The company annually distributes timekeeping information to both employees, managers, and timekeepers.

In June of 2013 timekeepers received pertinent reminders/training concerning their duties via mass Email from the Payroll organization. In that email timekeepers were updated on our current metrics and efforts to specifically identify and follow up with problem areas. They also received encouragement to receive training and to share with those in their organizations, and well as other pertinent training.

An iNote was distributed to all employees and managers in June of 2013 with reminders/training about areas of importance relevant to timekeeping. Included general information about the importance of accurate timekeeping, specifics for employees on proper charge number usage and timely recording/submitting, and reminders for management about the importance of the review and approval cycle with specific direction provided.

Metrics

The metrics that continue to be utilized that are most relevant to the recommended areas are those that measure timesheets not submitted/approved prior to payroll deadlines, and daily update. These metrics are consistently updated and reported to management. Quarterly, senior management is provided results by organization and periodically also receives names of those employees/managers not in compliance with company procedures for further followup and encouragement. As a company, non compliance totals have generally shown improvement both as a result of efforts carried out during the EVMS review process, and during the months since that time. These metrics and accompanying feedback will continue.

BEA does understand the importance of accuracy and continued improvement with respect to our labor charging practices. It should be noted that during the preceding 12 months 3 BEA employees have been terminated for reasons that included timekeeping inaccuracy.

(See attachments supporting above topics)

Employees and Managers reminded of the need for accurate and timely timesheet processing

From General Accounting:

Managers and employees are encouraged to take an opportunity to discuss together the following general information related to timekeeping/labor reporting practices:

The Peoplesoft Electronic Timekeeping System (ETS) provides a data collection and transmission system for time and attendance reporting. A completed ETS timesheet is a critical tool used not only to compensate employees for work performed, but is also a major component of our cost collection system(s) and overall proper project costing. Maintaining systems and processes that utilize complete and accurate timekeeping in accordance with provisions of our Management and Operating (M&O) Contract (DE-AC07-05ID014517) with the Department of Energy while ensuring compliance with Government Cost Accounting Standards (as well as federal and state laws) is vital to our success as a company.

Part of our public trust includes prevention of waste, fraud, and abuse, and since labor costs are a major component of total cost, a commitment to labor recording accuracy by our employee population and management helps ensure proper use of taxpayer's dollars. Each employee should understand that he/she is personally responsible for accurately recording absences and time worked, and that time allocated and charge numbers used are accurate based on the work being performed.

Employees and managers are reminded of the following Company policies and practices related to timekeeping (see STD-5):

<u>Employees</u>

-Work with your management to identify charge numbers to be used prior to the start of work.

-Accurately complete the timesheet on a daily basis, or at the end of each task if working multiple tasks during a day. Timesheets with one charge number may be completed weekly (but not in advance). Ensure the charge number(s) and earn codes accurately reflect the task performed. Accuracy the first time will reduce the need for amended timesheet processing.

-Submit for approval your timesheet at the end of your last work shift for the week.

-If an employee is unavailable to submit time, it should be delegated to someone within the department (typically a designated timekeeper).

-Periodic email reminders are sent to employees who have not completed their timesheets daily where that requirement exists.

-An employee's submission of the timesheet certifies that the tasks charged are those performed and the hours recorded accurately reflect productive and absence time.

Management

-Management (or delegated person) reviews and approves timesheets at the end of each workweek, but no later that 8:30 a.m. each Monday morning. Timekeepers and/or delegates should be utilized to help ensure that timesheets for all employees within their respective organizations are being processed to meet the deadline.

-Managers should perform a reasonable and appropriate level of due diligence to support their approval that labor hours charged accurately represent the work performed.

-Managers who fail to approve timesheets that are then administratively approved by Payroll will be required to retroactively approve those timesheets through the "post" review process.

Thank you for your efforts in ensuring timekeeping reporting practices are followed. The Payroll organization will continue to periodically monitor and provide feedback to management in areas of concern with respect to these activities.

Notice to Timekeepers June 17, 2013

Hello All- This note is intended to say "thanks" for all your continuous efforts and support in the timekeeping arena, and to offer a couple of reminders and suggestions as we move forward. We are sending this out in conjunction with an iNote going out this week with timekeeping reminders for employees and managers.

As you are aware, one of the things asked of our timekeepers is that they be responsible to monitor timesheet activity each week and help ensure employees and managers are getting their timesheets submitted and approved. Since the EVMS review last year, we continue to track the numbers of timesheets that either are not submitted and/or not approved by management, and share with you now that our numbers remain considerable lower than what they were prior to the EVMS exercise, which is good. However, we seem to have leveled off at totals company wide of around 125 timesheets not management approved (weekly) , and around 30 each week not submitted by employees. We can and should do even better than this. We would encourage you in your areas to see if you can help us further improve on these totals.

By request of management, we periodically send out lists of employee/manager names to the LMT of "offenders" when it appears we are starting to get a little lax - in an effort to encourage improvement. We will continue to do this. If you're wondering if your group it still having issues, I would encourage you to simply ensure that each organization has someone responsible to "watch" timesheet activity and you'll know how you're doing just by watching and then following up with folks when action is not taking place.

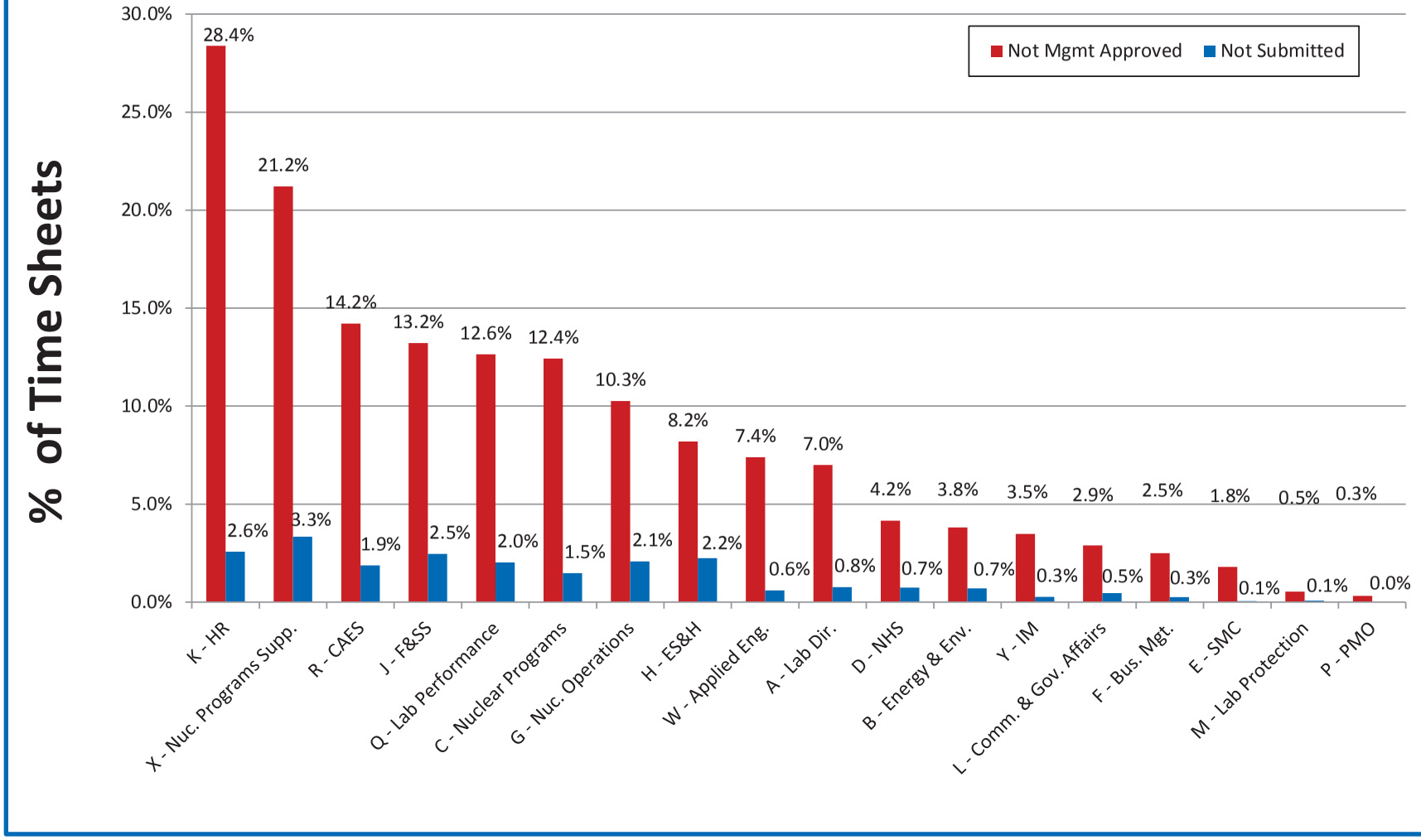
We also would encourage you to become familiar with the iNote content coming out this week and take an opportunity to bring up these issues in staff mtgs, etc. and use this time to education and assist employees with their concerns.

We receive calls on occasion in which someone is checking with us to see if a particular person is either set up to timekeep or approve for a particular organization. Remember that you can look this up on your own by accessing either Peoplesoft Self Service or Manager Self Service as follows:

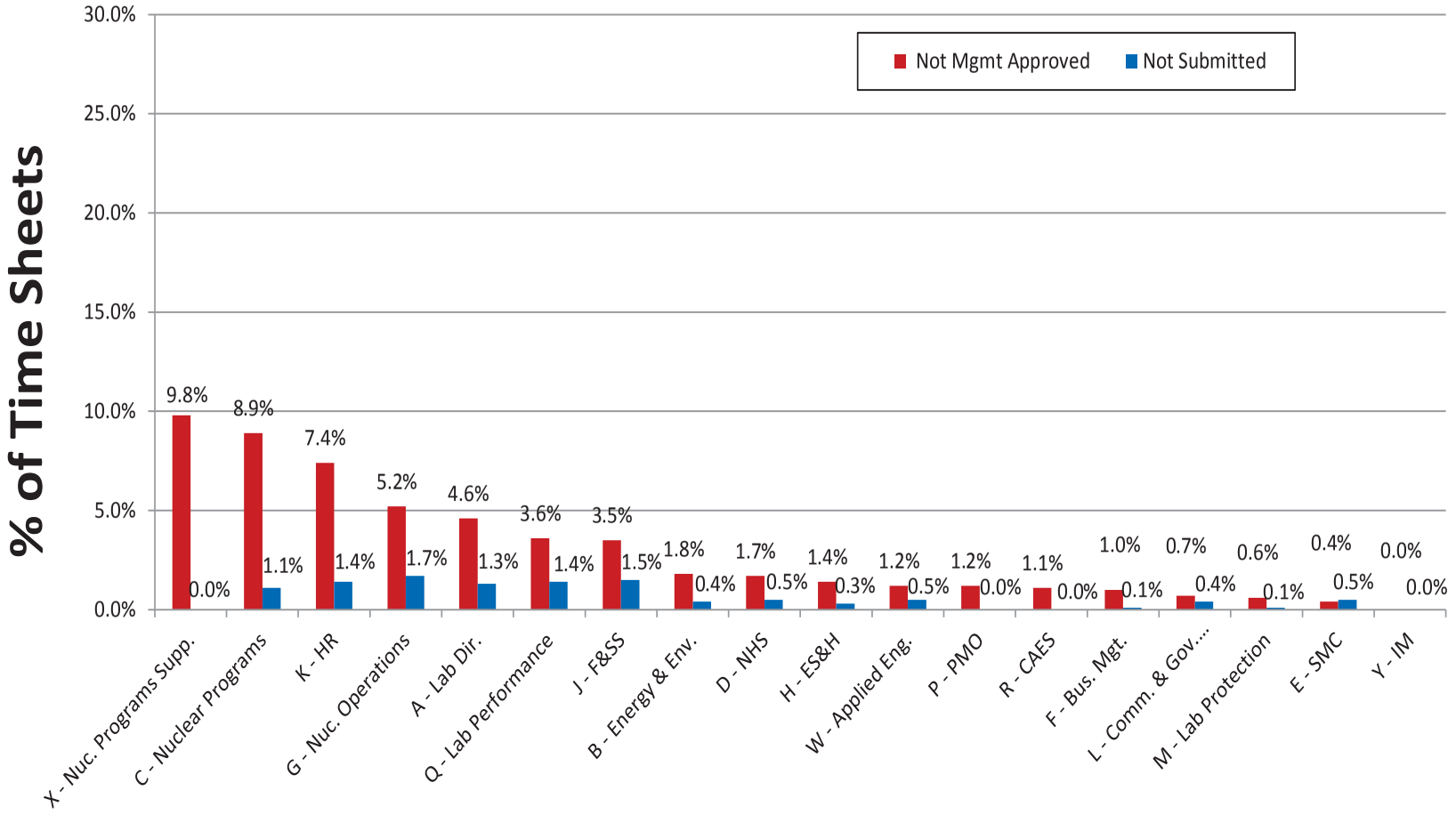
Self Service/TS-View Approvers & Timekeepers - You enter the org number you're interested in and it lists all timekeepers, approving managers, and delegates.

Manager Self Service/TS-View Access by Org- You enter a person's S number and it lists all org numbers for which they have either timekeeping or approving access.
We would encourage you to help us keep these accesses "clean" by informing us when access is no longer appropriate or needed for a particular person.
Thanks again for all your support.....we really appreciate all you do. This is an area that remains very important to the laboratory and our future success.

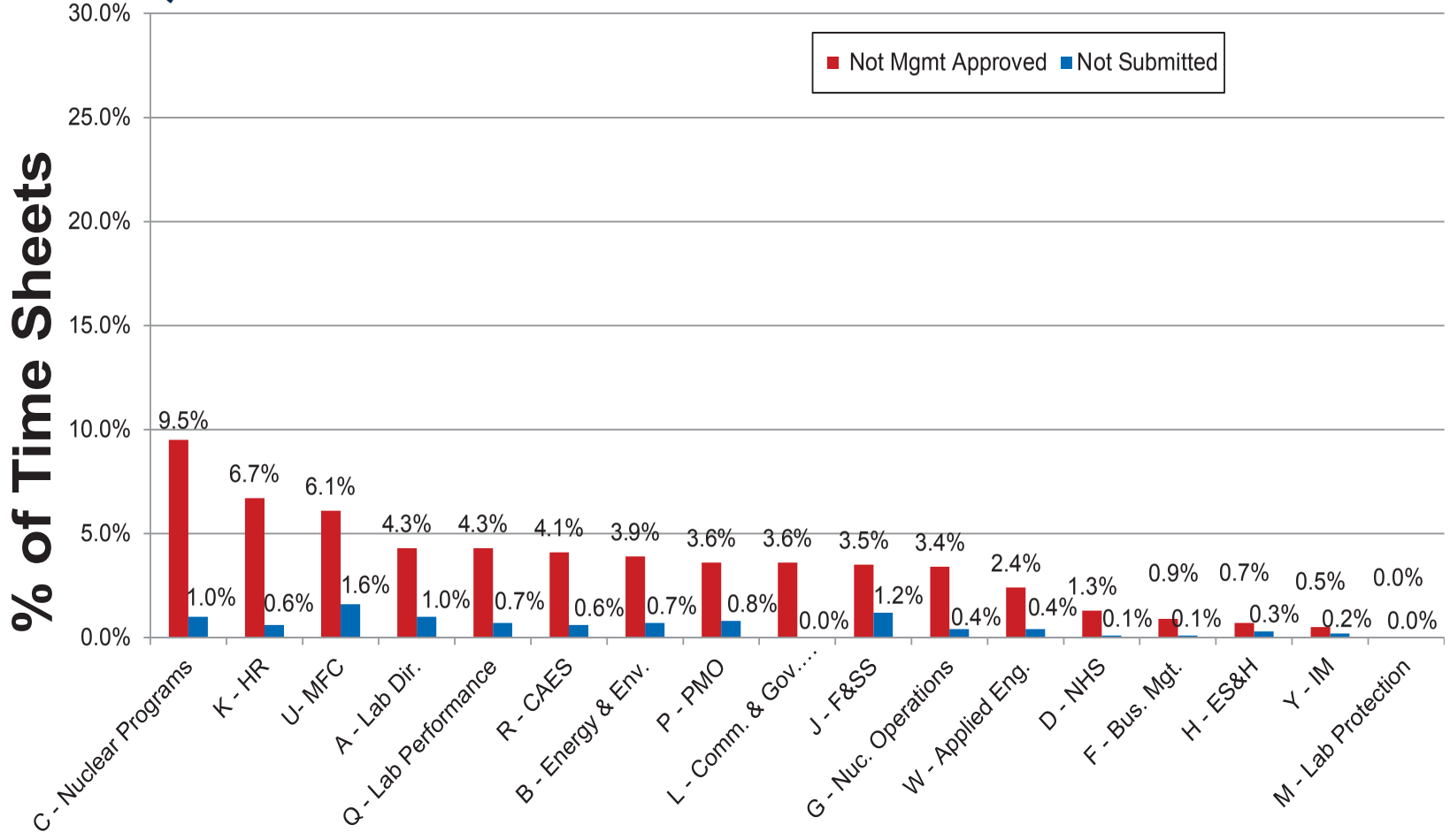
Timesheets Not Submitted/Not Mgmt Approved 3rd Quarter FY 2012



Timesheets Not Submitted/Not Mgmt Approved 4th Quarter FY 2012



Timesheets Not Submitted/Not Mgmt Approved 1st Quarter FY 2013



Timesheets Not Submitted/Not Mgmt Approved 2nd Quarter FY 2013